Balochistan Conservation Strategy

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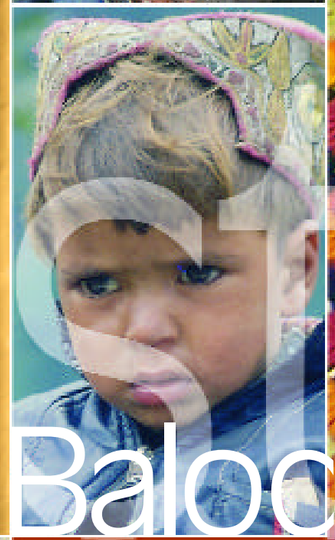

Balochistan

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Contents

Acronyms and Abbreviations

ADB	Asian Development Bank
ADPB	Area Development Programme Balochistan
AZRC	Arid Zone Research Centre
BAP	Biodiversity Action Plan for Pakistan
BCC&I	Balochistan Chamber of Commerce and Industry
BCIAP	Balochistan Community Irrigation and Agriculture Project
BCS	Balochistan Conservation Strategy
BDA	Balochistan Development Authority
BIDA	Balochistan Irrigation and Drainage Authority
BMIADP	Balochistan Minor Irrigation and Agriculture Development Project
BNRMP	Balochistan Natural Resource Management Project
BoS	Bureau of Statistics
BPEDP	Balochistan Primary Education Development Programme
BRUWAS	Balochistan Rural Water and Sanitation project
BWASA	Balochistan Water and Sanitation Agency
BWR	Bureau of Water Resources
CBO	Community Based Organization
DFIs	Development Finance Institutions
DMD	Directorate of Mineral Development
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESCAP	Economic and Social Commission for Asia and the Pacific
FAO	Food and Agriculture Organization

GEF	Global Environment Facility
GIS	Geographical Information System
GoP	Government of Pakistan
HITE	Hab Industrial and Trading Estate
IEE	Initial Environmental Examination
IMPLAN	Improving the Systems for Development Planning in Balochistan
IUCN	IUCN-The World Conservation Union
IWASRI	International Waterlogging and Salinity Research Institute
LB&RDD	Local Bodies and Rural Development Department
LCC&I	Lasbela Chamber of Commerce and Industry
LIEDA	Lasbela Industrial Estate Development Authority
M&E	Monitoring and Evaluation
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NGO	Non-Governmental Organization
NORAD	Norwegian Agency for Development Cooperation
NWFP	North Western Frontier Province
P&DD	Planning and Development Department
PAS	Poverty Alleviation Strategy, 1999
PEPA	Pakistan Environmental Protection Act
PSDP	Public Sector Development Programme
QDA	Quetta Development Authority
QMC	Quetta Municipal Corporation
SPCS	Sarhad Provincial Conservation Strategy
WAPDA	Water and Power Development Authority

Glossary

Katchi abadi	Unauthorized and unplanned human settlement (mostly) slum areas lacking civic amenities
Barani	Rainfed
Bunds	Embankments
Hamun	Seasonal wetland or playa
Hor	Bay
Jirga	Council of tribal elders
Karez	Underground water channel
Kaur	River
Khushkaba	Rainfed agriculture
Mazri	Dwarf palm, its foliage is generally used for making handicrafts and mats (Nannorrhops ritchieana)
Nullah	Water channel/stream
Rabi	Winter cropping
Sailaba	Agricultural landform irrigated through hill torrents
Ulema	Religious scholars

Preface

The Balochistan Conservation Strategy is a strategic plan designed to define and address the issues affecting the socio-economic development of Balochistan, through the sustainable use of its natural resources. In many ways, it can be termed as a sustainable development agenda of the province that promises regeneration and sustainable use of ecological resources and continued economic development with active participation from the people of Balochistan.

The need for developing the BCS arose because of, all the provinces of Pakistan, Balochistan has a high rate of depletion of resources. The conventional top-down development approaches with their command and control implementation have met with limited success. Institutional weaknesses have been predominant due to poor participatory planning and decision-making that has constrained appropriate prioritization of goals and the proper use of limited resources.

Another major need was to take an integrated view of the main issues and to prepare a framework that did not compromise one solution at the cost of another. The BCS was developed through a robust participatory planning process spanning three years. It took as its baseline the National Conservation Strategy developed by the federal government, while building on the experiences of the Sarhad Provincial Conservation Strategy exercise undertaken by the NWFP government. The BCS aims to devise ways and means to weave environment and natural resource conservation with development and to recommend an institutional framework that will bring ownership, sustainability and efficiency in management of these vital endowments.

The strategy is not carved in stone, rather, it is a living and evolutionary document. It will be important to learn lessons during implementation and capture them at mid term review of BCS implementation five years from now for refining direction and improving implementation.

Given political will and the marrying of other major initiatives such as the Poverty Alleviation Strategy, the Social Action Programme and the Devolution Plan, the BCS offers a common platform for joint action towards a prosperous, healthy and economically viable Balochistan and eventually, Pakistan. Certainly, its implementation will enable Balochistanís resources to achieve a level of sustainability that can secure the future for many generations to come.

Acknowledgements

The development of the Balochistan Conservation Strategy was a team effort spanning four years. This entailed constituency building, the establishment of multi-sectoral and multi-stakeholder interest groups and consultations at the district and provincial levels. The voices heard were bolstered through a ëBCS frameworkí, the commissioning and review of 15 Background Papers, and comments on five drafts of the document itself. The stakeholders included politicians, federal and provincial government agencies, armed forces, civil society institutions, the private sector, media, academia, ulema, tribal elders and community leaders, and donors. All in all 4,000 stakeholders represented the people of Balochistan in 125 meetings, workshops and training events. Their efforts were acknowledged by the provincial Cabinet which approved the BCS on May 19, 2000.

The development of the BCS was guided and supervised by a Steering Committee chaired by the Additional Chief Secretary (Development) and composed of members from government agencies, the private sector and civil society institutions. The guidance provided by Ata Muhammad Jafer, Muhammad Younas Khan Mandokhel, Major (Retd) Nadir Ali and Ahmed Bukhsh Lehri as Additional Chief Secretary (Development) and chair of the Steering Committee is gratefully acknowledged. Taj Muhammad Faiz, Ahmed Khan Khajak, Mian Anwar-ul-Haq Badar and Muhammad Azam Kasi, as the Chief of Section (Environment), coordinated this exercise within the P&D Department and with the line departments. The EPA Balochistan associated itself closely throughout this exercise. A.Z.K. Sherdil, Shahid Hussain, Muhammad Younas Khan Mandokhel, Abdul Hakeem Baloch, Mirza Qamar Baig and Major (Retd) Muhammad Ashraf Nasir oversaw the development of the BCS and had provided insight in political management of the process.

The Chief Executives of the province Mr. Zulfiqar Magsi, Mr. Akhtar Mengal, Mir Jan Muhammad Jamali and the Governor Justice (Retd) Amir-ul-Mulk Mengal have taken keen interest in the development of the BCS. The interest and insight of the Governor and the Cabinet members, especially Sardar Wazir Ahmed Jogezai, Minister for Environment, Wildlife, Livestock, Forest, Agriculture, Cooperatives, Tourism, Food and Fisheries, reflected in the reading, debating and approval of the BCS document is gratefully acknowledged.

It is not possible to acknowledge a very large number of contributors individually. However, their contributions are collectively acknowledged as inputs from the various fora they were part of, including:

- Steering Committee members (Appendix 2).

- Members of 13 open-ended interest groups on water, forests and biodiversity, livestock and rangelands, agriculture, fisheries and coastal development, minerals and mining, industry, urban environment, cultural heritage and tourism, environmental health, NGOs, environmental communication and environmental education- actively participated in the entire process.
- The men and women who participated in the consultative meetings in Gwadar, Kech, Lasbela, Nasirabad, Mastung, Quetta, Pishin, Ziarat and Zhob districts; and the interest, assistance and cooperation of the Deputy Commissioners in organizing and participating in the meetings is recognized.
- Authors of the BCS Background Papers (Appendix 3) for writing and revising the papers based on several consultations;
- The participants of the provincial workshops who represented a cross-section of civil society in Balochistan.
- Donor-funded projects for sharing information, experiences and lessons learnt. The contributions received from the UNDP's Technical Assistance Team to the Area Development Programme Balochistan, led by Dr. Choudhry Muhammad Yousaf, is appreciated.

IUCN Pakistan, through the BCS Support Unit led by Mr. Abdul Latif Rao, Senior Programme Director, supported the entire BCS process and document. Thanks must be given to the BCS team: Julian Thomas Inglis, who wrote parts one and two of the document; Iqbal A. Kidwai for building the BSC constituency and managing the public consultation; Dr. Fauzia Deeba Tareen, Communication and Education Coordinator, and Nadir Gul, NGO & Gender Coordinator, in developing their relevant constituencies and involving them in the BCS process. Usman Qazi assisted as the NGO Coordinator in the early days while Hamid Sarfraz, Documentation Specialist managed to pull all comments into the BCS Background Papers and the document itself.

IUCN Pakistanís contribution through Muhammad Rafiq, IUCN Country Representative for Pakistan and Nikhat Sattar, Director Programmes is acknowledged. The Communications Unit played a role through Saneeya Hussain, Dhunmai Cowasjee, Amber Hak and Azhar Saeed. Not least is the contribution of Ms. Aban Marker Kabraji, the current IUCN Regional Director for Asia, who hails from Quetta. It was her dream that Balochistan should have a framework for environmental protection and sustainable development and this document is testimony to that.

The financial assistance provided by the Government of Holland through the Royal Netherlands Embassy, Islamabad is gratefully acknowledged. Special thanks are due to Mr. E.C. Kengen and Mr. Aart van der Horst, for their keen interest and cooperation.

Finally, many thanks are due to Linda Stark who edited the document.

Steering Committee

Additional Chief Secretary (Development) Planning and Development Department, Government of Balochistan	**Chairman**
Secretary Environment, Wildlife, Livestock, Forests and Tourism Department, Government of Balochistan	**Member**
Secretary Agriculture, Cooperatives, Food and Fisheries Department, Government of Balochistan	**Member**
Secretary Education, Culture, Sports and Youth Affairs Department (Secretary, Information, Culture and Sports Department before October 29, 1999), Government of Balochistan	**Member**
Secretary Finance Department, Government of Balochistan	**Member**
Chief Executive Balochistan Rural Support Programme	**Member**
Country Representative IUCN Pakistan	**Member**
President Balochistan Chamber of Commerce and Industries	**Member**
Chairman Society for Torghar Environmental Protection	**Member**
Chairperson Female Education Trust	**Member**

Executive Summary

The Balochistan Conservation Strategy (BCS) was prepared by the government of Balochistan with the technical assistance of IUCN–The World Conservation Union. It is the product of three years of work. It involved a great deal of discussion with all those who have a stake in the future of the province. It was recognized from the outset that there could be no 'quick fix' for the problems of water supply, rapid urbanization, and the deterioration of rangelands and their natural resources. Dealing with the complex issues confronting the province will require a concerted programme of action for many years to come. The BCS focuses on an action programme to be implemented over the next 10 years.

The report has three parts. The first (Chapters 1 and 2) provides the rationale, process, and framework for the BCS. It includes a key section on principles, goals, and objectives. The second and more substantial part (Chapters 3–18) contains the 'building blocks' of the strategy. The third part (Chapters 19–23) is concerned with how the strategy will be implemented, resources mobilized, and progress assessed.

PART I: BACKGROUND

Balochistan has a rich history dating back to the Stone Age. Then, as now, people depended on the natural resources of this arid region.

Balochistan led the world in the domestication of native plants and animals that now form the basis of the agropastoral systems and settlement patterns we see today. The government is determined to achieve prosperity and progress for the people of Balochistan. It intends to achieve this through the optimal use of resources, new policy initiatives, financial discipline, and balanced inter-sectoral and inter-regional development.

The Ninth Five-Year Plan recognizes that progress and prosperity cannot be measured in economic or monetary terms alone. It also has to do with access to health care, education, and basic civic amenities. It entails giving citizens an opportunity to influence public policy. They must be participants in decision-making on the development and use of natural resources.

The BCS places particular emphasis on the need to protect the natural environment. It is a strategic plan, prepared through a participatory process, designed to define and confront the issues facing the socio-economic development of the province based on the sustainable use of its natural resources.

The BCS comes at an important time in the province's development. In March 1999, the government released a Poverty Alleviation Strategy (PAS) for the province. The PAS is targeted at the estimated 70% of the population and its focus is development. Emphasis is placed on increasing production and exports in the agriculture, livestock, fisheries and industrial sectors. Achieving development objectives and dealing effectively with poverty depends, for at least the next decade, on the ability to manage natural resources in a sustainable manner and to conserve the environment. This is where the need for a strategic plan comes to the fore in underpinning the government's attempts to reconcile its environment and development objectives.

Points of Departure

Events at the provincial, national and international level provide the context, precedents and momentum for the development of the BCS. The reality is that for much of its recent history, Balochistan has been confronted with major environmental challenges. The shortage of water and degraded pastures and forests have been the subjects of concern for decades. Settlements are characterized by poor planning, contaminated water supplies, inefficient or non-existent sanitation and waste management services and air pollution. The situation is getting worse as the population expands and urbanization accelerates. Interventions in the natural resource sector have been numerous, extensive and expensive since at least the 1950s. Nevertheless, when the government of the Netherlands published an Environmental Profile Balochistan in 1992, it drew attention to a growing and widespread concern about the state of the environment and the sustainability of the province's natural resources. Clearly, sectoral interventions on their own have not produced the desired results. On the basis of that report, the government of Balochistan announced its intention to develop a conservation strategy.

In 1992, the Pakistan National Conservation Strategy (NCS) was approved. The NCS set out a 10-year environmental action plan for Pakistan. Most important, it recognized the importance of implementation at the provincial level. Provincial conservation strategies are to be based on the objectives, priorities and recommendations of the NCS, adapted to the needs, potentials and aspirations of the people in each province. There is an important international dimension to the strategy. Balochistan is bounded by Iran and Afghanistan and by the Arabian Sea. It shares many resources with its neighbours, including water, fish, and wildlife, and is conscious of its responsibilities as a steward of these transboundary resources. Pakistan is a signatory to many international agreements and is active in fulfilling its obligations under numerous environmental and conservation conventions.

Process

A high-level Steering Committee guided the development of the BCS. This committee is chaired by the Additional Chief Secretary (Development). Its members are the secretaries of provincial government departments and representatives of the private sector and civil society. The process involved building a broad constituency of support for the preparation and implementation of the BCS. The process reached out to local people through a series of district-level public consultation meetings. Background papers were prepared, mainly by local authors. Close working relationships were developed with related projects and programmes. The real strength of the process came from the wide stakeholder participation in numerous groups set up to consider and debate issues dealt with in the strategy. The BCS process has gone a long way towards developing a participatory culture in decision-making.

Probably the single most important outcome of the process was the development of principles, goal and objectives. The overall goal of the strategy is the well-being of the people and ecosystems in Balochistan. Based on the underlying principles agreed on, the objectives of the BCS are:

- providing a framework and strategic plan for conservation of the environment and sustainable use of natural resources;
- promoting behavioural change for the protection of the environment, biodiversity and natural resources;
- facilitating better access to information for improved decision-making at all levels; and
- improving mechanisms for promoting public awareness and popular support for the sustainable use of resources.

The principles, goal and objectives are of fundamental significance. If development conforms to these, then the prospects for a sustainable future for

the province is assured. They will guide the preparation, planning, and implementation of all development programmes in the social, economic and natural resource sectors.

PART II: THE BUILDING BLOCKS OF THE BCS

The BCS is constructed from a series of linked 'building blocks'. Each block can be read independently of the others, and offers the best available information on the subject, a discussion of issues and trends, and a section entitled 'The Way Ahead'. This is the action plan for dealing with these issues and trends. Extensive background information is provided for several reasons. It gives a factual account of the subject based on the best available and most up-to-date quantitative data and generally accepted set of facts. It provides a point of departure for the discussion of issues and trends and for the action agenda that follows. It also serves as a reference for assessing future changes in the subject area. Having all of the information in one place is important in a largely oral culture, where perspectives on issues vary widely and where reports may not generally be available to all stakeholders.

The first blocks of Part II deal with the resource base on which the population subsists: land, water, biodiversity, the coastal zone, the atmosphere, and minerals and energy. The next two blocks on industry and urban environment review the potential of the province for sustainable development based on its natural resources. The following three blocks look at the relationship between people and their environment in terms of health, population and poverty, and cultural heritage. The final five blocks look at key elements for the successful understanding, acceptance, and implementation of the strategy: governance, the role of civil society organizations, gender and development, information management, and environmental communication and education.

Land

Balochistan is the largest province of Pakistan, covering an area of 347,200 square kilometres. It occupies a strategic location in the context of resource-rich Central Asia. The province commands major overland access routes from Europe to South Asia and is a vital link in future transportation corridors from the Central Asian Republics to the Arabian Sea. Balochistan shares river basins and groundwater resources with Iran and Afghanistan. It is located on the migration routes of economically and biologically important wildlife populations. It has a major stake in and responsibility for coastal and marine resources of the Arabian Sea.

Mountains dominate the terrain, and valley floors and piedmont plains make up only 15% of the landscape. It is these two landforms on which most human settlements, farms, and roads are developed. Accurate and detailed information on land use is hard to find. Land use in only half of the province has been reported, and in some districts it amounts to less than 20%. Key issues include a lack of awareness about the potential and limitations of the land; a poor or absent information base; several incompletely developed land classification systems; a continuing controversy over the impact of grazing on processes of desertification; and a complex, poorly understood land ownership system.

Dealing with these issues will require introducing a comprehensive and integrated land use planning process. Decisions on land use and development will take account of the needs of the people, the national interest, and the importance of taking advantage of the province's geopolitical location in respect of Central Asia. Traditionally, decision-making has been most effective at the local level. The process will be geared to participatory, local decision-making, with national needs and regional development set in that context. This approach is in line with the wishes of the communities and is consistent with the decentralization of decision-making, devolution of power to district level, the strengthening of local bodies, and empowerment of local communities. The process and institutional arrangements will ensure that information flows freely to those who require it and that responsibility and accountability is in local hands. The first and most important step is involving stakeholders from the beginning in the planning process. A Land Use Planning Commission will oversee the process.

A second, related activity will be the preparation of an Electronic Resource Atlas of Balochistan. This will be a groundbreaking initiative that will literally put Balochistan on the map. It will be an invaluable tool for land use planners, resource managers, and the development community. The Atlas will capitalize on the large amount of existing information and expertise within the province. It will be used to identify and fill information gaps on the distribution of renewable and

non-renewable resources. The Atlas can readily be distributed and updated.

A much-neglected characteristic of Balochistan is its seismic activity. Earthquakes and tsunamis have shaped the history of the province and have had a profound effect on people and property. Balochistan is located on several active faults. A risk assessment will be undertaken as an input to development planning and emergency preparedness measures. This would include coastal areas, where major port development is anticipated, and areas where water control schemes are planned.

About 6% of the land is currently being cultivated, mostly in small landholdings. Agriculture is the mainstay of the economy and employs 67% of the total work-force. Approximately 60% of cultivated land is under dryland farming. These crops give poor yields but are important in the subsistence economy. It is the orchards in the upland valleys that produce the highest returns. The production of orchards per unit of land fetches three to four times the income of grain or vegetable crops.

At intermediate elevations (500–1,500 metres) where there is perennial water and a marketing infrastructure, farmers can produce off-season vegetable crops that command a premium price in major urban areas. In valleys above 1,500 metres, farmers can obtain significant returns from fruit production if irrigation water is available. The promise of high returns has promoted the shift to irrigated agriculture. There has been a tremendous increase in land brought under irrigation since 1985. This has been made possible through the increase in the number of tubewells and additional surface water from the Indus. Investment in groundwater abstraction is high and orchards have proliferated. Provincial revenues have increased by over Rs. 12 billion since 1985 from orchards, grain crops and vegetables.

There are many issues of concern in the agricultural sector. The most pressing, however, relate to the heavy and inefficient use of water and the extensive, often indiscriminate use of agrochemicals. There are more than 21,000 tubewells in operation, contributing to the rapid decline in groundwater reserves. Irrigation systems operate at 45% efficiency due to poor maintenance of channels, field losses, and overirrigation. All aspects of agrochemical use, including handling, storage, use, and disposal, are cause for concern. Little attention has been paid to integrated pest management approaches. The strategy for agriculture includes measures to improve water management practices and marketing, provision of research and extension services, training in the use of agrochemicals, and reorienting and improving service delivery at the community level.

Range-based livestock production systems are one of the major sources of livelihood for people in rural areas. Rangelands constitute 79% of the total area of the province. There may be more than 20 million sheep and goats – six times the estimated carrying capacity. Animals are low in productivity and prone to a variety of diseases. The uplands of Balochistan are characterized by flocks of sheep and goats and the seasonal movements of the people who tend them. It is a traditional way of life, full of cultural and social traditions and characterized by established seasonal migratory patterns. It is more than a romantic image. These people may have few options open to them. They are not organized and have no voice in resource management. It is a way of life that is very susceptible to unintended changes as a result of development activities. Pastoralists have an intimate knowledge of the land and its resources. Understanding their cultures may provide some answers to the issues of overgrazing and desertification and provide some strategies for ameliorating the situation and reversing these trends.

The strategy calls for the development of a policy on nomadic and transhumant pastoralism to ensure the sustainability of these life-styles, to understand it better, and to enhance the flow of benefits that flow from it. This involves privatizing and setting up veterinary services where and when people need them. It means obtaining fair prices for producers, promoting security of tenure, working with pastoralists to improve range management practices based on traditional practices such as pargorh, and applying the lessons learned from almost 50 years of range science in Balochistan.

Freshwater Resources

It comes as no surprise that a reliable supply of water is central to the sustainable development of this arid region. Problems of water shortages affect every living thing and every human endeavour. Access to water is fundamental to the growth and prosperity of the province. What is surprising is that very little planning has been done to ensure that water resources are used and developed in a sustainable manner.

While data are deficient in many respects, the basic facts are fairly well known. The bottom line is that within the next 50 years, over 90% of all available sources will be fully used, with 86% of this dedicated to agriculture. All of the province's share of Indus waters

will be used, together with all of the groundwater reserves and most of the water from surface runoff and floods. Harnessing flash floods will be an enormous challenge. In cities such as Quetta, the gap between supply and demand is growing rapidly. The collapse of the water supply predicted in 1992 in the Environmental Profile Balochistan is a spectre that now looms very large.

The major issues that must be tackled are groundwater mining and the inefficient use of the resource. The strategy will be to manage groundwater on a sustainable use basis. If properly managed, the resource will be available in the long term. Shifting from the present practice of groundwater mining to sustainable use requires a great deal of planning. It also means evaluating some current practices, such as the use of delay action dams, to ensure that human and financial resources are efficiently and effectively deployed. Agriculture places the heaviest demand on the resource. The strategy recommends that all stakeholders work together to develop a clear vision for the future of irrigated agriculture in the province for the next 5–25 years. A roundtable will be established for the purpose. The development of a sense of vision is urgently needed at a time when some orchard owners are cutting down their trees due to lack of economic viability or lack of water, while others are busy installing new wells and planting more fruit trees.

A sovereign Balochistan Water Board will be established initially for Pishin Lora Basin by expanding the mandate of the recently established Provincial Water Management Authority and restructuring or linking the existing water related bodies to improve water management. The jurisdiction of this Board will be expanded to other river basins. Ideally, there should be one Board for each of the 14 river basins in Balochistan. The Board will have sweeping powers to deal with what is a major crisis. It will be supported by a Technical Committee, and a lead agency e.g. Irrigation and Power Department will be designated to collect, maintain, and distribute information on supply, demand, and quality of water. The Board will develop and implement management plans; decide on the issuance of water licenses; monitor enforcement of laws; recommend comprehensive water policy and enabling legislation; oversee research, and monitoring and evaluation programmes; and ensure that environmental impact assessments are carried out for all major water projects. The Board will focus on addressing the issue of groundwater depletion in upland districts, promoting irrigation efficiency, harnessing surface runoff and sustainable water development.

There is a rich tradition of water rights and local water resource management in Balochistan. Local people can provide considerable insights into what to this point has largely been the subject of mathematical models. The Water Board will consult widely with local people in developing management plans and will take advantage of effective and efficient water management practices where they exist or can be reintroduced. Watershed rehabilitation and management will be given priority attention. The specific needs will be assessed on a basin-by-basin basis, at the valley level. The major task for the Water Board will be to work with local people to reach consensus on the nature of the problem, and to get their assistance in solving it.

Biodiversity

Balochistan is rich in biodiversity. Wide variations in physical features and climate have produced diverse landscapes, ecosystems and habitats that are important to the national and global heritage. Much of the province remains poorly investigated. Systematic knowledge of the flora remains incomplete and a comprehensive analysis of endemicity and species distribution and abundance has not been completed. What is certain is that Balochistan is one of the most important wildlife regions of Pakistan, and contains a large number of species not found elsewhere in the country.

Balochistan has one of the largest blocks of juniper (Juniperus excelsa) forests in the world. They cover approximately 141,000 hectares. The most extensive and best-known examples are found in the Ziarat and Zarghoon valleys, which occur at elevations between 1,980 – 3,350 metres. Growing conditions are harsh. The trees are very slow growing. Consequently, these forests are believed to be among the primitive in the world.

The province also has some of the world's finest wetland habitats. These are small in number and extent, but have enhanced value when viewed in the perspective of an arid environment. They attract a variety of waterfowl including swans, geese, ducks, grebes, herons, and several species of waders. Zangi Nawar Lake in Chagai District is a wetland of international importance.

There are four species of threatened mammals in Balochistan. Two are critically endangered – the Balochistan black bear and the Chiltan markhor. Two species are endangered – the straight-horned markhor and the urial. There are many important species of migratory birds. The Chagai Desert hosts a unique assemblage of reptiles including six endemics

and at least six others found only in the region. Among the marine species, the status of the endangered green turtle, the vulnerable marsh crocodile, and sea snakes is uncertain. There are a number of endemic species of fresh water fish. Less well known is the diversity of crop plants, livestock and wild relatives of crop plants.

The protected areas system consists of two national parks, 14 wildlife sanctuaries, and eight game reserves. It adds up to 5.3% of the province. To this can be added five private game reserves and one community conservation area. But with few exceptions the protected areas contain few, if any, of the animals they were set up to protect. Competition with other land uses such as agriculture and livestock grazing, indiscriminate and uncontrolled hunting, and the removal of natural vegetation for fuel are some of the contributing factors. The indiscriminate use of agrochemicals is a cause for concern.

The Biodiversity Action Plan for Pakistan provides the basis for action to address issues related to biodiversity. It sets out the steps to be taken to promote the conservation and sustainable use of Balochistan's biodiversity. Key measures include:

- a comprehensive education and awareness programme;
- development of a biodiversity database;
- community-based sustainable use programmes;
- developing and strengthening the protected areas system;
- developing a policy for ex-situ conservation of biodiversity;
- developing an effective policy framework and enabling legislation; and
- developing institutional capacity to manage biodiversity.

The key to the success of these measures is the active participation of all stakeholders, especially the communities. This has been demonstrated in areas such as the Torghar Community Conservation Area, Qila Saifullah District; in Dureji Game Reserve; and in Hazarganji Chiltan National Park. Early attention will be given to conserving threatened and endemic species and important habitats such as the juniper, chilghoza, and mangrove forests; wetlands; and wintering and staging areas for migratory birds.

Coastal Zone

In any discussion of natural resources, the coastal zone is often an afterthought. In fact, much of the 770-kilometre-long coastal belt in Balochistan is beyond the pale. With the exception of the shrimp fishery, it is a poorly known and often neglected area. Yet it is one of the most important areas of the province. In Gwadar district, the 600-kilometre coast is characterized by remote bays, beaches, and headlands. These provide natural harbours around which 35 fishing communities have developed. This coast is also important for many species of wildlife, including turtles and migratory birds. It is a rich, productive, and largely unspoiled area. The Lasbela coastal belt, in close proximity to Karachi, has two fishing villages and a more developed character. There are two industrial estates, a major power plant, and a ship-breaking yard. A dam on the Hab River provides water to Karachi. A refinery is being planned.

The sea is very much a mixed blessing for Balochistan. On the one hand it provides a source of income, but on the other it can be a destructive force. Southwest monsoon winds, submarine topography, and coastal orientation combine to promote the upwellings that result in this coastal zone being one of the most productive in the world. But the coast is also susceptible to wave attack during this period, and there is a continual process of erosion and deposition along the coast. The coast has other problems, including susceptibility to earthquakes, tsunamis, and oil pollution and the salination of ground water. The coastal zone is for the most part arid. Rain, when it does come, often results in devastating flash floods.

The coastal areas, particularly in the Mekran, remain the least developed part of Pakistan, notwithstanding their strategic importance and economic potential. Distances are large, the population small, water in short supply, the climate inhospitable, and road networks poor or non-existent. Electricity is available in small number of coastal settlements and that too for a few hours each day. The federal and provincial governments have responded with a comprehensive development plan. Elements include:

- a deep sea port at Gwadar;
- a coastal highway and national highways including the one to central Asian countries;
- upgraded airports;
- coastal shipping and ferry services;
- new power plants;
- a bulk liquid terminal at Mauza Damb;
- dams on all rivers and streams for drinking water and irrigation;
- a desalination plant at Gadani;
- modern fishing equipment and infrastructure;
- tree plantations;

- introduction of goats and poultry; and
- new beach resorts.

Priority is given to a special development zone for Greater Gwadar City, the deep-sea port, and the coastal road. Private activities under way include offshore exploration for oil and gas, planning for a petrochemical complex in Sonmiani Bay, and a major new residential development and resort near Gwadar.

The key consideration is one of sustainability – how should the coast be developed consistent with the goals and objectives of the BCS? The plan does not deal to any great extent with issues such as coastal erosion, degrading coastal and marine ecosystems, declining water quality and pollution, overexploitation of coastal resources, endangered marine species and the need for institutional capacity and legislation. The intergovernmental and interdepartmental approach to the development of the Mekran package is encouraging. But it falls short of an integrated approach to resource management. There are no mechanisms to manage conflicting uses, to ensure that measures are taken to protect the environment, or to deal with emergencies such as oil spills, flooding, or earthquakes. There have been many development projects on the coast. A review of past experiences – successes and failures – reinforces the need for an integrated approach to the management and development of coastal resources.

The development of an Integrated Coastal Zone Management Plan (ICZMP) is now a top priority, requiring the participation of all stakeholders. Guidelines for the preparation of a plan have been drawn up, and the stakeholders identified. Priority is to be given to the management of the Hab, Winder and Gadani industrial areas; the sustainable use of coastal marine resources; the sustainable use of freshwater resources; and conservation of natural capital. The plan can build on earlier scientific and technical work by ESCAP in the 1980s.

The ICZMP will differ from earlier technocratic approaches by fully involving the communities through an extensive participatory planning process. This will ensure that local priorities are identified and addressed. An important first step in the process is the development of a vision of the coastal zone in the future. The vision has of necessity to be pragmatic. It has to accommodate local needs, national interest, and international realities. Local needs are currently seen in the Mekran in terms of a healthy and expanding fishing industry with some limited agricultural development. In Lasbela, the hope is for a thriving industrial economy in the shadow of Karachi. The national vision is one of major offshore fisheries development, oil and minerals, major ports, the opening up of the interior, and access to markets from central Asia. From a geopolitical perspective, the area is one small part of a region dependent on the Arabian Sea for fisheries and transportation.

The goal of planning is to promote the sustainable development of resources, and not simply to zone it for various purposes or to limit human use. Addressing issues and trends and developing planning measures means examining various ways of managing human use of the area and evaluating alternative management strategies. The first and foremost concern is addressing poverty. Responses to the issues surrounding coastal development must give this concern top priority. Planning is no substitute for action. Where needs have been identified, interventions will be planned. Perhaps the most pressing issue concerns the fishery. The first step will be to reassess stocks of all economic species of fish and shellfish. The second step will be taking action to improve the present fishery, especially handling and processing the catch. Other priorities may include:

- a pollution monitoring and oil spill response programme;
- emergency response preparedness;
- small-scale desalination plants;
- protection of critical habitats and species, cultural heritage, scenic landscapes and recreational areas;
- alternative sources of energy;
- town planning;
- pollution control;
- a local Agenda 21 for Gwadar City; and
- management plans for Hingol national park and potential Ramsar sites.

Atmosphere

The atmosphere provides the air to breathe, water for drinking and agriculture, and a source of energy. The ecosystems we see today are an expression of a harsh and demanding climate. They have evolved to meet these conditions and to persist during times of change. As elsewhere, climate is changing but we know little about how it will affect Balochistan. Mean sea level is rising and low-lying areas at Gwadar and Gadani may be affected, as well as lagoons and wetlands. Freshwater resources along the coast may become saline. Long-term changes in the abundance and distribution of rainfall are not known. These have implications for

agriculture, livestock, ecosystems and for the recharge of groundwater. Changes in winds affect marine productivity and the potential for energy generation. The frequency and duration of dust storms and shifting dunes is also affected.

Resource planning and development programmes require continuous, detailed, high-quality records of meteorological data and the human and financial resources to develop, maintain, and use them effectively. In Balochistan, both data and resources are scarce. This lack of reliable data is one of the major constraints in the scientific planning and sustainable development of water resources of the province. It also constrains the analysis of trends in the periodicity and duration of droughts and changes in the monsoons. Weather forecasting systems are not in place to forecast cyclones or to provide early warning to people.

Balochistan suffers from poor air quality, especially in urban centres such as Quetta. Airborne dust is a fact of life everywhere. In the cities, the exhaust from heavy traffic triggers the formation of smog during winter.

The key issues in terms of the atmosphere thus are:

- the effects of global warming and climate change;
- lack of adequate, reliable meteorological data;
- the need for predictive climate models for agriculture, drought, and monsoons;
- the need for weather forecasting for land and marine regions; and
- the need to monitor and deal with poor air quality and air pollution.

The strategy provides for the development and operation of an up-to-date network of meteorological stations; an effective atmospheric environment service; and monitoring and control measures to combat air pollution in urban, rural and industrial areas.

Minerals, Mining and Energy

Balochistan has enormous mineral potential. Factors adversely affecting mineral exploration and development are numerous. Among them are out-of-date mining methods, practices, and techniques, low recovery and inefficiency. At present the investment climate is not attractive to international mining interests. Balochistan has yet to face the environmental hazards associated with large-scale mining. Environmental assessments of proposed mining ventures have yet to be carried out. Water is a major factor to be addressed in any prospective mining venture. A sustainable supply of water is not assured in many mineral-rich areas, and the effects on other users have not been assessed.

The strategy calls for the government and the private sector to work together to resolve the many obstacles faced by the mining sector under the present policy and regulatory environment. An environmental review will be conducted for all mining activities in the province to assess the nature and extent of existing and potential effects, determine what remedial action is required, and provide a baseline for future monitoring activities. Environmental impact assessments will be required for all proposed mining operations, including the Saindak mine. Mitigation measures will be developed, implemented, and monitored. Assessments should include the socio-economic aspects of mine development, especially in remote areas, and mine abandonment, clean up, and monitoring. The position of IUCN's World Commission on Protected Areas on mining in protected areas will be adhered to. Planning for mineral exploration and development will be an integral part of the land use planning and water basin management processes recommended in the BCS.

Balochistan has large reserves of natural gas and coal, and accounts for 40% of the primary energy production of Pakistan. Ironically, 80% of the energy needs of the province are met through the use of biomass energy – firewood and dung cakes. An estimated 2 million tonnes of wood are burned each year. Gas consumption is low due to a limited supply of piped natural gas and liquid petroleum gas. Balochistan produces about 2 million tonnes of coal, most of which is exported to the Punjab. About half of the villages in Balochistan are electrified, but they, along with other consumers, suffer from frequent interruptions in service. There have been many experiments with other forms of energy e.g. solar, wind, geothermal, biogas, but these have not amounted to anything so far.

The provision of infrastructure for the supply of electricity and gas is not cost-effective in remote rural areas. That means that alternate approaches should be sought. With the exception of coal, all the primary energy sources, including petroleum, gas and electricity, are within federal jurisdiction, and the provincial government has not been involved in planning and policy-making. One reason for the slow growth of the industrial sector has been the lack of an adequate and dependable electricity supply. Private-sector power projects supply electricity to the national grid but most of it is not available to Balochistan. The grid suffers from high transmission and distribution losses. In response to the total demand of 460 megawatts, only

285 megawatts are being supplied to Balochistan. The deficit is resolved through unscheduled load shedding and power shutdowns. This causes losses to businesses and damage to machinery. Another issue is the smuggling of petroleum products from Iran. While cheaper than local products, the quality is poor, resulting in air pollution and damage to vehicle engines.

Three data sets will be assembled in support of a strategy for a sustainable energy sector: proven, potential and possible reserves of energy; production; and consumption. The provincial and federal governments will collaborate to develop a strategy for the energy sector based on the national policy of minimizing dependence on imported oil and petroleum products, the efficient development and use of indigenous resources, conservation of energy, and optimizing the use of renewable energy resources. A key objective will be to provide people with suitable alternatives to the use of wood and dung cakes. The energy policy should strive for equity in the provision of energy and infrastructure to a province that is energy-rich. Policies, programmes, and projects will be subject to environmental assessment. Production and transmission facilities will be required to meet national environmental quality standards, and all fuels will be tested to ensure compliance with established standards. Energy conservation will be promoted through improvements to infrastructure, incentives, demonstration projects, regulatory measures and public awareness campaigns. Alternative energy sources will be thoroughly tested and introduced, where cost-effective, to address the needs of energy-deficient areas.

Sustainable Industrial Development

Industrial development is one of the pillars of the Poverty Alleviation Strategy. The success of this component will depend on how efficiently and effectively the natural resources of the province can be used to generate income and provide jobs. The goal is to increase production in agriculture, livestock, fisheries, and minerals sectors and the processing and marketing of their products. Some of the obstacles to be overcome include the current investment climate and the availability of credit, lack of infrastructure, an assured supply of water, inadequate supply of qualified and trained human resources, the need for access to appropriate technology, low productivity, and heavy losses in key sectors such as agriculture, livestock, and fisheries.

The strategy for attaining sustainable industrial development will be based on lessons learned from previous efforts to develop the industrial sector and in light of the above issues. It will focus on what the province does well and emphasize its competitive advantages over other provinces. The aim will be to establish industrial estates and training centres where there are strong links to sources of raw material and local entrepreneurial skills. Linkages will be established with local, provincial, national and export markets.

The strategy will aim at the establishment of industrial units that are specific to location, raw material and indigenous technology. The need for quality will be stressed to meet the demands of the market. Export units will be encouraged to meet ISO 9000 and 14000 standards. Industrialization must face the resource realities of the province. In Quetta, for example, the already overpopulated, polluted and water-starved valley cannot afford any further burden on its limited resources. Industry should not compete with the domestic need for water or further contribute to air pollution. Rather, areas such as this should capitalize on developing existing skills in the service sector, add value to existing products, encourage small-scale fabrication and assembly, and engage in legitimate trade with central Asian markets.

Urban Environment

Urban areas are magnets for rural people seeking improved socio-economic opportunities and access to facilities and amenities. The percentage of the population living in urban areas increased from about 16% to 23% between 1951 and 1998 – a rate of 4.8% per annum. This compares with an overall population growth rate of 2.42%. Trends indicate that the population of the province will reach 14 million by 2030, with 50% living in urban areas. Many of these people will be attracted to the Quetta area. Next to water supply, urbanization and the problems that it brings is the biggest challenge facing Balochistan. The issues faced in urban areas include:

- absence of, or uncoordinated, development planning and adequate housing;
- inadequate administration and enforcement;
- shortage of water;
- contamination of water supplies;
- inadequate sanitation, solid waste and effluent disposal facilities;

- air and noise pollution; and
- traffic congestion.

Reliable, quantitative information is not available for most of the 18 large towns (those with more than 20,000 residents). In Quetta, it is difficult to assess the true state of municipal affairs and to analyse trends with any degree of accuracy. The problems are, however, highly visible. By any account, cities such as Quetta have declined appreciably over the past quarter-century. From being one of the cleanest and attractive cities in the subcontinent, Quetta is subsiding under the weight of its own pollution.

The process of urbanization can be slowed but not reversed. Alleviating some of the factors that motivate people to leave rural areas is one step. That means providing jobs and delivering services such as education, health, communications, water, sanitation and energy at the community level. The industrialization strategy will have a big effect. Dealing with population growth is a long-term process, particularly in an area where cultural practices and traditions in favour of large families are strongly held.

The strategy calls for the introduction of a systematic urban planning process. It contains guidelines for preparing structural and master plans. There has to be fundamental change in the role that government plays in the planning process. This will be accomplished by transforming the government's relationship with civil society from that of being a controller and enforcer to that of being a facilitator and enabler. Both must assist and reinforce each other's efforts if services and utilities are to be provided to all. Communities should be encouraged to plan and manage their own areas, consistent with their needs and wishes and in accordance with accepted planning standards. The strategy provides a comprehensive action plan for Quetta, which can serve as a model for other urban areas.

Environmental Health

Environmental health has not received much attention in Balochistan so far. At this stage, attention is being given to preventive health primarily through vaccination programmes, vector control, and disease-specific health education. While there is cause for concern about obvious health hazards such as contaminated drinking water, poor sanitation, and ineffective waste management programmes, there is little reliable, quantitative data to assess effects and trends. Most of the information on the subject comes from the personal experiences of health workers.

A look at some common indicators gives some indication of where the problems lie. Balochistan has a lower life expectancy than in other parts of the country (57 for men; 56 for women). Vaccine preventable diseases are still prevalent. Infant mortality is high (112 per thousand live births), and many infant deaths are linked to diarrhoea, malnutrition, and communicable diseases. The main environmental health problems arise from high levels of coliform bacteria, viruses and parasites in the water supply, even in deep wells. Other problems include hyperfluorosis (yellow-brown discoloration of teeth), poisoning from food contaminated by pesticides, and respiratory problems related to chronic air pollution. Patients with acute respiratory tract infections crowd health outlets throughout Balochistan.

Vector-control programmes have been only partially successful. To add to the problems, pesticides such as DDT are commonly used. The careless handling of agrochemicals pose a major health threat. Diseases such as cholera and malaria are on the rise. Mental health problems are also on the increase. The underlying issues include lack of legislation and regulations, lack of education and awareness programmes, lack of training for health professionals, and the absence of a health management system.

To address these issues, the strategy proposes:

- an awareness campaign to promote understanding of the link between a healthy environment and a healthy population;
- development and enforcement of comprehensive legislation and regulations covering all factors contributing to environmental health;
- improved co-ordination among departments and agencies dealing with various aspects of environmental health; and
- a strengthened institute of public health as the lead agency.

Population, Poverty and Environment

The goal of the BCS is to promote the social and economic well-being of the people of Balochistan through the conservation and sustainable management of the province natural resources. The emphasis is on people. Their relationship with the environment and resources is a complex one that needs to be assessed if the strategy is to be appropriate. The role of poverty adds further complexity. In Balochistan, conventional models of population, poverty and environment provide

a basis for understanding and dealing with complex interrelationships the dimensions of which have not been quantified, the trends not clearly defined, and the solutions not fully explored or implemented.

The present population is about 6.51 million. At the current growth rate it will reach 14 million by 2030. Currently, about half of the population is under the age of 15. Given high fertility rates, prevalent social and cultural traditions, and the limited reach of family planning programmes, particularly in rural areas, this young population has the innate capacity to increase very rapidly. By some measures, poverty has declined in recent years, but the gap between the rich and poor has widened. The literacy rate has improved to 27% but there are major disparities between the urban and rural populations, and between men and women. The literacy rate among rural women – those who are primarily responsible for many aspects of resource use – is currently less than 9%.

The impact this rapidly growing, poorly educated, poverty-stricken population will have on the environment and how environmental conditions will in turn affect them has to be explored very carefully. It will be accorded high priority. Many simplistic relationships can be drawn but solutions have to be based in the realities on the ground. It is inevitable that a growing population will increase the demand on living space and on food and water. But there are cultural and social dimensions that have to be factored into solutions if they are to be meaningful at the local level. The cultural and social fabric of the province offers a safety net for many but it is not certain how far this net can be stretched.

As is often the case, the poor get the blame for the circumstances they find themselves in and for the environmental damage that is seen. There is little quantifiable evidence so far to support this view. For example, nomadic pastoralism has been a way of life for centuries, practised in response to the distribution and abundance of range resources and to variations in climate that include periods of drought. The traditional farming system is likewise adapted. Certainly, overgrazing is a problem and flocks are moving increasingly into marginal areas. This is more likely related to a breakdown of traditional management structures and causes other than poverty. The denudation of the natural vegetation for fuel is a province-wide phenomena and is not limited to the poor. There is a ready market for wood among all sectors of the population.

The details of the government's Poverty Alleviation Strategy are reviewed in the BCS. The next step will be to establish a roundtable to elucidate the linkages among population, poverty, and environment and to help focus appropriate interventions in social and economic programming.

Cultural Heritage

Cultural heritage is an important component of the BCS for two reasons: it underpins an intimate relationship between humans and their environment that spans many thousands of years and that persists today, and it provides a basis for new directions of economic development.

Evidence of human presence in Balochistan dates back to the Palaeolithic era (100,000–40,000 BC). A number of Neolithic sites have been discovered dating back to the eighth century BC. The most famous of these is Mehrgarh, which was occupied from about 8000–2300 BC. These cultures evolved into the well-known Indus valley civilization. Excavations at Mehrgarh graphically demonstrate how cultures evolved from hunting and gathering to a settled agro-pastoral system, based on the domestication of a wide range of plants and animals. The cultural landscape of Balochistan is still rich today, manifested in tribal arts and crafts, music and dance. Nomadism is still a prominent feature of life among the Baloch, Pashtun and Brahvi with distinctive seasonal patterns and traditions.

In addition to the many archaeological sites that dot the landscape, there are forts, tombs and graves, mosques and monuments. Rock art was recently discovered in caves and rock shelters dating back 20,000–30,000 years. Although protection for this heritage is provided for under the Pakistan Antiquities Act (1975) the land on which the majority of the sites and monuments are found is privately owned. Acquiring this land is not an easy task, and many provisions of the Act have not been implemented. Sites are generally unprotected and most have deteriorated over the passage of time or through vandalism. To deal with these problems, the strategy calls for the establishment of a forum, involving all stakeholders, to look at all facets of conserving cultural heritage and to recommend an action plan to deal with them.

From an economic development perspective, the past and present cultures of Balochistan are potentially a magnet for tourists from around the world. In addition, Balochistan has many natural attractions, ranging from a largely unspoiled seacoast

to the high mountain ranges in the central and northern parts of the province. But tourism in recent years has not fared well. The province has seen a great deal of turbulence in its short history, and most international tourists transit through the area, stopping for a day or two in Quetta. Travel throughout the province requires prior government approval, which many tourists are not prepared to deal with. Attractions are not well known, and in any event have few of the services and facilities that all but the most serious travelers demand. Clearly, a tourism development strategy has to be developed, based on the cultural, ecological, and scenic riches of the province. Implementing the strategy will require the concerted efforts of the government, private sector, and communities in order to publicize tourism opportunities and provide tour packages at a standard the modern traveler demands.

Governance, Institutions and Capacity

Good governance and public accountability are high on everyone's list of priorities in Pakistan. Balochistan is no exception. These subjects came up time and again during public consultations and discussions among stakeholders. Without good governance and accountability, the BCS cannot succeed. Governance is used in the BCS to mean the system of decision-making and implementation as it affects people and the environment they live in. It encompasses the elements of capacity, the devolution of power, access to information, participation of civil society, transparency and accountability.

Lack of capacity is perhaps the single most important factor impeding the attainment of sustainable development. There is both a lack of technical skills and expertise and a lack of knowledge at all levels of government and in civil society organizations. This is particularly so in the field of environment. The capacity to monitor policies, programmes and projects is weak, and there is little accountability.

Centralized decision-making is still the order of the day. It involves the federal, provincial and local governments. While the policy framework at the federal level is fairly strong, the provincial government has not developed policies geared to the needs of Balochistan. Instead, five-year plans are used to bridge the gap. As a result, short-term, sectoral priorities substitute for a comprehensive and integrated development policy framework. Where legislation and policies are in place, such as the Pakistan Environmental Protection Act (1997), they are not implemented and enforced. The process of mobilizing information for decision-making is described in detail in the chapter on Information Management. Issues surrounding the role of civil society are dealt with in detail in the chapter on non-governmental organizations (NGOs). Participation also means engaging the private sector, something that is sorely lacking under the present system.

The problem is manifested in problems such as the disregard for environmental laws and standards. Accountability includes prudence in the exercise of authority, transparency in decision-making, responsibility for the outcome, and a system to oversee that accountability is more than just a figure of speech.

There are signs of improvement in all these areas, such as the formation of the Balochistan Environmental Protection Council. Civil society organizations are becoming involved in this and other forums. The strategy for improving governance is based on a suite of measures under the heads of:

- policy and legal reforms;
- devolution and empowerment;
- institutional reform;
- upgrading knowledge and skills;
- greater engagement of civil society; and
- transparency and accountability.

Until a comprehensive policy framework is in place, the BCS will form the basis for natural resource conservation and sustainable development. High priority will be given to legislative reforms required to bring the PEPA into effect and to update sectoral legislation. Development planning and implementation will eventually be decentralized to the district level to promote co-ordination of development interventions, more efficient and effective delivery, and more transparency and accountability.

Non-Governmental Organizations

NGOs have an important role to play within civil society in promoting policy development and implementation and in working with communities in urban and rural development programmes. While the NGO sector has grown fairly quickly in recent years, it has suffered from lack of recognition and support. The sector is characterized by its limited impact, gaps in strategic focus, dearth of human resources, and absence of long-term sustainability. The thrust of development efforts seems to be concentrated on community

projects, the capacity building of community-based organizations and service delivery. There is a need to promote institutions or organizations focusing on the macro issues of development, at the level where decisions and policies are made.

NGO networks already exist in the province and play a useful role for improving co-ordination and communication. These networks will be supported through:

- promoting understanding of their role and building their potential;
- giving them access to relevant information; and
- providing platforms such as the BCS to communicate and influence policy-making processes.

Linkages between government and NGOs will be strengthened through the creation of a roundtable involving government officials and representatives of the networks. The establishment of a government-NGO network is something the NGOs would welcome. To have credibility, however, this type of network would only be established where an enabling environment is created in which the network can influence policy decisions. NGOs can also benefit from increased networking with groups working in the international development arena.

NGOs suffer from a negative image as a result of a few corrupt and wasteful organizations. The groups need to put their own houses in order by adopting prudent spending habits, by building trust with communities, the government, and donors, and by adhering to practices of transparency and accountability in all their activities. A Fund for Sustainable Development would be established under the provisions of the Pakistan Envrionmental Protection Act (PEPA). This would provide some funding for NGO activities for protection of environment. A code of conduct should, however, be adopted to guide the use of these funds. The NGO cause can be strengthened through strong and effective communication strategies.

Gender, Development and Environment

Most development interventions in Balochistan, for example in the agriculture and livestock sectors, have been designed to meet only the needs of men. Gender-sensitive development approaches are now being introduced to look at the impact of development on both men and women and to tailor interventions to ensure more equity in the roles and responsibilities of both. Change is possible, notwithstanding the cultural and social fabric of the province, as can be seen in coastal areas. Women have become engaged in many sectors of the economy there and play a prominent role in community affairs where men have migrated to find work or are occupied in the fishing industry. Strategies will be implemented to ensure that gender issues are addressed by:

- giving support to women in existing roles, for example in collecting water and firewood, and in making domestic tasks easier to perform through the introduction of improved technologies;
- encouraging women to take on new roles in sectors such as livestock care, fish processing, renewable energy, and water management, and ensuring they have equal access to training in these skills;
- involving women in the implementation of resource management and environmental programmes; and
- opening up more opportunities for women in institutions of government and civil society organizations.

Information Management

Managing natural resources effectively, and adopting measures to protect the environment, means drawing on as many sources of information and advice as possible. Acquiring the right kinds of information and advice means asking the right questions, understanding the answers, analysing the results, and comprehending the consequences of taking various courses of action.

Government departments are commonly described as 'watertight compartments'. That is to say, information of all types is closely held by officials at all levels in the organization. In line with time-honoured administrative procedures, responsibilities are closely defined and the decision-making process is adapted to it. The principle of 'need to know' is closely followed. The concept of 'right to know' is seldom accepted. The process militates against collective decision-making or a comprehensive or integrated approach to dealing with issues.

Balochistan is not particularly attuned to working with written materials. While the working language of government is English, the language of work and of the client groups may be one of several local languages. Finding copies of documents can be very difficult. At the end of the day, the value of the vast numbers of documents that have been produced over the years is greatly discounted. The ability of departments to acquire, analyse and mobilize information for decision-making varies widely. While the agriculture department

has the advantage of a province-wide network and access to the village level, the department of industries has very few resources to get the information it needs. Where information is collected, it is often of questionable value or relevance. Disagreement is common among departments. The Bureau of Statistics itself does not produce statistics but reproduces summaries of old data reported by the line departments. The Bureau has a broad mandate but has never been structured, managed, directed, or supported to function effectively.

Steps are being taken to improve the flow of information within departments such as Planning and Development (P&D), and to promote transparency in development. But much of the computer hardware is outdated and plagued with problems such as viruses. The computers are not equipped to run commonly used software. Further, software is not standardized. Many of the projects and NGOs operating in Balochistan have developed report libraries and databases specific to their needs, and they often support sophisticated information management systems. Projects and NGOs do not communicate routinely with one another on issues of common interest, although the means to do so are improving. This is not necessarily because of any reluctance to share information, but rather the investment of the time and resources it requires. The opportunity to share hardware exists but has not been pursued.

The real commitment to community and grassroots participation in development is less than what is openly recognized. Some progress is being made in this regard as local people become increasingly involved as partners in development programmes. It is acknowledged that local people are the beneficiaries of development, that government at present has little effective control over the use of natural resources, and that government has few resources to dedicate to the collection of information it requires. What has not been recognized is that local people themselves have knowledge. Although this does not apply to everyone, many local people do know a lot about their local environment. This includes knowledge of biodiversity; uses of plants and animals; ecological relationships; trends and cycles in wildlife populations and in weather; the effects of hunting, fishing, and grazing; and the effects of development on the environment.

There are four main elements to the information management strategy:

- development and implementation of a Development Information Management Policy. If Balochistan is to enter the "knowledge age", then information resources must be opened up in support of economic growth. The objective of the policy would be to ensure that information needed for decision-making is made available to all of those involved in a timely fashion. The government should collaborate with all other stakeholders to mobilize information;
- restructuring of the Bureau of Statistics;
- development of a policy that recognizes local knowledge and that ensures it is given due attention in policy development, legislation and decision-making on the management of natural resources and conservation of biodiversity; and
- establishment of a Development Information Users Group. This group would function as a think tank to look at effective and efficient ways to mobilize information, particularly in support of decision-making at the local level, and to share commonly used services such as geographic information services, cartography and remote sensing.

Environmental Communication and Education

The importance of awareness raising and the need for environmental education are common themes and recommendations throughout the BCS. The challenge is to develop and implement effective programmes for key groups of stakeholders: the decision-makers, the stewards of natural resources and the general public. There is growing interest in government, civil society and the private sector, but limited resources and poor communication and education infrastructure hamper these efforts. In 1998, only 27% of the population were deemed to be literate. The total readership of newspapers is only about 3–4%. In contrast, nearly 87% of the population listens to radio in local languages, and an increasing number have access to television. There are many informal channels of communication, including melas, jirgas, and the ulema. Street theatre and agricultural fairs are also vehicles for promoting environmental awareness.

The key elements of the strategy involve:

- raising awareness and educating tribal leaders and other local opinion leaders;
- building the capacity of government officials, the media and NGOs;
- raising awareness and promoting participation of women's organizations;
- using funding more effectively; and
- incorporating education and awareness programmes in all development initiatives.

PART III: IMPLEMENTATION

Implementation measures have been developed in consultation with stakeholders. They benefit from experiences with the implementation of the NCS and SPCS.

The many recommendations made in the strategy are grouped for convenience into an action agenda for the next 10 years. This time frame corresponds to the Ninth and Tenth Five-Year Plans. The action agenda has 14 core programmes:

1. Raising public awareness.
2. Improving governance and effectiveness of institutions.
3. Institutionalizing environmental education.
4. Arresting depletion and pollution of groundwater and increasing irrigation efficiency.
5. Making agriculture sustainable.
6. Managing rangelands and enhancing productivity of livestock.
7. Developing coastal and marine resources sustainably.
8. Sustainable planning and management of urban areas.
9. Creating and sustaining environment-friendly development.
10. Conserving, rehabilitating, developing and using forests sustainably.
11. Conserving and using biodiversity and wetlands wisely.
12. Conserving cultural heritage and developing tourism.
13. Collecting authentic data and managing information.
14. Alleviating poverty.

The components of the core programme are given in Chapter 20.

The principal mechanisms to be used in implementing each of the core programmes are:

- institutional strengthening (including roundtables, focal points in departments, restructuring public sector institutions, improved co-ordination and capacity building);
- awareness raising and environmental education;
- policy and legal reform together with the use of economic tools; and
- mobilizing human and financial resources through improved efficiency and reprofiling; and
- identification of new sources of funding.

It is important to note that the BCS is not about fundraising or developing a portfolio of projects to be funded. The strategy does not require huge additional investments to achieve its objectives. Rather, the emphasis is placed on more efficient, participatory and transparent institutions, and the implementation of improved and co-ordinated policies.

The key institutions to lead implementation of the BCS are:

- the Steering Committee, with a renewed and revised mandate;
- a strengthened Environment Section, P&D Department (for co-ordination, catalytic action, and support);
- an effective enhanced monitoring and evaluation section;
- a revitalized Bureau of Statistics in the P&D Department;
- a strengthened Environmental Protection Agency;
- sectoral roundtables; and
- an external technical support mechanism at provincial and district levels.

But all relevant organizations, institutions and even individuals are stakeholders and partners in BCS implementation. The BCS includes a detailed table on the roles and responsibilities of political leaders, the federal and provincial governments, the judiciary, the armed forces, district authorities and local bodies, the private sector, citizens' groups, tribal elders and community leaders, communities themselves, the media and donors.

The Rules of Business will be amended to make BCS implementation a mandatory requirement of all relevant public-sector institutions. Planning Commission Proforma I and Planning Commission Proforma II (PC-I and PC-II) documents will require conformance with the BCS principles, goals, and objectives. Extensive use will be made of roundtables to bring together all stakeholders. In addition, a multi-stakeholder Development and Environment Committee will be established in each district.

The most important task for promoting implementation will be communicating the concepts, approaches, core programmes, suggested interventions, and recommendations of the BCS to all relevant organizations and stakeholders as well as to assist them in action planning and implementation. This responsibility would be shared between the Environment Section and other relevant sections in the Planning and Development Department, relevant line departments, and formal and informal media. The strategy includes a detailed table that lays out the responsibilities for communicating the messages in each of the 14 core programme areas.

The strategy does not advocate a huge additional investment of funds to achieve its goals. Rather, the emphasis is placed on more efficient, participatory, and transparent institutions that adopt context-specific approaches to deal with problems of environmental degradation and human deprivation. A four-pronged approach will be adopted for efficient utilization of existing resources and raising additional funds. Effective monitoring and assessment systems will be put in place to enable the province to review its progress and make adjustments to achieve the objectives of the strategy and optimize the use of scarce resources. The requirement for M&E will be based in legislation, with annual reports detailing the progress the province is making towards sustainability. M&E will be a participatory process involving all stakeholders through mechanisms such as the roundtables.

It is also important to assess not only whether the actions outlined in the BCS are being implemented, but also the impact the BCS is making in achieving sustainable development. IUCN has developed a process – the Well-being Assessment Method – that will be used to gauge both human well-being and ecosystem well-being. The results can be demonstrated graphically on the Barometer of Sustainability. Stakeholders can then see at a glance where Balochistan stands in terms of human and ecosystem well-being, what progress is being made towards achieving sustainability, and what needs to be done in social, economic, and resource sectors to make improvements.

The Steering Committee will have the responsibility of overseeing the monitoring and evaluation and Well-being Assessment processes and procedures, and producing a report to the provincial Assembly every three years. Finally, an independent, external review of the BCS will be commissioned five years from the start of implementation.

Part I

Background

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Chapter 1

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Rationale and Process

Balochistan is an arid, largely mountainous province of Pakistan. It endures frequent spells of drought, flash floods and earthquakes. It is underdeveloped by any standard.

The government of Balochistan is determined to achieve prosperity and progress for its people and to attain the highest possible level of development for the province. It intends to do that through the optimal use of available resources, enforcement of appropriate policy measures, financial discipline and balanced inter-sectoral and inter-regional development.

In the Ninth Five-Year Plan (1998/9-2002/3), the government takes the view that the progress and prosperity of its people is not only measured in economic or monetary terms, it also has to do with:

- the social well-being of people in terms of access to health care, education and basic civic amenities, such as clean drinking water; and
- opportunities for citizens to influence public policy through participation in decision-making processes.

In mid-March 1999 the government of Balochistan announced a Poverty Alleviation Strategy for the province. This programme is targeted at the estimated 70% of the population living in poverty. The focus is on natural resources, with an emphasis on increasing production and exports in the agriculture, livestock, fisheries and industrial sectors. The strategy is expected to provide jobs for 270,000 people.

Evidently, achieving development objectives and dealing effectively with poverty depends, at least for the next decade, on the ability to manage natural resources in a sustainable manner and to conserve the natural environment. This is where a strategic plan – the Balochistan Conservation Strategy (BCS) – comes in, to underpin the government's attempts to reconcile its environment and development objectives. The urgency for and scope of the BCS is the result of events at the local, national and international levels.

The reality is that for much of its recent history, Balochistan has had to confront major environmental challenges. The shortage of water for drinking and agriculture, and degraded pastures and forests have been the subject of concern for decades. The current drought situation is a manifestation of unsustainable use of natural resources. Settlements are characterized by poor planning, contaminated water supplies, inefficient or non-existent sanitation and waste management services and air pollution. These are emerging as major issues as the population rapidly expands and urbanization accelerates.

Balochistan: an arid and largely mountainous province.

Finding a reliable supply of fresh water has always factored into daily life, whether for livestock grazing, agricultural production, human settlements, development of infrastructure, communications, or industrial development. From the 1880s onward, military and civic authorities have expended great efforts to secure a reliable supply of water for Quetta. The founder of Pakistan, Muhammad Ali Jinnah, raised the issue at the time of Partition. The subject has been high on the agenda ever since. Concern for the deterioration of rangelands dates back to at least the 1950s, and many projects have been launched since that time to address the situation.

In 1992, the government of the Netherlands published the Environmental Profile Balochistan. It focused attention on these and other issues, and underlined a growing and widespread concern about the state of the environment and the sustainability of the province's natural resources.

The authors predicted that by 2000, the mining of groundwater and the degradation of natural pastures would result in the collapse of the Quetta water supply, demise of the livestock industry and a sharp decline in horticulture. They concluded that desertification is well advanced and has been accelerating in the past two decades. Other issues identified in the study included a decline in biodiversity, soil salinization and erosion, urban pollution, the potential for overfishing and the ineffectiveness of both legislation and public administration.

The authors laid the responsibility for these problems squarely at the feet of the provincial and federal governments, claiming that they had ignored the environmental and economic threat and had not taken action to deal with either the environmental impacts or their underlying causes. They suggested that the public administration lacks the institutions, the expertise and sometimes the legislation to act upon the information it has. Donor agencies do not escape criticism either. They were blamed for contributing to many of the problems through faulty problem diagnosis, or through incompetence at both the technical and institutional levels.

On the basis of this report, the government of Balochistan announced its intention to develop a conservation strategy with the assistance of IUCN and with the financial support of the Dutch government.

At the national level, March 1992 marked the federal cabinet's approval of the National Conservation Strategy

(NCS). The NCS is designed to conserve the environment of Pakistan, maintain its resource base and ensure that development efforts are environmentally sound (Appendix 1). It was prepared by the government of Pakistan and IUCN. The NCS was a product of consensus-building and mobilization of a constituency of support. It is recognized as one of the world's best conservation strategies in terms of its content, as well as the participatory and inclusive way in which it was developed.

The NCS set out a 10-year action and implementation plan for Pakistan. The agenda is based on a set of core programmes (Box 1). The NCS is directed to federal, provincial and local governments; businesses; non-governmental organizations (NGOs); local communities; and individuals. Most important, it recognizes the importance of implementation at the provincial level.

Pakistan is a federation of provinces and territories. Its constitution devolves much responsibility to the federating units. This, together with the importance of action at the local level, made the NCS architects realize that sub-national strategies would be required to guide government departments, NGOs, the private sector and individual citizens in implementing the NCS across the country. Provincial conservation strategies are therefore based on the objectives, priorities and recommendations of the NCS, adapted to the needs, potentials and aspirations of the people of the provinces.

A significant milestone in the implementation of the National Conservation Strategy was the development of the Sarhad Provincial Conservation Strategy (SPCS) by the government of the NWFP and IUCN. This was initiated in 1992 and approved by the NWFP Cabinet in 1996. Implementation of phase III of the SPCS is now under way. The SPCS stands out not only as the first provincial conservation strategy, but as a concerted effort to apply the lessons of the NCS by placing great emphasis on public involvement.

Jalal-ud-din Qureshi

A dry well in Quetta.

Box 1 NCS Core Programmes and Environmental Issues in Balochistan

NCS Core Programmes	Issues in Environmental Profile Balochistan
Maintaining soils in croplands	Integrating population and environment programmes
Increasing irrigation efficiency	Preserving the cultural heritage
Protecting watersheds	Deforestation of watersheds
Supporting forestry and plantations	Depletion of aquifers
Restoring rangelands and improving livestock	De-vegetation of rangelands; desertification
Protecting water bodies and sustaining fisheries	Salinization and waterlogging of irrigated areas
Conserving biodiversity	Excessive exploitation of coastal and marine resources
Increasing energy efficiency	Destruction of wildlife habitats and depletion of wild flora and fauna
Developing and deploying renewables	Destructive mining practices
Preventing/abating pollution	Air and water pollution
Managing urban wastes	Unplanned urban and industrial growth
Supporting institutions for common resources	Unmanaged urban and industrial solid wastes
	Lack of control over development planning

At the international level, the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, in 1992, resulted in key agreements, including the Rio Declaration, Agenda 21, the Convention on Biological Diversity, the Framework Convention on Climate Change and the Forest Principles. The government of Pakistan played a very active role in the preparations for UNCED, and supports the implementation of these and other international agreements (Box 2) related to the environment.

In summary, events at the provincial, national and international level, provide the context, precedents and momentum for the development of the BCS. First, the Environmental Profile identified the need for a comprehensive environmental framework to address critical issues in Balochistan. Second, the government of Balochistan announced its intention to develop a provincial conservation strategy with Dutch assistance. Third, the BCS was conceived as a provincial implementation plan for the National Conservation Strategy. Fourth, the BCS was seen as a tangible commitment on the part of the provincial government to work towards implementing the agreements reached in Rio and other international agreements to which Pakistan is a contracting party.

Most important, however, is that Balochistan has its own distinctive environment and resource base, a unique social structure and a multicultural population. The province's development needs are different from those in other parts of the country. To be successful, it was recognized that the BCS must first and foremost respond to the distinctive needs and nature of the province.

There have been numerous projects and programmes at the federal and provincial level designed to tackle specific environmental and resource management issues. A number are under way and many others are planned. However, environment does not figure much anywhere in Pakistan as an issue related to social development. This is not from a lack of interest, but from a compelling need to focus on social and development issues. Environment is seen as an 'add on'. A study for SPCS Phase III (Hardi 1998) revealed that the three closely related and most pressing issues that need immediate political and social action in the NWFP are poverty, food security and population pressure. Three additional issues of high importance are societal peace, education and health.

The study found that the environment seems to be a priority issue only when it directly affects food security (waterlogging, salinity, soil erosion) or when it is linked to visible catastrophic events (flash floods). Even in the context of health, the most pressing issue is vaccinations, while topics such as sanitation, solid waste disposal and urban air pollution are not at the top of the political agenda. Global and international environmental issues receive little attention.

The situation is much the same in Balochistan. There is a greater awareness of some issues, simply because the impacts are felt widely, for example, water needed for drinking and irrigation, and air pollution in urban areas. The potential for over-exploitation of fisheries resources is another concern. But desertification and over-grazing are not seen as issues as long as livestock can find something to eat. However, the drought in the year 2000 has forced people to think about some of these issues. Many other issues, such as solid waste management and loss of biodiversity are seen as someone else's problems.

The federal and provincial governments have worked hard to try to deal with environmental issues in the face of scare resources. For example, the federal government has:

Box 2 Selected Environmental Conventions to which Pakistan is a Contracting Party

n **Ramsar Convention (1971)**	Convention on Wetlands of International Importance especially as Waterfowl Habitat
n **WHC (1972)**	Convention Concerning the Protection of the World Cultural and Natural Heritage
n **CITES (1973)**	Convention on International Trade in Endangered Species of Wild Fauna and Flora
n **Bonn Convention/CMS (1979)**	Convention on the Conservation of Migratory Species of Wild Animals
n **UNCLOS (1982)**	United Nations Convention on the Law of the Sea
n **Vienna Convention (1985)**	Convention for the Protection of the Ozone Layer
n **Montreal Protocol (1987)**	Protocol on Substances that Deplete the Ozone Layer
n **Basel Convention (1989)**	Control of Transboundary Movements of Hazardous Wastes and their Disposal
n **CBD (1992)**	Convention on Biological Diversity
n **FCCC (1992)**	Framework Convention on Climate Change
n **CCD (1994)**	Convention to Combat Desertification

A.L. Rao, IUCN

Balochistan supports much wildlife: urial habitat in Dureji game reserve.

- provided a national framework for the conservation and sustainable use of natural resources through the NCS;
- addressed the environment in the Eighth (1992/3-1997/8) and Ninth (1998/9-2002/3) Five-Year Plans;
- created and strengthened institutions (NCS Unit in the Ministry of Environment, Local Government and Rural Development; Environment Section in the Planning Commission; and Federal Environmental Protection Agency);
- improved legislation by enacting the Pakistan Environmental Protection Act (1997); and
- created opportunities for the private sector and NGOs to become involved.

Coordination with the provincial governments and mainstreaming of environment in planning has remained weak so far, and environmental policies and legislation have not been enforced. For want of resources and political will, Five-Year Plans are only partially implemented. The role of civil society in environment and development remains uncertain in the absence of a clear policy.

The government of Balochistan has:

- addressed environmental issues in its own Eighth and Ninth Five-Year Plans;
- created and strengthened the provincial Environmental Protection Agency;
- established and operationalized the Balochistan Environmental Protection Council;
- developed and launched the Environmental Profile Balochistan;
- established an Environment Section in the Planning and Development Department;
- planned and is implementing the Balochistan Natural Resources Management Project, which focuses on strengthening environmental institutions, and addresses some key natural resource management issues;
- accepted the role of NGOs and local communities in planning and implementing donor and government-funded projects;
- facilitated establishment of the Corp of Volunteers for Environment for Quetta City;
- begun implementation of the National Drainage Programme in Balochistan, implemented many other useful projects e.g., Balochistan Community Irrigation and Agriculture Project (BCIAP) and Balochistan Rural Water and Sanitation (BRUWAS) project in the water sector and sought the participation of local communities and involvement of NGOs in all such efforts;

Hamid Sarfraz, IUCN

Plants such as these mazri palms in Turbat can be of economic value.

- facilitated setting up a compressed natural gas (CNG) station to reduce the levels of air pollution and resulting health problems in Quetta; and
- initiated a study of water and sanitation issues in Quetta.

These are valuable contributions to dealing with environmental and resource management issues. However, there can be no quick fix for problems of water supply, rapid urbanization and deterioration of rangelands and natural habitats. Many of the complex issues confronting the province will require a concerted programme of action for many years to come. Accordingly, the BCS is designed to contribute to the achievement of the government's objectives in both the short (5 years) and long term (10 years).

PROCESS

The key steps in developing the BCS were:

- forming a Steering Committee;
- building a constituency of support for the preparation and implementation of the BCS among all of the stakeholders including the formation of sectoral and thematic interest groups as precursor to roundtables;
- reaching out to local people through a series of district consultation meetings;
- developing background papers on key sectors and themes;
- developing close working relationships with related projects and programmes;
- developing a BCS Framework (discussed in Chapter 2); and
- developing and extensively reviewing five drafts of the BCS document.

The major features of each step are described below.

Steering Committee

A Steering Committee, chaired by the Additional Chief Secretary (Development), Planning and Development Department, Government of Balochistan, guided the development of the BCS. Members included the secre-

taries of relevant line departments and representatives of civil society institutions and the private sector. The committee provided guidance both in carrying forward the process (for example, the district consultations) as well as in developing the products (for example, this document and the BCS Background Papers).

An Executive Committee was formed to help implement activities and organize events.

Building Support Among the Stakeholders

Development planning and implementation in Balochistan is undertaken in an environment characterized by compartmentalization among sectors and between sub-sectors. There is little experience of public-private participatory approaches. Similarly, there is almost no history of involving the private sector, NGOs or other members of civil society in the development process. Social structures and gender segregation further complicate the situation. While women are the primary users of many natural resources, their mobility is restricted. They do not participate in decision-making.

One of the central concepts underlying the BCS approach was to develop the document through meaningful stakeholder participation. Stakeholders are those who have a direct or indirect stake in the conservation and sustainable use of natural resources, the protection of the environment and sustainable development. They include:

- decision-makers and planners (political leaders and senior government officials);
- government agencies (national, provincial and local), including the armed forces;
- NGOs, including umbrella organizations involved in capacity-building, promoting linkages, funding, research and communication, as well as groups involved in planning and implementing projects and community-based organizations working at the grassroots level to meet the basic needs of the population;
- the private sector;
- communities;
- the media;
- academia and research institutions;
- ulema;
- women's groups; and
- the general public.

Consultation Process

The objectives of the consultation process were to define and set priorities for the issues to be addressed in the BCS and to promote a participatory approach to its development. A series of consultations were held at both the provincial and district levels. In addition, sectoral, thematic and various specialists groups were also established. Consultations were held in nine of 26 districts (Table 1; Map 1 in Maps section).

Table 1 District Consultations

District	Location	Dates	Language of Meetings	Principal Socio-Linguistic Groups*	Principal Agro-Ecological Zones*
Mastung	Mastung	**6 May 97, 1 Jul 97, 7 Aug 97 & 19 May 99**	Urdu/Brahvi	**Brahvi**	Brahvi-Toba Kakar
Nasirabad	Dera Murad Jamali	**11 Oct 97 & 24 May 99**	Sindhi/Urdu	**Sindhi**	Sibi-Kachhi-Nasirabad
Pishin	Pishin	**4 Nov 97**	Pashto/Urdu	**Pashtun**	Brahvi-Toba Kakar
Lasbela	Uthal	**23 Nov 97 & 27 May 99**	Urdu/Sindhi	**Sindhi**	Lasbela
Gwadar	Gwadar and Pasni	**23-24 Nov 97 &29 May 99**	Balochi/Urdu	**Baloch**	Coastal Mekran
Kech	Turbat	**23 Dec 97**	Balochi/Urdu	**Baloch**	Coastal Mekran
Zhob	Zhob	**18 Apr 98**	Pashto/Urdu	**Pashtun**	Northern Sulaiman
Quetta	Quetta and Hanna Urak	**29 Apr 98 & 11 Jun 98**	Urdu/Pashto	**Baloch, Pashtun, Brahvi, Punjabi, Sindhi, Siraiki and Urdu speaking**	Brahvi-Toba Kakar
Ziarat	Ziarat	**9 Jun 98 & 3 Jun 99**	Pashto/Urdu	**Pashtun**	Brahvi-Toba Kakar

*As selected by Gils and Baig 1992.

Shuja Zaidi, BCIAP

Consulting communities is important for natural resource management.

The BCS Steering Committee defined the objectives of district consultations as 'working with the people at the grassroots level' to:

- obtain their perceptions of environmental and natural resource management issues and the impact of development as it relates to them and their environment;
- promote the conservation and sustainable use of natural resources and ensure that the development process is environment-friendly;
- ensure ownership of the BCS, by the people, through their participation in its formulation;
- raise people's awareness about environmental issues and enhance the knowledge of planners regarding peoples' needs and perceptions; and
- provide input to the District Profiles that were being prepared by the IMPLAN project of the Planning and Development Department at that time.

Specific objectives were:

- to identify, establish priorities and document environmental, conservation and sustainable development issues in the selected districts, for input into the BCS Background Papers and the BCS document, as well as into the District Profiles when revised;
- to solicit views on development initiatives, their impacts and future directions; and
- to discuss the concept of District Conservation Committees as a forum for discussing environmental issues.

The results of the consultations have been compiled as a separate series of reports.

Compiling Background Information

In addition to the consultation process and the review of available documentation, specialists in each sector compiled 15 background papers (Appendix 2). Authors were asked to focus on strategic actions to implement the recommended options, together with recommendations on how barriers to implementation might be overcome (Box 3). To complement these general guidelines, sector-specific guidelines were drawn up through interest

group and specialist group meetings. These guidelines in essence provide a detailed 'table of contents' for the background papers and discussion documents.

These papers are 'desk studies', based on interviews and discussions with stakeholders, review of available documentation as well as published and unpublished materials and the author's personal knowledge of the sector.

Linkage with Programmes and Projects

In the process of developing the strategy, strong links were developed with the relevant programmes and projects in Balochistan, including the Area Development Programme Balochistan the Improving the Systems for Development Planning in Balochistan (IMPLAN) project, the BCIAP, the Balochistan Primary Education Development Programme, the Primary Education Quality Improvement Project, the BRUWAS project, the Balochistan Trial District Management Project, the Quetta Water Supply and Environmental Improvement Project, the Quetta Kachi Abadies Environmental Management Project, the Balochistan Natural Resource Management Project and the Rickshaw Project. The strategy has benefited from technical inputs from the staff of these programmes and projects and from the lessons learnt in their implementation.

BCS Products and Outcomes

The process has generated a number of key documents including this one, a series of background papers, a conceptual Framework and reports on the results of the district consultation process. Five drafts of the BCSdocument were developed one after the other. These and the BCS Background Papers benefited from extensive review.

Box 3 | Information Sought from Authors

Essential background	Factual, up-to-date and reliable, quantitative and qualitative information on the sectors of concern to the BCS.
Stakeholders	Details of the stakeholders: those affecting the sector and those most affected by it.
State of knowledge	An assessment of the state of knowledge on each sector, based on all the available information, with identification of major gaps and deficiencies.
Issues and trends	A succinct account of the major issues confronting sustainability in the sector, and an analysis of trends.
Consequences of inaction	Prediction of the consequences of inaction, both in the short term (5 years) and long term (10 years) on the sustainability of the sector, and the impacts on the stakeholders in the short and long term, if appropriate measures are not planned and implemented.
Vision of the future	The opportunities that the sector offers if developed and managed according to the principles of sustainable development.
Current initiatives	An assessment of what is currently being done, planned, or proposed by organizations and agencies within Balochistan to address the issues and halt/reverse trends, focused on the extent to which current initiatives are effectively addressing the key issues.
Learning from past experience	The goals, objectives and scope of interventions undertaken especially with external assistance, with examples of where these steps and interventions have succeeded or failed, and why.
Learning from experiences elsewhere	Case studies from other provinces and internationally, where similar issues have been tackled successfully, and from which useful lessons can be drawn.
Options for action	Two or three options for dealing with issues and trends in the sector.
Analysis of options	The likely outcome if each of the options is pursued, given the present situation in Balochistan.
Recommendations	The preferred option and the rationale for recommending it
Strategy for implementation	How the preferred option should be implemented in the short and long term, with an emphasis on pragmatic options for action based on the current situation, trends, mitigating measures and interventions.

Chapter 2

BCS frame

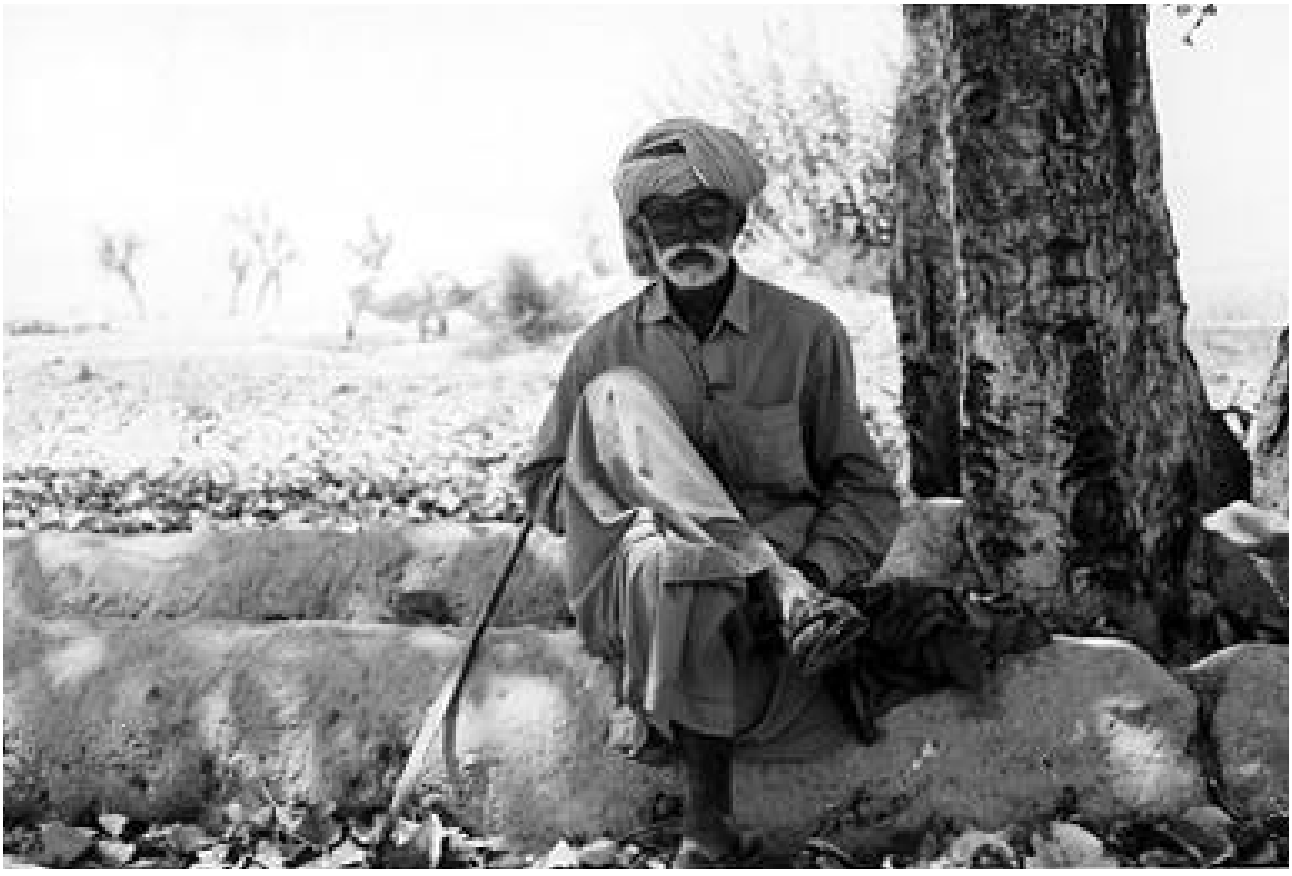
BCS Framework

The process described in Chapter 1 produced a wealth of information on socio-economic conditions, the natural environment and natural resources. The challenge was to pull this material together into a strategy. A conceptual framework was developed for that purpose. The aim was to:

- set out the principles, goal and objectives of the BCS as a basis for addressing issues in the conservation and sustainable use of natural resources;
- set out the approach and process to be followed in its preparation;
- serve as a guide on the process of developing and implementing the BCS;
- assist the BCS team and contributors in collating, analyzing and integrating relevant input from many sources into a coherent and meaningful document, including public consultations, discussions with experts and opinion leaders, workshops, interest groups, background papers, literature review, research and analysis;
- make the BCS document more understandable to its audience in terms of its goal, objectives, principles, structure, content and processes;
- provide a basis for assessing how well the products and processes of the BCS conform to the goal, objectives, principles and processes;
- aid monitoring of progress in the development and implementation of the BCS; and
- serve as a basis for revising and updating the strategy.

The framework developed the following principles, goal and objectives as the basis for the future development of the province's natural resources and the conservation of its environment. They underpin the preparation, development and implementation of all development programmes in social, economic and resource sectors. They provide the basis for monitoring and evaluating the implementation of the BCS and the progress the province is making in achieving sustainability.

The principles, goal and objectives complement, at the provincial level, those set out in the National Conservation Strategy. Their adoption by all stakeholders, is a commitment to the sustainable development of resources and conservation of the environment. This is in keeping with the contribution the BCS will make to the overall economic development strategy for the province, particularly its contribution to achieving the goals of the government's poverty alleviation programme.



Shuja Zaidi, BCIAP

All members of societies need access to information.

PRINCIPLES

- The distinctive geography, geopolitical location and socio-economic characteristics of Balochistan will be recognized.
- Ecological balance will be maintained for sustaining essential life-support systems.
- Biological diversity will be conserved in a sustainable manner.
- An integrated approach will be taken to meet development and environment objectives.
- Natural resources will be developed and used in a sustainable manner for generating rural livelihoods to alleviate poverty.
- All members of society are responsible for improving the quality of life and achieving a sustainable future.
- Community participation in conservation and resource development programmes will be ensured.
- Cultural and religious values and traditions will be recognized, respected and adhered to.
- Change will proceed at a scale and pace appropriate to local needs and capacities.
- Both scientific and local knowledge of resources and environment will be recognized, respected and used.
- All members of society will have access to information on which to make sound, informed decisions.
- International and inter-jurisdictional cooperation is a prerequisite for the sustainable use of shared resources.
- Peace, order and good governance are essential to the achievement of sustainable development.

GOAL

The well-being of the people and ecosystems in Balochistan.

OBJECTIVES

- Providing a framework and strategic plan for the conservation of the environment and sustainable

Shuja Zaidi

Conserving water is essential in Balochistan.

The BCS is aimed at the well-being of all people.

use of the natural resources of Balochistan to:

- confront the issues facing Balochistan in a comprehensive manner;
- employ and institutionalize a participatory approach to strategic planning;
- respond to complex issues in accordance with a clearly structured, cross-sectoral strategic plan;
- promote efficiency in resource use and production processes, and find ways to minimize their effects on the environment;
- prepare and implement the policies, programmes and actions required in both the short and long term;
- prepare new or revised legislation and undertake institutional reform; and
- recognize the roles and responsibilities of all the stakeholders in implementing, monitoring and updating the strategy.

n Promoting behavioural change for the protection of the environment, biodiversity and natural resources.

n Facilitating better access to information for improved decision-making at all levels.

n Improving mechanisms for promoting public awareness and popular support for the sustainable use of resources.

SETTING PRIORITIES

As mentioned earlier, the process described in Chapter 1 provided a wealth of information on issues of concern to the public and to interest groups. Added to these were issues being addressed through the government's existing priorities and work programmes, and the commitments to action made at the national and international level (for example, the NCS and conventions). The conceptual framework proposed a set of criteria to be used by stakeholders to set priorities for action:

n issues or sectors affecting most people;

n popular support;

n areas with greatest potential for resolution;

n areas with greatest potential for economic success;

n capacity to move quickly and availability of existing capacity;

n gravity of the problem;

n issues and sectors of high profile, with the potential to generate critical support for implementation;

n fulfilment of international commitments;

n resource availability including external funding;

n synergy with government and donors' joint action;

n private-sector interest; and

n opportunities for replication on a larger scale.

Part II

The Building Blocks of the BCS

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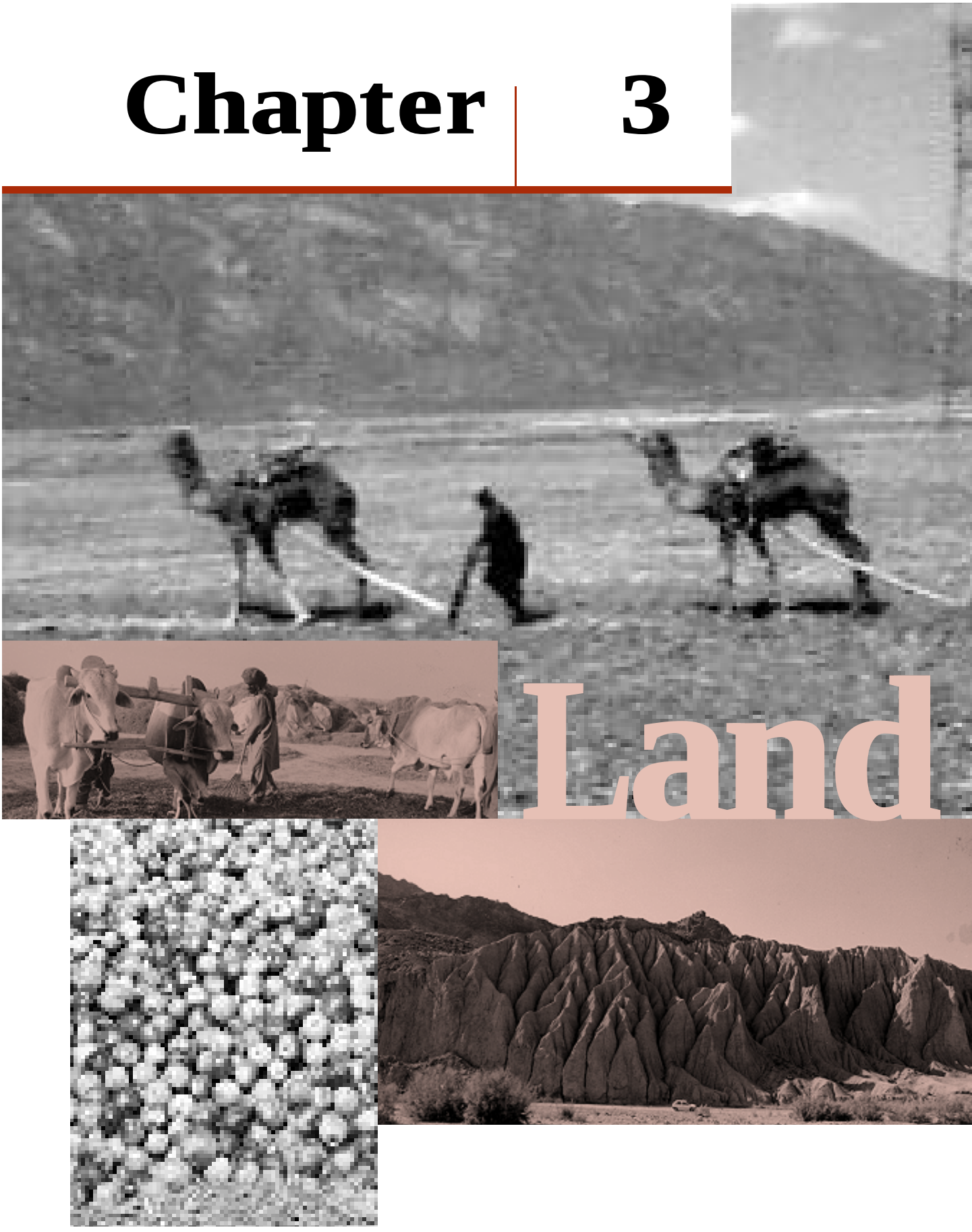
Chapter 3



Land

Land

Balochistan is a land of striking contrasts and contradictions that defies easy description. It has deserts, a coastal zone, uplands, plains, diverse plants and wildlife, and climatic extremes. It has a mix of sophisticated urban life-styles, feudal village life and a multicultural population. Its recent, fading colonial past belies a history of human occupation that spans thousands of years. Civilizations have emerged and collapsed in a land that once led the world in the domestication of livestock and settled agriculture, and where the world's largest mammals (Baluchitherium) once roamed.

This semi-arid land provides for all the needs of the people. It enables, constrains, funnels, divides and obstructs. It enables by providing the space and materials for human settlement, the soils on which to grow crops and the natural vegetation on which to graze animals. The land provides for a broad diversity of plants and wildlife that make up its web of life and serve many human needs. It influences climate, and in turn, the rivers and groundwater resources that are its lifeblood. It also provides a source of raw materials that underpin economic growth. But the land has its limits. It is often inhospitable, constrains settlement patterns and limits the growth of economic sectors, such as agriculture and forestry. The natural landscape funnels and dictates the movement of people and livestock. The mountains divide the province into distinctive cultural, socio-economic and ecological regions and limit communication.

Understanding the land, its potential and its limitations is the basis for understanding past and present patterns of development and planning for a sustainable future. Balochistan, with an area of 347,200 square kilometres, makes up 44% of Pakistan. It is the largest province, and shares borders with the other three along its eastern margins. The upper half of the province is bounded by Afghanistan to the north and west, and by the Indus Valley to the east. The lower half is bounded by Iran to the west and the Arabian Sea to the south. Balochistan occupies a strategic location in relation to resource-rich Central Asia. It commands major overland access routes from Europe to South Asia, and is a vital link in future transportation corridors from the Central Asian Republics to the Arabian Sea. Balochistan shares river basins and groundwater resources with Iran and Afghanistan. The province is located on the migration routes of economically and biologically significant bird species, and shares internationally important wildlife populations with its neighbours. It has a major stake in, and responsibility for, the associated coastal and marine resources of the Arabian Sea.

High relief and a rugged landscape dominate the province's northernmost areas. From here, towering mountain ranges arc southward. The Toba Kakar Range forms the boundary with Afghanistan, while the Sulaiman Range forms the boundary with the Indus valley. From the central region of the province, the mountains sweep south and west, reaching almost to the sea. Elevations exceed 2,000 metres in many areas, with peaks reaching to 3,500 metres around Quetta. These ranges present formidable barriers to movement within the province and from West Asia to the Indian Subcontinent.

A quick glance at Map 2, in the Maps section, on land use reveals three other major physiographic units. First, a narrow, hilly coastal strip runs 770 kilometres from west to east along the shores of the Arabian Sea. The Mekran Coast Range bounds the coastal zone, marked by bays, headlands, sandy beaches and lagoons. Perennial rivers are found in the eastern end of the coastal zone – the Hingol, Porali and Hab. A narrow continental shelf extends about 20 kilometres offshore. Astola is the largest island within the coastal waters of Pakistan.

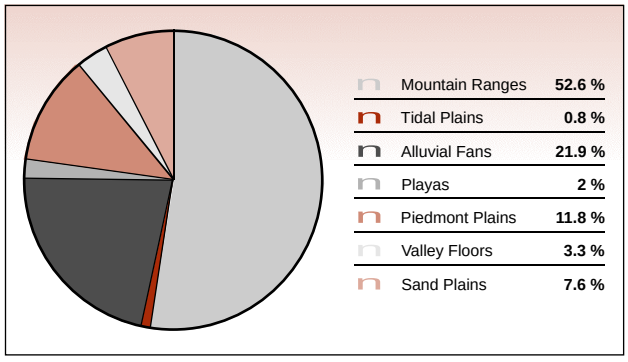
Second, the Chagai-Kharan Basin dominates the southwestern part of the province. It is part of the ancient Seistan sandy desert that extends north into Afghanistan. The Hills Ras Koh and Chagai punctuate the basin. The precipitation from these and the surrounding mountains drain into saline basins known as playas or hamuns. Hamun-e-Mashkel is the largest. It is 87 kilometres long and 35 kilometres wide, and is dry for much of the year.

Third, the broad, low-lying Kachhi Plain distinguishes the east-central part of the province. It is bounded on the North by the Marri Bugti Hills, on the west by the mountains of the Central Brahui and Kirthar ranges and on the east by the Indus valley. A network of seasonal streams drains toward the Indus.

Mountains dominate the country, while valley floors and piedmont plains amount to only 15% of the landscape. It is these two landforms on which most human settlements, farms and roads are developed (Figure 1).

Several active faults are located in Balochistan. The most striking is the Chaman fault, which is clearly visible on satellite images as a prominent line extending 850 kilometres northward from Kharan to Kabul. This represents the junction of two continental plates – the Indo-Pakistan plate on the east, and the Afghan micro-continental block on the west.

Figure 1 | Distribution of Landforms



Source: Gils and Baig 1992.

According to the Pakistan Meteorological Department, there have been 377 tremors since 1909 with a strength of 3.5 or greater on the Richter scale (Table 2). About 80% were in the range 4.1–5.0 and 15% in the range 5.1–6.0. Seven events registered 6.1 or over. The maximum recorded was 7.5, the earthquake that devastated Quetta in 1935. There has been only one large earthquake in Quetta since the 1950s. It occurred in 1997, with a magnitude of 6.2.

The frequency of smaller tremors, the general absence of large events in the past 40 years and the adoption of an appropriate building code have lessened public concern about earthquakes. But damage to buildings in Quetta from the 1997 earthquake suggests that building codes have not been strictly followed. The greatest risk is for those living in kacha houses and in poorly designed and constructed dwellings. Physical infrastructure such as irrigation works, dams, roads and bridges are also at risk. Seismic activity can also have a major affect on natural drainage systems as well as groundwater basins. The probability of further major seismic events seems high.

Geophysical and geological studies show that the Mekran region is an active subduction zone. The oceanic portion of the Arabian Plate is sliding under the Eurasian

Table 2 | Earthquake Data*

Richter Scale	3.5–4.0	**4.1–5.0**	5.1–6.0	**6.1–7.0**	7.1–7.5
Frequency	8	**307**	55	**4**	3

Source: Pakistan Meteorological Department 1999.
*Within latitude 23°-32°N and longitude 60°-70°E during 1909-98.

Akram Dost

Rock erosion in the mountain ranges of southern Balochistan.

Plate beneath the Mekran coast at a rate of 50 millimetres/year (Farah and Dejong 1989). The process of subduction is far from being of interest only to scientists. The Mekran subduction zone is also an area of major seismic activity, particularly near Pasni. Four major earthquakes have occurred around Pasni this century, along with 18 smaller events. Along the coast, two large earthquakes occurred on 27 November 1945 and on 5 August 1947. Both had their epicentres in approximately the same area (24.5°N, 63.0°E). Inhabitants of three towns reported that the coastline rose by about 5 metres after the 1945 earthquake. Pasni and Ormara were completely destroyed by the earth tremor and Gwadar was severely damaged. The earthquake was followed by a tidal wave, estimated to be 15 metres high, which destroyed all buildings left standing in Pasni and Ormara (Sheikh 1992).

The mountains of Balochistan dictate not only the course of rivers, but also movement within and across the region. The combination of desert, mountains and narrow valleys makes transit across the province difficult. Road and rail access from the west to the Indus valley is routed through Quetta. The city commands two strategic mountain passes, the Bolan and Lak. The nearby Khojak Pass is the only major access route between Afghanistan and Pakistan south of the Khyber Pass. Further north, the Zhob valley provides access to the Indus at D.I. Khan. There are few major roads and only one operating railway line. They link Balochistan with the Iran and Afghanistan borders, and with the major cities on the Indus. Quetta, by virtue of its central and strategic location, is the centre for all of this traffic.

In 1996–97, there were 17,090 kilometres of roads in the province, of which only 2,026 kilometres (12%) were metalled. One-third of the metalled roads are in Quetta Division and the remainder are the main roads linking major cities. The rest of the province relies on shingle roads. In many areas there are no roads and bridges, just dusty tracks.

LAND USE

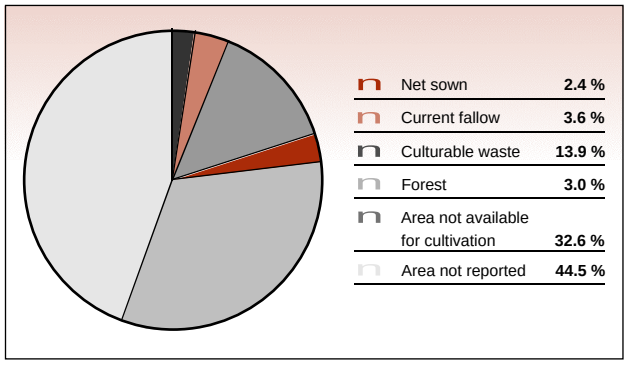
Accurate and detailed information on land use is difficult to obtain. At the district level, a series of 26 profiles was developed by IMPLAN in 1997, to consolidate statistics about each district. In doing so, classifying land proved to be a complex task, not least because records are available for only parts of the area. Also, 'forests' may not actually have any trees – the term may refer simply to lands under the jurisdiction of the Forest Department.

To help classify land, a number of definitions were developed by the Agricultural Census Organization (Box 4). The statistics are concerned principally with defining the potential area available for cultivation (Figure 2). There are, for example, no available statistics on the extent of settlements.

According to the Development Statistics of Balochistan, the reported area of the province is about half of the total area. The variation from district to district is considerable. For example, in Pishin, close to Quetta, only 20% of the area is reported. It is assumed however, that all agricultural and forestry uses are reported, and that there are no significant areas of cultivated land in the unreported area.

The principal land uses discussed in this chapter are agriculture and livestock production. (Information on the extent of land set aside in specially designated areas for forestry and wildlife conservation is given in Chapter 5.) The livestock and agriculture production systems in Balochistan are well-integrated and inter-dependent. They are part of one system – the agro-pastoral system. This varies from area to area and within the same area. Different systems are practised simultaneously, depending upon the availability of irrigation water. Although for convenience, land used for cultivation and for livestock are described separately, it is important to keep in mind the close relationship between the two.

Figure 2 Land Use, 1996-97



Source: Directorate General of Agriculture 1999.

Cultivated Land

About 6% of the land is currently being cultivated, that is, net sown and current fallow; about 14% is culturable waste (Directorate General of Agriculture 1999). Crops contribute about 62% of gross farm income. The major crops are wheat, rice, sorghum, fruit, vegetables and oilseeds. At 1996 wholesale prices, crop production was worth Rs. 42.4 billion. Although small in the national context, Balochistan's agriculture is the mainstay of the provincial economy, and employs 67% of the total workforce. The provincial agricultural output is insignificant in terms of grain and other major crops grown in Pakistan. Orchards in the upland valleys however, are the major suppliers of deciduous fruit. They contribute more to the provincial economy than any other crop. Farms in mid-elevation areas are important providers of off-season vegetables to urban areas.

Approximately 60% of cultivated land is under dryland farming. This involves flood irrigation (sailaba) and rainfed irrigation (khushkaba). Crops grown under these conditions give poor yields and returns, and are very risky. However, these farming systems do provide – in conjunction with livestock and off-farm incomes – the major source of revenue for many of the poorer farming communities. The remaining cultivated land is served by perennial irrigation systems.

Box 4 Classifying Land

Total Geographical Area	is the area within the administrative boundaries of the district.
Area Reported	is the area covered by village and/or district records.
Area Not Reported	is the difference between the Total Geographical Area and the Area Reported.
Area Not Available for Cultivation	includes barren or mountainous land; area under roads, canals, or settlements; or other areas put to non-agricultural uses.
Area under Forest	is any land that is covered by trees, permanent pastures, or game sanctuaries (all protected areas) and also areas that fall administratively under the Revenue and Forest Departments.
Culturable Waste	refers to areas that may be available for cultivation but that either has not been cultivated or has been abandoned, is waterlogged or saline, or has been left fallow for more than four years.
Arable Land	is land suitable for ploughing and crop production (or being ploughed), not sown or left fallow for less than four years.
Net Potential Area Available for Cultivation	is both arable land and the culturable waste.

At low elevations, less than 500 metres – for example, in Porali and the Kachhi plains – irrigated agriculture is generally in direct competition with Indus irrigated systems. Grain, rice, oilseeds, pulses, cotton and tropical fruit crops predominate. Crop gross margins are small, so farmers have limited access to expensive irrigation technology. At intermediate elevations, 500–1,500 metres, where marketing infrastructure and a perennial supply of water exists, farmers have the opportunity to generate relatively high incomes through the cultivation of off-season vegetable crops, which command a premium price in cities. In valleys above 1,500 metres, farmers with access to perennial irrigation water can obtain significant financial returns through the production of fruit. The promise of high return has promoted a shift to irrigated agriculture. Investment in groundwater abstraction is high, and orchards have proliferated rapidly.

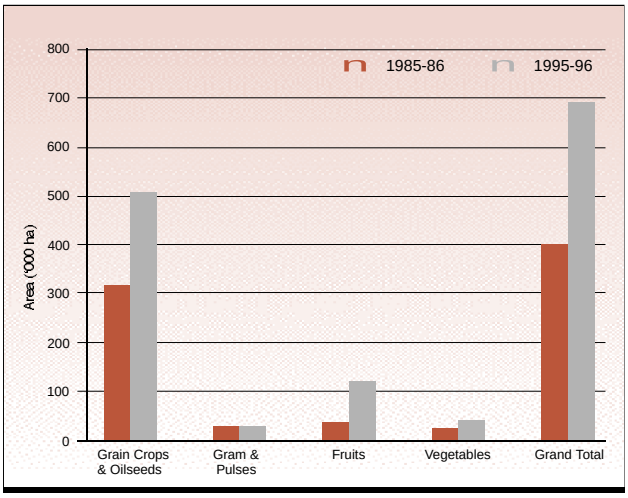
The production of orchards per unit of land fetches three to four times as much as conventional grain and vegetable crops. This is also true for the unit quantity of water used. The economic impact of water development can be gauged from the increase in the irrigated areas over the past 10 years for some major crops, fruits and vegetables and their production (Table 3 and Figure 3). There has been

Table 3 Growth in Irrigated Area, Production and Value of Production

Crop	Area ('000 ha)		Production ('000 tonnes)		Production Values (million rupees)			
	1985-86	1995-96	1985-86	1995-96	1985-86	1995-96	Discount Value* (1995-96)	Increase
GRAIN CROPS AND OILSEEDS								
Wheat	172.0	297.4	**353.7**	**775.4**	707.4	4,442.5	2,150.1	1,442.7
Rice	94.1	128.0	**255.2**	**348.1**	1,275.9	5,145.8	2,490.5	1,214.6
Barley	8.2	26.0	**7.7**	**39.4**	17.4	353.9	171.3	153.9
Jawar	21.5	18.8	**17.2**	**20.1**	38.6	100.7	48.6	10.0
Maize	3.2	2.1	**2.7**	**2.3**	6.7	15.5	7.6	0.9
Oilseeds	19.0	34.0	**11.8**	**24.5**	63.6	1,113.6	539.0	475.4
Sub-total	318.0	506.3	**648.3**	**1,209.8**	2,109.6	11,172.0	5,407.1	3,297.5
Gram and Pulses Sub-total	29.2	27.6	**20.5**	**21.8**	161.4	604.1	292.4	131.0
FRUITS								
Apples	9.7	35.4	**85.1**	**466.0**	638.2	6,710.0	3,247.5	2,609.3
Grapes	2.8	8.3	**28.3**	**70.6**	141.3	1,193.2	577.5	436.2
Almonds	6.7	10.1	**38.4**	**46.5**	638.1	6,607.7	3,198.0	2,559.9
Pomegranates	1.4	3.9	**20.0**	**80.7**	99.8	1,100.3	532.5	432.7
Plums	1.1	2.9	**13.0**	**40.4**	39.1	316.1	153.0	113.9
Apricots	3.6	9.8	**42.0**	**171.1**	125.9	1,762.9	853.2	727.3
Peaches	1.1	2.8	**9.6**	**32.5**	28.9	303.2	146.7	117.8
Dates	9.3	42.2	**83.6**	**403.6**	313.5	3,965.2	451.7	138.2
Sub-total	35.7	115.4	**320.0**	**1,311.4**	2,024.8	21,958.6	9,160.1	7,135.3
VEGETABLES								
Onions	6.2	18.3	**86.8**	**367.0**	86.8	1,673.4	809.9	723.1
Potatoes	5.4	7.3	**77.7**	**113.2**	155.3	1,076.2	520.9	365.6
Other vegetables	8.7	13.0	**115.1**	**184.4**	437.5	2,291.4	1,109.0	671.5
Sub-total	20.3	38.6	**279.6**	**664.6**	679.6	5,041.0	2,439.8	1,760.2
Grand Total	403.2	687.9	**12,68.4**	**3,207.6**	4,975.4	38,775.7	17,299.4	12,324.0

* Discount value is taken at 15% per annum, with 1985-86 as the base year.

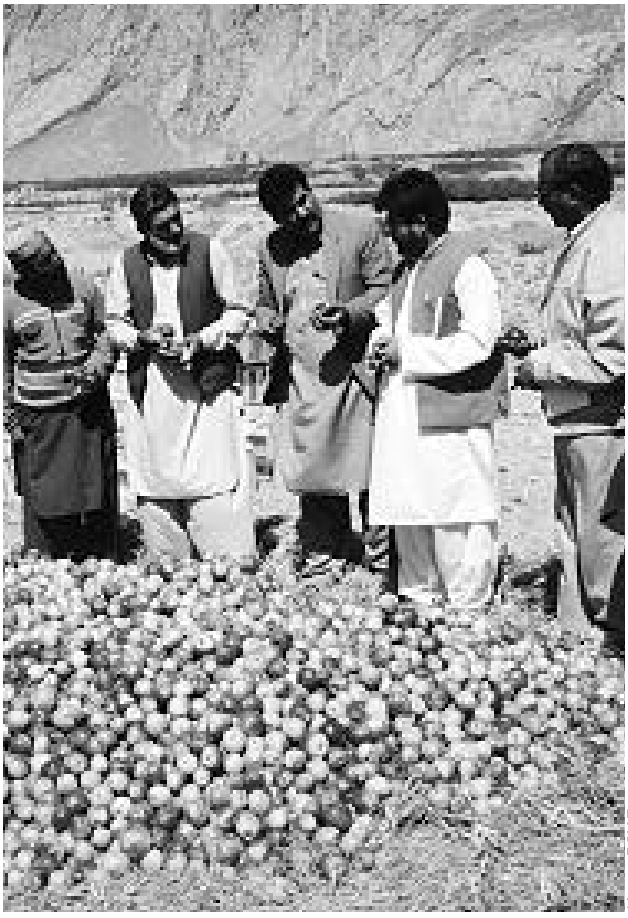
Figure 3 Area Under Irrigation



a tremendous increase in the irrigated area of the province since 1985. Provincial revenues increased by over Rs. 12 billion in absolute terms in the same period from orchards, grain crops and vegetables. This has been possible only through developing water resources by the installation of tubewells, and additional surface water made available through the Indus River system.

It is estimated that each acre under orchards brings in a net income of about Rs. 29,000 in the first year of fruiting. This progressively increases to over Rs. 60,000 per annum by the tenth year and then becomes constant. Similarly, vegetables bring in about Rs. 20,000 per annum, increasing to Rs. 27,000 in the third year. For grain crops, such as wheat, the income is Rs. 3,300 in the first year, increasing to about Rs. 6,000 per acre in the fourth year.

Nasirabad Division, covering Nasirabad and Jaffarabad Districts is the only area canal-based irrigated farming is practised. The area is fed by the Kirthar and Pat Feeder canals from the Indus River at the Sukkur and Guddu barrages respectively. The construction of Kachhi Canal is being planned for draining additional water from Indus system. Rice and wheat are the principal crops grown in the Division.



Liaqat, BCIAP

Sorting apples – fruits earn considerable amounts for Balochistan.

The average private farm is 9.6 hectares. If cultivated area is the criterion, the average size decreases to 4.8 hectares. About 90% of farms are less than 20 hectares in size and over half are under 5 hectares (Table 4). In addition, there are 26 government farms with a total area of 48,338 hectares.

Table 4 Number and Size of Private Farms

Farm Size	Number of Farms		Area	
	Number	%	Hectare	%
Under 5 ha	138,224	57.0	**334,124**	**14.3**
5–10 ha	48,851	20.1	**346,747**	**14.8**
10–20 ha	31,597	13.0	**414,286**	**17.7**
20 ha and above	24,113	9.9	**1,243,829**	**53.2**
Total	242,785	100.0	**2,338,986**	**100.0**

Source: Agricultural Census Organization 1994.

Women participate in all types of work except labour, commerce and transport and building and maintenance. In rural areas, subsistence-oriented agriculture is being replaced with market-oriented production through the expansion of irrigated orchards. The role of women in the economy is changing correspondingly. Where men operate new types of technology, one consequence may be a reduction in the economic power and social status of women. It is ironic that modernization may result in increased production and greater returns, but at the same time reduce employment, particularly among women. Women are generally denied direct access to productive inputs, such as training, credit, technology, ownership of productive assets and control over both the processes and proceeds of labour. Women's economic contributions are discounted and under-reported in official statistical documents (Table 5).

The tribal society of Balochistan has not traditionally been a conducive place for women's empowerment. In the early decades of development, women were largely ignored in all development planning and implementation. The 1960s saw them become the beneficiaries of aid, and some welfare-oriented programmes were initiated for women. But it was not until the 1980s that bilateral agencies started taking an interest in women as partners in development. In the mid-1990s, the government of Balochistan recognized the role of women as active participants in development. The Gender and Development approach has only now started taking root.

Women contribute in four major areas: crop production, livestock production, cottage industry and household work. More than 50% of rural women are involved in fetching water, collecting fodder, caring for animals, planting, harvesting and threshing crops, carrying meals to the fields, selecting seeds and leading livestock in the field. In some areas, collecting medicinal plants for sale to local healers has become a small business managed by women and children. For some of these activities, women are paid in cash or kind (Box 5).

Table 5 | Women in the Work-force

Area	Participation by Women (% of Total Work-force)
Kalat	1.2
Chagai	1.6
Kech	1.8
Pishin	1.9
Lasbela	3.9
Sibi	4.5
Gwadar	6.8

Source: Agricultural Census Organization 1994.

Livestock and Rangelands

Rangelands constitute 79% of the total area of Balochistan and provide more than 90% of the total feed requirements of sheep and goats, 40% of the feed requirement for pack animals and 5% of cattle and buffalo requirements (Figure 4). Their watershed and biodiversity value are also important.

On the basis of physiography, the rangelands of Balochistan can be divided into three agro-ecological zones (Mohammad 1989). The Central Balochistan Ranges found in the Quetta and Kalat Divisions have a Mediterranean climate with annual rainfall ranging from 100 to 200 millimetres. Most of the rainfall is received in winter or early spring. The Western Balochistan Ranges cover the desert areas of Chagai, Kharan, Panjgur, Kech,

Box 5 | Division of Labour by Gender in the Uplands

Exclusively Men	Exclusively Women	Shared Tasks
Migrant labour	Gardening	Planting
Commerce and transport	Food preparation	Harvesting
Building and maintenance	Working wool (cleaning, carding, spinning and weaving)	Threshing
	Child care	Crop storage
	Midwifery	Livestock tasks
	Care of sick	Water collection
	Sewing and embroidery	Gathering firewood
		Milling grains

Source: Sabir and Nagy 1988.

Gwadar and Lasbela Districts. In this area, the rainfall, about 50 millimetres a year, is erratic. The Eastern Balochistan Ranges, located in Zhob and Loralai Districts, receive more than 200 millimetres of rain. As a result, the Eastern rangelands have a higher grazing capacity than those in other areas. The Eastern ranges constitute about 38% of the total area of the province and support 76% of the livestock. The remainder of the rangelands have very low grazing capacity.

Range-based livestock production systems are one of the major sources of livelihood for people living in rural areas (Figure 5). Small ruminants, such as sheep and goats, are better adapted to Balochistan's harsh environment and greatly out-number large ruminants, such as cattle and buffalo. Camels, donkeys, horses and mules are used as pack animals. There are about 20 million sheep and goats (Agricultural Census Organization 1998), which is 6–7 times the actual carrying capacity of the rangelands. Poor nutrition results in high mortality, high parasite loads and the stunted growth of young lambs. Livestock owners sustain high losses, especially during droughts.

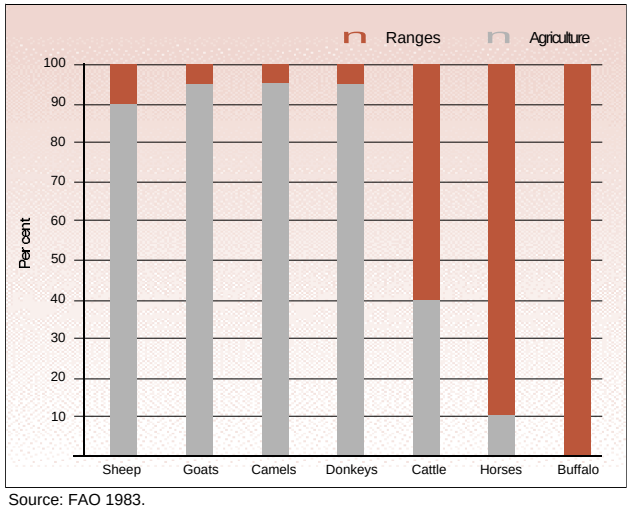
The population of buffalo has increased 10% in the last 10 years. This is related to the establishment of peri-urban dairy units in different towns of the province to meet the increasing demand for fresh milk. The sheep population has remained stable, while the number of cattle has decreased due to the gradual mechanization of agriculture. Similarly, the numbers of pack animals have decreased due to the use of modern transport.

Range Management and Livestock Production Systems

Balochistan's rangelands are managed under two property regimes, classified as common or open rangelands. Common rangelands are traditionally owned by tribes, with customary institutional arrangements for their management. Open rangelands have unrestricted access and are usually in poorer condition. They have been increasing in area, as common rangelands have undergone degradation and have been abandoned by their owners (Buzdar et al. 1989). From an ecological point of view, and contrary to popular belief, migratory livestock production does not create desertification. Nor is the overgrazing by domestic animals the primary cause of degradation. Instead, depletion and destruction of natural resources is due to the lack of grazing management and the use of scarce vegetation for fuel (FAO 1983).

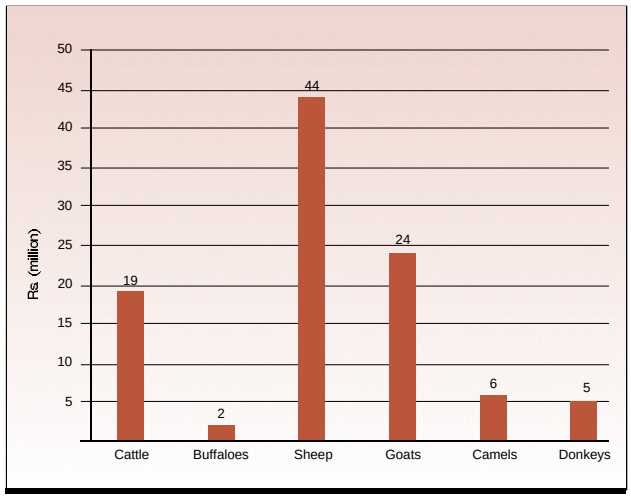
There are three categories of ownership and production systems: nomadic, transhumant and sedentary. The two migratory systems account for about 90% of the livestock in Balochistan, with 60% being transhumant and 30% nomadic.

Figure 4 Contribution of Rangelands and Agriculture in Feed Requirements



Source: FAO 1983.

Figure 5 Monetary Value of Livestock



Nomadic Livestock Production

Nomadic flocks move constantly throughout the year in search of grazing. They migrate from the uplands to the lowlands in winter and return in summer. Their migration follows traditional routes where they have contacts with the communities who provide them grazing privileges and animal feed. In return, the nomads sell them animals and their by-products and provide farm labour. Grazing is generally conducted free of charge, but in some cases, owners are obliged to pay the tribe. As a general rule, over 90% of the forage consumed by nomadic flocks comes from the rangelands. In times of acute shortages, shepherds have to buy forage.

Transhumance Livestock Production

Two types of transhumance livestock production system are found: producers either own land (semi-sedentary) or they do not (semi-nomadic). Semi-sedentary transhumant herders practice agriculture by harvesting surface run-off. Each winter, they migrate along with their flocks to the lowlands in Sibi and Kachhi plains. When no feed remains in the cropped areas, flocks migrate to rangelands and flood plains. Herders spend roughly five to six months away from their villages. Shepherds at times have to pay for stubble or range grazing, and occasionally purchase feed for their animals.

Sedentary Livestock Production

Most people in rural areas raise a few animals. Household flocks rarely contain more than 5 to 15 animals, and often a single shepherd is hired to look after the livestock of an entire village. As villages are normally inhabited by members of the same lineage or clan, they have usufruct rights over rangelands adjacent to their villages. Fodder crops were grown over 5% of the annual cropped area in 1995–96. The major fodder crops are sorghum, alfalfa, barseem, maize and bajra. Wheat and barley is grown for grain and also as a source of green fodder. Sheep and goats graze chickpea fields following harvest.

Studies conducted in highland Balochistan among sedentary and transhumant farmers indicate that in a transhumant system, about 80% of the income comes from small ruminants, while in sedentary systems, small ruminants provide only 15–40% of the income. Livestock represents financial security and a means to meet unforeseen needs. Animals are also used in payment of ransoms, bridal prices and other debts (Buzdar et al. 1989). A family without livestock is considered to be the poorest. It is the last item, with the exception of land, that a family will sell, and the first endeavour on the path to economic recovery. Since the introduction of tubewell irrigation in the mid-1970s, there has been a steady increase in the number of livestock owners settling near irrigated land to engage in agriculture.

Dairy Cattle Breed Improvement

There are now about 3,000 heads of purebred European dairy animals and almost 70,000 crossbred animals. Two liquid nitrogen plants have been installed in Quetta to produce and supply liquid nitrogen to preserve semen. Forty artificial insemination centres have been established in strategic areas of the province. About 22,000 inseminations are carried out annually, with a view to increasing milk production. A Semen Production Unit and Embryo Transfer Technology Centre have also been established at Quetta for expanding the breed improvement programme on scientific lines.

Women in Livestock Sector

Women in pastoral communities have a greater role in nomadic production systems because of their relative freedom and mobility (Box 6). Women of poor families actively participate in livestock production and by-products, as do the women from relatively well-off families. Pashtun women cannot engage in agriculture-related activities outside of the domestic compound unless the family is too poor to hire labour. On the other hand, Balochi women have greater cultural freedom and undertake a large range of livestock-related work.

Positive changes in gender relationships are seen in the Mekran region where women undertake day-to-day business with comparatively more freedom. Men consult them on all matters of strategic importance. Apart from this, most of rural Balochistan remains a society that retains a very traditional view of women's role in resource use and management and related roles and responsibilities.

Poultry Production

About 80% of rural families keep 5–10 hens and one or more cocks. Most are indigenous, low-yielding moulting

Box 6 | Division of Labour by Gender in Livestock Sector

Exclusively Men	Exclusively Women	Shared Tasks
Marketing	Milking and feeding	**Fodder collection**
Breeding	Processing by-products	**Decision-making**
Slaughtering	Fodder management	**Type/number of animals to buy or sell**
Purchasing and transportation	Caring of sick livestock	**Birthing**
Medicines	Hand suckling of young	
Field grazing	Processing local herbal medicines	
	Dung management	
	Cleaning animal shelters	

Source: Bonfiglioli 1995.

types. The birds live by scavenging and on household scraps. Birds that have finished laying eggs are eaten or sold. Although rural poultry-keeping is not very productive and remunerative, it is attractive to rural families because it involves little cost. According to the 1996 Livestock Census, there were more than 4.6 million chickens in rural areas. This exceeds the numbers of birds kept in commercial farming enterprises.

ISSUES

Here are some of the issues and trends characterizing land and land uses in Balochistan.

- A general lack of awareness about the land, its potential and limitations: attention is currently focused on productive sectors such as agriculture, but little on the overall structure and functioning of the province as a whole, based on its resources and environment. There appears to be little attention to integrated planning at any level, regional or district. Ad hoc decision-making continues to meet day-to-day needs in various sectors.
- An information base that is poor or lacking: maps, aerial photography and remote sensing imagery are not routinely used, partly due to costs and lack of availability. Statistics on most sectors are weak or non-existent. Where databases exist, they are flawed and often contradictory.
- Use of several incompletely developed land classification systems, based for example, on physiographic criteria, forest type and vegetation.
- A continuing controversy over the impact of grazing on forests and processes of desertification and the future of this vital sector: most people in the rural area depend on small livestock production and have done so for hundreds of years. Lack of alternatives suggest that they will continue to do so for many years to come, but few viable solutions to the problems of the sector have emerged so far.
- A land ownership system that is complex and not well understood: it is arguable how much land government actually owns or effectively controls. Traditional concepts of ownership and use seem very much the order of the day. The success of any government venture depends on the goodwill between the people and their leadership. There is hardly any awareness or planning system in place to ensure that all stakeholders can participate in a discussion of issues related to the land and its use and planning effectively for its future.
- A poorly documented system of protected areas in Balochistan: the location, boundaries, level of population and status of many areas is not certain. Many have not been surveyed in recent years and there is good reason to doubt that the animals these areas were established to protect still exist in many of them. Only one management plan has been prepared, for Hazarganji Chiltan National Park.

Availability of Quality Seeds

The Department of Agriculture has been providing certified wheat and rice seeds, some of which are produced at departmental farms. The rest are acquired from Seed Corporations in other provinces. A seed processing plant has been built at the Agriculture Development Institute, Khanpur, Jaffarabad District, with a grant from the Japanese government. The plant can process the seeds of wheat, rice, pulses and soybean. Another seed processing facility for oilseeds has recently been established at Gandava farm, District Jhal Magsi, under the World Bank–financed National Oilseeds Development Project.

Inadequate Extension Services

The sector lacks adequate capacity and financial resources to provide basic services to the farmers, transhumants and nomadic grazers. Extension staff work mainly with a small percentage of large farmers, virtually ignoring the needs of small and medium-sized farmers. To improve conventional agricultural extension, the training and visit system of agriculture extension was introduced on a pilot basis in four districts of Balochistan (Loralai, Lasbela, Jhal Magsi and Nasirabad) through the World Bank-funded Balochistan Agriculture Extension and Adaptive Research Project. At the moment, the professional education offered at the universities and colleges is not relevant to the needs of the province.

Inadequate Agricultural Research Facilities and Resources

The province has only one Agricultural Research Institute at Sariab in Quetta City. The institute has no sub-stations to conduct site-specific studies in the various agro-ecological zones of the province. The provincial agricultural research system lacks adequately trained personnel and the financial means to backstop extension services. Some

progress has been made on deciduous fruits through a UNDP/FAO project. A Date Research Centre has been established at Turbat for the improvement of the date palm. Little effort has been made to incorporate ecological, social and economic factors into agricultural research. A list of donor assisted projects is given in Box 7.

Inefficient Use of Water

The use of water for agricultural development is discussed in Chapter 4. In summary, there are now more than 21,000 diesel and electric tubewells in the province. Due to the uncontrolled increase in their numbers, groundwater levels are steadily declining. The lowering of the water-table by over-pumping has resulted in the drying up of many karezes.

In order to save water, on-farm water management has involved the improvement of 3,795 watercourses, construction of 2,000 water storage tanks and precision land leveling on 7,000 hectares. There are more than 15,000 farms that require new watercourses or improvement. According to one estimate, the present system is 45% efficient. Inefficient water use in farming occurs at three stages: water conveyance from source to field due to poor maintenance of the channels, unleveled fields and over-watering due to lack of knowledge. Studies by WAPDA indicate that water storage tanks and renovated water channels have helped increase water delivery efficiency by about 26%. This in turn increases both cropping intensities and crop yields. High-efficiency irrigation systems are still being introduced.

Waterlogging and Salination

Waterlogging is confined to the canal-irrigated areas. Salination results from inappropriate designing of the irrigation system for a lack of proper drainage leads to waterlogging and salt accumulation. In the Kirthar canal area alone, salinization has affected 5,000–7,000 square kilometres of land.

Heavy Use of Pesticides

A major issue concerns the use of pesticides and the unintended consequences of these agrochemicals. There is a very heavy use of pesticides and other agrochemicals, particularly in orchards. An increase in cotton production will inevitably result in the increased use of chemicals. These chemicals pose serious health and environmental problems if not handled properly. A recent report (Naz 1999; Ahmed 1999) estimates that 10,000 people die every year from pesticide poisoning in Pakistan. Many times that number are affected. The pesticides used are

Box 7 | Donor-Assisted Agriculture Projects

From 1970 to 1995, many donor-assisted project were under way in Balochistan. The main object of these projects was to increase agricultural production and improve the standard of living of the people. Some of the important projects were:

- Fruit Development Project, 3 phases (1979–97)
- Strengthening Agricultural Planning in Balochistan (1992–96)
- Area Development Programme Balochistan – Preparatory Assistance Phase (July 1997 – December 1998) and Implementation Phase (January 1999 – June 2003)
- Pak-Swiss Potato Development Project in Balochistan (1991–96)
- Agricultural Research Project II (Umbrella Project) (1991–98)
- On-Farm Water Management Project, Phase III (1992–97)
- National Oil Seeds Development Project (Umbrella Project) (1989–97)
- Balochistan Minor Irrigation and Agricultural Development Project (1983–96)
- Balochistan Agriculture Extension and Adaptive Research Project (1985–92)
- Fruit and Vegetable Marketing Project (1988–96)
- Agriculture Development with Widening of Pat Feeder Canal Project (1990–94)
- Introduction of Trickle Irrigation System in Balochistan (1990–96)
- Pat Feeder Command Area Development Project (1994–2001)
- On-Farm Water Management Project (1992–2000)

In addition, the province also received assistance from the national research project, Management of Agricultural Research and Technology (MART), funded by USAID. This project provided training facilities and equipment to the Agriculture Research Institute laboratories. The Arid Zone Research Centre was a component of the MART project that was responsible for conducting high-altitude research in the province.

often highly toxic, and a number of them have been banned internationally (Box 8). The problem is compounded by the use of adulterated pesticides and chemicals smuggled in from Iran.

Concerns were raised during public consultations on all aspects of agrochemical application, handling, storage and disposal. These chemicals may also reduce soil fertility. Unfortunately, little attention has so far been paid to Integrated Pest Management and integrated disease management programmes. The coverage of the pest-scouting programme is very small.

Livestock Feeding

Nutrition is a serious limiting factor for livestock production in Balochistan. Many animals arrive at the market in less than optimal body condition. The small ruminants of Balochistan survive only on the traditional livestock feeding system described earlier. The livestock fodder ratio is undesirable. Feed available from rangelands is generally deficient in protein, energy, minerals and vitamins during the greater part of the year, and has been found to be a factor in limiting the productivity of sheep and goats. Poor nutrition is generally blamed for high losses during lambing. Feed supply and quality are particularly poor during the cold winter months and before the monsoon rains in July and August. In the southern zone, feed is scarce for 10 months of the year, interrupted only by forage growth following winter rains. There is a mill in Quetta which makes animal feed including that for small ruminants.

Animal Health System

Livestock diseases are another problem limiting the production of small ruminants in Balochistan. It is estimated that only 11% of Balochistan's livestock owners have access to veterinary dispensaries. The inaccessibility of many pastures and the migratory nature of Balochistan's livestock system adds to the problems. Common diseases include anthrax, blackquarter, sheep pox, pleuro-pneumonia, bovine diarrhoea, foot and mouth rinderpest and entero-toxaemia. Parasitic infections of lungworm, intestinal worms, liver flukes and piroplasmosis are common. Ecto-parasites such as ticks, mange mites, sheep keds and warbles affect economic productivity.

Veterinary health services in the province are delivered through 54 veterinary hospitals and 666 dispensaries staffed by graduate veterinarians and stock assistants (para-veterinarians). In addition, about 100 mobile veterinary aid camps are organized annually along migration routes, where mass treatment against parasitic diseases and vaccination against infectious diseases are carried out by the staff of the Livestock Department. In 1995–96, out of 27.3 million animals, 5.6% received treatment and 11% were vaccinated.

A Veterinary Research Institute has been established at Quetta, where the emphasis is on the annual production of 8 million vaccines doses. Training is given to para-veterinarians at the Para-Veterinary Training Institute at Quetta. The Livestock Department provides in-service training for stock assistants and other staff.

Women in the Livestock Sector

Rural women spend approximately five hours a day on livestock-related activities. As with agriculture, they have no direct access to productive inputs to enhance their economic participation in the livestock sector (Dove and Carpenter 1992). Surveys at the village level reveal a wide gap between the technology used by rural women

Box 8 | Pesticides, Human Health and Environment

In Pakistan, more than 200 chemicals are registered for use in pest control. In 1998, pesticides worth Rs. 12 billion were imported into the country. Multinational companies are being held accountable for promoting the sale of their products, caring little about environmental degradation or protection. Annual pesticide use has increased from 6,000 tonnes in 1982 to 45,000 tonnes in 1997. Most of this is sprayed on cotton, while 20-30% is used on fruit and vegetables. Where Integrated Pest Management initiatives have been tried, the need for pesticide use has been substantially reduced. These technologies are being transferred to farmers at very low cost and are being used on an increasingly large scale.

At the International Workshop on Integrated Management of Agricultural Pests for OIC (Organization of Islamic Countries) Member Countries and Asia held in Islamabad in March 1999, participants heard that immediate preventive and legal measures are to be taken to ban the use of pesticides that are extremely detrimental to human health and environment. Many developing countries, including Pakistan, are still using pesticides that have been banned or restricted in western countries, for example, DDT and BHC, which are banned in the United States and most of Europe.

Source: *Nation* 9 March, 1999.

Shuja Zaidi

Livestock in Bolan Pass.

and the more efficient practices of livestock production. This is attributed to their lack of contact with extension services and lack of resources to adopt more efficient methods of livestock care. Women's access to credit is very poor due to limited mobility, lack of education and lack of collateral.

Livestock Production Constraints

Low producer prices and officially controlled market prices for many livestock products, particularly meat, are major constraints to the adoption of more intensive production techniques. Although prices have risen in recent years, they are still low compared to neighbouring countries. The feed supply falls at least 20–25% below the level needed for the livestock to produce at their full potential. The grazing resource is finite, and it is difficult to persuade users to adopt sound grazing practices to permit improved productivity.

The quality of skins is poor. Problems include thin leather and a smaller size compared with skins from Afghanistan and Iran. Skins are damaged during flaying and handling skin parasites and through improper preservation. There are no organized training courses for those in the business. Fleeces are damaged from poor shearing techniques. The sorting and marketing of wool leaves much to be desired. The wool produced is coarse and suitable for carpet making only. The average yield is 1.5–2.0 kilograms per animal a year.

One positive aspect of the wool sector is that exports have exceeded imports for the period 1994–95 to 1996–97. In 1996–97, the export of wool was worth Rs. 647 million, while imports were Rs. 325 million. This trend, if sustained, suggests the acceptance of local wool in international markets, as well as an increase in domestic consumption.

Lack of Coordination

Difficulties in coordinating the work of different institutions are a major constraint in the livestock sector. In particular, coordination is often lacking between Crop Extension Services, which is responsible for fodder crops, and Livestock Services. Priorities are not agreed upon, so fodder crops receive little attention. Coordination

Fazal Dad Kakar

Threshing, the traditional way, near Sibi.

between the forestry and livestock departments also poses a constraint to the development of rangelands and range management practices.

Poultry Raising

The major problems in rural poultry-rearing arise from epidemics of the New Castle disease (ranikhet), which often wipes out entire village poultry populations. During the last two decades, an increasing number of improved breeds like Dokki, Fayoumi (Egyptian breeds) and Mini-red have been introduced under an UNDP/FAO project. They have better performance and acceptability in rural environments. While the informal poultry sector is as large as the commercial one, little attention has been paid to developing it, despite the fact that it provides a large part of the basic diet to more than 75% of the population. The commercial poultry market is characterized by a volatile supply and demand situation, resulting in fluctuating prices.

CONSEQUENCES OF INACTION

Desertification

Drought is a recurrent feature in Balochistan, and in case of crop failure, livestock provides the security of food and hard cash. In rural communities, the number of animals a person owns confers status. This leads to the maintenance of larger herds of poor-quality animals. Grazing pressure increases, causing degradation of rangelands. The major consequence of managing rangelands ineffectively is the depletion of a vital primary resource base for rural communities. This has far-reaching social and environmental implications.

One of the major environmental consequences of land degradation is accelerated desertification. This term

is defined as degradation caused by human activities. It involves a substantial decrease in plant cover and accelerated soil erosion. In Balochistan, the major problem is the exploitation of rangelands for fuel and uncontrolled grazing (Atiq-ur-Rehman 1997). Most of the mountain slopes in Balochistan are already ecologically dead due to advanced irreversible soil erosion (Gils and Baig 1992). The consequences of soil erosion in Balochistan include:

- irreversible loss of vegetation and soil on the mountain slopes that form about 50% of the total area of Balochistan;
- increases in the already high natural rates of siltation and sedimentation of reservoirs; and
- the loss from arable land of topsoil that contains most of the nutrient and organic matter on farmland, resulting in reduced soil fertility and water-holding capacity, and consequently, decreased crop yield.

Poverty, Migration and Security

If the current trend of overgrazing and uprooting of shrubs and trees for fuelwood continues, it is expected that the number of animals that can survive on these rangelands will be further reduced. The direct social impact of this, particularly on landless farmers, will be further impoverishment. An increase in poverty, together with a depleted natural resource base, forces people in rural communities to look for other work. This triggers migration to urban centres. It is probably one of the major contributors to uncontrolled urbanization in Balochistan. The depletion of rangeland resources and growing population pressures have probably weakened communal organization and traditional tolerance. Although there are presently not many reports of serious conflicts between tribes about land and grazing rights, thee could occur unless the growing pressure on rangelands is eased.

THE STAKEHOLDERS

The stakeholders in the agro-pastoral sector are:

- public-sector organizations: the Agriculture Department, the Forest Department and the Livestock and Dairy Development Department;
- the private sector, such as farmers, livestock owners and herders;
- non-governmental organizations (NGOs); and
- the people – communities, households and individuals.

The Department of Agriculture is responsible for implementing policies and programmes in agriculture. The Livestock Department is responsible for animal health care, artificial insemination and breed improvement. The Forest Department, in addition to the conservation and development of forests, is also responsible for the management of rangelands, soil conservation, watershed management and wildlife management.

The Pakistan Agricultural Research Council, a parastatal organization, operates a well-established Arid Zone Research Centre at Quetta. Part of its mandate is 'to find solutions to the problems of arid and semi-arid zones to improve the sustainability of biological systems and to lessen the dangers of further environmental destruction of the fragile ecology of these dry areas'. Research activities are, however, at a low point due to funding difficulties.

THE WAY AHEAD

Land Use

The following steps will be taken to address the major issues and trends concerning the land resources of Balochistan:

- integrated land use planning process;
- production and distribution of an electronic resource atlas of Balochistan; and
- preparation of a risk analysis of seismic activity along major faults and subduction zones.

Integrated Land Use Planning

Decisions on the future development of the province will take into account the needs of the people, the needs of the country and the desire to be a major player in the opening up of Central Asian markets. Decision-making will accommodate all these demands, and appropriate processes will be developed to ensure that limited resources are applied where they can do most good.

Current Planning Processes

Development planning is done on an annual and five-year basis. It is carried out according to triennial sectoral plans advanced by departments. Very little is forthcoming in such key sectors as fisheries, mines and minerals, energy and industry. Decision-making is largely ad hoc. Although it is generally agreed that the resource potential of the province is significant, the nature and extent of these resources is poorly known. The province is large, the infrastructure is poor and access to many areas is difficult. Much of the information about the province is derived from gazetteers published at the turn of the

century. The recently published District Profiles (by P&DD in 1997), probably the best-organized sources of information currently available, rely entirely on secondary and inaccurate information. Measures to improve and disseminate development statistics are under way in the Planning and Development (P&D) Department.

Some attempts have been made to classify land use. The figures quoted earlier are derived from the Agricultural Statistics of Balochistan, which looks at the net potential area available for cultivation. As noted, usage on only half of the land area of Balochistan is reported. Changes in district boundaries over the past 50 years further complicate record-keeping. At best, data are unreliable. Most effort has been put into assessing the agricultural potential of the province. But detailed information on the distribution and extent of existing and potential agricultural land is not generally available. This information is essential in making planning decisions – ensuring the most effective use of limited resources; ensuring the maximum benefit to the largest number of people in the most deserving areas; focusing on areas with greatest water potential; and capitalizing on the developing network of farm-to-market roads.

Other resource uses need to be taken into account. The problem of classifying and assessing the extent and distribution of forests, rangelands and areas of critical importance to biodiversity have been identified. Some of this information may be held in departmental records, but it is not easily accessible for planning purposes.

Future Integrated Processes

It may be that agricultural development in some areas is not economically viable, given the availability of water and agricultural inputs, labour and infrastructure. But there may be other options that offer better short or long-term benefits. Balochistan is rapidly urbanizing. The pattern and implications of urban development needs to be assessed both on a province-wide basis and at the district and city level. The growth of cities inevitably involves hard decisions on land development – the land most suited to productive purposes is usually the first to go. Strategic decisions have to be taken on the development of roads, water supply and energy. Rapid development in the coastal zone also has implication for land use planning.

There is thus a strong case for establishing an integrated land use planning process to guide decision-making and help establish priorities in response to provincial, national and international economic imperatives. The process will recognize the needs of all stakeholders — civil society, government and the private sector. Traditionally, decision-making has been most effective at the local level. The process will therefore be geared to the local level, and national needs and regional development will be set in that context.

Decisions on the most appropriate use of the land resources of the province will be based on comprehensive land use plans. The approach will be integrated and participatory. Land use plans provide the overall framework for development decision-making. This includes physical infrastructure, agriculture, fisheries, grazing lands, urban development, forests and plantations, parks and recreation, protected areas for the conservation of biodiversity, non-renewable resources, transportation corridors and industry. The scale of planning needs particular consideration.

Land Use Planning Commission

The process and institutional arrangements will ensure that information flows freely to those who need it. At the same time, the approval process will be free from unnecessary red tape. That implies putting responsibility and accountability in local hands. There will be a coordinating body at the provincial level. This will take the form of a Land Use Planning Commission. The Commission would be independent, reporting to the provincial chief executive. The Commission will be established under a Land Use Planning Act, independent and impartial, and be highly credible.

The Terms of Reference of the Land Use Planning Commission will include:

- developing and implementing integrated land plans for the sustainable use of land resources;
- ensuring that land use planning processes meet the objectives of transparency, public participation and involvement of all stakeholders;
- developing terms of reference for the preparation of land use plans in consultation with the communities concerned, and with the input of all stakeholders;
- developing and maintaining a comprehensive and up-to-date assessment of land capability, use, trends and demands;
- developing terms of reference for planning area steering committees and planning offices;
- developing and overseeing the implementation of research, monitoring and evaluation programmes, including the identification of appropriate indicators of sustainability;
- recommending the appropriate use of land resources;
- recommending policy and legislation on all matters concerning the use, conservation, protection, restoration and rehabilitation of the resource;
- ensuring that environmental assessments are conducted for all projects and programmes affecting or

Jalal-ud-din Qureshi

Planning needs to put aside areas for protection e.g., these juniper forest near Ziarat.

likely to affect land resources, that the results are made publicly available, and that they are taken into account in decision-making;

- ensuring that the province's rights and obligations are met in matters affecting trans-jurisdiction and trans-boundary use;
- developing codes of practice for land users in all sectors;
- holding public hearings and ensuring the participation of all stakeholders on major issues affecting the resource;
- ensuring that both scientific and local (indigenous) knowledge is used in assessing land uses, capability, restoration and effects of development activities;
- ensuring liaison with other jurisdictions;
- developing education and communication programmes; and
- handling any other matters referred to them by the provincial chief executive.

Participatory Planning

The plan will be developed at the local level. This is clearly the wish of the communities and is consistent with the decentralization of decision-making and the strengthening of local bodies. The first and most important step is involving communities and stakeholders right from the beginning of the planning process. This means having discussions with them on the goals and objectives of planning, the process to be followed and their role in that process. The terms of reference for the development of the plan will be established through a participatory process.

Selecting Planning Areas

There are a number of options for selecting planning area, each of which has merit and needs to be explored in depth. There are numerous technical, social, economic, political and administrative factors to be taken into account. For example, it may be desirable to define planning areas on sectoral criteria. Planning might focus on industrialization in the Karachi hinterland

Liaqat, BCIAP

Canal irrigated agricultural areas would benefit from better planning.

falling in Balochistan, an area with a particular set of economic, social, physical and environmental issues that is intimately linked to planning initiatives and policies in other jurisdictions.

The coastal zone has another particular set of issues, geared to the development of the fisheries, the use of very limited fresh-water supplies, the frequency of catastrophic events, such as flash floods and coastal erosion, habitats for important animals and plants and major infrastructure development. A strong case can be made for the development of an integrated coastal zone management plan that takes into account this diverse range of issues and interests (see Chapter 6).

Canal irrigated areas are likely candidates as priority areas for planning, given their intense development for agriculture, allied industries and services. Remedial measures under the National Drainage Programme and restoration of waterlogged and saline soils pose particular environmental challenges that would benefit from an integrated approach.

Planning areas could also be established according to priorities at the local, district and provincial level. They might arise in response to initiatives, such as mine development in Chagai, as major mining development in this area seems assured. Development in this area might also accelerate development of a transportation corridor from Chagai to the coast, to the parts of Central Asia. It might provide the impetus for other mining initiatives that are currently uneconomic. International corporations plan on the basis of regional resources and see Balochistan as part of an archipelago of resource-rich areas in Central Asia that may be physically linked in the future.

Responsibility for land use planning falls within the jurisdiction of the P&D Department. New planning mechanisms will benefit from and complement structures already in place and information management systems being developed. Links will also be made with planning processes envisaged at the water basin and urban levels.

Steering Committees

A Steering Committee will be appointed for each planning area. Its members will reflect the socio-cultural make-up of the area and include representatives of the major stakeholders and the general public. The Steering Committee will oversee the planning process. It will ensure that plans conform to the terms of reference, that the process is open and transparent, and that it is truly participatory in nature. The group would hold public meetings to obtain feedback on the progress of planning and ensure that it is geared towards the needs of

the local people. The committee would submit a report on the progress of planning to the Land Use Planning Commission on a regular basis.

Land Use Planning Offices

Each planning area will require a planning office, which will be located in a community within the area. The work of the planning office would be supervised by the local Steering Committee. As much as possible, its staff will be drawn from the local area, with technical resources provided by the government. Planning is an iterative process and takes time. There is no single plan that can serve the needs of an area forever. Rather, plans will evolve and change as circumstances dictate. Building capacity among local people is therefore a priority.

The responsibilities of the office are largely of a technical and coordination nature. The Director of the Planning Office would serve as secretary to the Steering Committee, and report to the Land Use Planning Commission. The Director would be the point of contact with other planning teams, line departments and district administrations. The office would compile all the technical information required to develop the plan and ensure that it is accurate and up to date. It would draft land use plans in accordance with the terms of reference developed by the Land Use Planning Commission, and under the guidance of the Steering Committee.

The Planning Office would ensure that the provisions of the Pakistan Environmental Protection Act 1997 are fully adhered to and that best practices are used to ensure that all projects that may affect the use of land resources are fully assessed. The results of these assessments will be provided to the Planning Commissions in support of decision-making and monitoring.

Codes of Practice will be prepared by the Planning Office to inform all users of their obligations toward the proper use of land.

The Planning Office will be responsible for the organization of public hearings as required by the Steering Committee and Planning Commission, for ensuring that all stakeholders are given a fair and equitable opportunity to be heard and for understanding the implications of the subject under consideration.

The institution of a land use planning process is directed towards stimulating the development of resources in a sustainable manner. It is a measure to ensure that people are fully involved in the process and that development in the province is carried out in an equitable, efficient and effective manner. It will also promote inter-departmental coordination and cooperation.

As a start, a section or cell in the P&D Department will be made responsible for implementing the recommendation, in collaboration with the Board of Revenue and line departments.

Electronic Resource Atlas of Balochistan

> An authentic up-to-date Atlas of Pakistan, ever since attaining independence by the nation, had keenly been awaited by all map-minded intelligentsia of geographers, educationists, planners, policy and decision-makers. The atlases available in the country till then had all been foreign drafted, depicting Pakistan insignificantly and portraying foreign political concepts, specifically in matters relating international boundaries while those drafted and published by private sector as commercial projects presented none or limited phase of socio-economic life of the nation.
>
> Survey of Pakistan (1997)

Much is known about Balochistan, yet little is recorded. The District Gazetteers produced at the turn of the century are still invaluable reference works on the resource characteristics and historical development of the province. The District Profiles, prepared in 1997, summarize the available information. Very little of that information is available in mapped form.

Gils and Baig (1992) did break new ground by providing much useful information on maps. More recently, the acquisition of sophisticated computerized tools, such as geographical information systems, has allowed some projects to produce maps depicting a wide variety of sectoral and thematic information. These are generally at a large scale, covering the entire province or individual districts. The federal government produces and controls other sources of information, including the National Atlas, topographic and thematic maps, hydrographic charts, aerial photographs and remote sensing images. Good coverage of Balochistan is available from neighbouring countries and from software producers, but obtaining information from within the country has been very difficult, ostensibly for reasons of security. The Survey of Pakistan has begun the task of digitizing its maps, which opens up the opportunity to produce maps and atlases on equipment already in use in the province.

The production of an Electronic Resource Atlas of Balochistan will be a major, groundbreaking initiative that will literally put the province on the map, and be an invaluable resource for land use planners, resource managers and the development community. It will capitalize on the large amount of existing information and expertise with-

in the province. It is more than just a tool, however. There is a great deal of information required on the distribution and extent of renewable and non-renewable resources in the province. Production of a Resource Atlas will provide the necessary focus and mechanism to develop much-needed information at the level of detail required by land use planners, line departments, water boards, district administrations and other stakeholders. This initiative will also limit the proliferation of expensive technologies and duplication of effort.

The responsibility for production of the atlas will be assigned to an organization with a mandate or particular interest in this area. The task will involve coordinating the development of the maps, ensuring consistency and quality control, overseeing production, distributing the product in electronic formats and maintaining and updating the files. The actual work of map production will be done by one of the agencies with the necessary equipment and training. The coordination and production functions will be assigned to well-established organizations. The task of compiling information for the thematic maps will be assigned to sector and thematic specialists. Initially, the maps will be developed from available information. Once gaps have been identified, the required information will be filled through coordinated resource inventory and research programmes.

A suggested Table of Contents for the Atlas will form the basis for further elaboration (Table 6).

A Steering Committee will be established to develop guidelines for the production of the Atlas. The Committee will include recognized specialists in the sectors and themes to be covered. They will establish the process and schedule for map production, set the standards to be followed, identify the best sources of information and examine ways of ensuring that the potential of the Atlas is fully exploited in the analysis of trends and other development planning applications.

The cooperation of the federal government in this endeavour is very important. This will be the first initiative of its type in Pakistan. The federal government will make available the latest maps and imagery to the project. Thirteen maps included in this document have been developed on GIS. These could be used in developing the Atlas.

Prepare a Risk Analysis of Seismic Activity Along Major Faults and Subduction Zones

Seismic events have shaped the history of the province and have had profound effects on people and property. They are recurring events, given that Balochistan lies on several active faults. A risk assessment will therefore be undertaken as an input to development planning and emergency preparedness measures. This would include coastal areas, where major port development is anticipated and in areas where major water control schemes are planned.

Agriculture

The government will address the high levels of risk faced by the poor by taking steps that minimize the extent to which poor households are forced to mine resources in situations where they fear falling below subsistence-level consumption. Governments will provide work opportunities (such as food-for-work programmes) to the poor in times of drought or flooding, in conjunction with on-going natural resource management programmes.

Laws that make it difficult for the poor to gain legal title to land will be rewritten and simplified. Where they do not exist, laws that provide an adequate legal framework for settling land disputes will be instituted. Where common property resources are being exploited, the government, along with NGOs active in the field, will help develop mechanisms to regulate the use of these resources.

The government, in partnership with the private sector, will also create opportunities for off-farm employment for the increasing population in, for example, agro-based industries. Development of cottage and agro-based industry will greatly relieve the pressure on the fragile renewable resources in the province, by providing the poor with alternative sources of income. Existing training centres will be reorganized and equipped and new centres will be established if necessary. The government will:

- Use NGOs to enhance access to agriculture extension services and inputs.
- Promote irrigation efficiency through on-farm water management and drip irrigation methods, especially in uplands.
- Implement and enforce cost-recovery measures to economize on irrigation water use, and to avoid the damaging processes of waterlogging and salinity.
- Help farmers in planning the area under individual crops especially those which are perishable, e.g., onion.
- Improve marketing of agricultural crops and fruits.
- Entrust water management and cost recovery to communities with the whole-hearted support of the government.
- Investigate less expensive and more sustainable measures of biological control on waterlogging.
- Investigate the possibility of replacing the present manual system of collecting yearly statistics with a

Table 6 Digital Resource Atlas – Table of Contents

Subject	Theme	Scale	Contents
Location	Balochistan in relation to Central & West Asia	**1: 15 million**	International boundaries, major cities and transportation
	Balochistan in Pakistan	**1: 8 million**	Boundaries, major cities, major roads, railways, airports, ports and harbours
Province of Balochistan	General	**1: 8 million**	Administrative boundaries, roads, railways and towns
	Physical	**1: 8 million**	Relief and drainage
	Geology	**Sketch map**	Structural features and origin
		Best available	Major geological divisions
		1: 8 million	Metallic minerals and mines
		1: 8 million	Hydrocarbons: proven, probable and potential resources
		1: 8 million	Geothermal resources and other features of interest
	River basins	**1: 8 million**	River basins and major sub-basins and surface drainage
		Appropriate to each basin	Major features of geology, drainage and discharge
			Land use and water supply, e.g. springs, karez, tubewells, and dams, chart of supply/demand, location of hydrometric stations, degraded areas
	Climate	**1: 8 million**	Climatic zones with charts of precipitation and temperature, major air masses and monsoons (coastal area)
	Precipitation	**1: 8 million**	Seasonal: winter and summer rainfall distribution, monsoon effect
	Solar radiation and winds	**1: 8 million**	Annual incoming radiation and wind rises for major stations, location of meteorological stations
	Soils	**1: 8 million**	Soil formation, land capability, classification
	Land use	**1: 8 million**	Major land uses, e.g. agriculture, forests, rangelands, protected areas, canal command areas, settlements, industry
	Vegetation	**Best available**	By vegetation type
	Wildlife	**Best available**	Distribution of important species, migration routes, flyways, wetlands, staging, wintering and nesting areas and other critical habitats
	Rangelands	**Best available**	Patterns of use, seasonal migrations
			Classification of range types/capability and areas heavily utilized
	Forests	**Best available**	Distribution of juniper, chilghoza, pistacia, olea, mazri, haloxylon, mangrove and other major forest types
	Fisheries & coast	**1: 8 million**	EEZ, fishing limits, bathymetery, coastal settlements, harbours, islands, protected areas, mangroves, estuaries, shipping lanes
		Best available	Productivity, fishing grounds (inshore/offshore) and seasonal distribution of stocks
	Ecological land classification	**1: 8 million**	Derived from the above
	Conservation of biodiversity	**1: 8 million**	Existing and potential protected areas
	Population	**1: 8 million**	Distribution of population and time series showing change in numbers and distribution. Projections of growth centres
	Settlements	**1: 8 million**	Urban areas: cities, towns and villages; time series on growth of urban centres

Subject	Theme	Scale	Contents
	Cultural diversity/ languages	**1: 8 million**	Distribution of major cultural groups and languages
	Cultural heritage	**Best available**	Historic and archaeological sites/areas of special interest, communication links
	Economic development	**1: 8 million**	Industrial estates, electrical grids, gas pipelines, proposed roads, harbours and airports
	Agriculture	**Best available**	Areas under irrigated, sailaba, and khushkaba agriculture, distribution of areas suited for agricultural development, major crops, agricultural productivity, trends in crop production and productivity
			Irrigated agriculture, waterlogging, salination and drainage

Note: This is an incomplete list and will be expanded to include mapping at the district level and watershed level as inputs to land use planning and water management, e.g., land uses, biodiversity and ecological land classification.

system based on remote sensing techniques. The work can be contracted out to a competent organization. Many organizations in Pakistan (and perhaps even in Balochistan) would have the capacity to provide such a service at a reasonable price.

- Transfer responsibility for agriculture extension, as far as possible, to communities and the private sector. For example, some local people can be trained in pest control. They can then provide services to the communities for a fee. Extension services by oilseed and agricultural chemical industries are also examples of the private-sector potential.
- Given limited funds, agriculture research will be reoriented to solving farmers' problems, focusing on a few priority areas. Mobilizing existing capacity is preferable to creating more capacity (equipment, buildings and staff). In doing so, attention will be given to environmental problems that are believed to be the cause of the increasing number of unexplained deaths. This might be related to the improper use and disposal of pesticides.

Livestock and Rangeland Resources

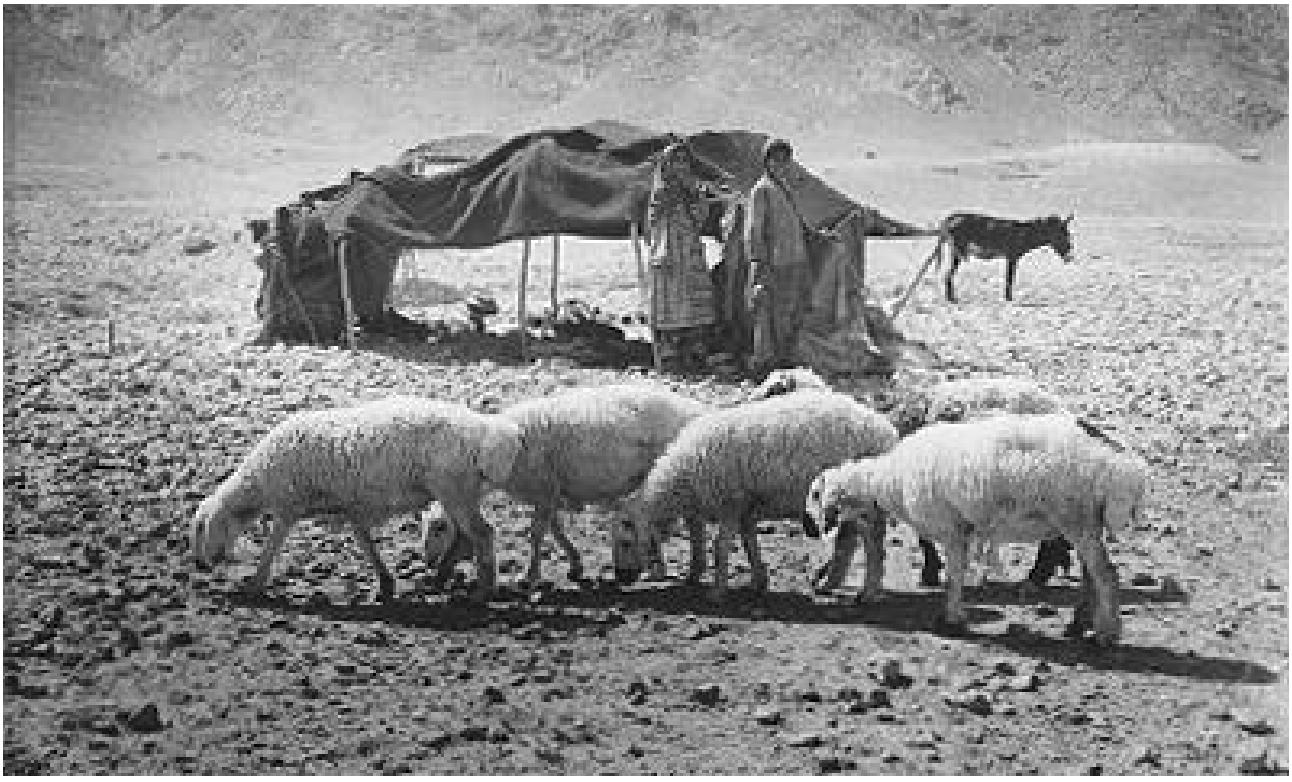
The uplands of Balochistan, for many people, are characterized by flocks of sheep and goats and the seasonal movements of the people who tend them. It is a traditional way of life, full of cultural and social traditions and established, seasonal migratory patterns. It is more than a romantic image. While it may be a lifestyle of tradition, choice or inclination, in reality there are few options open to herders if they are to maintain social and cultural integrity. It is a hard way of life, but likely a reality for many people for generations to come. For that reason, it is a way of life to be recognized and better understood.

It is also a way of life that is susceptible to unintended changes as a result of other human activities that pose restrictions or impose hardships. Examples are changes in land tenure, agricultural development, water management practices, transportation corridors, energy development, mining and industrial activities. These types of changes may be responsible in part for the rangeland problems we see today, which are attributed to grazing and the use of trees and shrubs for fuel.

A policy on nomadic and transhumant pastoralism will be developed to ensure the sustainability of these lifestyles, and to enhance the benefits that flow from it. The seasonal rhythms of nomadic peoples will be fully documented. This takes time if it is to done thoroughly. Once development activity begins, there will be little opportunity to undertake this work. Some information on seasonal movements is available, but much more needs to be understood about the routes these pastoralists use, their grazing strategies and their decision-making systems. They are among the people who have the most intimate knowledge of the land and its resources. Understanding their cultures may provide a key to the issues of overgrazing and suggest strategies for ameliorating the situation and reversing these trends. Nomadic peoples may have a particular knowledge of the natural environment, its biodiversity and rhythms. Recording such information requires the informed consent of the people concerned and a great deal of patience on both sides. The results are potentially very rewarding.

Improvements in this sector will be sought through:

- Creating the capacity for providing animal health services to transhumant and nomadic herders. Their seasonal movements do not permit them to take advantage of the facilities provided by the government. The need for more sophisticated animal



Shuja Zaidi

Nomads – the people with the most intimate knowledge of the land and its resources.

health services will be met by setting up well-serviced facilities in suitable locations along migration routes. These services will be operated on a seasonal basis to save costs.

- Encouraging and establishing marketing associations to ensure a fair price to the farmers.
- Improving range management by seeking security of tenure of ownership and use, and by improving range productivity through rotational grazing and resting (pargorh). Priority will be given to ranges used by sedentary and transhumant livestock, as it will have greater continuity in management and will allow the consolidation of results. Nomadic grazing is less amenable to such an approach, and will be further studied to identify appropriate interventions.
- Establishing the true extent of rangelands and their grazing potential by undertaking mapping and assessment studies.
- Increasing the contribution of livestock and range resources to the province's economy, with special attention being given to improvements in grazing systems, herd management, animal health and marketing; and assessments of the true potential of rangelands and monitoring changes in them. This will be best pursued through pilot projects in select areas focusing on sedentary and transhumant systems.
- Transferring veterinary health services, especially preventive care, from the public sector to the private sector. This is particularly appropriate in the case of nomadic and transhumant systems. Building the capacity of the local people in vaccination and the treatment of simple ailments will be less expensive and more useful. The same would also apply to the treatment of poultry.
- Creating an awareness of the contribution grazing lands can make to poverty reduction. A large percentage of Balochistan's population depends heavily on livestock.
- Encouraging the private sector to invest in dairy development, breed improvement, poultry farming, hygienic slaughtering of animals, disease prevention and care, and animal feed production.
- Handling of livestock related environmental issues in urban centres especially in Quetta, e.g., open unhygienic slaughtering and meat selling, dairy farms, and animal herding on waste dumps.
- Establishing fodder plantations in rural areas as reserves to cope with drought situation.

Chapter 4

Fresh
reso

Freshwater Resources

Balochistan is by nature an arid area, and therefore, scarcity of water is typical of much of the province. Water enables and sets limits on settlement patterns and population growth, agriculture and industry. Access to a reliable supply of clean water is fundamental to the growth and prosperity of the province. Gils and Baig (1992) predicted that by 2000, the water supply of Quetta would collapse, livestock populations would decline drastically and the area under irrigated agriculture would decrease. That has started happening steadily and there are no grounds for complacency. The supply and demand for water must be thoroughly understood if this resource is to be managed on a sustainable basis.

SUPPLY

There are two sources of supply: surface water and groundwater.

Surface Water

Surface water in Balochistan comes from precipitation, in the form of surface runoff, and from Balochistan's share of water from the Indus River. Precipitation is concentrated in the winter months in most of the province, and may accumulate as snow on the higher mountains. Eastern areas of the province, particularly on the fringes of the Indus Basin, receive some monsoon rains. Overall, precipitation is erratic, and accurate information on it lacking. There are three major drainage systems, defined according to the distribution of surface runoff. The three systems, in order of size, are the coastal, inland and Indus drainage. See Map 3 in Maps sction.

Coastal

This system is characterized by small, ephemeral streams and hill torrents draining into the Arabian Sea. It comprises four river basins: the Dasht, Shadi Kaur, Hingol and Porali. The coastal drainage system covers an area of 17.25 million hectares.

Inland

This system dominates the central and northwestern areas of the province. It is characterized by ephemeral rivers and streams, many of which drain to the western desert regions of Chagai, Kharan and Afghanistan. The system comprises six main basins: Zhob, Pishin-Lora, Hamun-e-Lora, Hamun-e-Mashkel, Mula and Rakhshan. These basins cover an area of 9.83 million hectares.

Indus

The Indus drainage is located in the northeastern margins of the province. There are three main basins: the Kachi Plain, Nari, the Kaha River and the Gaj River. The surface area of this drainage is 7.62 million hectares.

Balochistan shares a number of basins with Iran, Afghanistan and the other provinces. An understanding of the hydrogeology of these basins is the key to future development of the province.

There are 13 major perennial river systems in Balochistan (Table 7). The flow in the rivers is characterized by spring runoff and occasional flash floods. The numerous and extensive systems of channels and floodplains are evidence of the intensity of these events. There are a lot of variations and discrepancies in the data and estimates of perennial flows. Meteorological data are collected from a few stations located in valleys where precipitation may be lower than on adjacent mountain slopes. Predicting surface runoff is a difficult task and relies heavily on empiricism and rules of thumb. For planning purposes, it is estimated that floodwater and runoff averages 12,500 million cubic metres (mcm) per annum.

Balochistan has a share in the water of the Indus River system (Indus Basin Accord 1991). The province is entitled to additional water during the summer season, subject to the condition that additional storage reservoirs are created on the Indus River System (Table 8).

Table 7 Catchment Areas and Average Annual Runoff of Major Rivers

River	Catchment Area (million hectares)	Average Annual Runoff (million cubic metres)
Bolan	0.40	**63**
Chattar	0.22	**109**
Dasht	2.52	**279**
Hingol	3.44	**1,990**
Hab	0.93	**247**
Kaha	0.57	**476**
Lahri	0.39	**190**
Nari	2.15	**560**
Porali	1.29	**569**
Sanghar	0.49	**416**
Shadi	0.43	**132**
Sori Janubi	1.71	**204**
Vehowa	0.26	**159**
Total	14.80	**5,394**

Source: P&DD 1993a.

Groundwater

The geology of the province favours the formation of groundwater reservoirs. Water is recharged primarily in the mountains and nullahs, and to a lesser extent, on alluvial fans and plains.

It is evident that all of the annual potential is being extracted in the Nari and Pishin Lora basins and that several of the others have limited development potential (Table 9). Groundwater resources were recently reassessed (Halcrow Rural Management 1995) in four basins and were considered to be overexploited. Two basins were reassessed where the development potential was considered high and where climatic conditions are favourable. The results confirm that the Pishin Lora basin is in deficit and that the development potential of others is limited at best. Where surpluses are available, extraction may have an impact on downstream areas. The use of surplus water in the Kachhi and Hamun-e-Lora basin is constrained by poor water quality.

The issues surrounding water management in different basins are different in nature. The figures do not, however, tell the whole story about development potential. A reassessment of several basins revealed that assessing the status of groundwater basins is complex, that several sub-basins were in deficit (the groundwater reservoir is being mined) and that there are major constraints to extracting more water, even when there is a positive water balance. A new project, the Quetta Water Supply

Table 8 Balochistan's Share of Water from Indus River System

	Kharif	Rabi (million cubic metres)	Total
Perennial	3,520	**1,260**	4,780
Seasonal (expected)	2,062	**210**	2,272
Total	5,582	**1,470**	7,052

Source: Majeed and Qureshi 2000.

Table 9 Reassessment of Basins

Basin	Resource Status	Sub-Basin	Groundwater Available (cusec)	Groundwater Development Potential Available (cusec)	Civil Districts
Hamun-e-Lora	Surplus	**Western**	33.2	**16.6**	Chagai
		Eastern	4.8	**2.5**	
Kachhi Plain	Limited surplus	**Sibi-Dhadar**	32.3	**19.0**	Sibi
		Kachhi	10.0	**10.0**	
Nari River	Limited surplus	**Loralai**	– 11.6 (deficit)	**Nil**	Loralai, Ziarat
		Duki (dependant reservoir)	8.5	**Not available**	
		Gumbaz (dependant reservoir)	20.0	**Not available**	
Pishin Lora	Heavily overdrawn	**Quetta**	– 29.0 (deficit)	**Nil**	Quetta, Pishin, Kalat, Mastung
		Mangochar	– 14.7 (deficit)	**Nil**	
		Mastung	– 9.8 (deficit)	**Nil**	
		Pishin	– 55.5 (deficit)	**Nil**	
Porali Basin	Surplus	**Wad**	39	**19.6**	Khuzdar, Lasbela
		Phat Jhat	9.8	**4.9**	
		Ornach	10.0	**5.0**	
		Bela Plain	108.0	**54.0**	
		Dureji	90.2	**45.1**	
		Saruna	19.5	**21.8**	
		Winder Nai	12.0	**6.4**	
Zhob	Limited surplus	**Muslim Bagh**	Balance	**Nil**	Zhob, Qila Saifullah
		Qila Saifullah	Deficit	**Nil**	
		Zhob	11.2	**11.2**	
Mula	Surplus		26.0	**16.0**	Kalat, Khuzdar
Gaj	Surplus		38.0	**18.0**	Kalat, Khuzdar
Hingol	Surplus		296.5	**148.0**	Kalat
Dasht	Surplus		51.0	**41.0**	Kech, Gwadar
Rakhshan	Surplus		27.0	**22.0**	Panjgur
Hamun-e-Mashkel	Surplus		68.0	**63.0**	Kharan
Shadi Kaur	Basin not assessed				
Kaha River	Basin not assessed				

and Environmental Improvement Project, funded by the Asian Development Bank, will attempt a more detailed assessment of the Quetta sub-basin (GKW Consult 1999). This is the latest in a series of attempts to accurately assess the actual water balance for the groundwater resources of the alluvial aquifer. The study will re-examine all of the water supply options for Quetta.

DEMAND

The increase of 2,270 million cubic metres (mcm) in the share of surface water from the Indus, from 4,780 mcm in 1998 to 7,050 mcm in 2025, will be used exclusively for agricultural purposes (Table 10). Groundwater supplies are assumed to remain constant

at 1,071 mcm, with 550 mcm or half being used by 2025 for agriculture and 200 mcm or 19% for drinking purposes. The total use of surface water from floods and runoff is expected to increase from 1,568 mcm in 1998 to 11,130 mcm by the end of the forecast period in 2050.

Over the period 1998–2050, more than 90% of all available sources would be in use, with 86% dedicated for agriculture. Surface runoff will play an increasingly important role, rising from 8.5% of the total available water in 1998 to 54% in 2050.

Domestic Consumption

The present population of the province is estimated to be 6.51 million (Population Census Organization 1999b). At an average growth rate of 2.42%, the population is

Table 10 Water Balance

	1998	2010	2025	2050
		(million cubic metres)		
AVAILABLE WATER				
Surface water (Indus river)	4,780.0	**7,050**	7,050	**7,050**
Surface water (floods and runoff)	12,460.0	**12,460**	12,460	**12,460**
Groundwater	1,071.0	**1,071**	1,071	**1,071**
Total Available Water	18,311.0	**20,581**	20,581	**20,581**
WATER USED				
FOR AGRICULTURAL PURPOSES	6,772.0	**11,030**	15,100	**17,700**
From surface water (Indus river)	4,780.0	**7,050**	7,050	**7,050**
From surface water (floods and runoff)	1,560.0	**3,500**	7,500	**10,000**
From groundwater	432.0	**480**	550	**650**
FOR DRINKING/DOMESTIC PURPOSES	147.0	**530**	860	**1,350**
From surface water (Indus river)	0.0	**0**	0	**0**
From surface water (floods and runoff)	0.0	**360**	660	**1,070**
From groundwater	147.0	**170**	200	**280**
FOR INDUSTRIAL PURPOSES	17.1	**25**	60	**125**
From surface water (Indus river)	0.0	**0**	0	**0**
From surface water (floods and runoff)	5.0	**10**	25	**50**
From groundwater	12.1	**15**	35	**75**
FOR MINING PURPOSES	16.0	**26**	38	**60**
From surface water (Indus river)	0.0	**0**	0	**0**
From surface water (floods and runoff)	3.5	**6**	8	**10**
From groundwater	12.5	**20**	30	**50**
TOTAL WATER USED	6,952.1	**11,611**	16,058	**19,235**
From surface water (Indus river)	4,780.0	**7,050**	7,050	**7,050**
From surface water (floods and runoff)	1,568.5	**3,876**	8,193	**11,130**
From groundwater	603.6	**685**	815	**1,055**
BALANCE LEFT	11,358.9	**8,970**	4,523	**1,346**
Surface water (Indus river)	0.0	**0**	0	**0**
Surface water (floods and runoff)	10,891.5	**8,584**	4,267.0	**1,330**
Groundwater	467.4	**386**	256	**16**

Source: Majeed & Qureshi 2000.

expected to reach 8.68 million in 2010 and 22.58 million in 2050. Domestic water consumption includes water for drinking, washing, bathing, sanitary and other purposes. The per capita domestic water consumption depends on climatic conditions, metering of supply, quality of water, population characteristics and sewerage and drainage facilities (Halcrow Rural Management 1995). With an improved standard of living, the per capita demand for water is assumed to increase to 40 gallons per day by 2020, after which it is assumed to become constant. The total domestic water demand of the province is expected to be around 531 mcm in 2010 and 1,354 mcm in 2050 (Figure 6).

Quetta city is now faced with an ever-increasing gap between supply and demand of water for domestic use. The official population of the city currently stands at about 560,000. At present, 10 million gallons per day are being supplied to the urban areas. This represents about 18 gallons per capita per day, which is slightly less than the 20 gallons minimum set by the World Health Organization. The water demand for Quetta urban area is estimated to reach about 46 mcm in the year 2010 and 117 mcm in the year 2050 (Figure 7).

Non-Domestic Use

In calculating demand, allowance has to be made for public use, which includes educational institutions, government buildings, hospitals, parks and the military. Allowances for

Figure 6 | Trends in Domestic Water Consumption

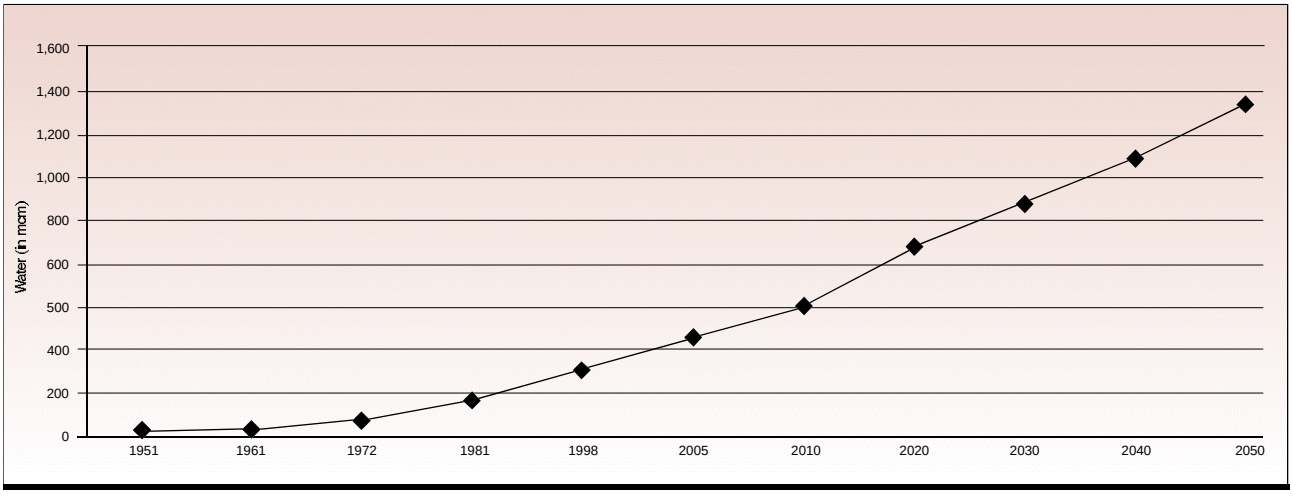
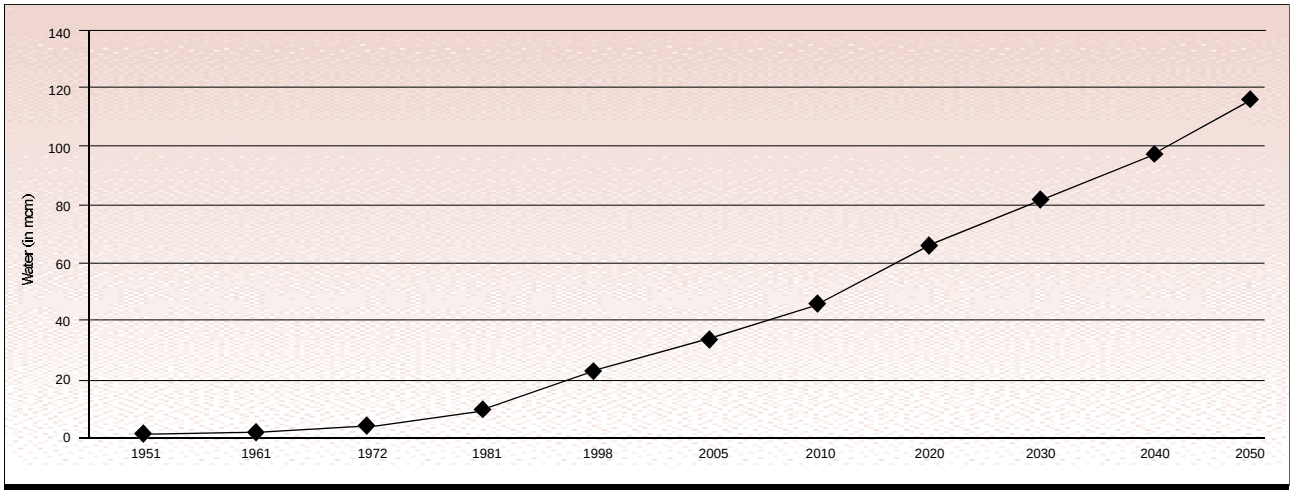


Figure 7 | Trends in Domestic Water Consumption in Quetta



Hamid Saffraz, IUCN

A traditional kaurjo, channelling water from the perennial river Rakshan in Panjgur.

wastage also have to be made, and these may be as high as 30–50% in places such as Quetta, where there is considerable leakage and illegal connections to the supply.

Agriculture

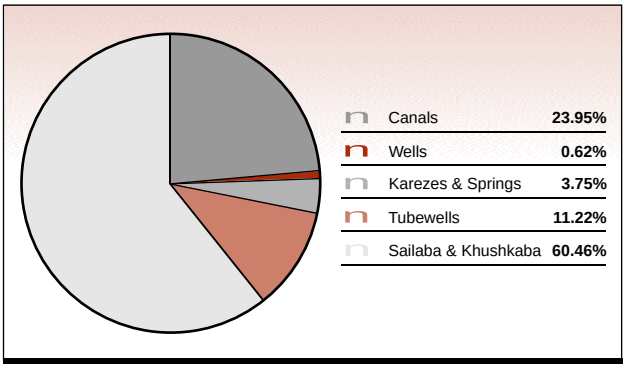
Irrigated Agriculture in Balochistan

The province of Balochistan is unique in Pakistan in terms of the types of irrigated agriculture being practised and the issues related to the sustainable use of its scarce water resources. Of the province's 34.72 million hectares, farmers cultivate about 2.09 million hectares (6%).

About 580,000 hectares are under perennial irrigation (Figure 8). Rainfall is used through water harvesting (khushkaba) techniques. Surface runoff is tapped through diversion and dispersion (sailaba) techniques. Roughly 242,000 hectares (42%) of the perennially irrigated area depend on water from the Pat Feeder, Kirthar and Lasbela canals, which are managed by the government. The other 338,000 hectares (58%) depend on minor irrigation systems that receive water from communal or individual owned and operated karezes (Box 9), small weirs, springs, tubewells (Box 10), open wells or rivers (see also Chapter 3).

Balochistan differs radically from other provinces in the relative magnitude of areas under conventional canal irrigation versus areas under alternative private or community irrigation.

Figure 8 Water Sources for Cultivated Area



Box 9 Traditional Water Systems: Karezes

Karez systems originated about 3,000 years ago in northwest Iran. The art of constructing them spread with the Persian Achaemenian Empire. The karez, or qanat, was devised as a means of tapping groundwater supplies using gravity flow. It is a gently sloping tunnel that conveys water from below the water-table to the ground surface. The origins of the karez system are uncertain, but may stem from the practice of opening up natural seepage areas to enhance water flow.

Specialists, known as muqannis, construct karezes. The traditional method of construction is to sink a well (the mother well) to the water-table and this is usually done at the apex of an alluvial fan. The depth to the water-table is usually less than 50 metres. The point where the gently sloping tunnel will reach the surface is then calculated and the tunnel dug to the mother well. In Iran, these tunnels can be up to 50 kilometres long, but they are generally about 0.5–5 kilometres in length, according to the slope of the ground. Vertical shafts are dug along the tunnel to provide ventilation and to enable removal of spoil.

The average karez can irrigate 10–20 hectares. The crucial factor for water production from a karez is the length of the water bearing-section – the part of the system that is below the water-table; this may be in excess of 1 kilometre. Also, since the level of the water-table will fluctuate seasonally, there will be a variation in flow during the year. In drought conditions, the variation period will obviously be longer.

The karez represents an enormous capital investment. It takes many years to construct, so there is a long period between the initial investment and any returns. On the other hand, once constructed, operating costs can be minimal. Karez are used in conjunction with other systems of irrigation; only in the most arid areas are they the sole source of water.

In Balochistan, systems are usually constructed on a communal basis. A karez is owned by shares, each representing the amount of time that water is available for irrigation purposes. Typically they yield up to 200 litres/second and serve a maximum of 200 shareholding families. These shares may in turn be rented out and are often fragmented into very small units. The nature of the karez system helped create particular societal relationships and socio-economic conditions in the villages they served.

Unfortunately, internationally sponsored irrigation surveys in the 1970s viewed the karez as traditional and outmoded, and not amenable to updating. The transition to tubewells and dug-wells was encouraged, lowering the water-table and decreasing the flow of water in the karez.

Building a karez in Balochistan can cost from Rs. 0.45 million (Qila Saifullah, two years) to Rs. 2.7 million (Muradabad, 1968–91). Renovation of the Temerek karez in Pishin took 11 years and cost Rs. 2 million.

Sources: Beaumont et al. 1989; Steenbergen 1997.

Box 10 Dug-wells and Tubewells

Dug-wells

There are an estimated 3,000 dug-wells in Balochistan. Water from the wells is often pumped out with the help of diesel or electrically operated pumps or Persian wheels. As they are usually installed in shallow, perched water aquifers, they tend to dry up during dry periods. The role played by dug wells in irrigated agriculture is limited, although they have been used extensively for orchard growing in some valleys of the Loralai District. For domestic water supply, dug-wells are still used extensively.

Tubewells

The number of deep tubewells in the province has grown considerably since electricity became available. It is estimated that over 21,000 tubewells, including a small number of public-sector ones, operate in the province. The Public Health Engineering Department installs most of the public-sector tubewells for drinking water supply schemes in urban areas. The Balochistan Development Authority has also undertaken the installation of tubewells for private individuals, besides large-scale groundwater development activity in the Nisai area of Qila Saifullah District as well as Lasbela District. General complaints about tubewells have been about the fluctuating voltage in the electricity supply, long periods of load shedding, inflated electricity bills and breaks in service. The government had been charging flat rates for electricity usage. This practice, strongly advocated by tubewell owners, is considered to be the root cause of over exploitation of groundwater. The initiative to install meters was resisted by the farmers. The federal government agreed to continuation of flat rate system. However, the farmers will pay a fixed amount of Rs. 6,000 per month per tubewell while the remaining amount will be paid by the federal government to WAPDA. Consequently the flat rate system will continue.

Jalal-ud-din Qureshi

Unlicensed tubewell drilling is depleting the water-table in many areas.

The looming gap in agricultural production and demand and the fundamental resource constraints of money, water and institutional capability have long been recognized. The National Commission on Agriculture (1988) noted that to meet the demands of a rapidly growing population, agricultural production should be increased at about 5% per year. This figure is based on the view that the national strategy should aim for self-sufficiency in food; reduce current deficits in edible oil, milk and sugar; and continue to support the growth in the production of grain crops, meat and pulses.

Minor Perennial Irrigation Schemes

Minor perennial irrigation is practised throughout Balochistan outside the Indus Canal Zone irrigated area. Cultivated areas are irrigated by perennial surface flows and typically range in size from 50 to 400 ha. Farmers have developed practically all the available water sources. However, while minor and individual systems have grown considerably over the last one and a half decades, the efficiencies of water resource and water delivery to the farm are often poor. In addition, capital development costs are high, and many communities are isolated with poor access to markets.

The government does not recover any of the public investment in the infrastructure of the 202 perennial irrigated schemes currently the responsibility of the Balochistan Irrigation Department. For the past 17 years, two related projects have sought to expand and improve minor irrigation practices (Box 11).

Water Rights

Water rights in Balochistan vary among the three main socio-linguistic groups. The laws may differ according to the dictates of local common resource management. Under such circumstances, communities, which may contain people from different tribes, act as managers and take their own decisions based on sharing common resources. Some examples of successes and failures are given in Boxes 12, 13 and 14. Traditionally, there is no restriction among any ethnic group on pumping groundwater by tubewells for domestic and livestock needs. But for irrigation purposes, water rights differ. Although Pashtuns recognize the rights of all users along a surface stream or river, there is no such recognition among the Balochs and Brahvis in the central and coastal parts of the province.

In the case of karezes, Pashtuns recognize that the owner of the mother well also owns the water rights.

The conveyance tunnel transporting water must pass through the owner's land. In rare cases, however, if the tunnel has to pass through other people's lands, then the owner of the mother well has to compensate the landowners in cash for use of their land. On the other hand, the Balochs and Brahvis in the central part of the province allow the construction of a karez on land belonging to more than one individual. In that case, they share the karez according to the extent of land contributed by the various owners. In the Mekran coastal areas, a karez can pass through anybody's land without compensation. The share of water is in accordance with the investment made in the construction of the karez.

All three ethnic groups have the same law where tubewells are used to tap groundwater resources: the right to exploit and develop the groundwater belongs to the landowner on whose land the tubewell has been installed. Tubewells are individually owned. Water is shared among stakeholders, according to their share of investment in installing the tubewell. Purchase of water

Box 11 | Minor Irrigation Schemes

The Balochistan Minor Irrigation Agricultural Development Project (BMIADP) was carried out from 1982 to 1995. Its objectives were to increase agricultural production and farm incomes by expanding minor irrigation and improving agricultural practices. BMIADP developed 42 perennial irrigation schemes throughout the province, benefiting 49,300 people, with a combined cropped area of 11,000 hectares. The project demonstrated that:

- schemes must be carefully screened according to social as well as technical and economic criteria;
- all beneficiaries/stakeholders must participate in project planning and implementation to ensure their ownership of schemes;
- local communities can construct simple engineering works with nominal outside inputs and at a considerably lower cost than local contractors;
- irrigation works require an aftercare period to ensure they operate as intended;
- project implementation requires a strong, unified multi-disciplinary management team;
- non-governmental organizations (NGOs) can help interface between local communities and government agencies;
- schemes should generally be in clusters to reduce administrative overheads; and
- continuous monitoring and evaluation are required.

The Balochistan Community Irrigation and Agriculture Project (BCIAP) is a follow on project to BMIADP. It incorporates lessons learned during the BMIADP. BCIAP's objectives are:

- the development of self-sustaining irrigation schemes (30 perennial and 4 flood) with a high level of community participation in planning, design, and construction and provision of potable water supply systems where required;
- the development and strengthening of farmer organizations capable of taking full responsibility for the operation and maintenance of the irrigation schemes besides looking after the village development needs;
- the introduction of a comprehensive cost-sharing mechanism for participation of farmers in the development process, with farmers initially contributing to scheme development costs and, after completion, raising funds for village development;
- the integration of women in community development;
- the increase of farmers' incomes through the introduction of efficient water management practices and high-value and high-yield crops, and the alleviation of poverty; and
- assisting the Balochistan Irrigation Drainage Authority (BIDA) in the transition from a line department to an autonomous authority.

The last two years (2001–03) of the project is the aftercare phase. The overall cost of the project is US$38.5 million, of which farming households contribute US$2.6 million and the government of Balochistan US$3.8 million.

The institutional development component is aimed at changing the role of BIDA from that of a constructor of minor irrigation works to a supplier of technical services to farmer organizations wishing to construct, rehabilitate, or improve minor irrigation schemes. To facilitate this process, a Community Irrigation Services Unit (CISU) has been established on trial basis in two districts within the framework of BIDA. A central CISU will transform the existing BIDA Irrigation Divisions into Community Irrigation Divisions. Selected BIDA engineers are undergoing formal and on-the-job training to equip them for a role in CISU. Additional staff will be recruited to CISU to build up its non-engineering capacity.

BCIAP is successfully developing minor irrigation in the province by applying lessons learned and following strict criteria for the selection of schemes. Consequently, BCIAP is likely to prove itself as a 'role model' for the development of self-sustaining minor irrigation schemes that may be adopted, with some modifications, to cover all minor and mini perennial irrigation in Balochistan. Minor irrigation includes all perennial irrigation schemes fed from sources of less than 50 cusecs diverted flow, whether or not communally owned, together with schemes fed from tubewells and flood irrigation schemes.

Box 12 Water Resource Development by Community Enterprise in the Kachhi Plains

In 1983, a partnership of 10 Brahvi families of the transhumant Sheikh Husaini tribe purchased an undeveloped tract of land from the Kurd clan. The land is located in the Bolan District on the banks of the Kumbri River. The price of the land and administrative formalities was Rs. 142,000. The money was raised by selling part of their flock of sheep.

The partnership operated on the basis of shares. There are 16 shares, named 'annas' after the monetary system in which 16 annas equal one rupee. The families subscribed to the shares, or to a part share.

In obtaining the land, the consortium was also entitled to develop its water resources. The partners excavated the bed of the Kumbri River where a rock outcrop forced water to the surface, to obtain a perennial base flow of 60 litres/second. Water rights were then allocated according to the shares held by each family. A share of one anna equalled a 12-hour flow in an 8-day cycle in the summer, and a 240-hour flow in a 16-day cycle in winter. The share system formed the basis for a small corporate structure.

Subsequent contributions to the development of land and water and maintenance of facilities were also made on the basis of the anna system. After some trial and error, the shareholders developed a downstream tract of land over a period of four years. The new land was not divided but instead an annual lottery was organized that allocated the use of the different plots to the shareholders in accordance with the size of their share. The reason for not distributing land titles was that it was considered unreasonable if one party obtained permanent rights to a more fertile stretch to the disadvantage of others.

Source: Steenbergen 1997.

Box 13 Karez Development in Chagai District with Private Investment

The idea of developing the Muradabad karez was conceived in the early 1960s. Farmers had suspected that an underground spring existed in the dry bed of a flood channel. They felt that the spring could be exploited by developing a karez. Water diviners assisted in locating the spring. It is on land belonging to a Baloch tribe, the Jamaldini. The farmers formed a consortium, called Khat Kash (karez diggers), consisting of 16 persons from several local tribes. Though there was sufficient uncultivated land in the area, the only tract suitable for irrigation was a tract that was already under cultivation, which also belonged to the Jamaldinis. The cultivators of the land, however, were a group of hereditary tenants who grew sorghum and wheat by harvesting rainwater from the adjacent hills. Under customary law the tenants had become co-owners of the land. An agreement was drawn up between the Khat Kash and the Jamaldini. The agreement stipulated that when the karez was completed, the land and perennial water would be divided in 32 equal shares, distributed as follows according to prior ownership, political system and management.

- Karez developers (Khat Kash): 13 shares
- Original landowners (Jamaldini): 13 shares
- Communal share of Jamaldini Sardarkhel clan: 4 shares
- Coordinator/Operator: 1 share
- Chief of Jamaldini tribe: 1 share

Under this arrangement, the hereditary tenants were not entitled to the water. A contract was drafted between the Jamaldini and Khat Kash and ratified by the local administration. It specified the moment when the karez could be considered operational; and at that time the swap of land and water rights would take place. The karez would be deemed completed when 12 hours of continuous flow sufficed to irrigate a plot sown with five kilograms of wheat seed. A panel of impartial persons was formed to interpret the contract.

It took 23 years and Rs. 2.7 million to construct the karez. In the meantime, 13 out of the 16 Khat Kash consortium members had been forced to withdraw, either because of lack of funds, or because they lost confidence in the scheme. Under a clause in the original agreement they could not transfer their share in the future karez to outsiders. This was meant to keep the original group intact and prevent influential outsiders from breaking in. The clause had the important side effect of restraining participants from abandoning the undertaking and making it more attractive for others to continue as they became the recipients of the sunk investments. The hereditary tenants were either bought off or offered land elsewhere. Some tenants refused, hoping to get access to perennial water. This did not happen, with the result that patches of the command area remained with the tenants and continued to be rain-fed.

The owners of the karez continued to invest in it after the first development phase was over and after land and water had been redistributed. In the second phase, all contributed to the further development of the karez to increase its discharge. This was financed by renting the land for seven years to sharecroppers.

Source: Steenbergen 1997.

Box 14 Groundwater Management: Successes and Failures

In 1978, the government of Balochistan reacted to the crisis it had created with the promotion of dug-wells and tubewells by introducing the Groundwater Rights Administration Ordinance. The objective was to 'regulate the use of groundwater and to administer the rights of the various persons therein'. The rights referred to are the permissions granted to develop and operate groundwater-abstracting infrastructure. But the Ordinance never managed to 'regulate the use of groundwater'. For example, the total ban on new wells in Quetta Valley, announced in 1990, has not been enforced. The only management measure adopted in 1990 was the traditional 'harim' rule. The harim is based on Islamic water law and specifies a prohibited zone around karez and wells, in which no other well or karez can be constructed. In Balochistan, a minimum distances of 250 metres in silty soils and 500 metres in gravelly soils is applied. The harim, however, originated in the era of karezes and Persian wheels and was in no way effective in regulating mechanized groundwater exploitation. Even this limited measure was disputed.

In the absence of formal rules to control the groundwater crisis, measures to manage the resource were left to the local people. Successes and failures are highlighted by the following three examples.

Kuchlak

Initially, groundwater was tapped by 11 karezes. Each served a small community of farmers. The introduction of diesel powered dug-wells in the 1960s sealed the fate of these karezes. The subsequent failure of collectively owned dug-wells installed by government promoted the trend to individual as opposed to collective action. Once the karezes dried up, the harim distance was disregarded and groundwater became an open access resource. Every landowner was free to develop a well on his property. As the water-table declined further, owners responded by drilling deeper wells. The lack of a collective response is attributed to the sudden death of the karezes. There was no one to argue against tubewells and dug-wells. Coupled with this is the importance of individual achievement and prestige in the local culture and the fact that groundwater irrigated horticulture is very profitable. In the absence of regulations, no one was ready to take the first step to halt degradation of the resource. The only wells currently in operation are those in the lower parts of the valley floor.

Mastung

There are three aquifers, one of which, the karez aquifer, has supported perennial irrigation for several centuries. The ethnically diverse social structure consists of a mosaic of village and tribal leaders. Diesel-driven pumps were introduced in the late 1950s and early 1960s. A series of dry years in the 1960s led to conflicts between karez and dug-well owners.

Local tribal elders imposed an informal ban on the development of new dug-wells or the deepening of existing karezes in the recharge zone. Further disputes led to the formulation of rules, which reconfirmed a zone free of dug-wells and halted expansion of karezes. Procedures for dug-wells were established outside of the exclusion area. A panel of three high-ranking tribal elders was appointed to safeguard the rules and issue dug-well permits. The panel stopped functioning as the elders found little time to perform the duties, and the responsibility shifted to the district administration. The dug-well free zone functioned well for a long time yet could not prevent overdraft. As karezes failed, the political clout of karez owners diminished. Some landowners have subsequently tried to use the Groundwater Rights Administration Ordinance to break the 1969 rules that gave a monopoly to karez owners in some areas. In one case they succeeded, taking advantage of the 'harim' rule.

Panjgur

The Panjgur oasis is located in the Mekran oasis and is unique in Balochistan and in the world. Its special feature is the ongoing development of karez irrigation. The karezes are located on an aquifer fed by the subsurface flow of the Rakhshan River and runoff from surrounding hills.

A combination of land reforms in the 1970s and inflow of remittances from the Gulf States mobilized capital for investment. In Mekran, most of the land is not registered. Further, as there are no strong tribal land claims, land rights are 'free' and are usually allocated with water rights, provided the karez irrigates virgin land. This provides an extra incentive to karez developers and gives them a free hand in forming a karez development consortium.

Concomitant with the expansion in karez irrigation came a ban on the development of tubewells and dug-wells. This may have been a result of experiences in other parts of Balochistan where tubewells were seen to have had a profound impact on karezes. An ethic developed in the area in favour of the collective ownership of karezes over the individual ownership of wells. The lack of electricity may have also played a role in instating the rule. The limitations on dug-wells are not clear, but minimum distances of 5 kilometres are used in some places. Exceptions have been made for wells for public drinking water supply. Enforcement of the ban is informal but effective. The local administration has favoured the karez owners notwithstanding the existence of the Ordinance. The absence of influential landlords has helped.

The situation in Panjgur is interesting in that it simply bans one type of groundwater extraction technology. For karezes, no restrictions apply other than the minimum harim distance between mother wells.

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Reliable data on water supply is unavailable.

rights is common and is widely practised among all the tribes. The rates differ from place to place according to the crop grown and the need and timing for the water.

For small irrigation schemes using surface water, two different mechanisms of water rights are followed. Where the users develop the irrigation system, water rights are defined prior to the undertaking of the scheme and are considered as shares in a group venture. A shareholder who is unable to contribute to the collective investment or to the maintenance of the system forfeits his right to use water. In schemes developed with external assistance, by the government for example, water rights are defined after the scheme is completed. In such cases, the stakes are high and bargaining is done to sell rights.

Industry and Mining

The lack of industrialization in Balochistan, and the small mining sector, have meant that there have been few concerns so far about the availability and consumption of water for these purposes. Most of the larger industrial units are located in industrial estates close to Karachi. Water supply has not been a major concern in the past but the dry Hab reservoir during 1999 and 2000 has caused a serious concern for the future. An upturn in economic activity would put further pressure on the limited resource. Certainly water is a serious constraints in sustaining and expanding industrial activities in Quetta. Mining activity in the province is limited mainly to the coal industry. Demand on water would increase very significantly if major mines go into production. The possible impact of mining on water resources is described in Chapter 8.

ISSUES

Water Supply

Data Availability and Reliability

The effective management of water resources demands a continuous, detailed, high-quality record of hydro-meteorological data, and the human and financial resources to develop, maintain and use water effectively. In Balochistan, both data and resources are scarce.

The large area and difficult terrain, poor infrastructure and communications, and discontinuous and short-term precipitation and runoff records exacerbate the problem. The hydro-meteorological network in

Balochistan was created primarily to serve the limited needs and interests of individual agencies. It has been led by project approaches, resulting in over-concentration in accessible areas, while neglecting some hydrologically important, remote areas. A substantial part of the network has either been shut down or is not being properly monitored.

The Surface Water Hydrology Directorate of the Water and Power Development Authority (WAPDA) established a stream-gauging system with gauges at 21 localities that are now being monitored by the Bureau of Water Resources (BWR) of the Irrigation and Power Department. This does not cover all the streams and critical locations in the province. In addition, the Pakistan Meteorological Department maintains a network of observatories to measure some standard climatic parameters, including temperature, rainfall, and in some cases, wind speed data. But this network does not meet the World Meteorological Organization standards of network density. The data generated, therefore, are scanty and often extrapolated in the design of projects.

Furthermore, Kidd et al. (1988) and Khan (1980) expressed severe misgivings about provincial rainfall data post-1950. This makes it difficult to identify cyclic trends in rainfall. It appears from pre-1950s data that mild to moderate droughts occur every 7–10 years, with severe drought conditions every 14 years. Similarly, data on evapotranspiration and water quality is deficient.

Considering the size of the province and the importance of the water sector to its economy, these two networks taken together are not adequate for the purpose. Problems with the data reflect as inadequately trained observational staff; differences in instrumentation, observational procedures and techniques; lack of data processing and analysis; and discontinuity in records. One of the outcomes of this has been the need to periodically reassess the information on water supply, both at the provincial and urban level, and to rely heavily on modelling techniques. These models rely on many assumptions on the province's hydrology.

Destruction of the Natural Vegetation Cover

Heavy grazing and cutting of trees and shrubs have resulted in sheet and gully erosion in the watersheds. Topsoil and nutrients are lost. The removal of vegetation exacerbates the problem of flash floods, which are a constant threat to life and property and are more difficult to control or harness. The heavy silt loads carried by floodwaters quickly reduce the storage capacity of reservoirs and render check dams and delay action dams ineffective.

Vegetation and climate are intimately related. Removal of vegetation affects the retention of snow in higher elevations. The more snow captured and retained, the slower its release in spring and summer, the longer the duration of surface flows and the greater the prospect of groundwater recharge. The pine and juniper forests found at higher elevations are associated with winter snow accumulation. As vegetation is removed, desertification occurs with a rise in ground temperature, increased evaporation and decline in biodiversity. Gils and Baig (1992) estimate that vegetation cover has been reduced to about one-third of its historical extent. This will have resulted in higher near-surface and surface temperatures and an increase in evaporation.

A reduction in stream flow also has an impact on the functioning of wetlands. The low-lying areas of the province feature various wetlands and marshes. They serve as important stepping-stones and wintering areas for the migratory birds breeding in the Asiatic region of Russia. For example, the Bund Khushdil Khan reservoir has effectively dried up, no longer supports breeding birds and is now only occasionally used by migrants. Similiarly without a supply of fresh water, the three remaining mangrove forests that fringe estuaries along the coast cannot survive.

Groundwater Mining

A census in 1908 revealed that there were 1,803 natural springs, 493 karezes, 132 streams and canals and 76 Persian wheels. In the 1970s, as noted earlier, dug-wells and tubewells were constructed with electric or diesel pumps. The number of wells increased dramatically with the introduction of the National Electricity Grid system in the 1970s. In six basins, the number of wells increased from 2,377 in 1973-74 to 10,961 in 1993-94. The highest numbers of tubewells were in the Pishin Lora and Nari basins.

The Pishin-Lora basin and the Loralai sub-basin are in deficit. The abstraction of groundwater far exceeds the recharge to the basin. The Zhob, Nari River, Hamun-e-Lora and Kachhi basins have limited development potential. Basins in the districts of Loralai and Ziarat are also in deficit, with no further development potential. A number of studies have estimated that the deficit in the Quetta sub-basin is about 26 million cubic metres a year and that the aquifer storage will be exhausted in 20 years. In spite of that, additional tubewells are installed. In the Pishin sub-basin, local reports indicate that as many as eight new tubewells are being installed each day. There is no indication that the development of groundwater is slowing.

The Poverty Alleviation Strategy (P&DD 1999a) has assigned specific targets for each sector (Chapter 12). The Balochistan Development Authority is expected to revitalize and develop tubewells in the Bela Plain area and install 1,000 tubewells in three years. The power sector is expected to expand electricity to areas with potential for groundwater development. The agriculture sector is expected to provide diesel pumps and tubewells to facilitate irrigation. The livestock department is expected to provide water supply for livestock. Sound water management will be key to the success of these initiatives in the long term.

There are two approaches. One is sustainable groundwater development and the other is groundwater mining. The first treats groundwater as a renewable resource. It assumes that, if properly managed, the resource will be available in the long term. Withdrawal of groundwater should be below the rate of recharge. Sustainable groundwater development is considered to be the best long-term policy where there is no heavy demand and where there is little or no groundwater in storage. The quantity of water available for development is based on average sustainable yields. These are only best estimates, and often-used terms such as 'safe basin yield' are not recommended. Factors to be considered include drought, accuracy and availability of information, the need for monitoring, groundwater quality and removal of groundwater from storage.

In arid areas, the sustainable groundwater development approach has not been practical, and so water is mined from aquifer storage. This is water that has accumulated over very long periods, possibly under more favourable climatic circumstances. In semi-arid areas, the growing demands on the resource outstrip the rates of recharge. In this case, groundwater mining can provide a breather until the sustainable development of other water sources is achieved. In Balochistan, groundwater mining is a reality in the Quetta sub-basin and in nearby rural areas. It is done on a piecemeal basis, in response to local demand. To prove effective, groundwater mining has to be managed and integrated with any other available water resources.

Adopting a groundwater mining approach requires:

- a realization that groundwater may eventually be exhausted;
- a groundwater abstraction and overall water use strategy;
- detailed knowledge of the resource; and
- a full monitoring and hydro-geological investigation where the mining policy is to be established.

An intermediate approach, the so-called deferred safe-yield model, allows temporary over-exploitation of the aquifer, under the assumption that in the course of time, the demand will diminish and a balance will be struck. This approach has little merit, and it may be difficult to check the irretrievable loss. In areas where the water reservoir is hydraulically connected with saline water, such as the Bela plain, seawater intrusion into the aquifer is likely.

The important thing to remember when discussing policies on supply and demand is that estimates are based largely on mathematical models and incomplete information. For example, in calculating water use, 25–30% allowance is made for water loss and wastage. But in some cases, losses will be as high as 50%. Per capita domestic water consumption also depends on climatic conditions, metering, quality, population and sewerage and drainage.

With the availability of good water, a rise in the standard of living and construction of modern houses with sanitary fixtures, consumption is bound to rise. Allowance has to be made for public use and for livestock.

Uncertainty about the number of tubewells and their discharge must cast considerable doubts over the water balances for each of the basins.

In terms of groundwater supply, considerations include drought, evapotranspiration and surface water discharge. As noted, Khan (1980) calculated that severe drought conditions occur once in every 14 years. The effect of evapotranspiration is hard to quantify and a figure of two feet per year has been used in models. Collecting surface water discharge (stream flow) data is beset with difficulties. Coefficients are used to determine the balance between recharge and runoff. An effective coefficient of 20% of annual rainfall in the mountains is assumed.

One of the dominant recharge processes is the infiltration of groundwater from transmission losses in channels. Few data are available to provide an assessment of these processes. Estimates of infiltration rates vary from 58–1,168 millimetres per hour depending on soil and channel bed conditions where perennial water or standing water occurs. This is a huge variation, and difficult to apply.

One of the most contentious issues is the artificial recharge of groundwater. There are two approaches: recharge wells and recharge dams.

In the opinion of some consultants, recharge wells are less appropriate in Balochistan, because they provide limited capacity and are likely to encounter problems with sedimentation, as well as reduction in hydraulic conductivity around the well. The approach of recharge by delay action dams needs to be looked into thoroughly in

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In spite of water scarcity, water loss can be quite high.

order to improve their usefulness, as they are highly susceptible to siltation. More efficient structures may produce long-term artificial recharge. It will be useful, however, to study their impact on overall water resources.

Notwithstanding the conclusion of some studies regarding the effectiveness of delay action dams, these structures enjoy considerable popular support in the province. The Executive Committee of the National Economic Council has recently approved the construction of 54 delay action dams, estimated at Rs. 436 million. These will be built in Quetta, Pishin, Mastung, Qila Abdullah and Mangochar. The Japan International Cooperation Agency has also offered grant of Rs. 811 million for construction of five delay action dams (two in Quetta, one in Pishin and two in Mastung District), along with construction machinery. The Asian Development Bank and the World Bank have agreed to finance desiltation of delay action dams and construction of new ones under the National Drainage Programme, if the feasibility is first proved with the construction of two delay action dams in Bostan and Mastung. The expectation is that depleted groundwater resources will be recharged (Shahid 1999). The challenge, therefore, will be to locate and construct these dams taking into account both scientific and technical criteria and local knowledge, to overcome the criticisms leveled at earlier efforts.

A comprehensive package is necessary for effective groundwater recharge that may include the construction of delay action dams at appropriate sites and fitted with in-stream infiltration devices; check dams, valley dikes and recharge basins; and watershed rehabilitation programmes for vegetation recovery through planting and protection of catchment area, in particular active recharge zones. In the arid and semi-arid condition tree plantations can be established with water conservation techniques, such as ponds, contour trenches and hillside ditches. The added advantage of these will be that the integration of technical and biological approaches will yield greater dividends for recharge. The efficacy of delay action dams can be enhanced by providing exit pipes for draining the silt-free water downstream for infiltration into stream bed.

Inefficient Use of Water

An important use of the surface water in Balochistan is for sailaba (floodwater) and khushkaba (rainwater) irrigation. These systems are used on 69% of the total irrigated area of the province. They are actually crudely applied water conservation techniques. Long periods of moisture stress and shallow rooting zones result in yields being very low and not very encouraging. In fact, these lands serve only to meet the barest needs of the farmers.

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Monitoring the groundwater level in Pechi karez, Ziarat.

Almost all fruit, vegetable and winter fodder crops are over-irrigated. As much as double the amount of water required is applied. Over-irrigation is most common in the Pishin Lora, Zhob and Nari basins. These are under greatest stress from groundwater mining. Trickle irrigation schemes are being tried, but have not met with wide acceptance by farmers (Halcrow Rural Management 1995) as water is not a priced commodity.

Lack of Awareness

The public is generally aware of the problems of water supply, perhaps more so in the rural and more remote areas of the province. They may not have much appreciation of why this is so, however, and may not see how they can play a role in addressing the issue.

Reliance on Neighbouring Sources

Balochistan derives some of its water from neighbouring jurisdictions. This has not presented a problem so far. But water security is an emerging issue worldwide and the sharing of these resources is receiving increasing attention. Gils and Baig (1992) give the example of the Saindak Copper Gold Project in Chagai. The source of water for this project is the Taftan-Tahlab basin, part of which lies in Iran. They speculate that a heavy demand on this basin will largely deplete the resource and affect an ecologically important wetland in Iran.

Water Management

Issues arise mainly from poor governance and from lack of interest and commitment by the public and private sectors in solving the water problems in a planned and systematic fashion. While social problems concerning water and other sectors of economy have been mostly traditional in nature, a multitude of technical problems have stemmed from poor governance. A project-by-project approach to solving problems has been followed whenever an integrated approach was required.

Institutional Constraints

BIDA has primary responsibility for the planning, investigation, design and implementation of various irrigation and water development projects in the province. The different cells of the department are handicapped, as they lack well-qualified, trained and experienced personnel. The existing staff is occupied with the operation and maintenance of current schemes, finding little time to conduct technical surveys or to plan and design new projects in the

water sector. The department still relies heavily on outdated and run-of-the-mill equipment to carry out various tasks. Library facilities and computerized access to data and information are non-existent. The situation has improved somewhat with the establishment of the BWR.

Similarly, there are no laboratory facilities to analyze samples, vital for the planning of any water development or irrigation project. The BWR is also deficient in adequately trained staff and does not have the equipment to monitor and collect hydrological data. The same is true for the Water Resources Research Centre and the research and development institution in the water sector. In the absence of strong institutions for data collection, project planning and execution, project monitoring and research and extension in water, effective water development projects cannot be planned and implemented.

Inadequate Legislation

Historically, legislation governing the use of water for irrigation has not been tailored for the specific needs of Balochistan, and it certainly has not kept pace with changing circumstances. Until 1980, Balochistan was subject to the (Punjab) Canal and Drainage Act of 1873, which dealt primarily with canal-based irrigation in the Punjab. In 1980, a Balochistan Canal and Drainage Ordinance was passed, but even this did not deal explicitly with issues such as water resource exploitation and non-canal-based, community-based and private irrigation systems.

It is open to question whether the Balochistan Irrigation Drainage Authority Act 1997 in its present form addresses key issues of water resource management in the province. For example, the Act makes no reference to 'minor irrigation'. The functions of Area Water Boards (AWBs) outside the major canal zones of the province are not specified. The Act requires the Authority/AWBs to be self-financing within 10 years. Outside the major canal zones, this would appear impossible. The Act does not establish farmer organizations on a sound legal footing, yet proposes to transfer management and financial responsibility to them for distributary or minor canals. Farmer organizations are currently being registered under the Balochistan Water Users Association Ordinance 1981. Under this, these organizations cannot own the infrastructure. Bylaws cannot be prepared, so guidelines have been prepared instead. The Act introduces ambiguity into the issue of ownership and control of groundwater resources. There are defects in the Act's approach to the governance, powers and staffing of the Authority/AWBs.

Cost Recovery

The government of Balochistan does not recover any of the public investment in the infrastructure of the 202 perennial irrigated schemes that are currently the responsibility of the Balochistan Irrigation Department. This practice is typical of the reliance on government, sends the wrong signals to the farmers and reduces their 'ownership' of the schemes.

Need for Improved Management of Minor Irrigation Schemes

There are many irrigation schemes in Balochistan that would benefit from improved management, operation and maintenance. The beneficiaries are not organized or trained to maximize the potential of these schemes. There is relatively little interaction or information exchange among communities on the options available to them in developing irrigation schemes, or on the lessons learned in funding, construction, management, operation and maintenance.

Need for the Involvement of Women

Project interventions at the village level have brought about changes in the role of women in the water sector. Still, cultural factors continue to have an impact on the nature and scope of activities that can be developed and implemented for women in irrigation schemes. The strict separation of men and women in much of rural Balochistan, clearly structured and defined roles, the low social and economic status of most rural women, restricted mobility and lack of decision-making power influence the extent to which women are involved in these activities. Communities have limited experience with women being involved in village-level decision-making, and both men and women need to be convinced of its value. Women cannot take full control of potable water supplies due to their restricted mobility. This prevents them from becoming heavily involved in operations and maintenance activities.

Electricity Tariffs

The subsidized 'flat rate' tariff was introduced nationally to encourage farmers to use groundwater for increased agricultural production. It has been very successful in upland Balochistan. Yet, the tariff promotes poor use of scarce groundwater resources and farmers show no interest in improving their irrigation efficiencies. Furthermore, farmers in many cases do not pay for the electricity they consume even at the flat rate.

Federal and provincial legislation exists to license the abstraction of groundwater and to enforce payment of electricity bills. While further improvements to such legislation are proposed, the main issue is political will and the ability to enforce it.

Moving from a flat rate to the imposition of a full tariff is an obvious way of promoting the conservation of

scarce water resources. However,the introduction of a full tariff to farmers on the Indus plains or southern, low-elevation valleys of Balochistan would be disastrous, since the tariffs would exceed gross returns. The imposition of full tariffs may be feasible only in, for example, fruit or vegetable growing areas, where the return on investment is substantial.

Lack of Project Monitoring and Evaluation

The province does not have an effective and organized mechanism or infrastructure for the monitoring and evaluation of completed or on-going projects. Without such monitoring, lessons from mistakes in the past cannot be learned and remedied in the future planning of R&D projects.

Lack of Coordination between Water and Agriculture Sectors

Though agriculture is the main user of water in the province and Balochistan's economy is largely agriculture-oriented, there is no coordination between the agriculture and irrigation departments. And at the federal level, coordination between the Agriculture and Water ministries is almost non-existent. This leads to inefficiency in the planning, execution, operation and maintenance of viable projects in irrigated agriculture, in a country where both these sectors are of vital importance to the economy and are inter-dependent.

Lack of an Integrated Approach to Project Development

While an integrated approach is very necessary in any project development, water development projects in Balochistan have followed a familiar pattern. Small isolated schemes are undertaken to develop surface and groundwater resources. The main sectors concerned are Water, Forestry, Livestock, Public Health, Local Government, Environment and Agriculture.

Water Pollution

There is a growing fear that both surface and groundwater may be polluted, particularly in areas where agricultural activity is being intensively pursued. The indiscriminate use of agrochemicals on fruit farms and irrigated areas is likely to result in polluted groundwater aquifers. The impact of industrial discharges on freshwater and marine ecosystems has not been investigated in detail, but the experiences from other regions of Pakistan give cause for concern. There are no water treatment plants, and sewage is generally discharged into open water bodies or streams.

The federal and provincial governments and their Environmental Protection Agencies have yet to formulate rules and regulations under PEPA1997 and action plans to control water pollution problems linked to agricultural, industrial and domestic uses.

Socio-Political Character of the Province

Water rights have been described earlier. The tribal system, low literacy rate and poverty often create problems in the identification of appropriate projects and their implementation. Under traditional practices members of the Provincial Assembly decide the projects to be started. They have their own personal priorities and interests related to the project. The project – rather than being based on technical, socio-economic, environmental, basin or physiographic considerations – may be designed to suit the interests of one person. The interests of the community at large are therefore ignored. Lack of education among water users, including farmers and the general public, also creates problems in convincing people of the importance of saving water for their own good, as well as for the good of the province and nation.

Economic Issues

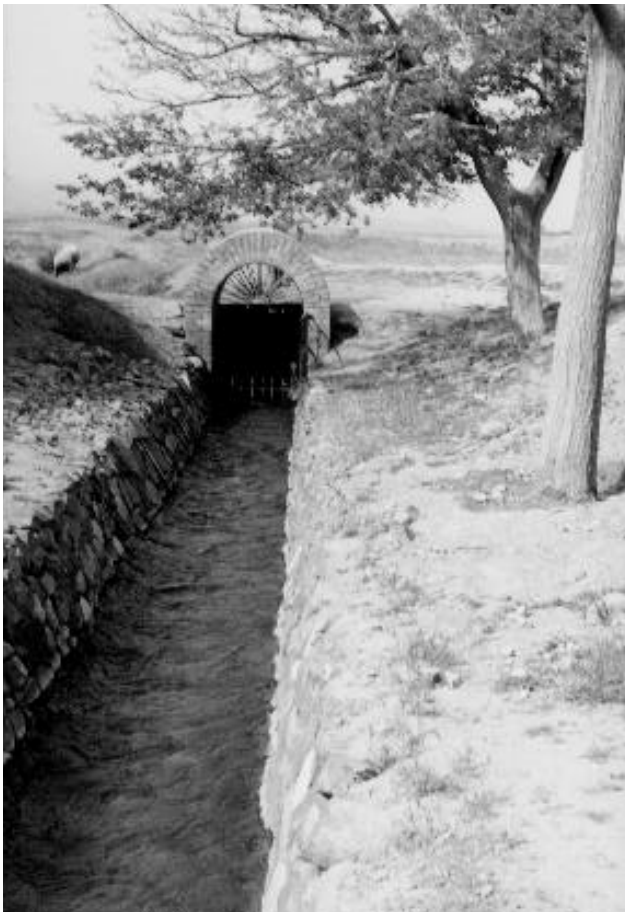
The growth of the agricultural sector and population translates into an increasing reliance on floodwater. Water management schemes involve an enormous cost in attempting to control unpredictable and frequently severe natural forces. Developing, implementing, maintaining and rehabilitating these schemes will in all likelihood become more costly and more complex as time goes on, with repercussions for the natural environment of the province.

THE STAKEHOLDERS

On the demand side, the major stakeholders are the agriculture sector and the rural and urban population. Industry is also an important stakeholder. The large industrial estates west of Karachi depend on a reliable supply from Hab dam. The expansion of the industrial sector will depend on a secure supply. On the supply side, the Irrigation and Power Department (now BIDA) is the main public-sector agency responsible for the planning and operation of irrigation schemes. The Public Health Engineering Department, in collaboration with the Local Bodies and Rural Development Department, is responsible for providing drinking water to settlements and villages, while the Balochistan Water and Sanitation Authority is responsible for the water supply to Quetta. The

Balochistan Development Authority has been instrumental in developing major groundwater development projects and in installing tubewells for government agencies and private individuals. Research is carried out by various agencies, including the Bureau of Water Resources, Water Resources Research Centre, Arid Zone Research Centre and Agricultural Research Institute.

The situation in Quetta is more complex, with several federal, provincial and local government agencies involved. The principal NGOs contributing to the development of the water sector are the Balochistan Rural Support Programme, the Trust for Voluntary Organizations, the Strengthening Participatory Organization, Khushhali Associates, Water Savers Environmental Services, Taraqee and Taleem Foundation. The role played by these NGOs in the water sector has been very limited, due mainly to lack of support from government and lack of technical staff, skills and resources. Most of the activities have centred on provision of water supply schemes and sanitation to local communities. Amongst programmes and projects NDP, Area Development Programme Balochistan, BCIAP, BRUWAS, Quetta Water Supply and Sanitation Project, Rural Water Supply Project, On-farm Water Management Project, Pat Feeder Command Area Development Project and Kachhi Canal Project are important.



The future lies in local level management of water.

THE WAY AHEAD

Current government strategy involves the aggressive development of all the water resources of the province. This is done to provide drinking water to the rural and urban population, provide public services, fuel economic development and meet projected future demands. Supplying clean drinking water to the population is a first priority. But most of the demand for water is from the agriculture sector, where the most rapid economic gains are to be found. For example, under the Poverty Alleviation Strategy, wheat production is to be increased by 1.2 million tonnes within two years, partly by increasing irrigated agriculture.

In the short term, this strategy is likely to continue, notwithstanding the sharp decline in groundwater levels in several of the province's 14 water basins. Improvements in the canal systems will soon optimize irrigated agriculture in the Nasirabad area. The province's entire share of Indus waters will be fully used. It is hoped that drainage projects will reduce the problems of waterlogging and salinity. It will then be a question of fine-tuning the system to maximize yields and cropping patterns on a sustainable basis.

Water management in canal-fed areas is receiving a great deal of attention from governments, technical experts, donors and the local population. But canal-fed areas, no-matter how well developed and managed, can only reach about 1% of the province. From a water management standpoint, the issue is the extent to which the remaining potential areas can be brought under cultivation, and at what cost to the sustainability of the water supply and the natural environment?

If there is any vision of the province in 25 or 50 years, from the perspectives of the government and private sector, it is of a green and fertile Balochistan – the future granary of Pakistan. There is no doubt that with unlimited water and the necessary financial resources and technology, this dream could be achieved. Experiences in more affluent areas of the Middle East and North America demonstrate what can be done in environments similar to those found in Balochistan, given the necessary inputs. It is a question of economics: how much the country can invest in irrigation schemes and how much its customers are willing to pay for Pakistan's agricultural products. Market forces will ultimately dictate trends.

Shuja Zaidi, BCIAP

Women needs to be involved in water management.

Management

The stakeholders will develop a clear strategy on irrigated agriculture for the next five years and look beyond to the next 25. A roundtable will be established for this purpose. It will complement existing coordination mechanisms related to research, production, extension, training, work-force, marketing, infrastructure and inputs. It has the advantage of bringing the stakeholders together on a level playing field, where everyone's views are appreciated.

The roundtable might help avoid problems of market gluts (for example, in apples and onions in the recent past), expand appreciation of the need for quality in a competitive environment and identify new techniques for making more efficient use of the available water. The development of a sense of vision is important at a time where some orchard owners are already cutting down trees due to a lack of economic viability or water, while elsewhere others are busy installing tubewells and planting new orchards. This sense of vision is extremely important in developing a sustainable water resources strategy. If the aim of the BCS is ultimately poverty alleviation, then the vision should also encompass the needs of the rural population, rather than just the affluent, the middlemen and the entrepreneurs.

The following steps will be taken to improve water management in the province:

- establishment of a Water Board ideally for each of the 14 major basins in Balochistan;
- establishment of Technical Committees in support of the Water Board;
- identification of an agency to coordinate the collection of reliable information on water supply and demand from all sources, and maintenance of an up-to-date distribution database;
- establishment of a process for engaging all stakeholders in the formulation of water management strategies that involve scientific, technical and local inputs;
- maintenance of local water management systems proven to be effective and socially and culturally appropriate;
- rationalization and assignment of clear roles and responsibilities amongst the various organizations, for all aspects of water supply, demand, quality, research and monitoring;
- establishment of goals, objectives and guidelines for watershed rehabilitation and management;
- establishment of guidelines for the environmental assessment and monitoring of all projects or programmes affecting water supply, demand or quality;
- launch of a mass awareness programme on water supply, demand and quality, stressing the need to conserve the resource and identify opportunities for public participation; and
- development of educational materials.

Water Boards

The Water Boards will operate at the highest level and report to the provincial chief executive. They will be established in legislation and be independent, impartial and highly credible. Their Terms of Reference will parallel those of the Land Use Planning Commission described in Chapter 3, although in this case, Water Boards will be established for each of the 14 water basins. Their responsibilities will include issuing water licenses, developing codes of practice for water users in all sectors and holding public hearings, ensuring the participation of all stakeholders on major issues affecting the resource.

The Water Boards will be given enormous responsibility. Experience in other countries shows that they work effectively. The membership will be broadly based and will be drawn from all walks of life. Members will not be drawn

from government service, and will not have a major vested interest in the management of the resource. An exception to this might be women, who bear the major responsibility for managing domestic water needs. An equal representation of women will be a goal in setting up the Boards. Members will be appointed for fixed terms, meet on 'as required' basis, and be remunerated appropriately.

The goals, principles and objectives established for the BCS will provide the basis for the mandate of the Water Boards. In addition, a mission statement, code of ethics and operating procedures will be developed, not only to guide the Boards but also to clearly demonstrate to all stakeholders what they should expect and demand of these organizations.

Although the Boards have many responsibilities, and are ultimately accountable for the management of the resource, each will be assisted in all technical matters by a committee of specialists (described below).

In terms of establishing Water Boards, there are a number of options. Not all Boards need be set up simultaneously, nor do there have to be Boards for each basin. They could be set up on a priority basis. The first priority might go to basins currently under stress and where urgent remedial action is required (Pishin-Lora, Nari and Zhob). But, in fact, it would be hard to exclude any basin from consideration. The earlier the planning begins, the sooner management solutions can be developed and implemented, requiring less costly remedial action and ad hoc decision-making later on. All the basins have distinctive resources and demands. A compelling argument for establishing the Boards as soon as possible is the need to push decision-making 'down and out' as quickly as possible. The Boards will be seen as part of the effort to decentralize decision-making and involve the stakeholders to the greatest possible extent. As a start a Water Board could be established and operationalized, along with its Technical Committee, for the Pishin Lora Basin.

Decisions on which basins might be combined under a single Board will take into account a mix of political, cultural, geographical, administrative and socio-economic factors. The probability of success is a very important consideration. Criteria will be developed and reviewed with the stakeholders, to get a 'buy in' the arrangement. For example, as the city of Quetta and its environs might draw on resources from other basins it may be useful to combine them under one Board. One concern from the local user standpoint might be the equitable treatment of smaller basins. The interests of larger and more powerful neighbours might prevail. For this, and for reasons of transparency and coordination, a Provincial Water Committee will be established, consisting of the Chairs of all Boards and headed by the provincial chief executive. It will be supported by a small secretariat drawn from the staff of technical committees on a rotating basis.

The Provincial Water Committee will be concerned with the overall needs of the province and will share the results of the work of the Boards, decisions taken and recommendations made to strengthen policy and legislation. The Committee will ensure that there is no duplication in the technical aspects of the work. The Provincial Water Committee will recommend on, and update as required, the mission of the Boards, ethical guidelines and procedures and an evaluation mechanism to assess the performance of the Boards and their use of resources.

Issues to be considered in setting up the Water Boards include relationships with District Administrative structures and the various land use planning structures recommended in the BCS. At the present time, decision-making proceeds through the divisional and district level to the local councils. The government administrative system is geared to this, and information is managed accordingly. Basin management implies that some accommodations will have to be made. Some basins span several district boundaries. Numerous hydrological studies have already demonstrated an ability to overcome these hurdles, although reconciling information collected at a district level – for example, on socio-economic and land use parameters – will take some readjustment.

Coordination among the various jurisdictions will require a re-examination of roles and responsibilities and some streamlining. Although certain structures are in place, if they are not functioning or are ineffective, they will be dispensed with. One benefit of the Water Boards is that they take the responsibility for the management of water, often a contentious issue, off the shoulders of the district administration that already has to juggle many competing demands.

A strong case can be made for linking basin planning with the need for an integrated coastal zone management plan (see Chapter 6). The coastal zone takes in four basins draining into the Arabian Sea: the Dasht, Shadi Kaur, Hingol River and Porali river basins. The focus would be on industrial and agricultural development in Lasbela District. In the Mekran, the focus would be on drinking water, livestock and agriculture and the maintenance of critical ecosystems dependent on sources of fresh water.

Technical Committees

The Chair of the Technical Committee will serve as Secretary to the Water Board and ensure its smooth functioning. The functions of the Committee are self-explanatory: to provide all the technical information required by the Board to discharge its responsibilities based on accu-

rate and up-to-date information on the supply, demand and quality of the water in the basin.

In the role of secretariat to the Board, the Technical Committee will set the agenda for meetings and develop an annual work plan to achieve the objectives set by the Board under the overall direction of the provincial chief executive. Members of the Technical Committee will include relevant experts in water management: hydrologists, hydro-geologists, irrigation specialists, engineers and environmental scientists (for example, specialists on wetlands, aquatic biology or watershed management).

The first and foremost need is to develop the strategic plan. This is developed according to the vision of how the water resource is to be managed in the short and long term. The vision is based on the mission, goals, principles and objectives of the Board, and should be developed with the stakeholders. Once this vision is developed and adopted by all of the stakeholders, working towards it will be much easier. The strategic plan will be completed within one year, but it should not be an impediment to mobilizing the Board or providing technical input to decision-making.

The second priority is developing and maintaining an up-to-date assessment of water supply, usage – where, by whom and for what purpose – and quality. This information will be managed in a way that makes it accessible to the Board and to stakeholders.

Third is the development and implementation of a research and monitoring programme. The Technical Committee will not be responsible for collecting primary data and data processing. It will have ready access to key databases and to all the many technical reports and assessments that have already been completed. The Committee will identify gaps in information and compile these as part of an annual research and monitoring plan to be submitted to the Board. It will have an important role in the identification of data collection needs, for example, by the Bureau of Statistics. It will also ensure that the monitoring of water supply, demand and quality is being conducted according to the standards laid down by the authority, such as the hydrometric network, and carry out quality control over the data collected. The committee will have an important role in the development of indicators adapted to the specific needs of the basin. This is of critical importance in ensuring that sustainable water management practices can be measured for their effectiveness, and that the quality of water for various purposes meets the required standard.

A fourth task is making recommendations on the issuance of water development licenses. There might be different classes of licenses according to the particular temporal and spatial needs of the user. Permits for 'small' uses, such as hand pumps for domestic water supply, will not be required.

Fifth is to ensure that the provisions of the Environment Act 1997 are fully adhered to and that best practices are employed to ensure that all projects that may affect the supply, use or quality of water are fully assessed. The results of these assessments will be provided to the Board in support of decision-making and monitoring.

In addition, the Technical Committee will prepare Codes of Practice for all users, to inform them of their obligations towards the proper use of water in the various sectors. It will also be responsible for organizing public hearings as required by the Board, ensuring that all stakeholders are given a fair and equitable opportunity to be heard, and for understanding the implications of the subject under consideration.

Information Management

A common complaint in the water sector concerns the inadequacy and inaccessibility of information. Ancient civilizations effectively managed their water resources with much less information than we have at present. Nevertheless, predicting the future and acting accordingly has always been a challenge for resource managers. Decisions have to be made on the basis of available information. That means ensuring that the watertight compartments of the various agencies holding information have to be opened up.

The advantages and disadvantages of setting up a central point for the management of information related to water need to be debated by the organizations that collect and hold the information and those that need it. Generally, data are collected for some particular purpose, and then the activity ceases. The data are filed by the agency concerned once they have served a purpose. The same goes for information collected by projects. These data will be held by organizations that have a mandate to routinely collect, manage and disseminate data on water. As information is collected on a very large number of variables, in various time series, and in different systems of measure, a lot of work is required to turn these data into information. Given the importance and magnitude of the task, and to avoid every new project having to search out data sets from many sources, a case can be made for a single entity to take on this task.

The Bureau of Water Resources currently monitors the hydro-meteorological network and has shown a willingness to compile useful data and make it available to all users. The Bureau might become the focal point for all

data on water if given the resources to do so. Considering the huge investment made in previous decades, in collecting data, the investment is modest, and the returns great.

A single source of distributed data will be particularly beneficial to Technical Committees, through online databases being developed by BWR and within P&DD and in other forms. The Bureau will assist in standardizing data formats and ensuring the quality control of data currently being collected, as well as assisting in the identification of key indicators.

Involving Stakeholders in Water Management

There will be a process that enables all stakeholders to contribute to the development of water management strategies, policies and legislation. The process followed in the BCS has been to draw on specialists and stakeholders through technical papers, discussions and workshops. Outreach to the local level has been limited. The process will be continued and expanded. The Interest Group on Water can continue as is, or broaden out to include more participants.

Ultimately, a roundtable format will be developed. As with other roundtables, this will provide an excellent source of advice from various quarters, not otherwise heard from. Project personnel do not generally involve themselves in discussions, yet they often have a great deal of knowledge of the issues, as well as useful approaches and techniques. Efforts will be made to draw them into these discussions. Where feasible, such discussions will be mediated by electronic conference in order to save time and resources.

Local Water Management Systems

The rich tradition of water rights and local water resource management in Balochistan has been compiled and discussed by Halcrow Rural Management (1995) and Steenbergen (1997). These rights and practices are key to how water is allocated for various purposes, when, where and by whom. They relate to groundwater, perennial surface water and floodwater. Each basin has its own particular sets of challenges and opportunities. Not only are the residents and other stakeholders the beneficiaries, they are also the most knowledgeable about local conditions, variability and techniques for adapting to it. Local people can provide considerable insights into what is until now, largely the subject of mathematical models, based on largely untested assumptions. Local people do not have all of the answers and can benefit from the interaction with specialists in areas such as water harvesting and cropping.

Hamid Sarfraz, IUCN

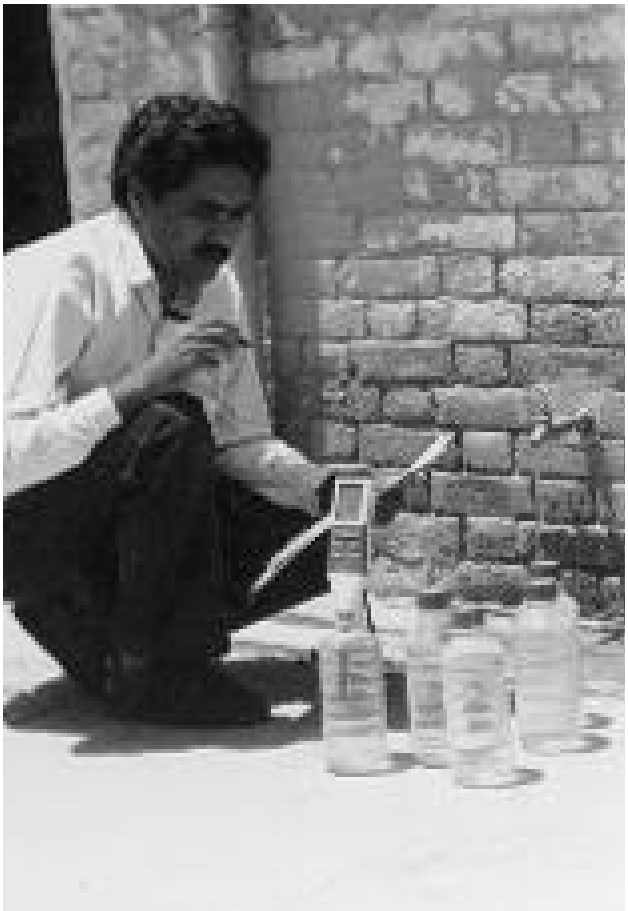
A marriage of traditional and modern water harvesting systems is needed.

Roles and Responsibilities

The issue of coordination and cooperation is a constant refrain in discussions of 'who does what' in water. The Irrigation Department is currently undergoing restructuring and reform as the Balochistan Irrigation and Drainage Authority. The roles and responsibilities of the agencies concerned with water will be comprehensively reviewed ,to support the basin water management strategy described above. They will all cooperate with the Bureau of Water Resources in building and managing a centralized database and participate in the development of monitoring and evaluation procedures.

Watershed Rehabilitation and Management

The specific requirements for watershed rehabilitation and management must be determined on a basin-by-basin basis, at the valley level. Rehabilitating the catchment of a valley will affect the lives of all who use its resources, whether for fuelwood, construction materials, agriculture, biodiversity or livestock grazing. For many of



Hammad Qureshi

Testing water quality in Quetta.

these people, there is no problem. Or if the problem is common to all people, it is not seen as their problem.

The major task is to work with local people to come to a consensus that there is a problem and that their assistance is essential to its solution. There must be some tangible benefit from changing the status quo. It might take the form of alternative sources of fuel, more efficient agricultural practices, delivery of services required by the community, income from community-managed schemes, such as trophy hunting, or more productive animals. The government has little influence in these matters. What influence there is may be in the hands of Nawabs, Sardars, Maliks and other influential individuals. The concern will be economic benefits and not the natural environment, even though there may be a keen realization of the problem among educated people. The concept of watershed management will be explained in terms that are meaningful to the people who can effect a change.

Awareness raising is probably one of the best means of achieving the desired results. Working with sympathetic landowners and influential individuals to demonstrate techniques of using resources more effectively will be another course of action. Rehabilitation in itself may not be a resource-intensive activity. Experience over the past 40 years suggests that major interventions, such as seeding, reforestation, landscaping and fencing have not been that effective due to lack of objectivity and commitment on the part of government agencies and lack of involvement and interest of local communities. What did work was allowing nature to do the work by controlling or restraining human influence. Certainly such interventions are likely to succeed if the constraints are addressed as has been experienced during the last four years in implementing watershed activities under the Area Development Programme Balochistan and FAO implementation project.

In light of this, the goals, objectives and guidelines for rehabilitating watersheds will be developed on a case-by-case basis, drawing from the wealth of experience already gathered and the lessons learned. Interventions will be strategic and focused on working where there is a will to change. Imposing solutions from the top down will not have much impact.

Mass Awareness

Mass awareness programmes will be among the most effective tools in changing the patterns of water use. These will range from disseminating information on sound irrigation practices to conserving water in domestic use. There will also be awareness-raising of traditional management water practices. These practices, such as the use of karezes, have deep-rooted social and cultural significance in rural communities. Customary practices have a great deal of merit, particularly where resources are scarce and where the community has to work together to find solutions.

Educational Materials

Appropriate materials will be developed for use in schools, regarding the importance of clean water and the need to conserve it.

Policy

Policies do exist for the rationale development and use of water, and these are supported by a suite of legislation. They are piecemeal and sectoral in nature. The problem is that these policies have not been fully implemented. Legislation has not had the desired effect. The need for a sense of vision was discussed earlier. It provides the context for policy development, the legislation required to implement it and the framework within which the Water Boards and other agencies will function.

Priorities for water have been established in the provincial Ninth Five-Year Plan. Given that only an estimated 20% of the population has access to reasonably safe drinking water, top priority is given to providing a reliable supply of clean water to both rural and urban communities. The government recognized the impact of tubewells on the groundwater resource, and imposed controls on their installation in Quetta, Mastung, Mangochar and Pishin. A No Objection Certificate is required to install a tubewell. Metering systems for electricity to run tubewells were to be introduced by the federal government in 1999, but the flat rate system will now continue until at least 2002.

Beyond these measures, a water policy is not clearly spelled out. Management measures will include more investigations of groundwater potential, application and testing of groundwater recharge techniques, support for the hydrometric network and promotion of the use of perennial and flood waters for irrigation through numerous development schemes.

Develop a Comprehensive Policy for the Sustainable Use of Water Resources in Balochistan

The policy will deal with the supply, demand and quality of water. It will cover groundwater, perennial flows, floodwaters and Indus water. The policy will spell out how the province intends to manage these resources in the long term. It will provide the basis for the work of the Water Boards and all other agencies concerned with water supply, demand and quality.

The first step is to develop a process for policy development. The goals, objectives and principles developed for the BCS provide the basis. The process will involve all the stakeholders.

Inadequate Legislation

New water legislation will be developed that explicitly addresses the problems of irrigated agriculture in Balochistan. The emphasis will be on improving irrigation and creating effective institutions for achieving this end. Arguably, Balochistan is in need of a Water Resources Authority, rather than a Balochistan Irrigation and Drainage Authority, dealing not only with canal irrigation and drainage but with the planning and management of ground and surface water resources on a hydrological-basin level and in an environmentally safe manner.

A detailed review of existing legislation will be conducted and amendments introduced. The development of new legislation in the water sector will require a broad consensus from all the institutions concerned, as well as from private users. In the short term, the BIDA Act will be reviewed and amended.

Cost Recovery

The underlying principle of minor irrigation schemes is that farmers and their own organizations will be fully equipped to properly maintain and further develop schemes with no recurrent costs to the government. This means that farmers will contribute to the capital costs of irrigation schemes and take full responsibility for all subsequent costs. For example, under BCIAP, farmers collect and contribute 17.5% of capital costs in low-income areas and 35% of the capital costs in high-income areas (such as deciduous orchards). To achieve fuller participation, farmers will be brought into the design and construction process, for flood irrigation and for the operation and maintenance of all irrigation infrastructure. Farmers will be organized into legally constituted bodies (such as the farmer organizations formed under BCIAP) to operate and maintain minor irrigation schemes. They will be allowed to own infrastructure. BIDA will hand numerous irrigation schemes that it controls over to the beneficiaries, in a manner consistent with this above approach.

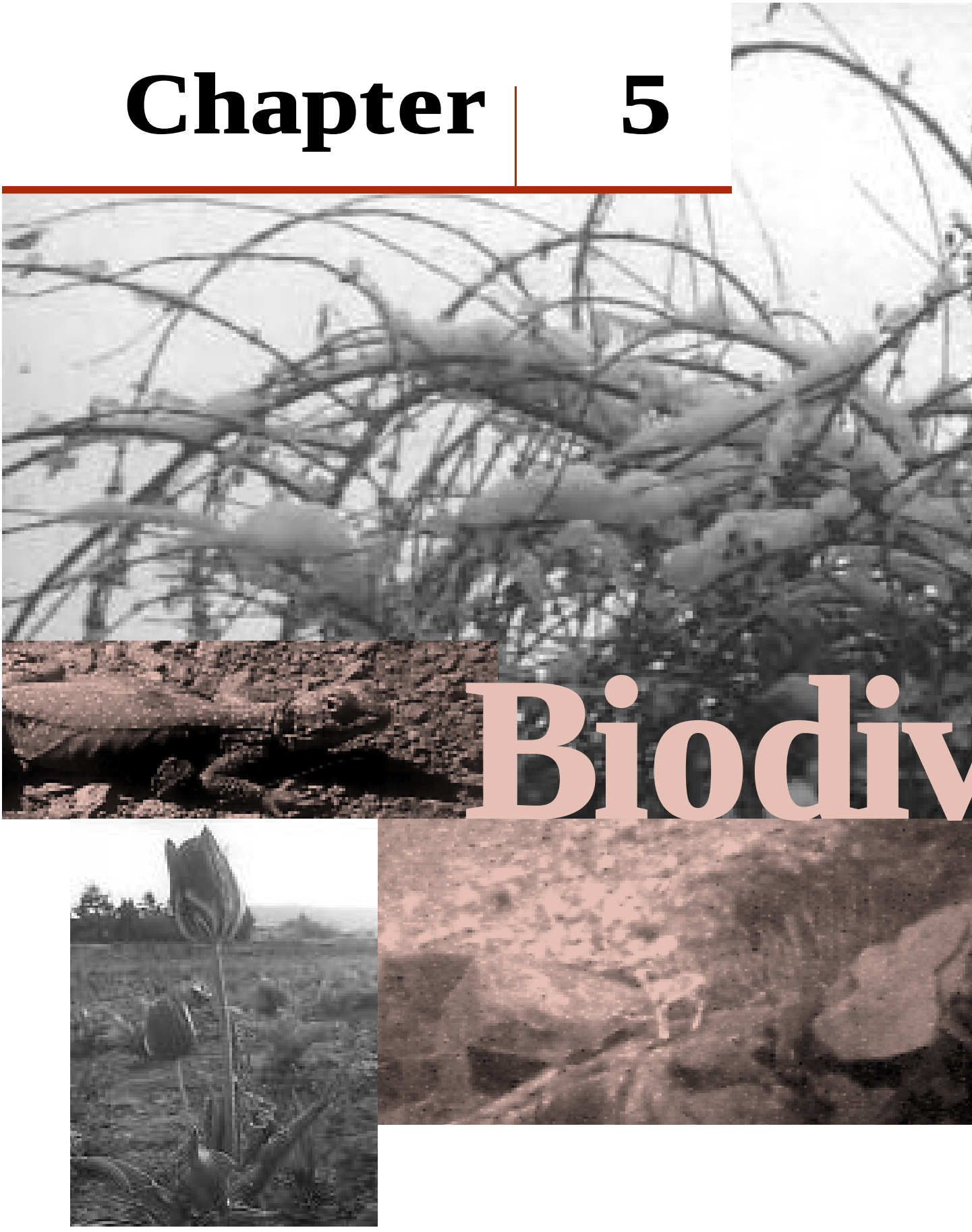
Need for Improved Management of Minor Irrigation Schemes

Government, NGOs and the private sector all have an important role to play in assisting farmers to improve the management, operations and maintenance of their irrigation schemes. Successful development models have been, and are being introduced, and it is essential that the best of these be used to enhance and expand irrigated agriculture in Balochistan. It is also important that communities are assisted in networking to build a greater awareness of the options open to them in irrigated agriculture and to allow them to appreciate various approaches that have been tried. These communities will also be linked to appropriate government departments, NGOs and private sector organizations, to ensure that they have access to the much-needed support.

Need for Involvement of Women

Water supply and irrigation projects will continue to find culturally appropriate ways of effectively involving women in operations and maintenance activities. Projects such as BCIAP have been able to extend their Women and Development activities to other aspects of water use, focusing on health, hygiene, safe water use, vegetable production and water management. The lessons learned from these initiatives will be applied in developing and implementing water management schemes in rural areas.

Chapter 5



Biodiv

Biodiversity

The people of Balochistan have sustained themselves for thousands of years on the plants and animals around them. Rock carvings and cave paintings from the Neolithic period graphically depict dependency on a wide variety of wildlife. Hunting and gathering cultures have evolved over the past 10,000 years into settled agricultural systems. The excavations at Mehrgarh show that wild animals were hunted and then increasingly domesticated. Wild plants were selected and cultivated, making settled agriculture and urban life possible. Nomadic patterns of grazing became entrenched in Balochistan's cultural, social and economic traditions.

Rural people need no reminder of the benefits that biodiversity brings, whether from the sea, rivers, rangelands, forests, or deserts. All the ecosystems of the province are used for some purpose during the year. Pastoralists, in particular, know every stick and stone, as they move around the area in search of grazing for their animals. Trees and shrubs are used for fuel and construction materials, and herbs for food and medicine. Marine life is essential to the survival of the isolated coastal population.

The term biodiversity means the variety of life on earth. It includes all varieties of plants and animals. Balochistan is especially rich in biodiversity, given its position in the transitional zone between two of the world's major zoogeographical regions – the Palaearctic and the Oriental. Species from the Ethiopian region are also represented in Balochistan. The geography of the region has an impact on the distribution of plants and animals. To the west lies the great Seistan desert basin, which includes parts of Iran and Afghanistan and extends, in Balochistan, into the districts of Chagai and Kharan. To the east lies the Thar and Cholistan deserts, to the north the Himalayas and adjacent mountain chains, and to the south the Arabian Sea.

Wide variations in physical features and climate have produced diverse landscapes, ecosystems and habitats that are important to the national and global heritage. Much of the province remains poorly investigated. Systematic knowledge of the flora of the province remains incomplete and a comprehensive analysis of endemicity, species density and relationships is not available. There are at least 1,750 known plant species (Rafiq 1965) and an impressive variety of animals (Table 11). A number of these are endemic to Balochistan. Detailed vegetation or habitat maps of the province are not available, hence, there is little information on the distribution and abundance of the plants and animals found there.

Table 11 Fauna of Balochistan

	No. of Species in Balochistan	No. of Species in Pakistan	Endemic Species in Balochistan
Mammals	71	**182**	2
Birds	356	**666**	0
Reptiles	94	**159**	7
Amphibians	8	**20**	0
Freshwater fish	61	**150**	8

Source: Roberts 1997.

Checklists have been compiled for mammals, birds, reptiles, amphibians, fish and plants as part of systematic zoological investigations, or in conjunction with various projects. The invertebrate record is particularly weak. What is certain is that Balochistan is one of the most important wildlife regions of Pakistan, and holds a large number of species not found elsewhere in the country.

FOREST TYPES

Plant communities have been described as a component of range management projects, in conjunction with studies of parks, forests and wildlife areas, and as part of studies on the animals of Balochistan. The major vegetation types are coniferous forests, scrub forests, subtropical desert and riverain forest.

Coniferous Forests

The coniferous forests of Balochistan occur at elevations of 1,500–3,500 metres. The forest types include chilghoza (Pinus gerardiana) and Dry Juniper Forest (Juniperus excelsa).

In Balochistan, chilghoza are confined to the Sulaiman Mountains, in the Shirani tribal area (Zhob District), ranging from 2,700 to 3,400 metres in elevation (Rafiq 1965). The main chilghoza areas are found at Shinghar, Kaisaghar, Takht-e-Sulaiman and Torghar (Zhob District). In Shinghar, 2,562 hectares are included in state forests, while the Shirani tribe owns the remainder. Chilghoza is the dominant species, with the sporadic occurrence of kail (Pinus wallichiana) in the upper reaches of Takht-e-Sulaiman and Torghar. Over the past 25 years, chilghoza trees have been completely cut at lower elevations. Cutting is now taking place between 2,100 and 2,750 metres (Ahmed et al. 1991).

Balochistan has one of the largest areas of juniper forests in the world. They cover approximately 141,000 hectares. The most extensive (86,000 hectares) and best-known examples are found in the Ziarat and Zarghoon hills. They occur at elevations between 1,980-3,350 metres. Growing conditions are harsh. Annual precipitation averages 328 millimetres and falls mostly as snow. The forests are quite open, depending on site condition. Trees are very slow growing. Consequently, these forests are believed to be among the oldest in the world.

Scrub Forests

These forests are found at elevations of 500–1,500 metres. They provide protection to agricultural land by reducing soil erosion, as well as the intensity of flash floods. In areas of low rainfall, large tracts were once covered with this type. They have now been cut down. The area is now colonized by degraded xerophytic shrubs. Very rarely, in some protected moist pockets, there are isolated trees of Olea ferruginea, Acacia modesta and Pistacia spp. (Champion et al. 1965).

Scrub forests can be divided into three categories:

- Balochistan Dry Temperate Scrub (Steppe) – Dry temperate scrub is the climax formation in most of Quetta, Mastung, Kalat, Qila Abdullah, Pishin and part of Qila Saifullah (Champion et al. 1965). Overgrazing and collection of fuelwood have affected large areas.
- Dry Sub-tropical Broad-Leaved Forests – Typical examples occur in the Sulaiman Mountains; Olea ferruginea and Pistacia khinjik are the dominant species, interspersed with P. atlantica and cabulica and a variety of low shrubs.
- Tropical Thorn Forests – These are generally open forests of thorny and woody species with stunted growth, low branching and other xerophytic habits. Grazing, browsing and cutting for fuelwood have converted these forests into a scrub form (Champion et al. 1965). In Balochistan, these forests are found on the Sibi plains and at Nok Kundi. The composition of species may vary from location to location.

Subtropical Desert

According to Rafiq (1965), there are three major types of desert:

- Haloxylon persicum – This type is found in the valleys of Kharan and Chagai Districts, between 600 and 920 metres. It consists of open stands of H. persicum, with trees attaining a girth of 1.2 metres and height of 6 metres.
- H. salicornicum-rhazya – This type is found in Chagai and Kharan Districts at elevations of 480–1,220 metres. This is a halophytic association growing in nullahs and washes. Typical plant species are H. salicornicum and Rhazya stricta.
- Salt Flats – This type is found on inland dry salt lakes, such as Hamun-e-Lora and Hamun-e-Mashkel in Chagai and Kharan deserts, at elevations between 610 and 860 metres. These are mostly devoid of vegetation. Some typical plants are Alhagi maurorum (pseudoalhagi) and Desmostachya bipinnata.

Other Forest Types

In addition, there are the remnants of two other forest types – riverain forests and mangrove forests. Very little of the riverain forest type survives in a natural state. The Forest Department controls 4,494 hectares. The Forestry Sector Master Plan reports about 20,000 hectares, including private forests in Districts Sibi and Lasbela. The dominant species is Acacia nilotica with varying occurrences of Populus euphratica and Prosopis cineraria on the drier sites (Champion et al. 1965). For decades, these forests were used for fuelwood and mine props and were lopped for fodder. They have been severely degraded and much of the area has been converted into agricultural land.

Remnants of mangroves occur along the coast in Districts Lasbela and Gwadar. The Forest Department controls 297 hectares. Mirza et al. (1988) reports 7,340 hectares in three locations: Miani Hor (3,100 hectares), Kalmat Hor (2,160 hectares) and Jiwani (2,080 hectares). The dominant species are Avicennia marina, Rhizophora mucronata and Ceriops tagal (see also Chapter 6).

Trees are grown in irrigated plantations and on farmland. Irrigated plantations are limited to about 298 hectares in Lasbela, Sibi, Zhob, Pishin and Quetta districts. The Forestry Sector Master Plan reports that there are about 1,000 hectares. In Nasirabad and Sibi Districts, plantations are irrigated with water from the Pat Feeder and Khirthar canals and from Nari River. In other areas, they depend on water from tubewells. The most important tree species raised are A. nilotica, Salix tetrasperma, Populus spp, Albizzia lebbek, Melia azedarach, Eucalyptus and Dalbergia sissoo (Forest Department 1998). Balochistan has a significant number of trees on farmland. The Household Income and Expenditure Survey estimated about 9,000 hectares under farmland trees, with a standing volume of about 3.43 million cubic metres, giving an annual production of about 100,000 cubic metres a year (Government of Pakistan and IUCN 1992). The most common trees growing on farmer's fields are Prosopis cineraria (kandi), which occur naturally. Introduced trees include A. nilotica, Eucalyptus spp., Cupressus arizonica, Alianthus altissima, Populus spp., Melia azedaraca, Salix spp., Albizzia lebbek, Robinia pseudoacacia, Platanus orientalis, Gleditsia tricanthos, Sesbania sesban, Prosopis juliflora, Morus alba, Azadirahta indica, Ficus religiosa, Pinus eldarica and Elaeagnus hortensis.

Balochistan is one of the largest stands of junipers.

WETLANDS

Balochistan has some of the world's finest wetland habitats. These are small in number and extent, but have

enhanced value when viewed in the perspective of an arid environment. They attract a variety of waterfowl, including swans, geese, ducks, grebes, herons and several species of waders.

The Zangi Nawar Lake in Chagai District is a wetland of international importance. More than 60,000 birds were counted there in the mid-1980s. However, it dries during drought years, e.g., 1987, 1999 and 2000. Spin Karez, a wetland near Quetta, is a site for several migratory, breeding and watering waterfowl species. Although developed as a recreational site in Quetta District, Hanna Lake does attract some waterfowl species in winter. The seasonal Siranda Lake in Lasbela District is famous for attracting a large number of common shelduck, which are also found in Badin District. The Biroon Kirthar canal in Jaffarabad District attracts large number of mallards, pintails, widgeons and coots. Grey herons and egrets are abundant on this site.

Other important areas include mangrove forests in sheltered bays on the coast, Pasni Bay and Hab Reservoir (see also Chapter 6). Diversions of surface runoff for agriculture have an impact on the functioning of wetlands. Without an adequate input of fresh water, the quality of wetlands and associated habitats will deteriorate, as will the mangrove forests that fringe three estuaries along the coast.

Reservoirs and canals have greatly enriched the habitat and wildlife populations of the province. Some of these lose most of their storage capacity over time, due to siltation. The Bund Khushdil Khan reservoir was created in 1890 and enlarged in 1914 to 5,340 hectares. Presently, there is only sufficient water to irrigate 200 hectares. Once an important breeding and staying area for birds, the reservoir is dry for most of the year and is being encroached by orchards and settlements. The government plans to construct a new dam at the site. If successful, some of the wetland habitats may be restored. Watershed management measures in the catchment might help reduce sediment loads (Balochistan Irrigation and Drainage Authority 1999).

MIGRATORY BIRDS

In addition to the migrant and breeding waterfowl just mentioned, several other important species migrate through the province. These include the houbara bustard, falcons and cranes.

The houbara bustard is predominantly a winter visitor to the deserts of Balochistan; 12% of the area of the province forms the winter habitat of this species. Some birds are known to breed in the highland areas of Nag in Kharan District and near Nushki. There is great concern for the bird's survival. Numbers have declined dramatically over the past 30 years due to hunting pressure from Arab falconers. Live birds and eggs are smuggled out of the country. The Saker falcon is a winter visitor to northern parts of the province. This falcon can be trained to hunt houbara and is sought after by falconers. The Peregrine falcon winters in coastal cliffs along the Indus Valley and southern and central Balochistan. This bird is also in much demand by falconers. It is estimated that about 400 falcons of both these species are trapped in Balochistan each year. They are then illegally exported to the Middle East. Demoiselle and Eurasian cranes migrate between Afghanistan and India. A major migration route for demoiselle cranes crosses the Zhob River and Loralai before entering Punjab. Zhob is popular with hunters and trappers from the NWFP. It is estimated that more than 40,000 demoiselle cranes pass through Zhob, of which a minimum of 5,000 are trapped each year.

Anam-Bostan-Nushki-Chagai is an important route for Eurasian cranes. They have been recorded resting at Zangi Nawar Lake on the way east. A third important route passes along the coast. The most important staging areas for cranes in Balochistan include the Zhob River, the plains of Loralai, Zangi Nawar, Chagai, the deserts of Lasbela and Hab reservoir.

MAMMALS

At least four mammals have disappeared from Pakistan in the past 400 years: The Indian one-horned rhinoceros was last seen in the Salt Range in the sixteenth century; the last lion was shot in Sindh in 1810; the last tiger was shot in Bahawalpur State in 1906; and the swamp deer has been absent from Pakistan since the turn of the century.

Two species that used to be found in Balochistan have become extinct in recent decades – the Asiatic cheetah and the Indian wild ass. The remaining large mammals are not doing well over much of their ranges.

The IUCN Red List of Threatened Animals (IUCN 1996) includes four species that occur in Balochistan. Two are critically endangered: the Balochistan black bear and Chiltan wild goat. In the 1970s, the Balochistan black bear was reported in the juniper forest zone on Khalifat, in north central Balochistan, and near Ziarat. It now appears to be confined to the arid sub-tropical thorn forest in southern Balochistan, in areas associated with the dwarf or mazri palm. The only significant population appears to be in the hill ranges of Khuzdar. A few may still survive in the Pab Range of Khuzdar District and the Jhal Jao hills to the north east of Kalat. As with many other species, the

absence of data precludes an assessment of population status. The Chiltan wild goat is largely restricted to the Chiltan Range, particularly Hazarganji Chiltan National Park. According to the park management plan (WWF-P 1998), 360 animals were reported in 1987. The population had increased to 806 by March 1999.

Two species are listed as endangered: the straight-horned markhor and the urial. The straight-horned markhor occurs in scattered, isolated populations on the major mountain ranges north and east of Quetta. Its numbers are limited. The greatest concentration today is in the Toba Kakar Range on the border with Afghanistan, particularly in a protected area in Torghar. A population of 480 was reported in 1994, 1,300 in 1997 and 1,684 in 1999. The urial is found in scattered populations from the coast to northern Balochistan. The two largest concentrations are in the Dureji and Torghar protected areas. In 1999, 1,742 Afghan urial were recorded in Torghar.

REPTILES

The Chagai Desert has the distinction of having a unique assemblage of reptiles, including six endemic species and at least six others found only in the region (Table 12). There is a substantial illegal trapping trade in these animals.

Among the marine species, the status of the endangered green turtle, the vulnerable marsh crocodile and nine species of sea snakes is uncertain.

CROP BIODIVERSITY

The diverse climate and soils permit the cultivation of a wide range of crops, contributing to the diversity of agriculture in the province. More than 100 undescribed crop varieties are grown in the province. The Chiltan Mountains are thought to be the source of a variety of wheat, from which high-yielding wheat varieties have been developed. Land races of agricultural crops represent a considerable germplasm bank for the agricultural crop sector. Modern agriculture has accelerated the breeding of new, high-yielding crop varieties that have replaced indigenous low-yielding, disease-resistant varieties. Unfortunately, these indigenous crop varieties are becoming extinct very fast, as there is no programme to conserve germplasm in Balochistan. An effective and economical option is that the germplasm is conserved in the national facility being maintained by the National

Table 12 | Endemic and Rare Reptiles of Chagai Desert

Common Name	Zoological Name	Status
Turkestan rock gecko	Cyrtodactylus fedtschenkoi	**Uncommon**
Sharp-tailed spider gecko	Agamura femoralis	**Rare, endemic**
Lumsdeni gecko	Stenodactylus (crossbemon) lumsdeni	**Very rare, endemic**
Whip-tailed sand gecko	Stenodactylus maynardi	**Endemic**
Baloch spiny-tailed lizard	Uromastix asmussi	**Rare**
Mountain dwarf gecko	Tropiocolotes depressus	**Rare**
Short-toed sand swimmer	Ophiomorus brevipes	**Extremely rare**
Eastern dwarf skink	Ablepharus pannonicus	**Rare**
Indian desert monitor	Varanus griseus koniecznyi	**Endangered**
Reticulate desert lacerta	Eremias acutirostris	**Uncommon, endemic**
Caspian desert lacerta	Eremias scripta	**Rare**
Chagai desert lacerta	Eremias aporosceles	**Endemic**
Dark headed dwarf racer	Eirenis persica walteri	**Rare**
Tartary sand boa	Eryx tataricus speciosus	**Rare**
Spotted desert racer	Coluber karelini karelini	**Rare**
Dark headed gamma snake	Boiga trigonata melanocephalus	**Rare**
Maynard's awl-headed snake	Lytorhynchus maynardi	**Rare, endemic**

Source: Ghalib et al. 1979; Groombridge 1988.

Shuja Zaidi

Six breeds of sheep are found in Balochistan.

Agricultural Research Centre, Islamabad. The knowledge of wild relatives of agricultural crops found in Balochistan is limited.

LIVESTOCK BIODIVERSITY

Balochistan possesses some well-known breeds of livestock. There are other breeds or varieties of livestock that are still to be described. The government, as well as the private sector, as stipulated in the National Breeding Policy, are apparently conserving local breeds.

There are six main breeds of sheep in Balochistan: Bibrik, Balochi, Harnai, Rakhshani, Kakri and Mengali. Goat breeds kept for hair and meat production are the Pahari, Kajli, Khurasani and Lehri, while those used for milk production are the Barbari and Kamori crosses. Some exotic sheep and goat breeds have been introduced in Balochistan in the recent past. These included Awassi, Rambouillet, Polled Dorset and karakul sheep, and the teddy (Bengal goat) and angora goats. Only a few of these exotic species of sheep can still be found, as they were unable to thrive in a harsh environment characterized by a scarcity of feed.

Cattle breeds include Bhagnari, Lohani and Red Sindhi. These are well-adapted to local conditions and have, over time, been selected for milk or draught. Red Sindhi is one of best milch cattle breeds in Pakistan, as it thrives under harsh conditions and feed scarcity, and is resistant to ticks. It has been in great demand from foreign countries for breeding purposes. Lohani animals are short-statured and capable of ploughing in sub-mountainous areas. They are sure-footed and able to survive on little feed.

The province does not have any specific buffalo breeds, except for an offshoot of Sindh Kundi. These occur in the canal-irrigated districts of Jaffarabad and Nasirabad. Other buffalo populations make up the peri-urban dairy units found in all towns of the province.

The camel commonly found in Balochistan is the Arabian one-humped camel. There are two main types – the 'mahari' or riding camel and the loading camel called 'bari', 'bar-bardari' or 'ladu'.

FORESTS, PARKS AND WILDLIFE AREAS

Local rulers traditionally had reserved areas for hunting. State institutions gradually replaced these local institutions and started taking control over the natural resources.

The history of state involvement in conservation dates back to the Balochistan Forest Regulation (1890). The Forest Department took control of forests and game reserves on state lands. In 1960, 831,000 hectares of the former Kalat State were declared 'Protected Forests' under the Forest Act 1927 when the state was merged with Pakistan. This brought 1.09 million hectares under the administration of the Department. An area of about 32,000 hectares in Jhal Magsi District was taken over by the government as a result of land reforms. This 'resumed land' area was transferred to the Forest Department. In practice, the department has not exercised any legal control over this area (WWF-P 1998). The Forest Department currently holds about 3% (1.086 million hectares) of the land. This includes forests, rangelands, wildlife areas and many deforested lands (Table 13). In addition to affording legal protection to the forest areas, 22 threatened tree species were given legal protection under the Reserve Trees Rules 1901. The Balochistan Wildlife Act (1974) provides for the establishment of national parks, wildlife sanctuaries and game reserves.

There are two national parks with an area of 646,464 hectares; 14 wildlife sanctuaries totaling 967,592 hectares; eight game reserves covering 409,719 hectares; five private game reserves; and one community conservation area with a core area of 300 square kilo-

Amjad Mirk, IUCN

Balochistan is on the migratory route of many wintering birds populations.

Table 13 State and Protected Forest Area*

Forest Division	Civil District	Coniferous Forest	Riverain Forest	Scrub Forest	Coastal Forest	Rangelands	Tamarix etc	Total
Quetta/Chagai	Quetta	**17,413.2**	0.0	**17,181.0**	0.0	**0.0**	25.3	**34,619.5**
	Pishin	**16,794.5**	0.0	**7,171.0**	0.0	**0.0**	2,513.5	**26,479.0**
	Chagai	**0.0**	0.0	**121,948.2**	0.0	**306,655.1**	0.0	**428,603.2**
Sibi	Sibi	**17,667.8**	1,682.7	**25,849.7**	0.0	**0.0**	0.0	**45,200.2**
	Ziarat	**51,191.6**	0.0	**0.0**	0.0	**0.0**	0.0	**51,191.6**
Loralai	Loralai	**18,519.7**	0.0	**20,413.6**	0.0	**22,480.7**	3,147.6	**64,561.6**
Zhob	Qila Saifullah	**0.0**	0.0	**20,287.3**	0.0	**0.0**	0.0	**20,287.3**
	Zhob	**1,036.0**	0.0	**6,276.7**	0.0	**5,698.0**	0.0	**13,010.7**
Kalat	Mastung	**0.0**	0.0	**10,360.0**	0.0	**4,046.9**	857.9	**16,074.1**
	Kalat	**22,350.8**	0.0	**45,708.1**	0.0	**809.4**	0.0	**68,058.9**
	Kharan	**0.0**	10,125.3	**33,589.0**	0.0	**0.0**	83,656.7	**127,371.0**
	Khuzdar	**0.0**	518.0	**16,834.9**	0.0	**0.0**	0.0	**17,352.9**
Lasbela	Lasbela	**0.0**	810.4	**122,721.9**	296.8	**35,223.9**	0.0	**159,053.1**
Turbat	Gwadar	**0.0**	0.0	**0.0**	0.0	**0.0**	14,504.0	**14,504.0**
Total		**144,973.6**	13,136.3	**448,341.4**	296.8	**374,913.9**	104,705.1	**1,086,367.2**

Source: Balochistan Forest Department.
*Area in hectares, under the control of Balochistan Forest Department.

metres. The total area covered under the protected areas system (excluding the five private game reserves and one community conservation area) is 1.829 million hectares, which constitutes about 5.3% of the province's geographical area (Table 14 and Map 4 in Maps section).

ISSUES

Environmental Degradation

In recent decades, the number of people and livestock in Balochistan has increased to the point where they have put great pressure on the limited natural resource base. Grazing and cutting of bushes and trees for fuel and timber has already crossed the threshold levels of sustainability. Wildlife populations have declined to the point where most of the principal species are classified as endangered; they are no longer found in most of the protected areas set up to conserve them. Forests are under threat from cutting and heavy grazing. Wetlands are under threat from siltation, encroachment, abstraction and extraction of water upstream, pollution and other human pressure. Local people are now mining the base capital of the resource.

The large-scale deterioration of the environment and degradation of natural landscapes has been evident for many years. The degradation of wild living natural resources has not only disturbed the ecological balance required for a healthy environment, it is one of the underlying causes of poverty. The rural poor are trapped in a vicious cycle of the over-exploitation of whatever remains, to compensate for the loss of productivity and the ever-increasing cost of living. It is estimated that barely 8% of provincial energy demands are currently being met from forest resources, compared with 33% on the country level (Government of Pakistan and IUCN 1992). These estimates, however, do not appear to include dependence of the rural population on rangeland shrubs. In a recent survey in Sinjawi (Loralai District), it was found that on average, 250 kilograms per hectare of woody shrubs are annually collected for fuelwood from the rangelands (Maarten 1996). The situation is the same or even worse in other areas of Balochistan, as fuelwood availability is limited.

The impact of pesticides on biodiversity is not known but must be considerable especially in orchard and vegetable growing areas. People in Balochistan are still using DDT for mosquito control purposes, despite the fact that its adverse and persistent impacts on the environment were recognized 40 years ago. Industrial effluents discharged into rivers and streams not only kill equatic life or contaminate freshwater life, but also find their way to the open sea, where marine habitats are affected.

Resource Inventory

There are no institutional arrangements in Balochistan for preparing or maintaining accurate resource inventories. All of the statistics in recently published reports have depended on second-hand information. They are of limited use for the purposes of policy, planning and management. The forest area statistics are based on land records rather than the area under tree cover. The lack of detailed quantitative and qualitative information on the biodiversity of the province was mentioned earlier. There is no monitoring of ecosystem health, or systematic surveys to obtain reliable data on the population of key species. Valuable forests are threatened by a parasitic plant, insects' attacks and other diseases, but there are few reliable data on the extent of the problem.

Resource Management

The state controls only a small area, which is notified as 'state' or 'protected' forests. Communities have certain rights to graze, collect fuelwood and obtain timber for building huts (WWF-P 1998). The present approach to the management of these forests is limited and involves policing to check the unauthorized cutting of trees, control the grazing of livestock and prevent the poaching of wildlife. Natural regeneration is almost insignificant due to heavy grazing. The forests and other renewable land resources, once considered sufficient to meet the needs of the local people, are no longer adequate. The only forestry work plan ever prepared was for the juniper forests in 1961–62. It was not implemented and it expired in 1975–76. Presently, there are no management plans for the conservation and sustainable use of these resources. A management plan was prepared for the Forest Department by the World Wide Fund for Nature (WWF)–Pakistan, for Hazarganji Chiltan National Park. It has not yet been implemented.

The situation on private and communal lands is little different from that on state lands. Over the last two to three decades, trees around villages have been completely cut down. Since then, bushes are being cut for fuel and fodder. Fuelwood collection and grazing are generally allowed free of any charge.

There is no doubt that the local population is over-exploiting natural resources. The reasons for this are a

Table 14 Protected Areas

Name	District	Location/ Area	Established in Year	Established to Protect	Current Status	Notes
NATIONAL PARKS[1]						
Hazarganji-Chiltan	Quetta and Mastung	**29°59´N 66°24´E 27,421 ha**	1980	**Chiltan markhor**	Created from two forest management areas that had been extensively grazed. Trees and shrubs used for fuel. Contains the only viable population of Chiltan markhor that is endemic to Balochistan (IUCN Red Data Book: Vulnerable) Management Plan submitted by WWF-P to GoB, 1997.	**Owes its success to the involvement of the community surrounding the park. Hazarganji State Forest declared in 1890 (2,267 ha); Shahwani Tribe granted access to Chiltan Shrine and to collect shina fruit (Pistacea khinjik). British used the area for grass and fodder production. Chiltan designated State Forest in 1964. Last urial shot in 1970s. Settlement of Marri tribe on boundary of park in 1992 led to illegal hunting, fuelwood collection and grazing in northern parts of the park. The area (2,351 ha) of existing Duzdara and Koh-e-Surko Game Reserve is likely to be included in this national park.**
Hingol	Lasbela, Gwadar and Awaran	**25°30´N 65°30´E 619,043 ha**	1988 and 1997 (includes Dhrun Wildlife Sanctuary)	**Marine estuarine and terrestrial fauna, such as marsh crocodile, green turtle, masheer fish, houbara bustard, dalmatian pelican, spot-billed pelican, plumbeous dolphin, Sindh ibex, urial, chinkara, pangolin and leopard**	The original area of the park was 165,000 ha. The park boundaries were extended in 1997, cover an area of about 619,043 ha. It includes the Hingol estuary and offshore to a depth of 5 fathoms. Limited law enforcement by Forest Department and Coast Guards. No Management Plan.	**Ranked as a protected area containing globally important ecosystems and species. World-class lowland and mountain desert panoramas. About 3,000 people live inside or adjacent to the boundaries. Crocodile hunted by Karachi residents. Indiscriminate hunting of ibex, urial and chinkara by influential people and government officials. Urial is most threatened. Chinkara and ibex under heavy pressure.**
WILDLIFE SANCTUARIES[2]						
Khurkhera	Lasbela	**26°03´N 66°44´E 18,345 ha**	1972	**Chinkara**	Notified but not managed.	**No prized wildlife in the area.**
Buzi Makola	Gwadar	**25°53´N 64°12´E 145,101 ha**	1972	**Ibex, urial and chinkara**	Notified but not managed. No recent surveys.	**Once hosted a large population of all three species. Many animals hunted during road construction. No game animal survives in the area.**
Chorani	Khuzdar	**27°42´N 66°45´E 19,433 ha**	1972	**Black bear, ibex and urial**	Notified but not managed. No recent surveys.	**Some ibex may have survived.**

Name	District	Location/ Area (Ha)	Established in Year	Established to Protect	Current Status	Notes
Kachau	Khuzdar	**21,660 ha**	1972	**Urial**	Notified but not managed.	**No big game animal is found in the area.**
Shaahan	Khuzdar	**27°50´N 66°35´E 29,555 ha**	1972	**Ibex and urial**	Notified but not managed.	**A few ibex might be surviving.**
Raghai Rakshan	Kharan	**27°20´N 65°20´E 125,425 ha**	1972	**Urial**	Notified but not managed.	**Urial population has been eliminated by hunters.**
Kolwah Kap	Kech	**26°02´N 64°39´E 33,198 ha**	1972	**Chinkara**	Notified but not managed.	**No wildlife in the area.**
Maslakh	Pishin	**29°55´N 66°30´E 46,559 ha**	1968	**Chinkara and urial**	Notified but not managed	**All flagship wildlife species have been eliminated from the area.**
Ziarat	Ziarat	**30°24´N 67°44´E 37,247 ha**	1971	**Markhor and urial**	Notified but not managed.	**Straight-horned markhor may still exist.**
Sasnamana	Ziarat	**6,607 ha**	1971	**Juniper forest**	Notified but not managed.	**May have important reptilian fauna.**
Gut	Chagai	**165,992 ha**	1983	**Ibex, urial and chinkara**	Notified but not managed. No recent surveys.	**No wildlife in the area.**
Koh-e-Gishk	Kalat	**24,356 ha**	1969	**Ibex and urial**	Notified but not managed. No recent surveys.	**Some ibex, no yrial.**
Ras Koh	Kharan	**28°50´N 65°06´E 99,498 ha**	1962	**Ibex and urial**	Notified but not managed.	**May be some ibex are found in remote areas.**
Chhapar Kohan	Khuzdar	**194,616 ha**	1998	**Chinkara, ibex, urial and Black bear**	Notified but not managed	**This comprises of two sites near Dureji Game Reserve.**
GAME RESERVES[3]						
Dureji	Lasbela	**178,259 ha**	Declared a wildlife sanctuary in 1972; game reserve since 1998.	**Sindh ibex, Blandford's urial, chinkara gazelle and marsh crocodile**	Area had never been managed as a wildlife sanctuary. It was re-designated a game reserve in 1998. Notified.	**Viable wild animal populations still exist. IUCN conducted a rapid appraisal of the area in 1998 following the grant of exploration rights to two oil and gas companies. Quite a large area is being used for grazing, agriculture, settlements, communication infrastructure and mining. The Forest Department has de jure ownership. The local tribe is heavily involved in its management, especially in controlling hunting and grazing in the core of the reserve. A management plan is required. The core area should be excluded from oil and gas exploration and exploitation.**

Name	District	Location/ Area (Ha)	Established in Year	Established to Protect	Current Status	Notes
Band Khushdil Khan	Pishin	**30°36´N 66°45´E 1,296 ha**	1983	**Staging and breeding area for waterfowl**	Notified but not managed.	**Waterfowl breeding in the area. Shallow water storage dam. Recreation area for Quetta. Problem of encroachment. Scheme initiated in 1886-87 and completed in 1891. The reservoir is 5 km long 2 km wide irri- Currently and with a maximum depth of 100 m. Intended to gate an area of 1,469 ha. silted up and dry due to prolonged drought. Some area encroached.**
Zangi Nawar	Chagai	**29°27´N 65°47´E 1,069 ha**	1982	**Migratory, breeding and wintering waterfowl, including whooper swan and marbled teal**	Notified but not managed.	**Under heavy hunting pressure. Brackish wetland 12.8 km in length. Considered to be a wetland of international importance, fulfilling the criteria for designation as a Ramsar Site. Area owned by the Jamaldini tribe. Lake is part of the Pishin Lora river basin. Water upstream used as a for irrigation and drinking. Burj Abdul Aziz dam may be constructed which is likely to have major impact on the wetland. River flows in part through Afghanistan and riparian use is practised both in Pakistan and Afghanistan.**
Gogi	Ziarat	**10,364 ha**	1962	**Game birds**	Notified but not managed.	**Population of chakor partridge has declined.**
Wam	Ziarat	**30°27´N 67°43´E 3,887 ha**	1962	**Game birds**	Notified but not managed.	**Population of chakor partridge has declined.**
Zawakhan	Chagai	**1,060 ha**	1963	**Markhor and urial**	Notified but not managed.	**One of the best habitats for markhor and urial. Some animal may still exist.**
Kambran	Chagai	**211,433 ha**	1983	**Ibex, urial and chakor**	Notified but not managed.	**Nuclear Test Site. No wildlife.**
Duzdara and Koh-e-Surko	Quetta	**2,351 ha**	1999	**Wild animals**	Notified but not managed.	**Negotiation is being carried out with the local community for inclusion of this area into the Hazarganji Chiltan National Park. WIld animals cyclically migrate from the Hazarganji Chiltan National Park to this area.**
PRIVATE GAME RESERVES[4]						
Hapursi	Kalat		Traditional use	**Ibex and urial**	Not designated officially.	**Owned by Haji Ahmad Khan Zehri. Some animals are present.**
Tobati	Kalat		Traditional use	**Ibex and urial**	Not designated officially.	**Owned by Sardar Sher Muhammad Jatak.**

Name	District	Location/ Area (Ha)	Established in Year	Established to Protect	Current Status	Notes
Dher	Bolan		Traditional use	**Ibex and urial**	Not designated officially.	**Owned by Sardar Sher Muhammad Jatak. Some animals are present.**
Gaj Kolachi (Kinjoo)	Khuzdar		Traditional use	**Black bear, ibex and urial**	Not designated officially.	**Owned by Sardar Yousaf Khan Sasoli. Some animals are present.**
Lohindo	Khuzdar		Traditional use	**Black bear**	Not designated officially.	**Owned by Sardar Ataullah Mengal. Some animals are present.**
COMMUNITY CONSERVATION AREAS[4]						
Torghar	Qila Saifullah	**1,800 km² (core area 300 km²)**	1985 by STEP	**Straight-horned markhor and Afghan urial**	Frisina et al. (1998) surveyed the area and estimated 1,300 straight-horned markhor and 1,500 Afghan urial.	**The initial conservation programme for markhor and urial has been expanded to include conservation of all biodiversity. Grazing animals have also increased.**

Sources: Frisina et al. 1998; Groombridge 1988; IUCN 1997; WWF-P1998.

Notes:
1. National Park: a comparatively large area of outstanding scenic merit and natural interest, wherein the primary objective is to protect the landscape, flora and fauna in its natural state and to which the public is allowed access for purposes of recreation, education and research.
2. Wildlife Sanctuary: an area set aside as undisturbed breeding ground, primarily for the protection of all natural resources, to which public access is prohibited or regulated, especially during the breeding period of wild animals.
3. Game Reserve: an area wherein controlled hunting and shooting is permitted on a permit basis to ensure sustainable use.
4. Private game reserves and community conservation areas are not protected legally in Balochistan.

lack of awareness about the ecological benefits and an increase in demand linked to growth of human and livestock population.

The cultivated area of Balochistan is about 6% of the total area of the province and is regarded as private property. The remaining lands, with the exception of the state lands, are considered common property. The major use of these lands is predominantly pastoral. In addition to providing forage for livestock, these lands provide wildlife habitat and play a valuable role in recharging groundwater. As in many other parts of the world, common property regimes have become open access regimes due to the breakdown of traditional resource management practices. The loss of productivity of the rangelands and manifold increase in livestock numbers have increased grazing pressure on protected areas.

The degradation of natural resources has a major impact on women's lives. It is generally the women who collect fuelwood and cut the grass for forage. Fuelwood and fodder, once within their reach, are now harder to find. As a result, they have to invest a lot of their time in this activity. The cutting of pistachio trees for fuel and of edible pine trees for timber has reduced family income and a source of nutrition.

Several watershed and range management projects have been implemented since the 1950s to restore the health and condition of these areas. Unfortunately, the focus of these projects has been on the transfer of technology and capital. Little attention was paid to engaging local people in building social infrastructure. Consequently, the results of most of these development interventions have not been very encouraging.

Biodiversity Conservation

The population of the Chiltan wild goat (Chiltan markhor) has increased substantially (84 in 1980, 700 in 1996 and 806 in 1999) in Hazarganji Chiltan National Park as a result of protection and management by the Forest Department. Similarly, the population of the straight-horned markhor increased in Torghar (Qila Saifullah District) with community-based management. All other species in the province, both plants and animals, are on the decline. There is a lack of reliable statistics on which to assess trends.

Straight-horned markhor and urial have enjoyed upward trends in Torghar but have suffered a lot in the rest of their range. Similarly, chinkara, Sindh ibex and urial have viable populations in Dureji, but are disappearing fast from other areas. For example, in 1982, only a few ibex were seen in the Ras Koh Range, where hundreds

were reported in the mid-1950s. A review of Table 14 reveals that very few species remain in the areas set up to give them protection. In spite of that, the areas are gazetted every five years and staff are employed to watch over them.

The threats to conservation are mainly linked to population growth, increase in livestock numbers, better access to remote areas and indiscriminate hunting. Goats and sheep compete with wildlife species for forage. In addition, the collection of shrubs and herbs for use as fuel are other factors contributing to the loss of habitat. Consequently, almost all the important wildlife habitats, including most of the protected areas, are highly degraded. Hazarganji Chiltan National Park, Torghar and Dureji are the only exceptions. Almost all the wetlands have serious problems and their survival is threatened.

The loss of biodiversity is not unique to Balochistan. Box 15 summarizes the factors contributing to the loss of biodiversity in Pakistan.

Policy and Legislation

The Balochistan Wildlife Act (1974) is applicable throughout the province. On the other hand, the Forest Act and the Forest Regulation extend only to certain districts. The Forest Act is applicable in Kalat, Khuzdar, Awaran, Lasbela, Mastung, Gwadar, Panjgur, Kech, Kharan, Bolan, Jaffarabad, Nasirabad and Jhal Magsi Districts. The Forest Regulation applies to Quetta, Chagai, Pishin, Qila Abdullah, Qila Saifullah, Zhob, Sibi, Ziarat, Loralai, Musakhel, Kohlu, Dera Bugti and Barkhan districts.

There has been no tradition of making forest and wildlife policies at the provincial level in Pakistan. The national policy prepared by the federal government is broad-based and cannot, therefore, address the specific needs of the province. The last time the federal government prepared a policy for forests and wildlife was in 1991. A mechanism to translate the policy into action and to monitor implementation is lacking at both the federal and provincial level. The 1991 policy is almost obsolete, as it cannot take into account the Convention on Biological Diversity, the recommendations of the National Conservation Strategy, the Forestry Sector Master Plan or the draft Biodiversity Action Plan (BAP). The Ministry of Environment, Local Government and Rural Development has developed a draft new forest and wildlife policy in 1999. Balochistan needs its own policy on forests and biodiversity.

Acts and regulations rely heavily on conservation through policing. They have not proved very effective, due mainly to weak enforcement related to social, economic and political factors. The principles of the sustainable use of species along with economic incentive are now universally accepted to achieve conservation. These principles are being applied in areas such as Torghar, but these are voluntary initiatives not adequately backed by the government. The current laws and regulations do not have the flexibility to support the concepts of communi-

Box 15 | Loss of Biodiversity

> Pakistan has some of the world's rarest animals and plants but these are now in danger of disappearing forever due to overuse and loss of natural habitat. While people are without doubt a most valuable resource in Pakistan, uncontrolled population growth puts ever-increasing pressures on the country's natural resource base. Misguided economic policies have widened inequalities and forced rural people and others to exploit biodiversity at rates that are no longer sustainable. As a result processes such as deforestation, overgrazing, soil erosion, salinity and water logging have become major threats to the remaining biodiversity in Pakistan.
>
> Government of Pakistan, IUCN and WWF-P 1998.

Pakistan is deeply concerned over the loss of its biodiversity. Action is being taken. Protecting Pakistan's biodiversity means involving local people and institutions that have responsibility for the conservation and sustainable use of biodiversity. The government of Pakistan recognized the importance of these measures in the National Conservation Strategy and in its commitment to the development and implementation of the Convention on Biological Diversity. Subsequently, the Biodiversity Action Plan for Pakistan was prepared in 1998.

The factors contributing to the loss of biodiversity habitat in Pakistan are summarized as follows:

- deforestation
- grazing and fodder collection
- soil erosion
- water diversion and drainage

Activities causing species or population losses include:

- hunting and trapping
- fishing
- over-collection of plants
- agricultural intensification
- irrigation
- introduction of high-yield varieties of crops
- cross-breeding
- pollution
- introduced species
- global climate change

Source: Government of Pakistan, IUCN and WWF-P1998.

Naseer Tareen

Torghar is home to many reptiles.

ty participation. The illegal trade in wildlife continues almost unregulated. Houbara, falcons and other birds, together with reptiles, are routinely shipped out of the country. The extent of this practice is not known. Houbara is protected by law, but the federal government continually accommodates foreign dignitaries who wish to hunt this species.

Institutions

The Forestry and Wildlife Department is responsible for the management of state-owned protected areas and the enforcement of legislation. Unfortunately, bureaucratic systems have not kept pace with the changing times, and are set up in the colonial tradition of command-and-control. Enforcement of laws dating back to the British rule is still the main tool for the management of forests and wildlife. Whereas the provincial mandate concerns nature conservation, the Forestry Department is pursuing development objectives that have only a limited scope in Balochistan. For example, the training given at the Pakistan Forestry Institute, which places a high emphasis on commercial forestry, largely influences the thinking of forestry professionals.

There is no research institution in the province with a focus on nature conservation. Consequently, very little is known about the ecology of the area or of management issues for the conservation and sustainable use of natural resources. There is no significant participation of civil society in nature conservation. IUCN and WWF are two international conservation organizations working in the province. The Society for Torghar Environmental Protection (STEP) is the only local NGO engaged in nature conservation, but its activities are limited to Torghar, Qila Saifullah District. More recently, the IUCN Sustainable Use Specialist Group (SSUG Central Asia) has begun work in the nature conservation arena in Balochistan.

Awareness

Maintaining biological diversity requires an understanding of:

- what biodiversity is;
- why it is important; and
- how it contributes to the goal of the BCS, which is the social and economic well-being of the people of Balochistan.

It means finding answers to the questions:

- What do we know about the biodiversity of Balochistan?
- What gaps remain to be filled?
- What are the key issues that surround the conservation of biodiversity in the province?
- What actions are being taken or proposed to deal with these issues and reverse negative trends?
- What needs to be done to ensure that the people of Balochistan continue to benefit in the long term from the diversity of plants and animals that characterize the province?

There is a very limited understanding of biodiversity among the general public, government officials and NGOs, especially those not routinely in contact with the natural environment.

THE WAY AHEAD

The principal recommendation in this area is for all stakeholders to work towards achieving the goals of the national Biodiversity Action Plan in Balochistan. This would mean promoting the conservation and sustainable use of Balochistan's biodiversity and the equitable sharing of benefits arising from it, for the well-being and security of the province.

Comprehensive Education and Awareness Programme

The single most important measure that government and conservation organizations can take is to launch an aggressive province-wide education and communication programme to explain what biodiversity is, why it is important to all of us, and what each of us can do to preserve it. The programme has to target all sectors of the population in both rural and urban areas. It has to reach influential people as well as nomadic herders, the affluent and the poor. It has to reach across government and within the departments responsible for the use of land and water resources. It has to reach all generations.

Good work is already being done by organizations such as IUCN, WWF-P, STEP and SUSG Central Asia, but it is not enough. There is very little sense of ownership. People are generally aware of and appreciate the variety of trees, flowers, birds and animals around them. People flock from Quetta to nearby lakes, springs and orchards on weekends to enjoy the countryside. Those who live on the land understand the importance of plants and wildlife, but the majority of the population is not intimately connected to the living things around them. The indiscriminate killing of wildlife is a common habit among children and adults alike.

Developing appropriate education and communications programmes is no easy task in a province as culturally, linguistically and demographically diverse as Balochistan. There are many good resource materials and experiences to draw on from other parts of the world, particularly for schools. Some of these resources are available over electronic networks and should be tapped. In fact, many successful approaches come from the people themselves and from their knowledge and caring for the land and sea.

There are several entry points. One starting point is the legacy of human occupation of the province. Balochistan holds a prominent place in the emergence of settled agriculture in Asia. The past 10,000 years have seen hunting and gathering societies evolve through the domestication of wild plants and animals to pastoralism and settled agriculture. Artisanal fisheries along the Arabian Sea have existed for thousands of years. This chain of events is clearly evident in the excavations in sites such as Mehrgarh. Each of the links to nomadic grazing systems and modern-day agriculture can be traced in detail and understood.

This close relationship between the land and the sea provides additional clues to the importance of plants and animals to everyone. There are about 1,750 species of flowering plants in Balochistan. Many of these plants are used for domestic purposes, such as medicines, cooking and crafts. More than 100 plants have commercial value for medicinal use, or as spices and seasonings. Plants such as the mazri palm are used extensively. Others are a source of fuel or have medicinal value. Some medicinal plants have commercial significance. The story of ephedra is one example. The diversity of these plants allows survival in a harsh and demanding environment. Local people, whether fishers, farmers or nomads, have immense knowledge of the land and sea. They should be invited to talk about their traditions and cultures and share what they have learned over the generations.

The utility of various breeds of livestock and some species of wildlife and plants can be communicated effectively. One of the issues to be tackled is explaining the importance of plants and animals that have no obvious use, such as snakes, scorpions and mosquitoes. Balochistan has many species that need special protection, yet their significance is not obvious to the general public. Many conservation programmes focus on large vertebrates, but not enough attention is paid to the lower orders. Attention, therefore, will be paid to the

Amjad Virk, IUCN

Community managed wildlife conservation areas are possible.

concept of conserving ecosystems and developing a basic understanding of their structure, composition and processes.

Wetlands, juniper forests and mangroves can be used to explain the 'web of life' in education and communication programmes. More effective use will be made of interpretation facilities at parks and recreation areas. This can be particularly effective around urban areas, where there is a heavy use of areas of special interest to biodiversity.

Particular efforts are required to promote an understanding of the concept of sustainable use. It is not enough to argue for the conservation of biodiversity on the grounds of its intrinsic value, or that Pakistan has special responsibilities under international conventions. Only a small percentage of important wildlife areas are under any form of government protection. As many people use these wildlife resources, there have to be sound economic arguments as to why species, populations, habitats and ecosystems should be used in a sustainable way. The best example of species conservation in Balochistan is from the work being done by STEP in the Torghar Mountains, part of the Toba Kakar Range (Box 16). One collateral benefit of this programme was the discovery of the Afghan mole vole (Ellobius fuscocapillus) in the area. This interesting zoological discovery put Torghar on the world map when it was featured on BBC television. Word quickly spread and the local people are particularly proud to be the custodians of this small rodent.

It is not only the conservation and sustainable use of biodiversity in natural systems that merit attention in an education and communication programme. The agriculture and fisheries sectors too have much to contribute. Farmers grow many different crops and raise various breeds of livestock. There are often many varieties of each. These varieties are particularly suited to different growing conditions and environments. The collection, storage and selection of seeds is part of the process of ensuring that crops can be grown successfully under a variety of conditions that change from year to year. Together, these varieties form a gene pool that needs to be understood and properly maintained for the benefit of many people in the province as well

as future generations. Educating and communicating about the agricultural sector also offers opportunities to discuss the role of other ecosystem components, such as soil, water and the useful insects and other invertebrates that sustain them. Wild plants and animals also depend on these resources, and ways of harmonizing natural and agricultural systems will be explored with local people, as part of the education and communication programme.

In summary, well-designed and well-targeted educational and communications programmes can help achieve some level of understanding of what biodiversity is, why it is important and how it contributes to the well-being of the people of the province.

Biodiversity Database

Balochistan needs to construct a comprehensive database on biodiversity. Federal departments, universities, research institutes and NGOs are doing valuable work, but it is insufficient. There are many organizations that can contribute. The concerted effort of the public will also be required. There are many knowledgeable individuals within the province. Amateur ornithologists, for example, know a great deal about the seasonal distribution and the habits and habitats of resident, breeding and migratory bird species. Fishers can provide a great deal of information on fish, crustacean and other marine life. Hunters, too, are a valuable source of information, as are those involved in falconry. As discussed elsewhere, the knowledge of local people concerning plants, fish and wildlife is legendary and needs to be given proper attention.

Building a database is not so much a question of financial resources as it is of mobilizing human resources and institutions. What is required is a well-thought-out framework within which the database can

Box 16 — Trophy Hunting in Pakistan – An Important Tool for Conservation

Classical 'protectionist' and 'hands-off' approaches are failing to conserve wild species. Increasingly, trophy hunting is being widely accepted as an important tool in wildlife conservation. Trophy hunting provides an important incentive to local people to conserve both species and their habitats, especially in the case of community-managed conservation areas. In Pakistan, as in almost all developing countries where many of the large mammals are threatened with extinction, both government and NGOs now endorse trophy hunting as a pragmatic management tool for conservation.

Limited trophy hunting has been practised in the provinces of Balochistan, Sindh and the NWFP as well as in the Northern Areas of Pakistan for many years. In the Torghar Mountains of northern Balochistan trophy hunting has been used as a management tool for the conservation of the internationally threatened straight-horned (Sulaiman) markhor and Afghan urial. These species were on the verge of extinction when the Society for Torghar Environmental Protection began in 1985. The local communities were persuaded that it is in their interest to stop hunting these animals. In exchange, they receive some income from limited and carefully controlled trophy hunting. These hunts are based on annual surveys, which allow scientists and villagers to assess the status of markhor and urial populations. Since the introduction of the programme, the populations of these two species have recovered dramatically, and the communities are committed and proud of their role in saving these animals.

The IUCN project, Maintaining Biodiversity in Pakistan with Rural Community Development began in January 1995. It covers Chitral in the NWFP and the Northern Areas. Trophy hunting is an important component of this project. Resource management plans are prepared with the participation of the local communities and, where the population of the Himalayan ibex and markhor can sustain it, trophy hunting is conducted. The proceeds are shared 75–25% between the communities and the government. This has led to a sense of ownership of wild resources in the project areas. Similar approaches have been adopted for Himalayan ibex in a WWF project in Bar valley.

Trophy hunting has also been carried out in Chitral for conservation of the flare-horned markhor. In Sindh, trophy hunting has been used for conserving the Sindh wild goat.

At the Conference of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora held in Zimbabwe in 1997, an annual quota of six sport-hunted markhor trophies from Pakistan was approved. The main arguments used by the Pakistani delegation were that Pakistan is actively promoting community-based management of wildlife resources and that the financial proceeds from trophy hunts will go directly to participating communities as an incentive to maintain markhor populations.

Even though trophy hunting has been accepted as an important tool in conserving species outside of protected areas, a clear policy and the associated legislation and regulations are needed to implement it. Pakistan and Balochistan must develop a transparent and well-defined policy with appropriate incentives to encourage the use of this important tool to reduce poaching and conserve natural heritage.

be built, which promotes collaboration and avoids the duplication of effort. Priorities will be established to ensure that species, populations, habitats and ecosystems listed as important, threatened, rare or of particular scientific and economic interest are given early consideration.

One of the products of the project will be a set of maps depicting key features of the biodiversity of Balochistan. This will be done as a component of the electronic resource atlas of Balochistan (see Chapter 3). The database will be available in electronic formats to facilitate sharing among all stakeholders and to serve as an aid in conservation planning, identifying the gaps that need to be filled, and identifying indicators for assessing trends.

This measure will be a major contribution towards objective 4 of BAP: expand and improve the information base on the biodiversity of Pakistan. Actions under this objective envisage:

- a provincial centre to coordinate biodiversity identification and monitoring activities;
- identification of priorities for biodiversity conservation, including threatened ecosystems and species, 'hot spots' and zones of endemism;
- more knowledge of indigenous micro flora for use in biodiversity conservation;
- established custodians for computerized databases;
- efforts to foster the sharing of information; and
- use of both traditional and scientific knowledge.

Protected Area System for In-Situ Conservation

While the reach of the government in protecting biodiversity through protected areas is limited at the present time, it is vital that work proceeds on identifying the areas to be included in the system, determining the appropriate level of protection required, establishing the areas and managing them effectively. Criteria will be developed for planning a comprehensive system of protected areas and for determining the level of protection required (the category most appropriate). Existing protected areas will be reassessed to determine if they are serving the purposes for which they were originally established, and whether they will be confirmed as a part of the system, deleted or reclassified. The area extent of protected areas depends on many factors, but protected area planning will be based on sound ecological criteria. Key to the success of developing and implementing a protected area system is the involvement of local people in all steps of the process. Without their understanding, involvement and support, the goals of the system will not be achievable.

Each protected area presently in the system will have a management plan. Such a plan has recently been drawn up for Hazarganji Chiltan National Park. The lessons learned from the process of developing this will be taken into account in developing others. Both government officials and local people have to be involved in its development and implementation. Properly structured protected areas can make a big contribution to the local economy, as well as serve conservation goals.

Taking this action will contribute to the achievement of objective 6 of BAP: strengthen the protected areas system in Pakistan and its contribution to biodiversity conservation. Actions envisaged under this objective include:

- ensuring that enabling legislation is in place;
- preparing a protected areas system plan;
- expanding the protected areas system;
- enhancing protected area management;
- restoring degraded ecosystems; and
- controlling the introduction of exotic species.

An Effective Legal Framework

Systems planning and protected area establishment and management imply the existence of comprehensive policy and enabling legislation, and the political will to support them. Efforts at the provincial level would complement action envisaged under objective 2 of BAP: develop an effective legal framework for the implementation of the convention on biological diversity and related conventions. Actions proposed under this objective include:

- reviewing and amending existing legislation and rules;
- ensuring that the proposed draft wildlife law embodies appropriate conservation measures;
- updating and rationalizing legislation on endangered and exploited flora and fauna;
- integrating forestry and wildlife sector reforms; and
- finalizing detailed rules, regulations and guidelines for initial environmental examinations and environmental impact assessments;

Once the legal framework is in place, enforcement mechanisms need to be developed. These will reflect provincial circumstances and needs. The actions recommended under objective 3 of BAP: enhance the enforcement of biodiversity-related laws will be taken into consideration in developing these mechanisms. Finally, there will be an effective monitoring and evaluation system, in

WWF Pakistan

Pistacea khinjik is found at higher altitudes in the Hazarganji area.

line with objective 5 of the BAP: develop and institutionalize systems to monitor key elements of biodiversity).

A Policy for Ex-Situ Conservation of Biodiversity

Ex-situ conservation includes measures, such as establishing seed and gene banks, maintaining purebred varieties of livestock and the captive breeding of wild animals. A policy for ex-situ conservation measures is required for Balochistan, to ensure that the genetic resources of important plants and animals are maintained. It will contribute to objective 8 of BAP: strengthen ex-situ programmes and their contribution to biodiversity conservation. The government will support efforts by NGOs and private landowners to re-establish native species in areas where they once thrived.

Community-Based Sustainable Use Programmes

This measure might be written as 'support the things that work'. Balochistan depends on its natural resources, and ways to ensure that these resources are used in a sustainable fashion must be explored with the people who use them, and with the people who control them. Traditional systems of ownership and control must be respected. In the case of the Torghar Mountains, the support and influence of the Nawab was a key component in ensuring the success of the project. This kind of support will be essential in launching similar initiatives elsewhere. Similarly, the government will actively support community-based sustainable use programmes. These will be seen as part and parcel of the provincial government's efforts to promote the sustainable use of resources in the forestry and wildlife sectors. Of particular interest to Balochistan is the use of plants for a wide variety of purposes. There is great potential for the economic development of a number of these species, such as mazri palm, if it is done in a sustainable fashion. The government will ensure that an appropriate policy environment is in place, to enable sustainable use initiatives to flourish.

Biodiversity Resources

Through international financing mechanisms, such as Global Environment Facility (GEF), the world may be will-

A. L. Rao, IUCN

Wildlife watching in Dureji game reserve.

ing to contribute if Balochistan is prepared to play its own role.

- The government may establish a protected areas system plan for Balochistan.
- Scientific management can be extended to protected areas through suitably developed management plans.
- The government may support the resourcing, by GEF and others, of proposals developed by organizations, such as IUCN on juniper forests and SUSG Central Asia on black bear conservation.
- The government may declare that wildlife on non-state lands shall no longer be a state property, and entrust its management to the individuals and communities owning the habitat. This will be done under an overall policy framework that would ensure the maintenance of the habitat and ecosystem, including their biodiversity. Enough evidence exists within Balochistan (Torghar and Dureji) that wildlife and biodiversity are relatively more secure and sustainable in the hands of communities. They are aware of its importance and are organized and committed to its conservation. Such community-managed protected areas will be extended.
- Wildlife and other biodiversity on state lands will continue to remain state property. These lands will be constituted into categories of protected areas appropriate to conservation needs, and will be managed effectively.
- Existing sectoral legislation will be reviewed and re-oriented towards biodiversity and environmental conservation. The process of revising or enacting the provincial law will be expedited.
- There is no training institution in Pakistan dealing with either wildlife or biodiversity. The curriculum and facilities at the Pakistan Forestry Institute and Punjab, Sarhad and Sindh Forestry Schools are inadequate. The government will consider arranging orientation and in-service training courses in Balochistan in collaboration with relevant organizations, such as IUCN, WWF-P and Arid Zone Research Centre.
- The existing Forest Department will be reorganized into a Parks, Protected Areas and Forest Service. Alternatively, a separate Wildlife Directorate (report-

ing directly to the Secretary to government of Balochistan for Environment, Wildlife, Livestock, Forests and Tourism) will be carved out from the existing Forest Department. There are already about 400 wildlife watchers and a Divisional Forest Officer (Wildlife), and this group's capacity can be harnessed by suitably reorganizing, without necessarily having to create too many new positions. Keeping this work force under the Forest Department as such, is of little value to wildlife or to biodiversity conservation.

- Freshwater fisheries will be investigated, as little is known about them.
- A biodiversity profile including a Red Data List for Balochistan will be developed.
- Invasive or alien species that have taken the place of native or more traditional species, and which may have adverse effects on the soil and cropping patterns, need to be investigated. Measures will be taken to eliminate their continued presence and effects.
- Particular attention will be given to Mazri, which has a commercial value and is also an important food source for the Balochistan black bear.
- Habitat and ecosystem maps will be prepared and maintained regularly.
- Extraction of construction material at Gwadar will be strictly regulated, as it is destroying the coast with a significant opportunity cost.
- Trade in wildlife species, such as birds and reptiles will be properly regulated in the interest of sustainability, and in view of unauthorized and unreported exports.

Shuja Zaidi

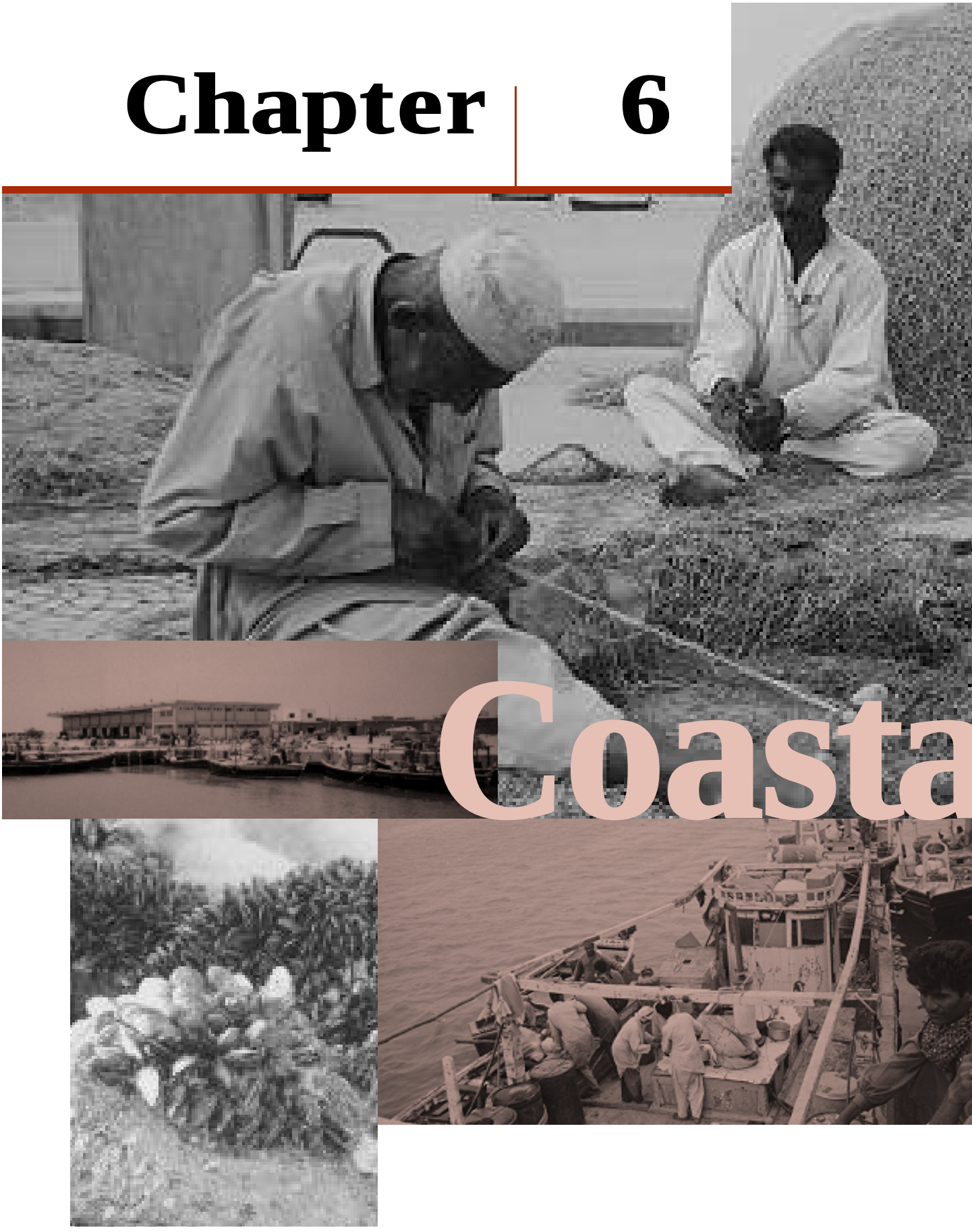
Wild tulips in Dasht.

Forests

The forestry sector in Balochistan is small. Few, if any, forests lend themselves to commercial management. Taking the following actions can optimize the potential of forestry:

- Riverain forest management can be improved by extending scientific management practices to these forests. A forest management plan will be developed in a participatory manner.
- Some non-commercial forests may be designated as parks and protected areas to conserve biodiversity and to increase their contribution to the economy through sustainable use and eco-tourism.
- The threatened juniper forests, which are considered one of the largest blocks of remaining forests of this type in the world, are a unique endowment of Balochistan. IUCN is proposing to study these forests with a view to their eventual declaration as a World Heritage Site. The government will support this effort and harness international interest to conserve these forests to benefit the local communities and economy. It is imperative that an alternate source of fuel is provided to the dependent population and that grazing in the forests is managed effectively.
- Public investment in forest plantations has had questionable outcomes. The responsibility for increasing the forest cover will be given to local people and the private sector. The Forest Department will be strengthened as necessary to provide the required extension services.
- Given the relatively larger economic potential through biodiversity conservation, sustainable use and eco-tourism (as compared to forestry as such), the Forest Department will be reformed and reorganized into a Parks and Protected Areas Service, preferably.
- Information on the extent, nature and distribution of forest resources will be updated and proper forest management planning will be introduced.

Chapter 6



Coasta

l zone

Coastal Zone

The coastal zone is the interface between two major environmental domains, the land and the sea. Pakistan has a coastline of about 990 kilometres and an Exclusive Economic Zone (EEZ) of 240,000 square kilometres. The Balochistan coast extends 770 kilometres from the mouth of the Hab River in the east to the Iranian border in the west (Map 5, in Maps section). Ancient raised beaches mark the landward boundary of the Balochistan coastal zone about 20 kilometres from the present coastline. The Mekran Coast Range, which closely parallels the coast, effectively defines the zone and separates it physically, socially and economically from the rest of the province. A narrow continental shelf - in much of the area, only 15–20 kilometres wide at the 200-metre isobath - defines the extent of the coastal waters. From here the continental slope dips sharply, delimiting an extensive, deep, offshore zone. The only large island is Astola, near Pasni. It has an area of 20 square kilometres and is uninhabited. Two smaller islands lie just off the coast, one of which only recently emerged.

Administratively, the coastal belt falls into two districts, Gwadar (the Mekran coast) and Lasbela, each with its own distinctive physical, biological, social and economic environments. The coastline in Gwadar District is about 600 kilometres long, running from the Iranian border at Jiwani to the Hingol River in the east. Bays, beaches and headlands characterize the coastline. The bays and headlands provide natural harbours, around which 35 fishing communities have developed. The population is about 400,000. Four small urban centres - Jiwani, Gwadar, Pasni and Ormara - account for more than half of the coastal population.

The climate of the Mekran coast is semi-tropical and arid. On average, it receives less than 150 millimetres of precipitation a year. Drought is common and may persist for several years. The summers are hot and the winters mild. The soils of this desert area are for the most part, saline, supporting little natural vegetation cover. Supplies of fresh water are very limited. This has restricted the development of human settlements, agriculture and livestock rearing. There are four main drainage basins, but only the Hingol River carries perennial flows. Destructive flash floods characterize the others, such as the Dasht. Drinking water is supplied to most of the population through government-operated water supply schemes, drawing from dams constructed on the Dasht River and Shadi Kaur. The rest of the population depends on a limited supply of poor-quality water from shallow wells. Sanitation and solid waste disposal facilities are virtually non-existent, and government services are limited.

The sea is both a major source of livelihood as well as a destructive force.

There are air links from the four urban areas to the rest of the province and to Karachi. Otherwise, the road network is scarcely more than rough dirt tracks, and there are no ferries. There is a long history of contact with the Gulf States, and through the Muscat-Oman maritime empire, with Africa. This is reflected in the makeup of the population. Until recently, many of the men were employed in the Gulf, with their remittances contributing significantly to the local economy. This is still important today, but it is estimated that 70% of the coastal population, in some way or other, depends on the sea. Communities situated close to Iran enjoy close contacts with that country and engage in an extensive, informal economy.

The second coastal belt, the Lasbela, lies between the Hingol River and the Hab River, which forms the border with Sindh. This coastline is dominated by Sonmiani Bay. Miani Hor, the large lagoon formed at the mouth of the Porali River, is a distinctive feature of Sonmiani Bay. The climate is similar to the Mekran, with erratic precipitation, received mostly during the summer months. Much of the district is an alluvial plain, and soils are fertile. About 70% of the population is engaged in agriculture (P&DD 1997b). While Lasbela has a population of 315,000, there are only two fishing villages on the coast, at Gadani and Damb. About 11,500 fishers supply the Karachi market with fresh fish and shrimp.

Situated close to Karachi, the Lasbela district has a 'developed' character in comparison with the Mekran. A major power plant is located on the coast and two industrial estates – the only major industrial areas in Balochistan – are located at Hab and Windar. Many of the employees are from the Karachi area. The Gadani ship-breaking yard is approximately 40 kilometres from Karachi. It has 8,000 metres of water frontage, divided into 200 plots. The total area of the yard is 1,400 hectares. During its peak (1982–86), the industry employed 35,000 people, and another half a million were indirectly dependent on it. A dam on the Hab River supplies drinking water to Karachi and to Hab town, and supplies some water for agriculture and industry. In recent years, water levels in Hab Dam have dropped considerably due to the lack of precipitation in the watershed, threatening drinking water sup-

plies to Karachi. In general, the modest, mixed economy of the district is diversified but oriented more towards Karachi than to Balochistan.

THE SEA AS A MIXED BLESSING

The sea is very much a mixed blessing. It provides a major source of livelihood, but it can be a destructive force. The monsoons are a major phenomena that have shaped the coastline of the region. The northeast monsoon, in winter, blows at about 10 knots. From mid-May to mid-September, the southwest monsoon blows at about 30 knots. During this period the coast is subject to wave attack, with waves reaching heights of 3.5 metres. Spring tides reach a height of over 3 metres, and backed by strong winds, raise the sea level further, producing occasional storm surges that penetrate sheltered lagoons. There is a continual process of erosion and accretion. Erosion is particularly prominent at Gwadar, Pasni and Gadani. In summer, easterly long-shore currents redeposit eroded materials along the coast. To further complicate the picture, the sea level is rising slowly due to global warming, at rates of about 1.1 millimetres a year. This may contribute to the salination problems that characterize the groundwater supply, and affect further development planning on the coast. Rough seas during the southwest monsoon restrict fishing to all but the largest boats and major harbours, such as Pasni and Gwadar.

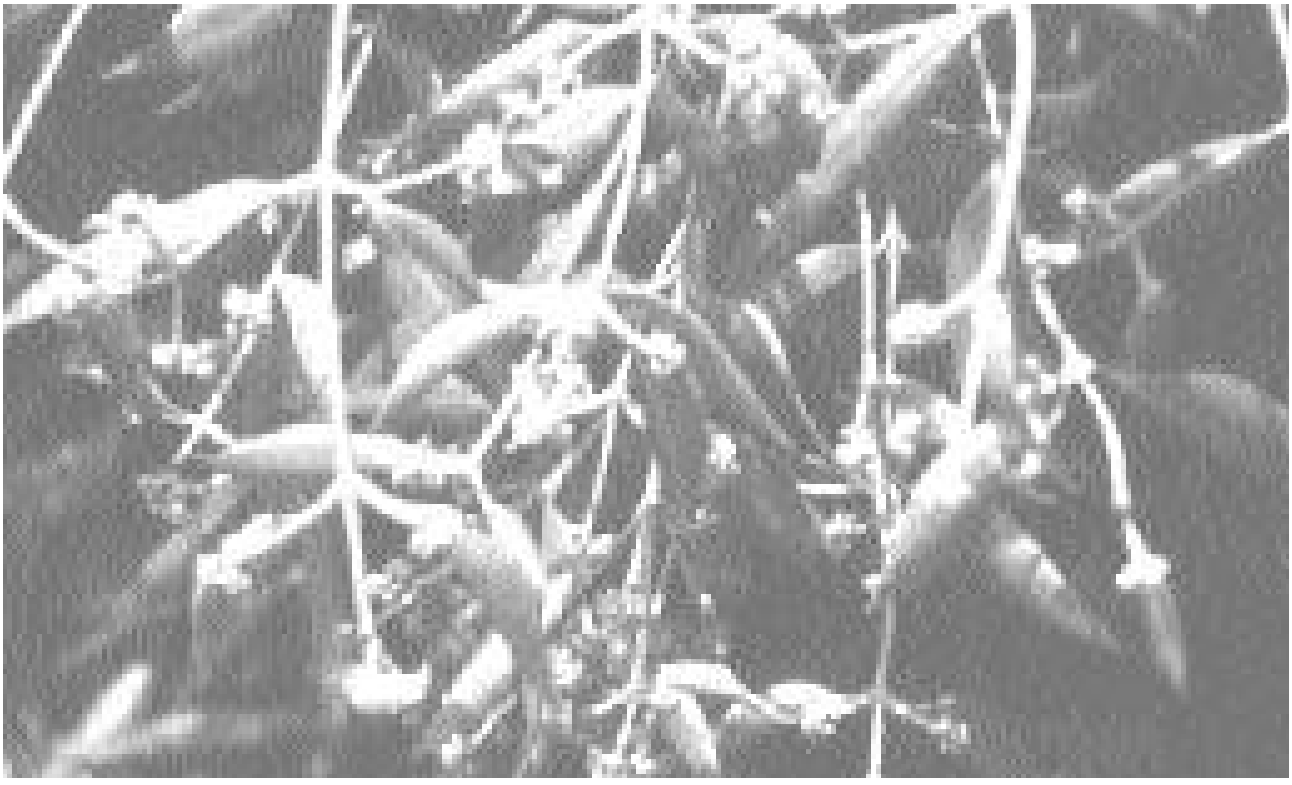
As described in Chapter 3, the coast is also susceptible to earthquakes and tsunamis. The coast sits on a major subduction zone. In 1945, an earthquake with a magnitude of 8.3 on the Richter scale and associated tsunamis destroyed buildings at Pasni. Sheikh (1992) describes the Mekran coast as one of the most seismically active regions in Pakistan. Seismic records for the period 1851–1990 show that there have been 193 earthquakes of magnitude 4.0 and above. Although it is impossible to predict the likelihood of further earthquakes, Sheikh concludes from an analysis of available data that there is a real possibility of a major earthquake in the next few decades. In the meantime, sea bottom upheaval has resulted in shallow areas being formed near Astola Island, Ormara and the Hingol River. Mud volcanoes, many of them active and emitting methane, are common features along the coast. In 1998, a small island suddenly appeared near the coast.

The sea also brings pollution. Shipping lanes in the Arabian Sea are considered to be among the busiest in the world. All vessels visiting the oil-rich Persian Gulf pass through the area. It is estimated that approximately 11,000 ships, totaling 12,000 million dead-weight tonnage, cross the Arabian Sea annually. There are about 2,500 oil tankers carrying 33 million tonnes of oil. The patterns of surface winds and currents expose the coast to the threat of oil pollution. A spill occurred in June 1998 from the R. V. Yashica. The leaking vessel, carrying 1,500 tonnes of furnace oil, was abandoned approximately 112 kilometres south of Pasni. Fortunately, the oil dispersed naturally, but under the influence of wind, waves and currents, a large slick of crude oil could ended up on the coast of Balochistan.

Hamid Sarfraz, IUCN

Gwadar is one of the main fish harbours of the province.

Oil pollution already appears to be of some concern along the Pasni coast. Sources of oil pollution include fishing boats and the large number of merchant vessels and oil tankers that clean bilge and tanks as they pass through the EEZ of Pakistan. As a consequence, tar balls (residues of weathered oil) are found on beaches. There is little in the way of sewage disposal in human settlements and industrial areas. Wastes from coastal villages and industrial estates eventually reach the sea to be redistributed by long-shore currents.



P.J. Meynell, IUCN

Mangroves, Avicennia marina, in flower.

The same climatic and oceanographic phenomena that create problems on the coast, also result in a highly productive marine environment. Submarine topography, orientation of the coast and strong southwestern monsoon winds combine to promote upwellings that result in this coastal zone being one of the most productive in the world. In terms of world oceans, the Arabian Sea has an average primary productivity that is 10 times the world ocean average and four times the average value of the Indian Ocean. It translates into a theoretical equivalent fish biomass of 9.4 million tonnes. But the productivity of the Arabian Sea is not evenly distributed and zones of high productivity vary both temporally and spatially.

Primary production rates are high around Astola Island and on the continental shelf offshore Pasni. Conditions for fish production in areas such as Sonmiani Bay are excellent. The province has the exclusive right to fish in coastal waters to the 19.3-kilometre limit, and to fish in the EEZ. Currently, about 5,000 small and large fishing vessels catch about 125,000 tonnes of fish and shellfish each year, valued at Rs. 1.4 billion. Much of the catch is salted, dried or converted into fishmeal. The fish stocks are estimated by the government of Balochistan at 572,000 tonnes, with an estimated maximum sustainable yield of 293,500 tonnes. Sindh boats take estimated 60,000-70,000 tonnes of fish and shellfish each year, which leaves a potential additional 105,000 tonnes available for the fishery. The products are marketed through Karachi harbour, with salt fish being exported to Sri Lanka. Prawns and other valued products are shipped to markets in southeast Asia.

PLANTS AND WILDLIFE

The coastal zone is noted not only for its fish and shrimp production, but also for its diverse plant and wildlife communities. The natural vegetation of the Balochistan coastal region is composed largely of xeromorphic types: those able to withstand the arid climate, salt spray and blowing sand. Tamarix (Tamarix aphylla), Salvadore oleoides and mesquite (Prosopis juliflora) are the most significant and widespread species. To the concern of some biologists, mesquite has invaded the coastal area in recent years. Some appreciate this plant for its ability to grow on saline soils, its soil-binding properties and as a source of fuel. Bushes of Indigofera oblongifolia and Hycium depressum are also widespread and grow well in sandy plains and dunes. Acacia nilotica is a common

species and is distributed in low alluvial depressions, plains and foothills associated with a more favourable moisture regime. Mazri or dwarf palm (Nannorrhops ritchieana), is of considerable economic importance for making mats, baskets and other products.

Mangrove forests were described briefly in Chapter 5. Mangroves are salt-tolerant woody plants that grow in inter-tidal areas. They inhabit depositional environments, such as bays, channels and lagoons. They are important for fuelwood, fodder for camels and for many other purposes (Saifullah 1992). They are especially important in providing nursery areas for shrimp and fish.

The shrimp fishery in Pakistan bears a strong relationship to the extent and status of the mangrove forests. Mangroves also help stabilize the coastline. Mirza et al. (1988) reports stands of 3,100 hectares at Miani Hor (Avicennia marina and Rhizophora apiculata with Ceriops tagal are scattered throughout the area); 2,160 hectares at Kalmat Hor (degraded A. marina and R. apiculata); and 2,080 hectares at the Dasht River Delta, Gawatar Bay (A. marina). Records indicate that mangroves were once much more extensive along the coast.

There have been no recent surveys to assess the status of once-diverse wildlife populations, but hunting has extensively reduced terrestrial wildlife. The coastal wetlands are very important sites for resident and migratory waterfowl (Ahmad et al 1992), with 91 species of water birds recorded. Sonmiani, Jiwani and Ormara beaches and Hingol Hor are important sites. Miani Hor, Dasht Kaur, Pasni Bay and Astola Island have been included in a Directory of Asian Wetlands (Scott 1989) on the basis of criteria developed under the Ramsar Convention.

In the Pasni area, two areas of coastal and estuarine habitat are of particular importance to water birds: the mouth of the Shadi Kaur immediately to the north of Pasni town, including the brackish lower reaches of the Shadi and the estuarine mudflats, and the sandy coast and lagoons extending south of Pasni town to the rocky foreshore at Ras Jaddi.

Few other areas on the Balochistan coast offer such a wide range of habitats – cliffs, river valleys, estuarine mudflats, sandy and rocky shores, lagoons and sheltered marine bays – within such a well-defined and relatively small area. The Pasni area is rated by ornithologists as one of the most important natural areas on the Balochistan coast. Large numbers of birds of many species, including pelicans, shore birds, ducks and geese over-winter in the area. Raptors winter along the cliffs and headlands and are trapped for sale to falconers.

The green turtle (Chelonia mydas), an endangered species, nests in significant numbers on stretches of beach at Jiwani and Astola Island. It also nests on sandy beaches in other locations on the coast, principally from October to December. The Ormara nesting area, however, is of international significance (Groombridge 1988). Thousands of turtles visit the 30-kilometre coastline each year. At one time, many of these turtles and their eggs were harvested. A ban on turtle killing was imposed in 1981. Olive ridley turtles may also nest on this poorly known coast.

PROTECTED AREAS

There are only two protected areas in the coastal zone, Hingol National Park and Buzi Makola Wildlife Sanctuary. Hingol was created in 1980 with an area of 165,000 hectares. It was extended in 1997 to include the Hingol estuary, offshore areas up to 5 fathoms and the area previously under Dhrun Wildlife Sanctuary. Important species include Sindh ibex, urial, leopard, chinkara and marsh crocodile as well as estuaries and marine fauna (see Table 14). Buzi Makola once hosted large populations of ibex, urial and chinkara. It is currently protected as a wildlife sanctuary, but no game animal survives in the area.

A number of areas have been proposed for protected-area status. The Ormara area and Kappar-Ras Shahid are worth investigation. Many other areas have been identified (Moazzam 1992). Astola Island (Haft Talar) is important for nesting green turtles on a sandy beach and rich marine fauna in the surrounding waters. It used to have diverse wildlife populations with large numbers of over-wintering and nesting birds. Introduced rodents and cats have greatly reduced the bird populations. The island may contain a number of endemic species in addition to sub-species of the sand scaled viper (Echis carinatus astolae). Ormara turtle beaches, Jiwani turtle beaches, Astola Island, Miani Hor and Hab Dam are being considered for designation as Ramsar sites.

RESOURCE DEVELOPMENT

The coastal areas of Balochistan, particularly the Mekran, remain the least developed part of Pakistan, notwithstanding their strategic importance and economic potential. Distances are large, the population is small, road networks poor or non-existent, the climate inhospitable and fresh water scarce. With the exception of Pasni, diesel generators serve the towns and villages. These provide electricity for only a few hours per day.

The federal and provincial government is responding to the development needs of the coast through a comprehensive development package. The Prime Minister set up a committee in 1999 headed by the Deputy Chairman, Planning Commission, to develop a Master Plan for developing the Mekran Coast (including Gwadar Port). Various proposals were submitted to the Committee by the government of Balochistan (Table 15). This is not an exhaustive list of all development proposed on the coast, but gives an overview of the breadth and scale of development activities. Other development activities in the districts concerned, such as oil and mineral exploration, will have an effect on the coastal zone. Private-sector interests are exploring the development of a major new city near Gwadar Bay and developing a petrochemicals complex in Sonmiani Bay and a refinery in the area adjacent to the Hab power plant.

Pending review of the complete development package, the Ministry of Communications has requested federal government approval to:

- designate 150,000 hectares of land as a special development zone for Greater Gwadar City;
- have WAPDA provide the necessary water and electricity; and
- proceed with Gwadar Port Phase 1 and the construction of a coastal road.

ISSUES

Both federal and provincial governments and the private sector have very ambitious plans for the development of the coastal zone. Plans hinge largely on the further development of the fisheries sector and on the economic development of the region, based on major infrastructure development. These plans will go a long way in providing employment and economic benefits for many years to come.

The key consideration is one of sustainability – how the coastal region can be developed consistent with the goal and objectives of the BCS. The approach to the development of the Mekran development package is very encouraging. It has involved a coordinated input from all sectors of the government of Balochistan and a review by a high-level committee under the chairmanship of the Deputy Chairman, Planning Commission and with representatives from all key ministries. The terms of reference of the committee include reviewing information on the history, status and trends of development on the coast; looking at the development potential in various sectors; producing a Master Plan; reviewing the projects that will help achieve the targets of the plan and how they should be phased; proposing alternatives for funding the plan; and monitoring and implementing the Master Plan.

Integrated Resource Management

It is not clear to what extent the development and implementation of the Mekran Master Plan follows an integrated approach to resource management. There have been many development projects on the coast, including the mini ports and fish harbours at Pasni and Gwadar, mechanization of fishing boats, improvements in the fishing industry, desalination plants, agriculture and livestock demonstrations, water supply schemes and residential land development. A review of past experiences and an assessment of lessons learned from these many interventions, will reinforce the necessity for an integrated approach to the management and development of the limited natural resources of the coastal zone. This implies the need for close cooperation among the departments, agencies and institutions involved, as well as with the private sector and the communities.

For example, electricity is in extremely short supply on the coast. WAPDA, by virtue of its mandate, is expected to provide electricity and water to the deep water port at Gwadar, as well as to the other developments envisaged in the development package. Domestic, public-sector and business demand will increase as the population expands to meet labour requirements. There is no spare capacity at the Pasni station, and so a major new installation would be required. The development package talks of developing wave energy, but does not discuss other options such as wind and solar power.

Water is also in very limited supply. Floodwater from virtually every stream and river along the coast will be tapped to meet the present needs of the population and to provide some limited water for agriculture. Development at many places along the coast will mean exploiting resources that are already very limited, dedicated to other uses, and in some areas saline. There has been considerable experience with desalination plants to augment the water supply, but at the moment these are proposed only for Gwadar and Gadani.

There have been land use conflicts in the past that could have been resolved through participatory approaches involving the parties concerned. For example, the construction of the Navy base at Ormara cut off access to the lagoon where the larger fishing boats have taken shelter traditionally. Some development will potentially conflict with existing or other planned activities. For example, plans by the Balochistan Development

Authority and foreign interests to construct a bulk liquid terminal at Mauza Damb, Sonmiani Bay, include dredging a channel in the lagoon and constructing extensive onshore facilities, eventually to include a petrochemical plant. This may conflict with the biodiversity interests as well as the existing fishing and shrimp industry and plans to improve this sector.

Oil and gas exploration is currently under way. The companies concerned are now considering the need for coastal infrastructure and pipelines for processing and distributing oil and gas. A 1998 cruise along the Mekran coast by the National Institute of Oceanography and German scientists revealed deposits of gas hydrates in the form of ice crystalline methane. Similarly, the seabed hosts many deposits of placer minerals and deposits of zinc and copper-rich sulphides. These are not commercially viable at present, but may well be developed in the future. The areas of major conflict in the future are like-

Table 15 Coastal Development Proposals

Component	Issue	Proposal	Socio-Economic Impact
Ports	Need to facilitate trade with the Central Asian states and Gulf countries, open up the hinterland, serve as a transhipment hub and form the basis for development of a refinery and petrochemical complex and other industries.	**Deep-sea commercial port construction at Gwadar.**	A third major port in Pakistan is the key to developing the potential import/export trade with neighbouring countries and the mineral resources of the interior, and for the development of maritime industries.
Roads	Need to provide motorways to connect Gwadar port with Central Asian states and national highways. Need to reconstruct the gravel/ kacha coastal highway washed out in 1992.	**Motorway to connect national highways in the north with ECO countries and Gwadar port. Metalled coastal highway to link coastal towns with Karachi.**	Prerequisite for effective development of the port, trade links with neighbouring countries and resources from the interior. Reduces dependency on coastal road connection to Karachi. Provides an enhanced link with Karachi, the major supply and trading centre for the coast.
Airports and air links	Need to improve passenger and cargo capacity domestically and internationally.	**Upgrade all airports to handle jet aircraft. Explore potential for international flights from Gwadar and Turbat.**	Essential to provide a safe and reliable service and facilitate economic development of the coast.
Shipping/ferries	Need to provide a means of linking communities without proper roads and facilitate marketing of fish products.	**Establish coastal shipping/ferry service.**	Reduces the cost of moving goods over land over very long distances, to obtain better prices for produce and reduce the cost of living.
Energy	Need to provide electricity to all settlements. Need to meet power requirements at Gadani. Need to develop petrochemical industries.	**Investigate wave energy as an alternate source of power. Explore feasibility of 10-megawatt power plant. Establish a bulk liquid terminal at Mauza Damb, Sonmiani bay and lagoon.**	Provides a reliable source of energy in support of coastal development. Ensures reliable supply of electricity to ship-breaking industry. Provides the basis for a petrochemicals industry.
Town planning	Need to protect valuable coastal resources, e.g. unspoiled beaches, due to lack of sewage disposal facilities and town planning.	**Prepare and implement town plans for all principal settlements.**	Prevents the continued haphazard development of coastal settlements and pollution of coastal beaches and waters.
Communications	Need for fully functional telecommunications.	**Upgrade telephone service to major communities.**	Enables effective phone and fax communications with all communities.
Water supply	Need to augment water supply by capturing runoff from heavy rains. Need to augment water supply at Gadani.	**Construct dams on the Basol, Shadi Kaur, Saur, Tallar, Shehzanak, Rumbra, Rekani Kaur, Ballar, Hingol and Shinzani rivers to supply settlements and enable irrigated agriculture. Establish a desalination plant at Gadani.**	Provides a secure and safe source of water for the population and for agriculture. Augment water supply for industrial, commercial and domestic use.

Component	Issue	Proposal	Socio-Economic Impact
Fisheries	Need to compete in the market with Sindh counterparts. Need to reduce the costs of marketing fish through Karachi. Need to improve the efficiency and economic return to all fishing communities. Need to exploit the fisheries resource fully. Need to share in foreign earnings from fish exports. Need for an institution to provide training in fishing technology and fish processing. Need to enhance production of commercially important shrimp.	**Supply modern fisheries equipment.** **Direct export of fish from Gwadar and Pasni to Gulf states.** **Construct jetties and other facilities in all fishing villages and alternate berthing facilities in Ormara.** **Construct 400 new fishing vessels.** **Allocate a share of fish export earnings to Balochistan.** **Finalize arrangements for a fisheries training centre.** **Develop pilot projects in marine aquaculture with donor assistance and foreign training.**	Improve the viability and economic return of the fishery. Improve economic returns to fishers. Improve the efficiency of fishing, reduce wastage of fish and improve economic returns. Provide modern fishing technology to increase catch by additional 28,000 tonnes, and increase income by Rs. 280 million annually. Contribute to the development of the industry in Balochistan. Put the fishing industry on a modern footing, promote sustainable fisheries and efficient use of the product. Enhance economic return in a key market.
Agriculture and livestock	Need to expand agricultural production, especially on saline soils. Need to exploit the potential of sailaba cultivation. Need to expand the livestock sector and meet future demand for meat.	**Establish plantations of salicornial (2,000 hectares in Lasbela), oil palm (throughout the coast), and coconut (5,000 hectares).** **Construct bundats/dykes to develop sailaba agriculture on 10,000 hectares.** **Introduce goats for milk and meat production, and poultry for meat and eggs.**	Enhance economic return from land unsuited to other crops. Enhance agricultural production. Enhance nutrition and source of income.
Marine pollution	Need to monitor and combat marine pollution in co-operation with neighbouring states.	**Introduce a monitoring programme and remedial action on oil pollution in coastal waters.**	Co-ordinated action to prevent pollution of marine and coastal environment.
Tourism	Need to enhance the contribution of tourism and recreation sector.	**Encourage the private sector to explore and develop the tourism potential of the coast, e.g. beach resort at Gadani and Jiwani and beach hotels at Gwadar and Pasni.**	Enhanced economic development opportunities.
Education	Need for post-graduate educational facilities in Mekran.	**Establish Kech University at Turbat with a centre of excellence in marine fisheries and science on the coast.**	Train local students to address issues linked to the sustainable development of the coastal zone.

Source: Government of Balochistan 1999a.

ly to involve the differing needs of the fishing industry, biodiversity, settlements, the tourism and recreation industry, shipping and industrial development based on oil and minerals.

Balochistan is in some ways fortunate that it has not seen the rapid population growth and high levels of economic development that have characterized the Sindh coast. The development of industrial areas in Balochistan adjacent to Karachi is, however, a cause for concern. The development of Gadani beach for ship breaking resulted in the ruining of a first-class recreation and tourism facility, and became a major source of marine pollution. The industrial estates in nearby Hab discharge untreated wastes, which then find their way to the coast. Only a downturn in the economy of the area has prevented major environmental problems. Despite the recognition of the issues and trends for many years, little has been done in terms of planning, implementation of mitigating measures or enforcement of environmental laws. The rationale for the development of an integrated coastal zone management plan for Balochistan is summed up in a 1995 United Nations report on the subject (Box 17).

In fact, a Coastal Environmental Management Plan (CEMP) for Pakistan was commissioned by ESCAP in 1988, and the results published in 1996. A study team led by the National Institute of Oceanography, and sponsored by the Environment and Urban Affairs Division of the government of Pakistan completed the CEMP. The National

Conservation Strategy envisaged this plan, once developed and implemented, becoming a framework for coastal management.

The CEMP was never implemented, and seems to have been relegated to the shelf. It did confirm, however, that the coast of Balochistan experiences all the serious management issues confronting many maritime nations around the world. These include:

- coastal erosion;
- degradation of coastal and marine ecosystems and habitats;
- declining water quality and pollution;
- over-exploitation of coastal resources (fisheries, mangroves, corals, etc);
- endangered marine species and coastal wildlife;
- coastal inundation/flooding; and
- a low level of institutional and legislative capability for integrated coastal area management.

In assessing its experiences in assisting countries in Asia and the Pacific prepare CEMPs, ESCAP is firmly of the view that the wide variety of resources and activities that occur in coastal zones makes it impossible to manage the coastal environment sectorally. The experience of all countries that have implemented coastal environment plans and programmes proves the need for integrated management. The CEMP prepared for Pakistan in the 1990s, is not an integrated coastal zone management plan. Nor was it designed to be one. It is a valuable study, prepared by a team of specialists, and as such is a contribution to understanding some of the issues that characterize Balochistan's coastal zone. It also highlights some of the actions that the research team feels should be taken to deal with them.

Box 17 Integrated Coastal Zone Management

Integrated management of coastal and marine areas is now recognized as a necessary tool for development and environmental protection. It relies on modern methods of planning and resource management, as well as interdisciplinary expertise, and involves the setting of national policies and goals; inventories of resources and available statistics; identification, selection and implementation of management systems, such as guidelines, permits and economic incentives; socio-economic and environmental assessment; conflict resolution techniques; land use planning and enforced zoning; and protection of sensitive areas. The present structure of most governments, involving many separate sectoral ministries, each responsible for some aspect or activity in the coastal and marine areas, is not always conducive to such integrated action. In view of this, Agenda 21 has recommended that each coastal state should develop a policy and planning framework and establish a high level planning body involving local populations for integrated coastal management.

Source: ESCAP 1995.

Emergency Measures

The presence of mud volcanoes, the sudden emergence of a new island, changes in bathymetery and historical evidence of earth tremors and tsunamis, all testify to the forces that accompany movements in the earth's crust in the coastal zone. The probability of major tremors seems high and is an issue to be factored into planning for development along the coast. A rise in sea level, while small in the short term, may have significant impacts over time when viewed in the context of the dynamic processes that characterize the coast and that determine the nature and extent of bays, headlands, estuaries and lagoons. There are implications for all future coastal development and protection measures. Although monitoring of oil spills is envisaged in the development plan, it does not elaborate on the need for trained personnel and appropriate equipment to deal with spilled oil or other pollutants. Flash floods characterize the streams along the coast and are a potential source of water. But they also have a devastating effect on the adjacent area and surrounding population. The ability to predict and respond to the problems created by these events appears to be limited.

Environmental Protection and Conservation of Biodiversity

The Mekran development package does not explicitly deal with environmental protection or the socio-economic effects on the existing population, with the exception of the need for measures to monitor and combat marine pollution. There is no mention of the need to undertake environmental assessments or detailed resource assessments, research, studies and inventories. Experiences with major harbours, such as Karachi and the Gadani ship-breaking yard, should give some indication of the types of issues that will have to be dealt with. The development of petrochemical complexes at Gwadar and Sonmiani Bay present other issues that will have to be confronted.

Remoteness, inaccessibility and limited human presence are the coast's greatest assets. The coastline is pristine, with the exception of areas around human settlements and the industrial site. It has great tourism and recreational potential and includes the Hingol National

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Fishing is a major livelihood source for the coastal people.

Park, a world-class protected area. While site-specific measures have been proposed in the Mekran package, a comprehensive approach to the development of this potential has yet to be articulated. As described, the coast contains critical habitats for many species of wildlife, including turtles, cetacean, fish and birds. There is little formal or effective protection for any of these habitats. As the population increases, access to the area is improved, and recreational activities increase, wildlife will come under increasing pressure. For example, wildlife in Hingol National Park is under great pressure from illegal hunting. A management plan for the park has yet to be prepared. Most of the large mammals that once frequented other parts of the coast have been hunted out, and falcons are already trapped in large numbers (see Chapter 5).

The growth of settlements in Miani Hor, Kalmat Hor and Gawatar Bay may put further pressure on mangrove communities already under stress. The importance of mangrove ecosystem to shrimp and fish production is well known, yet these plants are still used as fodder for camels and for other purposes. The introduction of a large number of goats to the coast, as proposed by the Livestock Department, may put pressure on other natural plant communities.

Urban planning is a component of the Mekran development package. A comprehensive master plan is to be developed for the greater Gwadar area and for all other towns. Defining the parameters of these plans will be important in ensuring that they are comprehensive.

Fisheries Potential

Fish stock assessments and estimates of maximum sustainable yields by the Fisheries Department appear to be based on the results of an Asian Development Bank analysis (1981–82) of the FAO/NORAD cruises of 1976–77. These were reported in the Coastal Environmental Management Plan for Pakistan (ESCAP 1996). Maximum sustainable yields were set at about 50% of the stocks estimated at that time. Fisheries Department officials main-

tain that stock assessments for large pelagic (e.g., tuna and marlin) and for cartilaginous fish (e.g., sharks and rays) are underestimated. Majid and Moazzam (1992), using the same data, suggest that demersal resources are being fished beyond potential yields. In the absence of stock assessments, they also express concern that shellfish are being fully-exploited or over-harvested.

The size, composition and disposition of the catch are important parameters in determining the incremental catch of all species. Details of the catch landed in Balochistan harbours are available, but there is little direct information available on the catch by Sindh fishermen or by foreign vessels. Some fish may be transferred to larger vessels offshore and exported directly to foreign ports.

Fish Handling and Marketing

The government of Balochistan, in its brief to the Senate Committee on Agriculture, Food, Livestock, Fisheries and Forest, has described in detail the state of fish handling and marketing in the province . There are handling and storage problems at every stage of the process, from the time the fish are caught to the time they reach the retailer. Of the 35 fishing villages, only 2 (Pasni and Gwadar) have fish harbours and ice plants. For the rest, the picture is bleak:

> In the absence of physical infrastructure and onshore facilities the raw fish is still handled on the bare ground and shabby curing yards where all sorts of filth and poor hygiene quickly deteriorates the quality of the fish. As a result of this quick spoilage, about 70% of the fish is converted into low quality produce of dry and wet salted fish and fish meal.
>
> Personal Interview with Director Fisheries, Government of Balochistan, Quetta, 1999

Fish is sent to Karachi by road or boat for marketing. Direct export is not currently allowed. The journey by road takes two to three days from Jiwani and Gwadar. About 30% are spoiled, at a loss of Rs. 300 million per year. High-value species, such as shrimp and lobster, are sent to the market chilled or frozen. Only Pasni has electricity for basic processing. Sindh boats and villages within easy reach of the Karachi market have an advantage over remote communities.

Turning the existing traditional artisanal fishery into a modern, well-managed, efficient and hygienic operation is a major task. Every aspect has to be revamped, from fishing equipment, training of the crews and provision of jetties to on-shore fish processing facilities and marketing systems. Developing the maximum potential yield of the fisheries will require Herculean efforts over many years. It calls for more than 1,000 additional boats of appropriate design, crewed by trained fishers and supported by on-shore infrastructure and modern technology. Direct export to markets in foreign countries might help reduce wastage, at least until such time as better road systems are developed. Foreign markets are not identified or developed, however, and moving large volumes of fish requires many large, specially equipped vessels and the ability to handle them.

Many of the steps required to realize the full potential of the fishery, have been advocated by the provincial government for many years, and are set out in the Mekran package for federal government and donor approval.

Research and Development

The commitment of resources for research and development in the country is almost negligible (less than 0.1% of gross domestic product). There are very few research institutes involved in the management of coastal areas. At the same time, R&D organizations in the federal and provincial departments responsible for providing coastal and marine research facilities have not been able to effectively mobilize available resources, such as laboratories, professional staff and other equipment.

At present, there is no single national agency or institution responsible for compiling and maintaining records on research, surveys or activities in the coastal zone. There is lack of cooperation and coordination among agencies, research institutions, government departments and non-governmental organizations (NGOs). These organizations work in isolation, resulting in the overlap and duplication of efforts. There already exists a plethora of valuable information and data, scattered in various places. Some may be published, but some is buried in files. Some are maintained by individuals in the many different sectors. There is no national data centre or geographic information system in place. For an integrated management approach, knowledge is of fundamental importance, but is largely lacking.

Habitat Loss

A number of species and communities are under threat. The coastal domain is highly susceptible to changes in sea level, groundwater level, salinity, wave patterns, current regimes, sediment budgets, storm events and erosion patterns. Physical changes themselves result in a

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These people are stakeholders in any coastal zone management plan.

wide variety of biological changes at the population, community and ecosystem level, which in turn affect the suitability of the coastal zone and its resources for use by people. One example is the effect of dam construction. The Hab River dam has virtually eliminated oyster beds. Sand dune stabilization through the introduction of exotics such as mesquite (Prosopsis juliflora) may have unintended consequences for native species.

THE STAKEHOLDERS

Balochistan has a large number of agencies and institutions at the federal and provincial level that are responsible for the coastal zone:

- Federal organizations, including all those participating in the committee established by the Prime Minister in 1999 to develop a Master Plan for the Mekran Coast: National Institute of Oceanography; Centre of Excellence in Marine Biology; Marine Fisheries Department; Zoological Survey Department; Federal Environmental Protection Agency; Pakistan Council of Scientific and Industrial Research; Maritime Security Agency; Pakistan Navy (Hydrography Department); Ministry of Environment, Local Government and Rural Development; Pakistan Armed Forces/Coast Guards; and Ministry of Food, Agriculture and Livestock.
- Provincial organizations, including all those contributing to the Master Plan for the Mekran Coast: Planning and Development Department; Fisheries Department, Environment, Wildlife, Livestock, Forest and Tourism Department and other sectoral departments; Board of Revenue (Mangrove Forest); Water and Sanitation Agency; Environmental Protection Agency; Public Health Engineering Department; Environmental Protection Council; Pasni Fisheries Harbour Authority; Balochistan Development Authority; and Balochistan Coastal Development Authority.
- Local Government – elected bodies and district administration.
- Private Sector.
- Donors.
- NGOs.
- Communities.

THE WAY AHEAD

In light of plans to undertake major new developments along the Balochistan Coast, to expand the fishing indus-

try and address current issues and trends, immediate action is required to ensure that development is sustainable and that appropriate measures are taken to protect the environment.

Develop an Integrated Coastal Zone Management Plan

The NCS and draft Biodiversity Action Plan recommended the development of an Integrated Coastal Zone Management Plan (ICZMP). This is now a top priority. The guidelines for developing this are given in Box 18.

The process has to recognize that there are distinctly different socio-economic, biological and physical environments. One falls within the influence, economic clout and needs of Karachi. The other is virtually 'beyond the pale', largely affected by external influences. Priorities for an ICZMP will include:

- environmental management of the Hab, Gadani and Windar industrial area;
- sustainable use of coastal/marine resources;
- sustainable use of fresh water resources;
- conservation of natural capital; and
- proactive development planning.

Joint Steering Committee

A high-level Joint Steering Committee will be appointed by the federal and provincial governments and provided with terms of reference for the preparation of the ICZMP. The terms of reference will reflect federal and provincial government policy on integrated planning for coastal zones, and a commitment to the implementation of approved plans.

This Steering Committee will be chaired by the Chief Secretary of Balochistan, and include representation from the key agencies and organizations, both governmental and nongovernmental, whose cooperation and participation is seen as essential to the success of this initiative and implementation of the plan. It will be supported by a small secretariat, preferably to be provided by the Planning and Development Department.

Participatory Approaches

The first job of the Joint Steering Committee is to develop the goals, principles and objectives for the plan using a participatory and open approach. This approach will also be followed in defining the planning area boundaries and the scope of the plan. Participation means involving stakeholders in all phases of the process. Various approaches to ensure effective participation can be pursued. One entails holding workshops on the coast to involve local people as much as possible. Another entails setting up an interest group or roundtable to obtain input from a wide constituency of specialists, policy-makers, resource managers, private-sector interests, NGOs and the public.

Whatever participatory process is followed, it must be adapted to the realities of a remote coastal zone, distant from the seats of government and from many of the people who have a role in its development. Scientific expertise lies mainly in Karachi, while federal government expertise and decision-making rests in both Karachi and Islamabad. Provincial expertise and decision-making rests in Quetta. Good communications and information systems will therefore be vital to success.

The methodology for planning depends on the status of coastal resource use and the areas to be covered. Where conflicts have already surfaced, it is most pragmatic to use a problem-oriented approach. In cases where coastal resources are not under threat, the more classical system of a resource-based approach is possible. Both are required in Balochistan.

Regardless of the approach taken, it is necessary to answer several questions in programme preparation:

Box 18 Guidelines for Preparation of an Integrated Coastal Zone Management Plan

- Establish a high-level Steering Committee to:
  - develop the goal, principles and objectives of the plan;
  - define planning boundaries and scope of the plan;
  - oversee development and implementation of a participatory planning process;
  - ensure inter-agency coordination; and
  - guide the preparation of the plan, its approval and implementation.
- Establish and mobilize a small, multidisciplinary core group to prepare the plan.
- Establish a broadly based interest group composed of all stakeholders.
- Collect secondary data and information, and analyze.
- Identify information gaps and commission-required studies.
- Define issues and trends.
- Establish priorities.
- Identify alternative ways of managing human activities causing adverse impacts.
- Evaluate alternative management strategies.
- Finalize and obtain approval of the plan.
- Implement the plan and establish a monitoring and evaluation mechanism.

- Which coastal problems or coastal resources are to be addressed?
- What management mechanisms will be used?
- How and where will management be exercised?
- What action is necessary to integrate coastal management activities into the existing management framework?

Experience has shown that inadequate attention to these questions has resulted in coastal zone management plans that are theoretically sound, but difficult or impossible to implement.

Vision

The Steering Committee will attempt to establish a vision for the coastal zone. This can be done through workshops. It is geared towards determining how the coastal zone will be developed in the long term, taking into account the Master Plan developed by the federal government. The goals, principles and objectives of the BCS provide a framework for ensuring that the vision is compatible with the sustainable use of resources and protection of the environment.

The vision must also be based firmly in the realities that bind development decision-making. For example, water and energy are extremely limited. The availability of water for domestic, agricultural and industrial use will constrain population growth and resource development. The economics of infrastructure development, such as roads, airports and harbours; energy supply; and the cost of developing alternative sources of water will all temper the vision and dictate how much of it can be realized. While agricultural potential is significant in some parts of the coast, the scarcity of fresh water, the cost of marketing produce and competition with neighbouring markets may make it unrealistic. The coast is also subject to catastrophic events, such as wave attacks, flash floods, droughts, rising sea level and earthquakes. Ambitious housing developments on exposed headlands and coastal development schemes may not survive the elements.

The vision has of necessity, to be pragmatic. It has to accommodate local needs, national interests and international realities. Local needs in the Mekran are currently seen in terms of a healthy and expanding fishing industry, with some limited agricultural development. In the Lasbela area, the hope is for a thriving industrial economy in the shadow of Karachi. The national vision is one of major offshore fisheries development, oil and minerals development, the development of major ports, the opening up of resources in the interior of the province and access to markets from Central Asian countries. From a geopolitical perspective, the Balochistan coastal zone is one small part of a region dependent on the Arabian Sea for fisheries and transportation. Markets, services and economic activity have to be viewed on this scale, and on alliances with neighbouring states. The vision has also to take into account the pace and scale of development and the ability of available resources to accommodate it.

Boundaries

Many factors come into play in attempting to define the geographical boundaries of the planning area. It is recommended that the coastal waters of Balochistan and adjacent offshore waters within the EEZ, the coastal belt and watersheds draining to the coast be included. This is consistent with the need to harmonize fishing activities, onshore and offshore resource development, land use planning and water management activities. The selection of boundaries will be done in a fashion that facilitates other resource management mechanisms proposed in the BCS.

Given the different character, socio-economic, environmental and development needs of the Lasbela area and the Mekran, the need to develop separate plans or sub-plans for these two areas will be assessed.

Information for Planning

Information for planning is available from a wide variety of sources, including the comprehensive ESCAP 1996 report and numerous documents, scientific papers, reports, surveys and charts held by government departments, research organizations, universities, NGOs and others. The challenge is pulling this information together into a useful form and managing it effectively. These issues are discussed in the chapters on information management, land and water. While a considerable amount of information will be needed, it is important that planning and decision-making proceeds, even though some gaps in information remain to be filled. Planning has to proceed on the best available information. The iterative nature of planning allows for new information to be included over time as plans are updated and revised.

Where information is totally deficient, the sustainability of the resource is in doubt, or the potential effects on the environment are considerable, then major planning decisions will be deferred until adequate information is available. At the very least, a conservative approach to their use will be adopted. The preparation of initial environmental examinations and environmental impact assessments will provide guidance on which to make these decisions. For example, the construction of a coastal road, major port development,

oil and minerals exploration and development, or transportation corridors to the interior will all be subjected to the requirements of the Pakistan Environmental Protection Act.

Research and Surveys

The NCS recommended filling the major gaps in information on coastal resource use and sustainability and on the environmental impacts of different forms of land use. The NCS also recommended conducting research on the traditional practices of resource use that were always sustainable. These recommendations are still valid and still await implementation.

But research and survey needs have to be addressed in a systematic and timely way to ensure the most effective use of limited resources. A process will be established to ensure that all projects and programmes are evaluated and priorities established. Some form of coastal zone research and management committee will be established to ensure a coordination of efforts, standardization of techniques and reporting, sharing of results, pooling of resources and avoidance of duplication. Budgets for research and surveys are grossly inadequate. Governments must commit the necessary resources, to enable research institutions to function effectively. Funding must be sustained for the time frames required to achieve useful results. The Pakistan Navy and Coast guards are active in the coastal zone. Navy and Coast guards personnel will be represented on the Steering Committee and on other planning bodies, including research and surveys. Apart from their vested interest in the coastal zone, they can support research and surveys by providing the necessary platforms and sharing facilities for this work.

Defining Issues and Trends and Establishing Priorities

Setting clear priorities is a key component of the planning process. Issues and trends have to be reviewed with the stakeholders, and priorities for action established. High among these priorities are ensuring that:

- the sustainable use of the fisheries resource, with access priority provided to the inhabitants of the area;
- the biodiversity of the coastal zone is used in a sustainable manner and that appropriate action is taken to protect threatened species, populations, habitats and ecosystems;
- all projects, programmes and activities in the zone are subject to an environmental assessment process;
- government organizations and institutions discharge their mandates effectively and efficiently;

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Pasni fish harbour.

- an appropriate legislative framework and institutional arrangements are in place to ensure that planning and resource use takes place in an integrated manner;
- a monitoring system with indicators is developed for plan implementation and sustainability of the resources; and
- emergency measures are planned and implemented to deal with catastrophic events, including erosion, flooding, oil spills and earthquakes.

Management Strategies

The goal of planning for the coastal zone is to promote the sustainable use of resources, and not simply to zone it for various uses or to limit human use. Addressing issues and trends and developing planning measures means examining various ways of managing human use of the area and evaluating alternative management strategies. The first and foremost concern is addressing poverty alleviation. Responses to the issues surrounding coastal development must give this concern top priority.

Coastal developments now on the drawing table will provide benefits to land speculators, private companies, offshore development interests, entrepreneurs and others. Few benefits from these schemes flow to local people, who are mostly uneducated and untrained to work in

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Better handling of fish catch is needed.

anything other than the fishing industry. There is still a heavy reliance on remittances. Planning has a cold, technocratic face and is usually seen as a rather sterile, impersonal process. Planning, however, is about improving socio-economic conditions on the coast. This has to be the uppermost consideration in developing and assessing alternative management strategies. It will be key to gaining political and popular support for implementation.

Plan Approval, Implementation and Monitoring

Final plans will be approved at the highest level of the federal and provincial governments. The responsibilities for implementation will be clearly defined, as will be the human and financial resources required and the need for enabling legislation, rules or regulations, policy and institutional reform. The plan will be accompanied by an action plan with measurable results.

A monitoring system will be established to track the implementation of the plan. Planning by nature is an iterative process. The life of a plan is generally three to five years. The monitoring system will provide feedback on the need to update or revise elements of the plan. In this regard, the input of local people is important. If they do not see tangible results from the planning process, or if it does not meet their priorities, then they will not support it. If the plan fails to influence negative trends, or if resources are being used in an unsustainable manner, then it must be reviewed and revised. Indicators are very important in this regard.

Take Immediate Action on Key Issues

Planning is no substitute for taking action where the needs are known and where interventions are urgently required to ensure the sustainability of resources or protection of the environment. Some priorities were identified earlier. In addition, the CEMP (1996) produced a long list of recommendations for action. Although these may be outdated, they should be reviewed by governments and all stakeholders to determine what immediate actions are needed by the agencies concerned to ameliorate the problems.

For example, the NCS describes an initiative to extend protection to sea turtles along the entire coast. Other initiatives concern the protection of mangrove forests. Governments can take immediate action to extend interim protection to key habitats and populations until appropriate management action is taken. For example, early action may be required to protect nesting turtles, over-wintering birds, mangroves, corals, fish and shellfish stocks; to manage water resources effectively; and to prevent unplanned coastal development. Management plans will be developed by the responsible organizations and recommendations made to the ICZMP Steering Committee for review.

Sustainable Fisheries

Perhaps the most pressing issue requiring urgent attention and action is fisheries. Not much has changed since the NCS, which among other things pointed out that shrimps are being over-harvested. The NCS recommended that policies are required to develop fisheries on a sustainable basis and to protect and restore shrimp fishing habitats, with harvesting restricted to the level of annual sustainable yields (Government of Pakistan and IUCN 1992).

Even the best-developed and scientifically managed fisheries in the world have had limited success in establishing and enforcing the concept of 'sustainable yields'. Generally, that point is only determined once it has been passed, when stocks have crashed. The response from

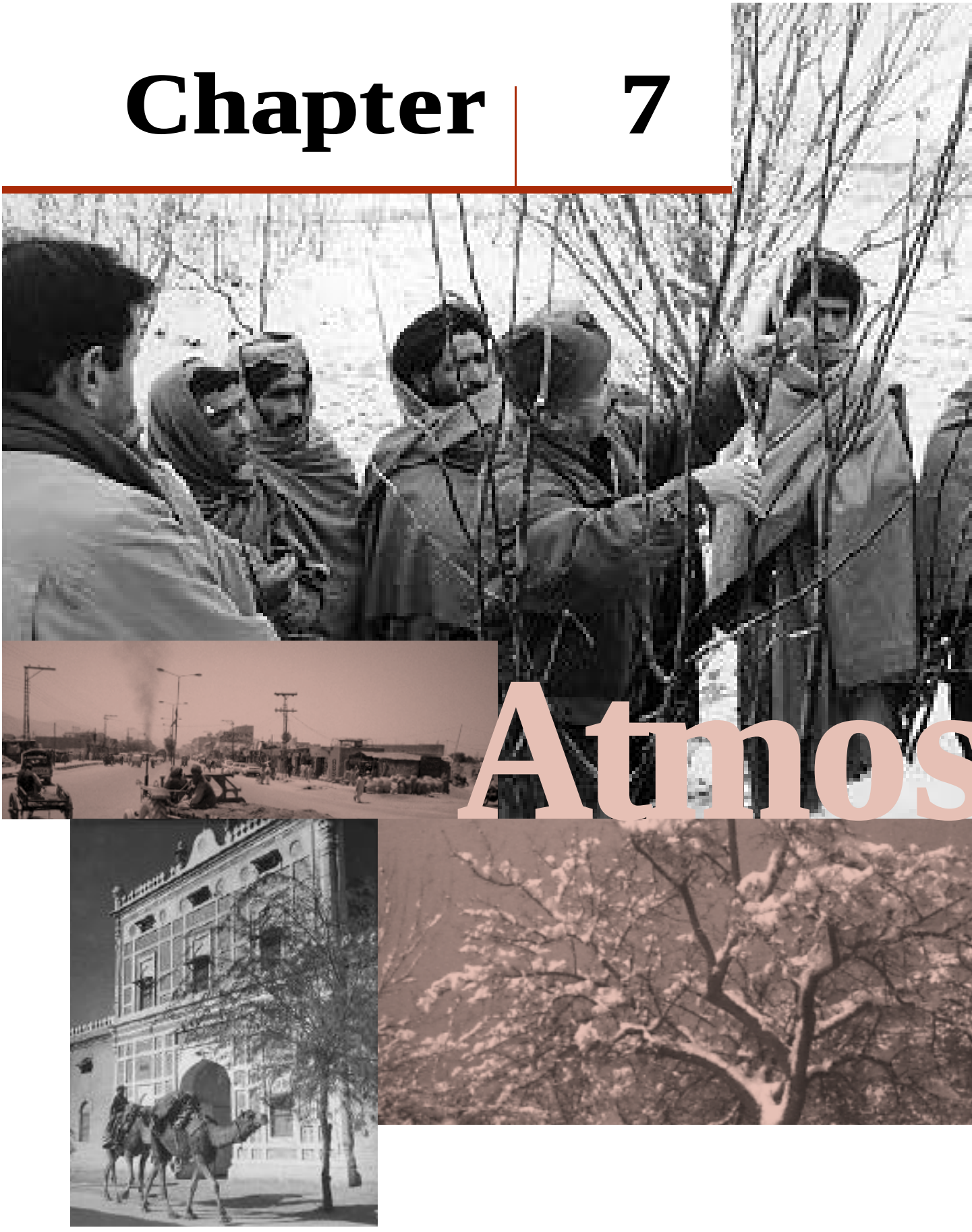
the fisheries sector is to adapt a 'pulse harvesting' strategy. This means aggressively fishing target species until it is no longer economically viable to do so, and then moving on. Mining this resource is an international practice.

Pakistan can do something about it, but time is rapidly running out. The first step is to reassess current stocks of all economic species of fish and shellfish as a basis for developing sustainable yields. The second step is to ensure that actions are taken to improve the present fishery in terms of handling and processing the catch, to ensure that full economic benefits are obtained. The steps outlined in the government's brief to the Senate Committee on Agriculture, Food, Livestock, Fisheries and Forest go a long way toward this. Once the fishery is organized along more efficient lines, attention could be paid to its expansion. Enlisting the help of Balochistan's coastal communities is surely an important element of any strategy, to ensure the sustainability of the fisheries resource.

The following additional measures will be taken to deal with the issues raised above:

- Governments and the private sector will cooperate in setting up a pollution-monitoring programme for coastal areas, enforcement mechanisms and regional and local oil spill response measures, together with the appropriate facilities and resources.
- An emergency response team will be established to assist with natural disasters.
- The government of Balochistan, in collaboration with the government of Pakistan, will encourage the private sector to establish a ferry service between the coastal towns of Balochistan and Karachi.
- The government of Balochistan will explore the feasibility of installing small to medium-sized desalination plants for major coastal towns, where water is scarce.
- The proposed construction of a coastal highway, port development at Gwadar, oil and mineral exploration and development, development of transportation corridors to the interior, dams, major water development schemes, communications development and other projects will be subject to all the provisions of the Pakistan Environmental Protection Act and its rules and regulations.
- At present, fisheries are part of the Agricultural Research Board. An independent Research Coordination Committee will be set up for marine fisheries to establish priorities and oversee all government-funded scientific and technical research and studies, and coordinate this work with NGOs and private sector activities.
- Government research and survey activities will be carried out by using the capacities of existing institutions, such as the National Institute of Oceano-graphy and others, in a coordinated manner. The creation of new research institutions in the near future will be avoided.
- The government of Balochistan will take immediate steps to extend protection to marine and terrestrial areas of special interest, such as mangrove forests, critical fish and wildlife habitats (including marine turtle nesting beaches), archaeological and historic sites, scenic landscapes and coastal resources important for tourism, as well as resident and migratory fish and wildlife populations.
- The government and the private sector will explore and develop alternative sources of energy at suitable locations on the coast and assess the economics of solar energy applications.
- The government will prepare and implement plans for all coastal towns.
- A pilot project will be launched in one town to develop an audit or profile of resources. This would include water supply, demand, quality and use; energy supply and demand; solid waste production and disposal; and sewage. It would form the basis for improving the environment and conserving scarce resources.
- The government of Balochistan will work with the government of Pakistan towards having key wetlands on the coast designated as Wetlands of International Importance under the Ramsar Convention.
- The Balochistan Environmental Protection Agency will assess the extent and nature of pollution from industrial activities in Hab, Windar and Gadani, and take action to control it in accordance with the Pakistan Environmental Protection Act and National Environmental Quality Standards.
- The government of Balochistan, in collaboration with the government of Pakistan, will allow and encourage the direct export of fish from coastal towns.
- A Local Agenda 21 will be developed as a pilot project for one major coastal town, such as Gwadar. This will be developed in a participatory manner by all the stakeholders in the community. It will be a process dealing with the key economic, social and environmental issues facing the sustainability of the community and an action plan to be implemented by the stakeholders – geared towards future management.
- A management plan for Hingol National Park will be developed and implemented as soon as possible, as proposed in the report of the Protected Areas Management Project.

Chapter 7



Atmos

sphere

Atmosphere

Balochistan experiences considerable variations in seasonal temperature and precipitation as a result of its mountainous character and the effect of its strong relief on regional air masses. Winters are dominated by an extensive anticyclonic system that lies over southern and central Asia. Disturbances arising in the Mediterranean enter the region on an average of six to eight times a month between November and March. These disturbances bring widespread precipitation, with snowfall on higher grounds. There are marked areas of higher rainfall, where northeasterly facing relief predominates. The intensity of precipitation is usually low. The disturbances bring cold, northwesterly airstreams in their wake. Frosts of considerable intensity are common in northern and central areas. Winter temperatures as low as –22° Celsius have been recorded as far south as Kalat. In Sibi District, summer temperatures exceed 50° Celsius, the highest mean temperatures recorded for all of Asia.

In spring, there is a reversal of the pressure gradient. A large anticyclonic system develops over the Indian Ocean. By June, the depth and extent of this system induces the southwest monsoon. From July to late September, in a normal year, the western flank of the monsoon enters Pakistan. It is of immense significance to almost the entire plant and animal community of the country, as well as to the agrarian economy. Cool, moisture-laden winds from the Indian Ocean increase in regularity and intensity from June onwards, culminating in intermittent heavy rainfall. The monsoon largely by-passes the Balochistan uplands and the southwestern corner of the province. By the time monsoonal depressions do reach the province, they have usually lost most of their moisture. The high mountains that form the eastern boundary, attract most of the rainfall. Most of the rain falls in the Loralai and Sibi Districts and the eastern portions of Khuzdar and Lasbela Districts. There is little summer rainfall in upland Balochistan. but in winter, it is upland Balochistan that receives the most rainfall. Areas of moderate to strong relief in the north of Pishin and Zhob Districts receive the greatest amount of precipitation. There is little rainfall during the transitional periods, particularly in autumn.

When the distribution of summer and winter precipitation is compared, it is striking how little of the province receives any precipitation in both seasons (Map 6, see Maps section). The exception to this is the area of strong relief between Quetta and Ziarat, which may be the only part of the province to receive relatively large amounts of rainfall in summer and winter. On the other hand, extensive areas of the

Liaqat, BCIAP

Winter temperatures can be as low as –22° Celsius.

south and west of the province, including Chagai and Kharan Districts, are hyper-arid. On average, they receive less than 100 millimetres of rain annually.

Winds are an important feature of the climate in both the desert areas of southwestern Balochistan and in the coastal zone. The advance of cold air associated with western disturbances results in frequent dust storms in the desert areas during winter. In summer, a low-pressure area develops over Balochistan and strong northwestern winds blow throughout the season. Such winds, in Chagai, are locally called bad-e-sad-o-bist-roz, the 120-day wind. Sandstorms are quite frequent, with wind speeds exceeding 60 kilometres an hour. Large areas of migrating crescent dunes are a testament to the persistence and strength of these winds. Visibility is generally poor throughout the year.

Winds, however, are not merely the cause of problems such as rough seas, dust, sandstorms, shifting dunes and coastal erosion. Their role in maintaining the productivity of key fishing grounds is also well known. Winds also offer a source of energy for considerable periods of the year – one that has not yet been fully investigated or tapped (see Chapters 6 and 8).

The climate of the province and its variability from year to year and from place to place is reflected in the wide range of habitats that have developed over a very long period of time. Partly as a consequence of geographical and climatic factors, a high percentage of Pakistan's bird fauna is migratory, with large numbers of Palaearctic winter visitors. The variations in precipitation in Balochistan do offer opportunities for migrant bird populations. As a result, a large number of Himalayan or sub-tropical and African wintering Palaearctic species breed in Balochistan during the summer. A number of Palaearctic species migrate south to the upland mountain regions of Balochistan in winter, e.g., hawfinch and leaf warblers.

The ecosystems we see today are an expression of this often harsh and demanding climate (Map 7, see Maps section). They have evolved to meet these conditions and to persist during times of change. They may be vulnerable, however, to long-term changes in climate, about

which there is little available information. They may also be vulnerable to human activities that affect the close interaction of climate, soils and vegetation.

GLOBAL WARMING

The mean sea level is slowly but gradually rising at a rate of about 1.1 millimetres per year due to global warming (see Chapter 6). This small sea level rise may be compensated for, to some extent, by the tectonic uplift on the Balochistan coastline, estimated at 1–2 millimetres a year at Ormara. Low-lying areas at Gwadar and Gadani may be affected, as well as lagoons and wetlands. Sea level rise may adversely affect the deep-sea harbour being planned. People may have to migrate further inland as the sea gradually advances. The other possible impact of sea level rise would be on coastal industry. Even a modest rise in the sea level will threaten storm barriers and salinate fresh water reservoirs along the coastal belt. The extent of other effects of global warming in Balochistan has not been assessed as yet.

METEOROLOGICAL DATA

The network of functioning meteorological stations in the province is limited and some of the data are not very reliable. The distribution of meteorological stations follows the railway network, and most are located in the valleys of the central portion of the province. This means that conditions at higher elevations have to be extrapolated using available information and rules of thumb. A database of daily rainfall for the period 1891 to 1946 is held at the U.K. Meteorological Office for 104 stations. The quality of the record is excellent. An analysis of records from recent years found them to be of poor quality.

The records do show considerable variation in rainfall from year to year in Balochistan, as mentioned. This can result in declining reservoir levels in some watersheds, such as Hab, and pose a threat to the security of water supply to cities like Karachi. There are also considerable variations in rainfall at the local level as evinced by data from five stations in and around Quetta valley (Table 16). These records are considered to be reliable and consistent. The variability can be explained in terms of the physical geography of the area. This means that site-specific data are required for planning purposes. Furthermore, data collected in the valleys may be useful for agricultural purposes, but of less value to watershed management. In that case, orographic effects (those induced by the presence of mountains) have to be taken into account, and not simply elevations.

Resource planning and development programmes require a continuous, detailed, high-quality record of meteorological data and the human and financial resources to develop, maintain and use it effectively. In Balochistan, both data and resources are scarce. The problem is exacerbated by the size of the area, greatly varying and difficult terrain, sparse population, poor means of communications, low level of development, discontinuous and short span records of varying quality and great variation in parameters such as precipitation.

The Pakistan Meteorological Department maintains the network of stations and collects temperature, rainfall and, in some cases, wind speed data at various locations in Balochistan. The network does not meet the World Meteorological Organization (WMO) standards of network density. The data generated are scanty and have to be extrapolated in the design of projects and construction of models. This lack of information and reliable data is one of the major constraints in the scientific planning and sustainable development of the water resources of the province. It also constrains the analysis of trends in the periodicity and duration of droughts and changes in the monsoons.

WEATHER FORECASTING

Flash floods are a fact of life throughout Balochistan. During the southwest monsoons, they cause heavy losses to people, livestock and property. In March 1998, torrential rain in Mekran resulted in a flash flood that swept away at least 250 people and rendered 25,000 homeless. The floods washed away topsoil and destroyed irrigation systems. Systems are not in place

Table 16 Variations in Rainfall in the Quetta Area

Meteorological Station	Annual Average Rainfall (millimetres)
Baleli	180
Urak	319
Quetta (Brewery Road)	222
Sariab	172
Spezand	135

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Vehicles cause both traffic problems and air pollution.

to forecast such storms and provide early warning to local people.

Farmers are faced with a significant risk of receiving inadequate crop moisture when rainfall is the only source of water. They need technical support and advice in making decisions about when and where to plant, and the appropriate crop to grow. Trying to understand the behaviour of variables, such as rainfall and temperature, is therefore very important. This is where good databases provide valuable tools for planning purposes.

For example, the rainfall data described earlier were used to analyze agroclimatological variables. Using normalized data for the period 1901–40, the project demonstrated that predictive models could be successfully developed for growing the right crops in the right area. Maps were produced showing the probability of a specified amount of rainfall being exceeded. Summer rainfall is necessary for planting certain wheat strains and other grains, for instance. The amount of rainfall required for summer planting is in the range of 20-40 millimetres. The maps suggest that the best areas are in Loralai and parts of Zhob, Sibi, Khuzdar and Bela districts, particularly where sailaba or water harvesting practices are used. On the other hand, in upland Balochistan, particularly in Quetta and Pishin districts, it is more sensible to concentrate on crops that mature quickly. Planting should be planned on the basis of winter rains, rather than relying on residual soil moisture from infrequent summer rains.

Local knowledge of climate, combined with predictive models based on good data, can go a long way toward the development of a productive agricultural sector and greater food security.

AIR QUALITY

Studies on air quality in Balochistan appear to have been concentrated in urban areas, particularly Quetta (see Chapter 10). A recent study (Solway and Malik 1998) on sources of air pollution has outlined the issues and responsibilities for dealing with them (Table 17). According to the study, air pollution causes respiratory diseases; increasing morbidity and mortality; impaired lung, kidney and liver functions; cardiovascular and neurological damage; skin infections; and adverse effects on buildings and plants. Noise pollution causes annoyance, stress and loss of sleep – behavioural and physiological changes. The study suggests that the environmental problems of Balochistan, particularly in Quetta, are well documented in a number of reports. The authors conclude that what is needed now are single-issue feasibility studies leading to the implementation of projects. In both urban and rural areas, people rely heavily on biomass for cooking and heating (see Chapter 8). Both firewood and dung cakes are used extensively, together with kerosene. The resultant smoke is a cause of health problems.

Quetta has all of the classic geographical characteristics that favour the formation of photochemical smog. It is located in a bowl-shaped valley, surrounded by high mountains, with an abundance of sunshine. Synoptic conditions favour the formation of atmospheric inversions, trapping cold air over the city for prolonged periods. Heavy traffic in Quetta emits dense clouds of exhaust. Among the worse culprits are the two-stroke rickshaws, poorly tuned diesel engines and automobiles burning sub-standard leaded petrol. The result is frequent, thick smog. There is no doubt that this is the single most pressing issue for many city residents.

Comprehensive data on pollution levels have not been compiled. The Environmental Profile Balochistan drew attention to this deficiency, but little new work has

been done since 1992. Various studies have pointed to unacceptably high levels of ozone, carbon monoxide, hydrocarbons, oxides of sulphur and nitrogen. Particulate levels, especially dust, are also high. One study, completed in 1996, summarizes the situation and provides some additional insights into the problem (Smith 1996). It confirmed that the major air pollution sources affecting Quetta are poorly maintained diesel engine buses and trucks, along with rickshaws. Oily exhaust smoke and benzene, a carcinogen, were found to be the main hazards.

The Pakistan Environmental Protection Act provides for the prevention and control of pollution. That includes air pollution by substances such as soot, smoke, dust, fumes, noxious gases and hazardous substances. The act provides for qualitative and quantitative standards for the emission of air pollutants and noise through the National Environmental Quality Standards, emission standards, or other standards established under the act. However, the rules and regulations are yet to be notified under the act and there are management gaps. The Pakistan Environmental Protection Council, which includes the chief executive of the province and the minister responsible for environment as members from Balochistan, approves the NEQS and may direct any government agency to promote or implement projects for the prevention and control of pollution. The agency mandated to administer the act is the Pakistan Environmental Protection Agency, established at the federal level. It is this agency that prepares, revises and enforces the NEQS and establishes ambient air quality standards in consultation with the provincial agency concerned.

Environmental Protection Agencies are established at the provincial level and are delegated certain powers and functions under the act. These include the monitoring of air pollution to ensure that it does not exceed the levels set out in the NEQS. The provincial agency can also enforce the law to monitor and control motor vehicle emissions, smoke and noise. PEPA provides for environmental screening and environmental impact assessment processes. Under PEPA, the federal and provincial governments have all the powers needed to monitor and control air pollution and to ensure that projects and programmes are thoroughly assessed to ensure conformance with the NEQS and other environmental performances. The issue is therefore, one of

Table 17 Summary of Air Pollution Sources, Issues and Responsibilities

Pollution Source	Issue	Responsibility
Stone crushers	Eight plants around Quetta create dust through crushing, conveying, screening and truck loading processes and are a major source of dust within the city. Presently, none of the plants carry out any form of dust reduction. Noise at the local level.	**Association of stone crushers and EPA***
Surface dust	Traffic raising dust, unvegetated land.	**QMC**
Vehicle exhaust	Poor quality imported fuel, adulterated fuel, oil/petrol mixture for two-stroke rickshaws, traffic congestion, inefficient or badly tuned engines, lack of awareness, poor enforcement, absence of relevant regulations and lack of monitoring capacity.	**EPA, private sector, rickshaw owners and operators association, traffic police, SSGC, HDIP, QMC, QDA**
Brick kilns	Four brickfields within 10-12 kilometres of Quetta with 100 kilns discharging dust, ash and sulphur dioxide. Season starts from April and ends in October.	**Brick kiln owner association, SSGC and EPA**
Energy sector - **power stations** - **industrial boilers** - **home heating** - **supply of gas**	Six major power stations: HUBCO, FEBCO, WAPDA, Lasbela, Uch Thermal Power Station and Coastal Power pollute when burning oil and/or coal.	**EPA, WAPDA, operators and top management of power stations**
	Leakage of natural gas during transmission, including methane, carbon dioxide and carbon monoxide.	**EPA and gas producers/suppliers**
	Air pollution from coal or oil burning boilers. Pollution from home heating with coal, wood, or dung cakes.	**EPA and operators ENERCON**
Waste disposal	Pollution from burning rubbish, including plastic bags.	**EPA and QMC**
Traffic	Noise.	**EPA and traffic police**

Source: Solway and Malik 1998.

* EPA: Environmental Protection Agency
QMC: Quetta Municipal Corporation
SSGC: Sui Southern Gas Company
HDIP: Hydrocarbon Development Institute of Pakistan
QDA: Quetta Development Authority
WAPDA: Water and Power Development Authority
ENERCON:

implementation. Standards must be established and enforced by the provincial agency. Ambient air quality standards have not yet been formally established and there is a limited capability to monitor or enforce any such standards.

Brick kilns, while contributing smoke and some noxious fumes from the use of poor quality coal, were not seen as hazardous particularly in comparison with vehicles, although their location around the airport can create visibility problems for pilots and may restrict operating hours. However, these were ordered to close down by the district administration, Quetta on the request of the Pakistan Air Force, EPA, and a citizens' group. The case is sub-judice in the Balochistan High Court.

While data are not available, and systematic monitoring of air pollution is not being done, there is ample evidence for the need for immediate action. This is one issue on which there is unanimity.

THE WAY AHEAD

Network of Meteorological Stations

Reliable meteorological data form the basis for weather forecasting, for the analysis of weather patterns, assessment of trends, the nature of climate change and as a basis for modelling climate variables. Balochistan urgently needs a comprehensive network of stations that meet standards of the World Meteorological Organization and are geared to the needs of the province. The most pressing needs are in the agriculture sector and for water basin management. The present system and the data produced since the mid-1950s are of poor quality. The network will be designed by the agency responsible for the collection of meteorological data, in collaboration with the user community. Consideration, for example, will be given to extending the network beyond the valleys and into areas where precipitation needs to be accurately monitored in support of water balance measurements.

Weather stations can be operated by many other organizations, in addition to the Meteorological Department. The process of collecting data and maintaining the equipment is straightforward. There is an opportunity for line departments, district administrations, educational institutions, the military, the private sector and non-governmental organizations to be trained to collect basic data and report them in a systematic fashion. The system can be enhanced in difficult-to-reach areas by using fully automated stations that transmit their data on a regular basis via satellite.

The key is the development of a well-thought-out network of stations, qualified staff to maintain them and observers trained to collect data according to internationally accepted standards. Better use can also be made of remotely sensed information, for example from satellite imagery. Data will be readily available to users in a timely fashion and in an appropriate form.

Establish an Atmospheric Environment Service

There is a pressing need for an efficient and effective Atmospheric Environment Service in Balochistan. This service could be entirely within the private sector, entirely in the public sector, or a combination of both. It might be instituted through reforms to existing organizations, such as the Meteorological Department, or developed specifically to serve provincial needs. The first step is to undertake a needs assessment, and then to design systems to meet those needs effectively.

The needs clearly go beyond supplying users with data sets on variables such as precipitation and temperature. The agricultural community needs detailed forecasts for the short (daily/weekly), medium (monthly) and long (seasonally) term. The monsoon affects both the agriculture and the fisheries sector. Water management authorities need forecasts to allow them to plan appropriate strategies to meet the demands for drinking water, irrigation and industrial and public use. A better forecasting system is required to support disaster and emergency measure organizations, and to give input into water management and land use planning programmes. Forecasting is a technically demanding occupation requiring a great deal of experience and good judgement. But in a province where weather dictates the livelihoods of so many people, the need for qualified personnel and modern equipment will be met as soon as possible.

Apart from forecasting, the role of a modern Atmospheric Environment Service will include assessing the nature and trends of global warming and the analysis and modelling of events such as drought and monsoons. The Atmospheric Environment Service will give priority to research in this area.

Local Knowledge

The data collected and analyzed by science-based organizations will be a valuable source of information for

decision-makers. Recognition also has to be given to the knowledge of local people about microclimatic variations and weather patterns that influence the agricultural practices and seasonal rhythms in their areas. Local people may have a detailed knowledge of the changes in their environment attributable to climate change. They have a knowledge of the periods of warming and of drought conditions. They can relate these changes to environmental conditions, such as changes in plants and vegetation patterns, abundance and distribution of fish and wildlife species and agricultural production.

Local people can also provide valuable insights into the frequency and duration of dust and sandstorms and shifting sands, and how these may have changed over long periods of time. These are natural phenomena ,but changes may reflect desertification processes. An Atmospheric Environment Service will work hand-in-hand with local people and specialists to develop indicators, and monitor the process of desertification as part of an integrated programme of activities to halt and reverse these trends.

Effective Monitoring and Control of Air Pollution

Top priority must be given to getting the provincial EPA up and running, and establishing, monitoring and enforcing air quality standards.

At the rural level, the use of wood and dung cakes for fuel results in eye, ear, nasal and respiratory problems. Awareness programmes will focus on these problems, with alternative types of stoves demonstrated and alternative sources of fuel found (see Chapter 8).

At the urban level, the need for concerted action by all stakeholders is identified in Chapter 10. Air pollution is undoubtedly the primary concern of most urban residents. Specific actions to be taken include the conversion of rickshaws to the use of alternative fuels, such as compressed natural gas (CNG). The establishment of CNG stations in urban areas has a high priority for the federal and provincial governments. Once established, the government fleet, as well as private and commercial vehicles will be converted to CNG. The technology is available in Pakistan and cost-effective. The government will consider incentive measures to promote the conversion of vehicles to CNG.

As an alternative to CNG conversion, vehicles will be properly tuned to burn fuels efficiently. Once the provision is made, there must be a system for vehicle testing and enforcement to ensure compliance with standards. Standards for fuels will be strictly observed, to eliminate the use of sub-standard grades of petrol and diesel currently imported from other regions.

A. L. Rao, IUCN

Vehicular pollution is one of the reasons behind respiratory illnesses in Quetta.

In addition to enforcement, there are a number of other measures that will be taken. These include traffic planning and public awareness. Traffic planning involves redirecting heavy vehicles away from the inner city and residential areas, improving the flow of vehicles on city streets, enforcing access and parking measures and offering incentives to vehicles fitted with emission control measures. These incentives might include privileged access to certain parts of the urban area and reduced license fees. Awareness programmes offer one of the best approaches to informing the public about vehicle emissions and the steps that they can take to reduce them.

Balochistan is not a heavily industrialized province. The industry here is concentrated in industrial estates close to Karachi. There is no room for complacency, however, and the EPA must be vigilant in monitoring emissions and enforcing standards. The development of the mineral sector needs particular attention, and the environmental assessment process will be strictly adhered to.

Chapter 8

Minerals, m
and e

Minerals, Mining and Energy

One of the main attractions of Balochistan is its unexplored geological potential. It occupies a strategic location in relation to Central Asia, and sits on a geological belt with known world-class mineral deposits (Map 8, see Maps section). For example, Sarchashmah in neighbouring Iran has reserves of 1.2 billion tons of copper and other mineral ores. The Chagai metallogenic belt, 480 kilometres long and 50 kilometres wide, offers the prospect of a similar potential in Balochistan.

Mineral deposits usually occur within minerogenic zones (of non-metallic minerals) and metallogenic zones (of metallic minerals). Of nine such zones in Pakistan, five are found in Balochistan. Base metal deposits, such as copper, lead and zinc, have been known in Chagai, Khuzdar and Lasbela Districts for quite some time. Silver and gold mineralization in association with Saindak copper ore has recently been confirmed. The province hosts the largest barite deposits in the country, in Khuzdar and Lasbela Districts. The plains of eastern Balochistan potentially have sizeable hydrocarbon reserves – mainly natural gas. The largest natural gas field in Pakistan (Sui) is located in the Marri-Bugti area. Recent gas discoveries in the Zarghoon Valley near Quetta may lead to the discovery of new fields in the central areas of the province. Oil has not been found in any appreciable quantity, but there are good prospects for large hydrocarbon reservoirs in the offshore zone.

Balochistan also hosts several sizeable sub-bituminous coalfields in the Quetta-Harnai-Duki region. There are numerous occurrences of industrial minerals, such as sulphur, silica sand and magnesite. Large quantities of construction materials, such as limestone, dolomite, sand and gravel exist in the province. Granite and other metamorphic rocks are abundant in Chagai District, for example at Dasht-e-Kain. Lead-zinc veins have been reported at several localities, including Ziarat Balanosh. Vermiculite exists in significant quantities about 15 kilometres south of Dalbandin in the Ras Koh Hills. Detailed treatments of the geology and minerals of Balochistan have been made by Raza et al (1995) and Kazmi and Jan (1997).

A number of metallic and non-metallic minerals are being mined on a small scale (Table 18). The only major mine is at Saindak, Chagai District. It is currently closed for lack of financing.

The mining sector has not grown in recent years for a variety of technical, administrative and financial reasons. The Nok Kundi Iron Ore Project has two prospects, at Pachin Koh and Chigendik. Pachin Koh might have been viable had there been a nearby source of energy for use in the direct reduction process. An international mining company has

Table 18 Mineral Production and Royalty, 1997

Mineral/Rocks	Production (thousand tonnes)	Total Royalties (thousand rupees)	Percentage Share (%)
Coal	1,670	**33,350**	64.1
Shale	920	**9,200**	17.7
Travertine	25	**3,000**	5.7
Marble	142	**2,855**	3
Limestone	150	**1,500**	2.9
Chromite	38	**1,325**	2.5
Barite	29	**581**	1.1
Building stone	15	**221**	0.4
Pumice	2	**22**	0.1
Serpentine	2	**21**	0.1
Fluorite	0.5	**12**	0.1
Magnesite	0.5	**8**	0.1
Sulphur	0.5	**10**	0.1
Ordinary stone	0.3	**3**	0.1
Total	2,994.8	**52,108**	100

Source: Siddiqui et al 2000.

ceased activities in Chagai pending a more favourable investment climate. There are several mineral deposits that have potential for early development (Table 19).

Existing mines are generally not mechanized, and manual labour is used for trenching, open-pit mining and quarrying until these operations become too dangerous for further excavation. Coal and chromite mining requires digging inclines and adits. This method of mining is labour-intensive and comparatively inexpensive for small mines, allowing them to stay in production. It is estimated that the mining industry currently employs 40,000 people and could generate an additional 30,000 jobs. Majority of labour force engaged in coal mining comprises of people from outside the province.

ISSUES IN MINING

The present trend in the international mining sector is to take advantage of exploration and mining opportunities, particularly in developing countries. Exploration and mining costs in developing countries may be comparatively lower, more profitable and more conducive to promoting global marketing and pricing of mineral commodities.

According to Siddiqui et al (2000), the main factors adversely affecting mineral exploration and mining activities in Balochistan are:

- out-of-date mining methods, practices and techniques and low recovery and efficiency;
- a high country-risk assessment, which discourages foreign companies;
- a focus on low-value commodities;
- the high cost of operation, material handling, packing and transportation to the market;
- incompatibility with modern technology and techniques, and lack of integration with downstream demand and international market trends;
- small, uneconomical mines that do not meet economies of scale or market or financial criteria;
- poor general management and lack of motivated personnel;
- poor coordination between regulatory and government departments;
- lack of access to published technical data;
- lack of physical infrastructure;
- inadequate security arrangements for field personnel and equipment;
- pressure and demands for benefits from local tribes;
- refusal of banks and development financial institutions to provide risk capital for exploration;
- lack of conformity between Balochistan Concession Rules (1970, revised) and the National Mineral Policy (1995); and
- poor safety standards, especially in coal mines.

Other factors that may also affect the growth of the mining sector include the subletting of leases, informal mining, export of mining products through middlemen, hiring of unskilled workers in the mines and environmental degradation due to unregulated mining operations. On the planning side, a comprehensive survey and analysis of potential mineral deposits is lacking, as is a strategic plan for their development.

Mineral deposits in Balochistan are located mostly in the remote and climatically extreme parts of the province. These areas are sparsely populated, have minimal infrastructure and civic facilities, have not seen much development, and still follow centuries-old tribal traditions. Conducting mining exploration and development, while at the same time building trust and mutually beneficial relations with local tribes, communities and other stakeholders is a tremendous challenge.

Environmental Effects

Little has changed in the mining sector since the preparation of the Environmental Profile in 1992. At that time, concern was expressed about water and air pollution from coal mining and from the Saindak mine. Remedies were proposed, including the treatment and management of coal wastes and sulphur dioxide emissions, as well as the preparation of an environmental impact assessment of the Saindak mine and other potential mining developments. The Environmental Profile authors estimated that 20,000 tons of sulphur would be emitted annually from Saindak unless remedial action is taken. The effects of these on the environment have not been assessed. It is not known if any of the report's recommendations were acted upon, or if any environmental overview of mining in Balochistan has been undertaken since 1992.

The need for a reliable supply of water is a major issue for the Saindak mine, and for all prospective mining ventures in Balochistan. Mines in Chagai, for example, will have to depend on a limited, finite supply of groundwater. The Saindak mine will draw on water resources from the Taftan-Tahlab basin. These resources have not been evaluated and are shared with Iran. The production of copper blister requires twice the volume of water for each ton of ore processed. A sustainable supply of water is not assured, and the effects on other users (communities, agriculture and wildlife) are not clear. The development of a major mine and the lack of attention to water management may preclude other mining operations in the basin, both in terms of water availability and economics.

Table 19 Mineral Deposits with Potential for Early Development

Mineral Deposits	Reserves	Current Status
METALLIC MINERALS		
Copper-gold at Saindak, Chagai	412 MT	**Saindak Metals Ltd is developing the deposit in collaboration with MCC of China. Work held up due to financial constraints. A major investment (Rs. 14 billion) has been made but economic viability has been questioned.**
Lead-zinc at Gunga, Khuzdar	10 MT	**Mining lease with BME, a subsidiary of PPL.**
Lead-zinc at Duddar, Lasbela	13.3 MT	**Exploration and prospecting of small area by PASMINCO of Australia.**
Iron ore at Dilband, Kalat	200 MT	**Prospecting license issued to BESROCK. Detailed evaluation of deposits required.**
Iron ore at Chigendik and Pachin Koh, Chagai	29 MT	**Pakistan Steel is planning to develop the deposit. Progress has been very slow.**
Copper-gold at Koh-e-Dalil, Chagai	400 MT	**BHP of Australia has conducted exploration of deposit. Lake Resources of Australia is also prospecting in the area.**
NON-METALLIC MINERALS		
Travertine, Chagai District	12 MT	**Small quantities being exploited and marketed by small private companies. Production is below efficiency level.**
Granite, Chagai Hills	Medium-size deposit	**Being exploited and marketed by private parties. Production much below efficiency level.**
Vermiculite, Chagai District	11 MT	**Lease to a private company. No production.**

MT: metric tonne

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Drilling for gas in Dureji game reserve.

Mining Outside of Protected Areas

In many cases, the physical impact of a mine may be confined to its immediate vicinity and may be quite limited. One example is the quarrying of marble. Mitigating measures to control various sources of pollution from mining operations are available. The long-term consequences of mining may come from opening up an area for development. Unless closely regulated, wildlife in these areas will suffer from heavy, recreational hunting pressure as new roads and trails are constructed, and as workers, local people and hunters gain access to the area. Ecosystems throughout Balochistan are already under great stress. Many environmental problems with mines manifest themselves following abandonment. It is often unclear who has the responsibility of controlling pollution from mine tailings, carrying out clean up operations, or undertaking remedial action. The safe disposal of abandoned industrial chemicals and wastes can be an expensive and difficult proposition if not planned in advance. Mining can also affect the social and economic fabric of an area. The life of a mine can be measured in decades, but it affects areas where cultural traditions and life-styles have evolved over many hundreds of years.

Mining in Protected Areas

There is a possibility that mineral exploration and development will be proposed within a protected area. Any activity within a protected area has to be compatible with the overall objectives of the area. These are focused on the protection and maintenance of biodiversity and associated natural and cultural values. IUCN's World Commission on Protected Areas (WCPA) has developed a position statement on mining and associated activities in protected areas, endorsed by the IUCN Council in April 1999. The WCPA recommends:

- A comprehensive approach to planning a protected area system that takes into account natural and mineral values.
- Prohibiting exploration and extraction of mineral resources in IUCN Protected Areas Management Categories I-IV (Box 19).
- Allowing mining activities in Categories V and VI only where these are compatible with the objectives of the area and where an EIA has been completed. Activities will follow 'best practices' and be subject to strict operating, monitoring and restoration conditions. An approval for exploration will not automatically mean approval for extraction.

- Any proposed changes to the boundaries of protected areas, or to their categorization, to permit the exploration or extraction of mineral resources, will be subject to procedures at least as rigorous as those involved in establishment of the protected area in the first place. There will also be an assessment of the impact of the proposed changes on the ability to meet the objectives of the proposed area.
- Exploration and extraction of mineral resources and associated infrastructure, that are outside of but negatively affect the values for which protected areas were established will be subject to EIA procedures. These will consider the immediate and cumulative effects of the activity on the protected area, recommend operating and after-use conditions and ensure that the values of the protected areas are safeguarded.
- Opportunities for cooperation and partnership between the mining industry and protected area agencies will be strongly encouraged. Collaboration with the mining industry will focus on securing respect and support for the WCPA position statement, broadening the application of best environmental practice for mining activity and exploring areas of mutual benefit.

THE STAKEHOLDERS IN MINING

The stakeholders in the mining sector can be classified into six broad categories:

- government of Balochistan and its departments;
- federal government and its departments;
- mining companies and mine owners associations;
- tribes and communities;
- environmental groups; and
- media.

A coal miner at work.

The stakeholders who have the most to gain or lose are the mining companies and the government of Balochistan, followed by the federal government, mine owners' associations, tribes and environment groups.

ENERGY RESOURCES

Balochistan produces 40.2% of the primary energy of Pakistan (Figure 9) in the form of natural gas, coal and

Box 19 Protected Areas Management Categories

Category	Name	Purpose
I	Strict nature reserve or wilderness area	Managed mainly for science or wilderness protection
II	National park	Managed mainly for ecosystem protection and recreation
III	National monument	Managed mainly for conservation of specific natural features
IV	Habitat or species management area	Managed mainly for conservation through management intervention
V	Protected landscape or seascape	Managed mainly for landscape and seascape conservation and recreation
VI	Managed resource protected area	Protected mainly for the sustainable use of natural ecosystems

Source: IUCN 1994.

Shuja Zaidi

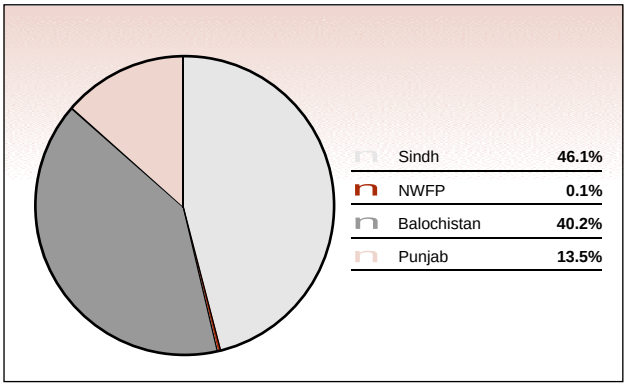
In Balochistan, coalfields cover about 12,500 sq km.

electricity. Of the total mineral fuel reserves of the country, Balochistan contains more than 33% of the natural gas, about 9% of the coal and about 2% of the probable oil reserves.

Despite a large share in fuel production, Balochistan's energy consumption is relatively low (Figure 10). Most energy requirements are met through biomass energy, principally firewood. According to the Pakistan Energy Yearbook 1997, in 1996–97 Balochistan accounted for about 12.1% of the petroleum products, about 2.5% of the natural gas, 3.9% of the electricity and 1% of the coal consumed in Pakistan.

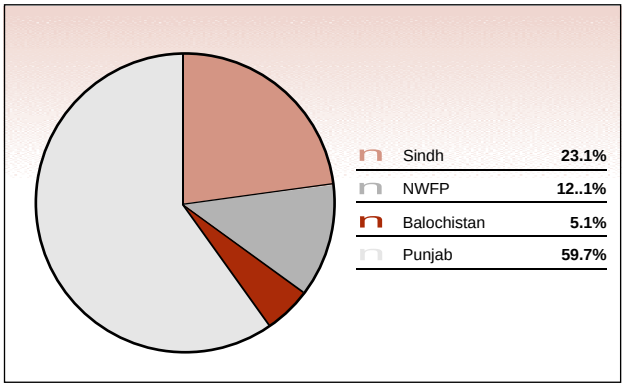
The Household Energy Supply Survey 1991–93 revealed that the urban population used 29.2% of the total energy consumed in Balochistan – urban residents made up 23.3% of the entire population according to the 1998 census. Firewood constitutes a significant proportion (80.9%) of the total consumed energy (Table 20). But the survey does not provide an accurate picture of the energy situation in Balochistan, as con-

Figure 9 Fossil Fuel Production by Province, 1996–97



Source: Hydrocarbon Development Institute of Pakistan 1998.

Figure 10 Energy Consumption by Province, 1991–93

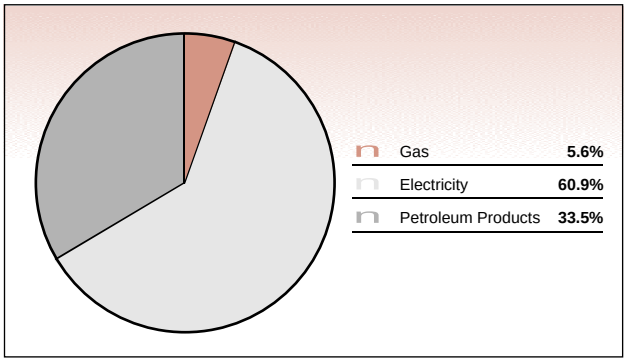


Source: Federal Bureau of Statistics 1997.

sumption of petroleum products and coal has not been mentioned.

Electricity constituted the major proportion of the commercial energy sources consumed in Balochistan during 1996–97 (Figure 11). Gas consumption was lowest, due to a limited supply of piped natural gas and liquid petroleum gas (LPG).

Figure 11 Commercial Energy Consumption in Balochistan, 1996–97



Source: Hydrocarbon Development Institute of Pakistan 1998.

Coal

In Balochistan, coal is found in five coalfields covering an area of about 12,500 square kilometres. The cumulative coal reserves of Balochistan in 1997 totaled 195 million tonnes – 53 million tonnes proven reserves, 13 million tonnes probable and the balance inferred. The heating value of the coal ranges between 7,950 and 12,590 BTU/pound and is high in sulphur and ash. At present, most of the coal produced in Balochistan is used in brick kilns in the Punjab. The decision to use this coal versus coal from the Lakhra coalfield in Sindh or from the Punjab is based on economics and availability of credit. The coal can also be processed for use in power generation units (5–10 megawatts). The provincial government is considering the possibility of establishing four 50 megawatt thermal power plants adjacent to the coalfields, in partnership with the private sector. Each would consume 170,000 tonnes of coal per annum (IUCN 1998c).

In 1996–97, more than 1.8 million tonnes of coal was produced from these coalfields. This represents about 51.4% of national coal production, while provincial consumption is currently less than 1% of the national total. The coal mining industry employs 26,000 workers and has the capacity to absorb an additional 15,000–20,000 workers. An overwhelming majority of these workers, however, come from NWFP or Azad Jammu and Kashmir. Workers from Balochistan do not work underground. The provincial government receives substantial revenue in the form of royalty and taxes from this industry.

Oil and Gas

The first exploratory well in Balochistan was drilled in 1884, at Khattan (Kohlu District) and produced about 20,000 barrels of oil. Since then, 43 exploratory wells have been drilled in Balochistan, of which 35 have been abandoned. The remaining eight are gas producers (Map 9, see Maps section). The Sui gas field had the largest original recoverable gas reserves in the country, but its imprudent use has resulted in a rapid depletion of the reservoir. The original recoverable reserves were estimated to be 8.6 tril-

Table 20 Energy Consumption in Balochistan, 1991–93

Fuel Types	Urban	Rural (TOE/year)	Total	
Electricity	14,089	**8,551**	22,640	**2.2%**
Natural gas	43,532	**0**	43,532	**4.3%**
Liquid petroleum gas	—	**—**	8,901	**0.9%**
Kerosene	11,118	**20,839**	31,957	**3.1%**
Firewood	230,011	**598,477**	828,488	**80.9%**
Dung cake	13,669	**74,514**	88,183	**8.6%**
Total			1,023,701	**100.0%**

Source: Federal Bureau of Statistics 1997.
TOE: Tonnes of Oil Equivalent

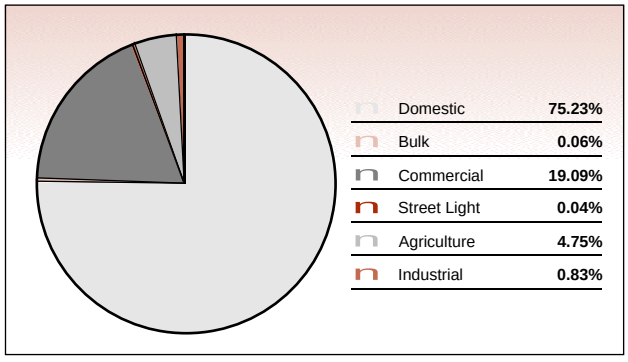
lion cubic feet, of which 75% had been depleted by June 1997 (Table 21). Additional development drilling should increase reserves by 600 million cubic feet.

Recently, two gas discoveries have been made at Zarghoon South, 40 kilometres east of Quetta and Zarghoon North, about 60 kilometres north of the city and 200 kilometres northwest of the Pirkoh and Sui gas fields.

Despite the fact that Balochistan owns the Sui gas field, it was not until 1983 that Quetta was supplied with natural gas through a 370-kilometre transmission line. Nineteen towns now have a piped gas supply. By April 1996, there were 91,220 gas connections, of which 98% were for domestic use. About 2,677 kilometres of pipeline have now been laid.

Balochistan consumed about 2 million tonnes of oil equivalent in petroleum energy products in 1996–97, which was 35.5% more than in 1995–96. This rapid increase in oil consumption was due to high consumption by the HUBCO power generation plant. The consumption of petroleum energy products by Balochistan constitutes about 12.1% of the national consumption. However, these figures do not include large quantities of petroleum products smuggled in from Iran, and used mostly in the western parts of the province.

Figure 12 Electricity Connections in Balochistan, May 1996



Source: Sarfraz and Mirza 2000.

Electricity

By November 1996, a total of 2,692 villages (44.1% of the villages in Balochistan) had been electrified. In 1996–97, the total electricity consumption in Balochistan was about 1,700 giga-watt-hours, which was 3.9% of the national consumption. Figure 12 provides a breakdown of the usage by sector, as of May 1996.

Details of electricity generation, grid stations and transmission lines are given in Map 10, in Maps section. The location of grid stations and electricity generation units indicates an electricity supply network in their vicinity, within a radius of about 10 kilometres. The northern and eastern parts of the province seem to have more access to electricity.

In the public sector, 14 thermal power generation stations are in operation in Balochistan, with the ones at Quetta and Pasni being larger. Their total installed capacity is 116 megawatts. In the private sector, there are three stations with a total installed capacity of 2,018 megawatts. These stations provide electricity to the national grid.

Table 21 Natural Gas Reserves and Production, June 1997

Gas Field	Original Recoverable Reserves (TCF)*	Cumulative Production (TCF)	Balance Reserves (TCF)	Production in 1996-97 (MCF)	Operators
Sui	8.624	**6.438**	2.186	**242,800**	PPL**
Pirkoh	1.504	**0.681**	0.823	**53,256**	OGDC
Loti	0.292	**0.125**	0.167	**15,163**	OGDC
Uch	3.100	**0.000**	3.100	**Nil**	OGDC
Zin	0.100	**0.000**	0.100	**Nil**	OGDC
Savi Ragha	0.030	**0.000**	0.030	**Nil**	BG
Jandran	0.019	**0.000**	0.019	**Nil**	OGDC
Total	13.669	**7.244**	6.425	**311,219**	

Source: Hydrocarbon Development Institute of Pakistan 1998.

*TCF: Trillion Cubic Feet; MCF: Million Cubic Feet

**PPL: Pakistan Petroleum Limited
OGDC: Oil and Gas Development Corporation
BG: British Gas

Renewable Energy

Biomass

About 81% of the province's energy requirements are met through the use of firewood and 9% from dung cakes. These are used by almost 90% of the households in the province and virtually all households in the rural areas. A major share of firewood used in Balochistan is cut from nearby woodlands. There are no accurate records of the amount of wood cut in Balochistan or imported from other provinces and Afghanistan. An estimated 2 million tonnes of firewood are consumed each year. Dung cakes provide the second major source of energy, used by one-third of all households. About 12% of urban and 48% of rural households use dung cakes for cooking. It is estimated that 325,000 tonnes of dung cakes are burned each year.

Solar

The federal government has for many years been actively involved in introducing solar technology to the coast. In 1985, solar electrification systems were introduced in 10 villages. A total capacity of 75–100 kilowatts was installed, but it is not certain if these systems still function. A desalination plant with a capacity of 6,000 gallons/day was installed in Gwadar in 1970, by the Pakistan Atomic Energy Commission, with donor assistance. It functioned until 1985, when it was refurbished and maintained by SERC, Hyderabad. It is currently not operating. SERC subsequently installed a second plant at Gwadar for the Pakistan Navy, which is still functioning. Most of the existing solar energy installations (Table 22) are not functional. In addition, a few television booster stations, located in remote areas of the province, are being powered by solar panels.

So far, the commercial construction and marketing of solar water heaters has been unsuccessful. Efforts are currently being made by the government to introduce solar-powered water pumps for use in tubewells. Additional desalination plants are proposed for the coastal zone (see Chapter 6).

The Area Development Programme Balochistan has developed a Model for Renewable Energy for Balochistan's Development. It will be tried in eight districts for off-gridline and low-power applications. The programme will demonstrate the use of solar energy through the use of solar cookers and solar water heaters. Solar energy will also be used for water desalination, heating and cooling of buildings and drying agricultural products.

Geothermal

Balochistan has considerable geothermal potential, but it has not been investigated as a source of energy. The National Institute of Oceanography is involved in some basic research along the Mekran Coast. Numerous hot springs occur throughout the province, but their energy potential has not been investigated in any detail.

Table 22 Existing Solar Energy Installations

Station	Capacity (kWh)	Application
Khurkhera (Loralai)	8.8	Domestic water supplies
Baiker (Dera Bugti)	5.0	Water supplies
Lehtar (Kharan)	20.0	Street light
Sharozai (Kharan)	10.6	Domestic/street light
Nowtani (Kharan)	25.0	Domestic/street light
Bughat (Loralai)	40.0	Domestic/street light
Karbala (Pishin)	40.0	Water supply
Ali Zai	24.0	Telecommunication
Malazai	40.0	Water supply (not installed)
Duragh (Musakhel)	24.0	Telecommunication
Muslimbagh (Qila Saifullah)	40.0	Water supply
Pandari (Qila Saifullah)	24.0	Telecommunication
Lak Pass (Mastung)	40.0	Radar station

Source: Area Development Programme Balochistan 1998.

In the absence of adequate energy firewood is used.

Biogas

Biogas is formed by fermenting animal dung and waste plant material in water, in the absence of air, to form methane. It can be used for heating or as fuel for internal combustion engines. Twenty-two biogas units have been installed in Balochistan. Details are not available. Those installed in Zindra near Ziarat did not succeed due to the cold climate and non-availability of animal dung.

Wind

Wind is widely available as a source of energy, particularly in the coastal areas. It can easily and efficiently be converted into shaft power or electricity. Conversion efficiencies in the range of 5–50% are possible compared with 1–2% for solar-mechanical or solar-electrical conversion. Optimal wind speeds range from 3 to 20 meters per second. In Balochistan, data on wind regimes are sparse, particularly on a local scale. The first windmill was installed in late 1950s in the Maslakh Range area in Pishin District. Four windmills have been installed in the coastal area of Mekran, at the farms of Sheikh Zaid Bin Sultan. Four units are also installed at Kore Khera, Sonmiani and Hab.

ISSUES IN ENERGY

Adequate and reliable data regarding supply and demand are not available at the provincial level. At least three sets of data are needed: on proven, potential and possible reserves of energy; on the production and development of energy sources; and on energy consumption and consumer behaviour. Without such data, it will be very difficult to design a strategy for a sustainable energy sector.

The provision of infrastructure for electricity and gas is not cost-effective, especially in rural areas. Another obstacle is found at the policy-level. With the exception of coal, all primary energy sources – petroleum, gas and electricity – are within federal jurisdiction, and the provincial government is not involved in planning and policy-making.

Industrialization in Balochistan has always been stressed as a prerequisite for the economic development of the province. One reason for the slow growth of this sector is the lack of an adequate and dependable electricity supply. Moreover, electricity is also in high demand for domestic use. Meeting this need may not only overburden the existing infrastructure, but also put pressure on coal and gas resources that are used for thermal electricity generation.

Private-sector power generation projects installed at Hab and Quetta provide electricity to the national grid. The grid suffers from high transmission and distribution losses. In response to the total demand for 460 megawatts of electricity, only 285 megawatts are being supplied in Balochistan. The demand-supply gap is being addressed by the Water and Power Development Authority (WAPDA) by resorting to unscheduled load

shedding and power shutdowns. These cause damage to machinery and tubewell equipment, as well as losses in business productivity.

The other facet of the issue is that bills are not paid. Not only the general public, but also various provincial and federal government departments are included in the list of defaulters. Illegal connections from service lines are a problem that not only cause revenue losses, but also put an undetermined pressure on electricity supply. A significant but unknown quantity of petroleum products, including LPG, are smuggled in from Iran. The prices of these products are significantly lower than the products being sold legally. Petrol is transported in dirty drums and cans and may be adulterated. This not only pollutes the air, but also damages vehicle engines.

People cut firewood from nearby woods and shrublands. If trees are not available, they cut bushes. At present, over 1 million hectares – 3.1% of the province – have been designated as state forests and protected areas where cutting of trees is prohibited by law except by the local communities under their legal rights. But the law is not enforced.

Although renewable technologies have been tried in Balochistan, the widespread use of such technologies still seems far away. Renewable sources might help solve the energy problems of those remote areas where it is difficult to provide electricity through transmission lines. Moreover, the use of renewable technologies will surely reduce pressure on fossil fuel reserves, trees and shrubs.

The major obstacle to a wider use of renewable energy power systems in rural areas is one that almost all such technologies face: compared with conventional commercial systems, there is a high initial cost, including that of converting it into useable form and storage. Other obstacles include lack of practical information on installation, use and maintenance; lack of a competitive range of appliances; lack of technical support; and lack of funds for operation and maintenance.

Consumers are the main actors in the supply-demand matrix. If consumers place a high demand for commercial energy resources, profit-oriented market forces will try hard to fill the supply-demand gap. When consumers do not have access to commercial energy sources, or when these are beyond their means, they opt for such sources as firewood from surrounding areas, such as the juniper forests. Pricing remains the main concern for consumers. Though WAPDA and Sui Southern Gas Company have introduced some pricing policies to motivate consumers toward energy conservation, various surcharges and taxes have neutralized their benefit.

The fact that women are not only the consumers, but also the gatherers of firewood and other biomass, enhances their importance in the energy sector. It is women who directly face all the health hazards and accidents while using any energy source, whether it is firewood, gas, kerosene or electricity. Women's concern about energy sources relate to access, health, safety and affordability. At present, non-governmental organizations (NGOs) are not involved in the energy sector. It is considered a sector where only the government and private business have a role to play. But there is a lot of room for NGOs to work for the welfare of consumers, as well as for environmental protection. Balochistan farmers, for instance, pressure the federal government to subsidize electricity for agricultural use in Balochistan. As a result, a flat rate is charged for electricity to pump water from tubewells. This is considered counterproductive, given the decline in groundwater levels in some basins. There was no effective NGO lobby against the flat rates on the grounds of energy and water conservation.

Blocks of land leased for oil and gas exploration include protected areas, together with places of historical, cultural and religious significance. To safeguard against any damage to such areas, the Petroleum Policy (1997) recommends that companies adhere to the prevalent laws, rules and regulations for the protection of the environment. The Environment Ministry has developed a set of rules and regulations for the petroleum sector in light of the Pakistan Environmental Protection Act. According to the draft rules, oil and gas exploration activity requires an initial environmental examination. An EIA is required only if the activity is planned in ecologically sensitive areas. This allows a petroleum company to get its foot into a protected area. From there onwards, the company may choose to proceed with seismic studies, test drilling and subsequent operations by obtaining permission from relevant authorities on an ad hoc basis. The system for protecting wildlife and environment still offers a few loopholes to get around environmental protection requirements.

It appears that, at least on the surface, a system is in place to prevent and minimize environmental damage from oil and gas exploration activities. But it is also clear that problems can arise once a block containing protected areas is offered to a company for exploration activities.

THE STAKEHOLDERS IN ENERGY

There are three major stakeholder groups: producers, regulators and consumers. The financial institutions that

M. Naseer Naz

Another type of mining: for stones from riverbeds for construction.

support power generation, distribution and rehabilitation schemes are also stakeholders.

The federal government is involved in development and production as well as regulation; 14 different organizations are involved. The government of Pakistan intends to develop energy resources in a sustainable manner to ensure the economic and social prosperity of the population. The energy sector received the highest amount of foreign assistance (US$ 421 million) in 1994.

The development, production and distribution of energy are the responsibility of the federal government. Coal production is the only energy sub-sector where the government of Balochistan has an active role in regulation. For the most part, this is restricted to the mining, production and marketing of coal. The federal government has allotted coal-mining leases to the Pakistan Mineral Development Corporation, but almost all coal production is now in private hands. The provincial Environmental Protection Agency will have a significant role to play when it is fully functioning. The production of natural gas is a significant source of revenue in the form of gas surcharge. The royalty in 1997–98 was Rs. 820 million, which the federal government was to remit to Balochistan.

Private sector participation in the energy and power sector is significant. Many national and multinational companies are involved in the exploration for oil and gas, on and offshore. HUBCO and Uch Power Company are pioneers of private sector power development in Balochistan. The private sector is involved in production and marketing, and it influences and is influenced by legislation, development and slumps in the sector.

THE WAY AHEAD

Minerals and Mining

- The government and private sector will work together to put the minerals and mining sector on a sustainable footing, with due consideration for the protection of the environment. This involves systematically tackling the numerous issues that characterize the present state of the industry. Actions will include:
  - revising Mining Concession Rules and implementing the Mineral Policy;
  - organizing the provincial Minerals Directorate on professional lines, with assistance from the private sector and technical advisors, with staff selected on merit, not political affiliations;

- resisting political pressure;
- monitoring the performance of all mining companies by instituting scientific systems and procedures;
- producing maps depicting the exploration blocks and status of each licensee as open file information;
- making available data held by government bodies (particularly the Geological Survey of Pakistan and the Survey of Pakistan), NGOs and libraries at reasonable cost and speed;
- initiating training programmes at all hierarchical and functional levels, with closer interaction between the educational institutions and the industry;
- making railway freight rates competitive;
- changing exploration strategies currently focused on small, localized deposits to regional exploration programmes that can lead to the exploitation of large, world-class deposits;
- increasing joint ventures with reputed foreign companies to obtain technology, risk capital, better management and an improved pace of development;
- increasing the availability of risk capital to genuine mineral entrepreneurs by setting up a fund with contributions from the federal and provincial governments, the private sector, banks and development institutions;
- reassessing the need for import duties on exploration and mining equipment;
- developing simplified taxation regimes, preferably under one authority;
- ensuring that licenses are not granted on the basis of political or tribal influence; and
- conducting a campaign to educate all stakeholders, including the media, government functionaries, politicians and educators on the need for a sustainable mining strategy.

n An environmental overview of mining exploration and development activities in the province will be conducted to assess the nature and extent of existing and possible effects of this sector on the environment, and to provide a baseline for monitoring future activities.

n An environmental impact assessment will be done for the Saindak mine. Mitigation measures will be developed, implemented and monitored.

n Planning for mineral exploration and development will be carried out as an integral part of the land use planning and water basin management processes recommended in the BCS.

n Environmental impact assessments will be completed for each new mine development. These will consider the social and economic aspects of mining activity, as well as measures for dealing with abandonment and post-abandonment effects and seismic risk.

n Special measures will be developed and implemented to ensure that direct and indirect effects of mining on the environment are avoided or appropriately mitigated.

n The government and mining industry will adopt and implement the WCPA policy on mining and protected areas.

n The mining industry will develop an Environmental Code of Practice based on models and standards widely adopted and employed by the international mining community.

n Mine safety rules and standards will be strictly observed by the industry, particularly by coal mines. Mining operations, particularly those related to coal, fluorite, lead and asbestos, will be regularly monitored to ensure that water and air pollution are controlled and no serious health hazards result.

n Incentives will be given to mine owners with an outstanding record of resource production, and who have adopted and implemented safety regulations and environmental standards.

n Marble mining must adopt modern quarry techniques. The present blasting methods damage valuable deposits. Much of the good material is broken into smaller pieces, which reduces its market price considerably. The downstream industry is perfectly capable of handling large blocks of several cubic meters for carving out exquisite large pieces, which fetch a premium price in the international market. By adopting better quarry techniques, mine owners will increase their profits substantially.

Energy Resources

n In line with national objectives, Balochistan will develop a strategy for the energy sector based on minimizing the dependence on imported oil and petroleum products, efficient development and use of indigenous resources, conservation of energy and optimizing the use of renewable energy resources.

n Adequate and reliable data will be collected at the provincial level on the supply, demand and use of all energy sources.

n There is a need for equity in the provision of energy to Balochistan and for a sharp increase in the provision of energy services. This will be done through

ADP, UNDP

Alternative energy sources will have to be tried out: testing a solar panel in Quetta.

intensifying exploration for commercial energy resources, sustainable use of renewable resources and reliance on energy conservation as a cost-effective supply option. An adequate, reliable and affordable supply of energy services would have a beneficial impact on poverty alleviation in the province by generating employment opportunities; improving transportation, health and education, water supply and sanitation; and stemming migration to urban areas.

- Reliance on biomass, such as fuelwood, will be reduced by providing affordable access to alternative energy sources, such as gas, solar and wind.
- Rates for the supply of electricity for agricultural purposes will be geared to the conservation and efficient use of scarce water resources.
- The environmental impact of energy sector development needs to be addressed, to reduce local health hazards and environmental pollution. This requires significant financial, human and technical resources and a broad-based energy supply scenario, to minimize the possibilities of natural resource degradation.
- Energy policy will reflect the provisions of the United Nations Framework Convention on Climate Change, to which Pakistan is a signatory, and the Kyoto Protocol. This calls for the enhancement of energy efficiency in relevant sectors of the national economy; research, development and increased use of new and renewable forms of energy; and measures to limit or reduce the emissions of greenhouse gases.
- Steps will be taken to minimize transmission losses from the grid and eliminate unscheduled load shedding.
- The provincial government will develop the infrastructure to ensure compliance with the National Environmental Quality Standards. Environmental management systems and environmental audits will be introduced to minimize waste generation and control pollution at the source. Environmental cells will be created in the provincial planning departments to make sure that every new project prepares and files an environment impact assessment report, and that environmental considerations have been incorporated in the development schemes in accordance with the guidelines established by the Pakistan Environmental Protection Agency. Attention will be given to promoting the use of appropriate technology to limit air emissions from fuel burning power stations and brick kilns.
- Energy conservation programmes will be supported by financial incentives, demonstration projects and regulatory and legislative measures. Scarce funds from domestic, bilateral and multilateral sources will

be directed to improving existing systems, before investing in new plants.

- For the development and implementation of an efficient energy programme in Balochistan, there is an urgent need to develop sound province-specific policies relating to production, distribution and use of energy that are consistent with short term and long term development perspectives and economic goals of the area. There s also a need to give a clear definition to the inter-linkage of provincial developmental objectives with the overall national objectives vis-à-vis enhancing trade with the central Asian economies.
- The government will develop and build the capacity of relevant institutions to catalyze the demonstration, development, construction and dissemination of energy-efficient technologies. Such institutions would carry out market assessments of commercially viable rural energy supply systems based on clean and renewable energy sources. They will conduct demonstration projects leading to commercial applications. These institutions will be developed and networked at the regional or national level, and serve as appropriate centres of excellence in the energy field. They will need to establish reliable information services and monitoring systems, covering market information and emission inventories.
- Procedures for energy audits need to be developed and implemented by the relevant agencies before a comprehensive effort at the provincial level can be made to address energy efficiency issues. There is a need for energy conservation initiatives in all sectors of the economy, including industry, power, transportation, residential and commercial buildings and agriculture.
- Full advantage will be taken of solar energy technology, particularly for sites far from the main grid line, taking into account the results of existing experimental applications.
- The provincial government will carry out wind resource assessment studies to generate reliable data. This will be done in collaboration with the Meteorological Department and research institutes. Appropriate windmill technology will be developed in accordance with local needs and available infrastructure, and based on the lessons learned from previous experiences. Wind and solar hybrid systems may be developed to sustain the energy needs in energy-deficit areas.
- Institutional arrangements for promoting and developing renewable resources of energy need to be strengthened. The provincial government will designate one institution as the lead organization for planning, demonstrating, analyzing and developing renewable sources of energy in the province. Specific targets for solar, wind or hybrid systems will be planned annually. The provincial and federal governments will earmark funding for this purpose. Appropriate training and maintenance procedures will be developed at the local and district level.
- The provincial government will give top priority to prohibiting smuggling of adulterated fuel. The laboratories of the Hydrocarbon Development Institute of Pakistan need to be strengthened to routinely monitor samples of petroleum products, both imported and locally manufactured.
- Provincial and federal governments will develop policy, legal, regulatory and fiscal incentives to overcome barriers to the accelerated introduction of energy-efficient and renewable energy processes and technologies, and to stimulate the deployment, manufacture, assembly and maintenance of energy equipment in rural areas far from the electricity grid. This will be done based on a review of progress made in countries with similar geographic conditions. There is also a pressing need to identify partners for energy efficiency projects.
- Energy policies designed to make Balochistan an energy-efficient province will be equitable and gender-sensitive. Micro-credit programmes will be initiated for under-serviced segments of the population, to encourage investment in energy conservation and the use of renewable and sustainable energy sources. Due attention will be given to gender issues with special reference to women's energy needs and employment in the energy sector. Women's cooperation will be essential in domestic energy conservation and use of renewable energy resources. A rational quota for the employment of women will be maintained in the energy sector.
- A total management approach is required to conserve energy – an environment that combines engineering, management, demonstration, training and financial and other policy aspects of conservation in a unified process. There is a need to demonstrate early results, in order to provide a visible impact and support for conservation.
- There must be on-site training and proper maintenance of mechanical components. To develop renewable energy systems effectively, planning authorities will ensure that new demonstration projects are installed at the village and district levels to demonstrate how the maximum use of renewable energy applications can be made through proper construction, operation and maintenance.

Chapter 9

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Sustainable Industrial Development

Industrial development is a key component of the Balochistan government's Rs. 1.27 billion in 1999 Poverty Alleviation Strategy. Through the strategy, the government hopes to create 270,000 jobs, mainly through increased production in the agriculture, livestock, fisheries and minerals sectors and the processing and marketing of their products. The strategy foresees improvements in the processing and export of dates, apples, livestock and fish and in promoting wool and cotton production and processing. Plans include accelerating mineral exploration and development and expanding garment and embroidery production.

Clearly, the success of this ambitious strategy over the next decade depends on how well the natural resources of the province are managed. The status of the resources and the issues that characterize them are described in Chapters 3 to 6. The opportunities and limitations on industrial development imposed by the availability of water are described in Chapter 4. Environmental concerns related to the setting of industrial facilities, the handling, storage and disposal of agricultural and industrial chemicals and to pollution are discussed, and recommendations made in Chapters 3, 4, 8 and 10. If the issues are given due attention, and the measures recommended in these chapters are implemented and monitored within a fully developed regulatory framework, only then can a sustainable industrial development strategy based on Balochistan's natural resources succeed.

ISSUES

Low population density, widely scattered settlements and slow development of the industrial sector are in many ways a function of the province's history and its socio-cultural fabric. Human settlements have grown near sources of water, around commercial centres and on trade routes. Balochistan did not take much advantage of its strategic location adjacent to Afghanistan and Iran. Its land did not offer much in terms of trade and commerce, nor did its rivers serve as dependable sources of water around which urban centres could form.

The classic evolution of agro-pastoral systems into commercial and manufacturing centres, and the development of urban clusters into cities has been slow to take place. Only Quetta and Sibi, with populations of over 10,000 in 1951, offered the potential for the establishment of large and medium-scale manufacturing units. But these sites did

Hamid Sarfraz, IUCN

Small units for fish freezing, drying and processing could have been set-up.

not have the industrial infrastructure to enable rapid industrialization. At best, the province could only promote small-scale, labour-intensive businesses and cottage industries, mainly producing handicrafts. The only industrial units established prior to the late 1960s were pharmaceutical and alcoholic beverage factories in Quetta and the woollen mills in Harnai. Cottage industries, such as flour mills and handicraft units were in a rudimentary stage of development.

The breakup of the 'one unit' into provinces in 1970, brought the need for industrial growth into sharp focus. In the late 1970s, numerous small industrial units, such as flour mills, or small companies engaged in handicrafts and livestock products, auto repair, agricultural engineering workshops, shoe making, carpet weaving and blanket making were established all over the province. A date processing plant was established at Turbat and fish processing facilities were improved in Gwadar and Pasni. Women produced handicrafts in their spare time and produced consumer goods and traditional cottage-industry products, such as carpets and woven fabrics.

The establishment of these enterprises reflected the policies adopted for industrialization in Pakistan. The private sector has been encouraged to establish small and medium-sized, labour-intensive, import substituting and export-oriented industries. These are based on local materials, imported machinery and related technologies. These policies left the establishment of large industries to the public sector. Industrial development was expected to take place according to the resource potential of the country and to generate employment opportunities at the local level. This strategy did not work, at least not in Balochistan. In the early stages, the problem was a regional imbalance in public-sector investments and the concentration of industrial enterprises in a few hands. Too many industries were established in the developed areas of Pakistan, excluding underdeveloped areas.

The federal government tried to alleviate the problem in the late 1970s by inducing private investment in less developed areas, such as Balochistan. The new strategy included the granting of incentives, such as a five-year tax holiday, location-specific concessions and special depreciation allowances. But the incentives did not address the three constraining factors in the establishment of industries: proximity to raw materials (for instance, brick kilns using local clay deposits and pharmaceuticals using local medicinal plants), markets for consumer products and ports for export-oriented industries.

The potential for the establishment of resource-based industries was not exploited during the first 30 years of the province's history due to the absence of a strategy and guidelines for setting up a self-reliant, economically viable, sustainable industrial sector. One approach might have been to focus on the establishment of industrial units that linked location, raw materials and indigenous technology. For example, small units

could have been set up for fruit and vegetable preservation and initial processing in locations close to orchards; for livestock and dairy products in livestock rearing areas; for fish freezing, preservation, drying and processing on the coast; for date packaging and date sugar production near the plantation at Turbat and Panjgur; for production of carpets and woollen textiles in sheep rearing areas; and for manufacturing marble products. By introducing value-added activities, these units could have provided a basis for the development of the industrial infrastructure.

Governments, however, were slow to act and in many cases initiatives turned to inaction. A small-scale industrial estate was established in Quetta but without adequate infrastructure. The same happened with small industries, such as the spinning and weaving centre, Balochistan Wool Research Laboratory, the small-scale tannery at Sibi and training centre for the carpet industry. The government launched a programme of industrialization through large and medium-sized industries, and at the end of the 1970s, proposed the establishment of 11 industrial estates. Some could not succeed due to lack of funds, while others had a weak start and are now fighting for survival.

The estates that have survived, have had a slow start. In Quetta, for example, 160 plots were offered, but only six units were set up between 1980 and 1992; in the Hab industrial area, only 150 units were established, against 1,440 industrial plots developed; at Uthal, five units were established, against 152 made available; and at Windar, seven units were established, against the 170 proposed and 70 undeveloped plots made available.

Table 23 reveals that of the 351 industrial units established by 1993, 35 units existed prior to 1970; the bulk were established between 1971 and 1993. The

Table 23 Establishment, Employment and Investment of Industrial Units

Nature	Up to 1970			1971–80			1981–93		
	No.*	Employ.	Invest.	No.	Employ.	Invest.	No.	Employ.	Invest.
Textile	—	**0**	0	**3**	4,100	**1,107**	22	**1,845**	3,109
Engineering industries	8	**22**	0.42	**5**	1,117	**303**	22	**1,128**	3,837
Electrical appliances	—	**—**	—	**1**	85	**8**	7	**407**	250
Pharmaceutical	—	**—**	—	**—**	—	**—**	23	**1,102**	1,577
Plastic	—	**—**	—	**—**	—	**—**	12	**707**	388
Edible oil	—	**—**	—	**1**	60	**12**	5	**209**	58
Chipboard	—	**—**	—	**1**	134	**61**	9	**589**	186
Beverages	—	**—**	—	**—**	—	**—**	2	**355**	259
Leather	—	**—**	—	**—**	—	**—**	6	**129**	37
Rice mill	—	**—**	—	**—**	—	**—**	16	**43**	6
Flour mill (large)	2	**11**	1.2	**6**	24	**7**	2	**8**	3
Flour mill (small)	10	**24**	0.95	**80**	174	**6.9**	40	**85**	3
Furniture	2	**33**	3.3	**3**	67	**3**	3	**230**	30
Food and/or confectionery	1	**3**	5	**4**	43	**4.3**	12	**608**	142
Printing press	5	**30**	1.5	**1**	1	**0.1**	—	**—**	—
Ice factories	1	**7**	0.9	**6**	18	**3.9**	7	**25**	8
Cement	—	**—**	—	**—**	—	**—**	1	**438**	116
Miscellaneous	6	**25**	2.7	**6**	18	**1.0**	10	**919**	394
Total	35	**155**	15.97	**117**	5,841	**1,517.2**	199	**8,827**	10,403

*No.: Number; Employ.: Employment (number of employees); Invest.: Investment (in million rupees).

Jalal-ud-din Qureshi

Ingenuity at work: water containers made from recycled tyres are in common use in Balochistan.

strategy for setting up industrial estates and training centres was not successful due to lack of linkages with sources of raw material and local entrepreneurial capability on the one hand, and with poor market links and the inability of industry to absorb trainees on the other hand. The authorities concerned lost the initiative and credibility in attracting entrepreneurs.

Market-oriented industrialization through the private sector did bring positive results however, such as flour mills, ice factories and brick kilns. Brick manufacturing has been operating successfully since the early 1980s. The success of small industrial enterprises, such as the brick industry, is linked to strong linkages with local raw materials, workers and market forces. Such was not the case with the medium and large-scale industries, which had overoptimistic expectations of linkages with markets in and outside Balochistan.

Small investments (Rs. 50,000–500,000) in small industrial units have had a significant economic impact. These investments are estimated at 15–20% of the total investments in the industries sector (Rs. 1.5–2.0 billion). Investment in medium and large industries, set up mostly at the Hab Industrial Trading Estate (HITE) and other estates in Lasbela District, has been over Rs. 10 billion.

The total value of annual production was Rs. 10.2 billion in 1990–91. Revenue generated from the production of goods, however, does not contribute to provincial revenues. Customs duty, income tax, sales tax and wealth tax are collected by the Central Board of Revenue, while the province collects local taxes. Figures on the income received by the provincial and local governments and authorities from the establishment of industries are not available. If revenue receipts of Hab Town Committee are any guidance, it is estimated that income increased from 930,000 in 1984 to Rs. 120 million in 1997–98. This increase is attributed to the levy of octroi on goods, plants and machinery and raw materials transported to and from the Hab Estate.

Rather than waiting for the government to act, many people have upgraded their standard of living through self-employment. Over 60% of the population falls into this category. In some cases, they have resorted to approaches that are unsustainable, while in others they have been forced to do so in view of a paucity of resources and lack of other employment opportunities.

Activities include drug trafficking, gun running and other illegal trade across the Afghanistan and Iran borders. Income from illegal trade is thought to be very significant, but figures are not available. Many of these activities do not require conventional communication infrastructure. In fact, they tend to bypass it. They do not contribute revenue to government, but they do provide employment. The retail trade and services sector, legal and illegal, is second only to agriculture in the provincial economy.

Credit

The growth of financial institutions in the province has been restricted due to constraints on the availability of credit. The investment climate in the province is poor. The beneficiaries, under these circumstances, are the agents in the middle, who virtually control trade and industry. They supply credit to the growers of crops, fruit and vegetables, livestock owners and mine lease holders. In short, they supply money to whomever needs it in advance.

The introduction of micro-credit schemes for enterprise development, by financial institutions such as banks was not successful due to the conditions imposed. The Department of Labour and Manpower and the Social Welfare Department created pools of Rs. 700,000 and Rs. 5.6 million respectively, the latter being provided by UNICEF. Both of these pools were for the establishment of micro-enterprises. The Department of Labour also received a grant from the Hans Zeidel Foundation to provide seed funding for trainees to establish their own enterprises. The Balochistan Rural Support Programme and the National Rural Support Programme have provided loans for agriculture.

Infrastructure

Sustainable industrial development requires the development of infrastructure facilities in an integrated manner. This has not happened (see Chapter 3). Development of communication systems has been painfully slow. In 1968–69, the communication infrastructure consisted of 10,470 kilometres of all types of roads, of which only 1,416 kilometres were high-grade. The Regional Cooperaton for Development highway was under construction to connect Karachi with Quetta and with Zahidan in Iran. The length of the broad-gauge railway line was 1,027 kilometres. A narrow gauge line connected Quetta with Zhob.

A. L. Rao, IUCN

Better marketing of handicrafts will help.

Today, the total length of the broad-gauge railway line remains the same, but the narrow-gauge railway line was abandoned in 1985 as uneconomical. The road network, on the other hand, has improved gradually and has increased by nearly 70% in length in the past 30 years. The road density has improved marginally from 0.03 to 0.055 kilometres per square kilometre, as compared with the national average of 0.20. The low road density reflects the absence of a coastal highway, farm-to-market and mining access roads and rural roads to provide adequate access to urban and industrial areas.

Water Resources

Agriculture, industrialization and urbanization demand an assured supply of water (see Chapters 4 and 10). Provision of water is a problem for the Quetta Industrial Estate and potentially so for those set up in Lasbela District. At Hab, the infrastructure consists of a 20 million gallon-capacity reservoir to store and distribute the water supplied from the Hab Dam. Water levels in the dam have been declining due to lack of rainfall.

Akram Dost

The livestock sector needs improvement.

Human Resources

At present, the industrial and mining sectors absorb 3.4% of the labour force. Managerial and skilled workers constitute an important component of the resource base for the development of an industrial sector. Literacy rates are low, and many graduates from universities and colleges lack the fundamentals to practice their subject or trade. Such graduates have not been successful working in high value-added industrial enterprises. They are unable to meet the staffing needs of industrial units or public sector organizations at the district level. Those who do not receive adequate education enter into low-wage employment in small industrial and service units, such as trade, transportation and auto and engineering workshops.

The Balochistan government has made it mandatory for local organizations to employ 75% local staff in different units, irrespective of availability and suitability. This political decision has had an adverse effect on the performance of value-adding units, since they cannot be operated economically without skilled labour. Many of them have had to close down. This is particularly true of Lasbela Industrial Estates, whose industrial units are owned and operated by entrepreneurs from Karachi.

Technology Transfer Processes

Balochistan has a limited capacity to transfer and use advanced technology. There are few trained people to act as technology transfer agents. The production system in small industries has its technology grounded in the local fabrication and installation of the plant and machinery. On the other hand, medium and large-scale industries have imported plant and machinery, and in many cases imported raw materials. These plants are often supplied on a turnkey basis. Technology, embodied or otherwise, did not concern investors who took advantage of tax holidays and reduced customs duties by establishing plants in locations like HITE. These investors had a demonstrated preference for ventures involving small investments, yielding high profits and an early payback. The preference for imported plants meant that a technology transfer base could not be created in Balochistan.

Productivity

Productivity of the agricultural sector is low, as growers are not properly trained in the use of agrochemicals.

Losses at the post-harvest stage are high due to deficiencies in production systems, such as preservation, quality control, grading, packaging, transportation and exporting. Deciduous fruits are often sold to contractors at blossom. They are dispatched without grading and appropriate packaging, to destinations chosen by agents in the middle and to contractors. Post-harvest handling at the farm-level, storage and freight are not the concern of the grower. The agents, by paying the estimated value of the crop in advance, make a major investment not only in the crop, but also in controlling the politics of crop production. The system puts the grower and the product at a disadvantage in that it does not offer a fair share of the proceeds and detracts from improving management practices at farm-level. Mishandling of the crop at the post-harvest stage is estimated to account for 15–20% of losses.

The productivity of the livestock sector is low, as the rangelands that provide much of the feed have been degraded. Access to public-sector veterinary health and advisory facilities is limited, and an organized marketing system is lacking (see Chapter 3). Productivity in the mineral sector is low for the reasons outlined in Chapter 8. The reason that small industries have been operating successfully is that they were established in the private sector; were small, labour-intensive and oriented towards import substitution and export; were based on local raw materials, locally fabricated machinery and simple technologies; and employed a local labour force.

THE STAKEHOLDERS

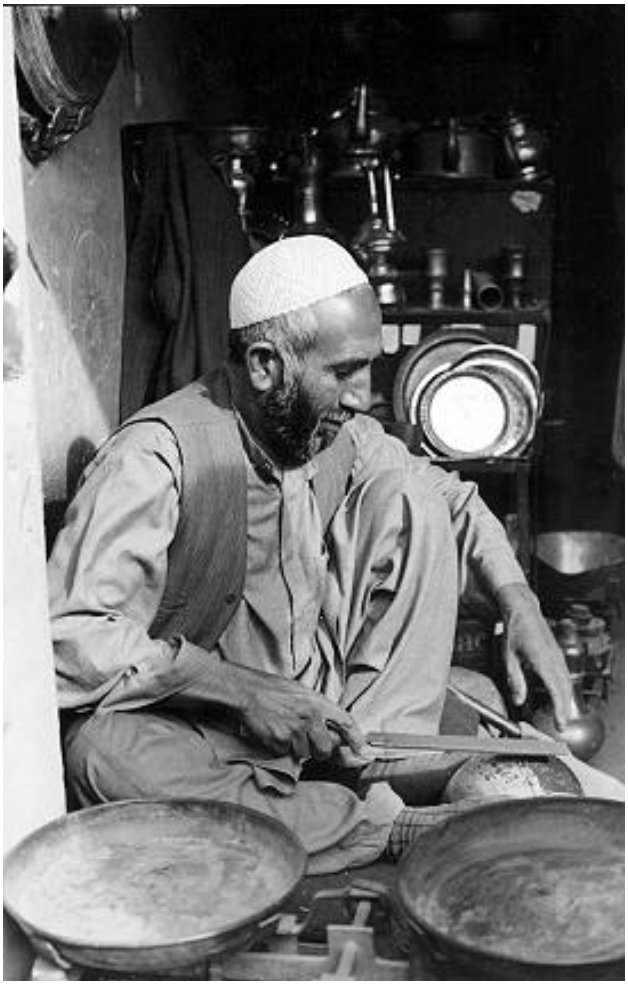
The most influential stakeholders are the landlords and tribal chiefs. They enjoy a strong hold over the areas of their influence and on the governance of the province. No development activity was initiated in their area until the breakup of the One Unit of West Pakistan in 1970. Even after this and the re-emergence of Balochistan as a province, projects that were technically, economically and environmentally sound were rejected if they did not suit the needs of these stakeholders. Projects were shelved if it was found that they would serve the community or raise its status, leading in the long run to the landlords' or chiefs' hold on the community being challenged by their people. In their self-interest, these individuals did not allow free access to water resources, roads, markets, education, or other social services where they could interact with other communities and demand a raise in their status.

The system of land ownership is quite different from that of the rest of the country, and so the influence of the landlords is much greater. Landlords, the major stakeholders in the agriculture sector, also have stakes in the real estate of the urban areas where, as the owners of agricultural land that has been urbanized, they act as real estate agents and control many of the sites suitable for the establishment of industries. They have stakes in oil and minerals, the natural gas field at Sui being a case in point. By virtue of their political clout and their individual or combined influence, they control the distribution of inputs, outputs and operation of marketing forces through a network of agents.

The stakes for entrepreneurs involved in small industrial enterprises are not as high as those for medium and large-scale industries. The investment was small and was financed from their own resources. Entrepreneurs of medium and large-scale industrial units were interested in setting up industries in Balochistan as a means of obtaining quick economic returns. They took advantage of the opportunity offered by organizations such as the Lasbela Industrial Estate Development Authority (LIEDA), and obtained financial assistance from other stakeholders and financial institutions. The development financial institutions and banks have a large stake in the industrialization process as a party to the investment. They are now faced with the problem of recovering loans made to units that were not economically viable, or which defaulted.

The Balochistan Chamber of Commerce and Industry has a membership of about 700 entrepreneurs, most of them are traders. There is also the Lasbela Chamber of Commerce and Industry. The interaction between the two is weak. They help their members in policy-making, the taxation system, customs duty and trade-related issues, and act as an interest group. They represent them in discussions with the government. Enterprises in the industrial estates also have associations to look after their interests.

The government of Pakistan has a large stake in the industrialization of Balochistan. It operates through the provincial Industries Department, which implements the federal policy. The federal Ministry of Industries formulates industrial policy and sets out targets for the provincial departments from time to time. The Ministry declared that all of Balochistan, except HITE, has the status of a rural area and granted industry a tax holiday and exemptions from duties. The Ministry sets out procedures for investment, offers incentives and proposes the establishment of industrial estates and export processing zones. The government of Balochistan on its part has exempted industrial units from the payment of provincial excise duty, and through its Industrial Estates, offers plots of land for the establishment of new units.



Shaukat Changezi

A metal worker.

THE WAY AHEAD

A sustainable industrial development strategy for Balochistan will be developed based on the lessons learned from previous efforts to develop the industrial sector, and in light of current issues of concern. It will focus on what the province does well and emphasize its competitive advantages over the other provinces in country.

The strategy will aim at setting up industrial estates and training centres as a means of strengthening linkages with raw material sources and local entrepreneurial capability. Similarly, linkages will be established with local, provincial, national and export markets and with training centres. Market-oriented industrialization by entrepreneurs has brought positive results through the establishment of small enterprises, such as flour mills, ice factories and brick kilns.

The strategy will aim at establishing industrial units that are specific to location, raw materials and indigenous technology. Small cottage-scale units can add value to cash crops, such as fruit and vegetables, through preservation and initial processing at locations close to orchards and vegetable-growing areas. Other examples include fish and date processing, the production of carpet and woollen textiles and the manufacture of marble products.

The establishment of these units will require setting up technical training centres, equipped with experienced staff, teaching materials, equipment and other facilities. Opportunities need to be created to employ graduates from the technical training centres.

Quality control facilities will be required to meet the needs of the market. Exporting units will meet ISO 9000 standards and prepare for ISO 14000. Appropriate technology will be introduced in a systematic fashion to ensure that manufacturing units are competitive, maximize the use of available resources and are environment-friendly. The introduction of new technology must be supported by skills training. The strategy for industrial development will incorporate an education and communication component to encourage industry to adopt and promote environment-friendly practices and procedures in sound waste management practices, conservation of resources and protection of the environment. Furthermore, there will be close cooperation between government and the private sector to provide information on and demonstrate the performance of environment-friendly technologies, processes and products.

The establishment of a consumer goods industry in the province may not be feasible due to the existing well-established free flow of all types of items across the border. It is therefore, not a target worth chasing in the foreseeable future.

The following specific measures will be taken to increase employment and improve the provincial economy, partly through self-sufficiency and partly by strengthening ties with up and downstream industry elsewhere in the country. An underlying assumption is that all industries will comply with all pertinent legislation, rules and regulations, including those concerned with environmental protection.

- Current efforts to develop industry in Quetta will be reviewed. The already overpopulated, polluted and water-starved valley cannot afford any further burden on its limited resources. Industrialization will favour activities that do not compete with the domestic sector for water and that do not further contribute to air pollution. Electronic goods and household appliance assembly plants would be good

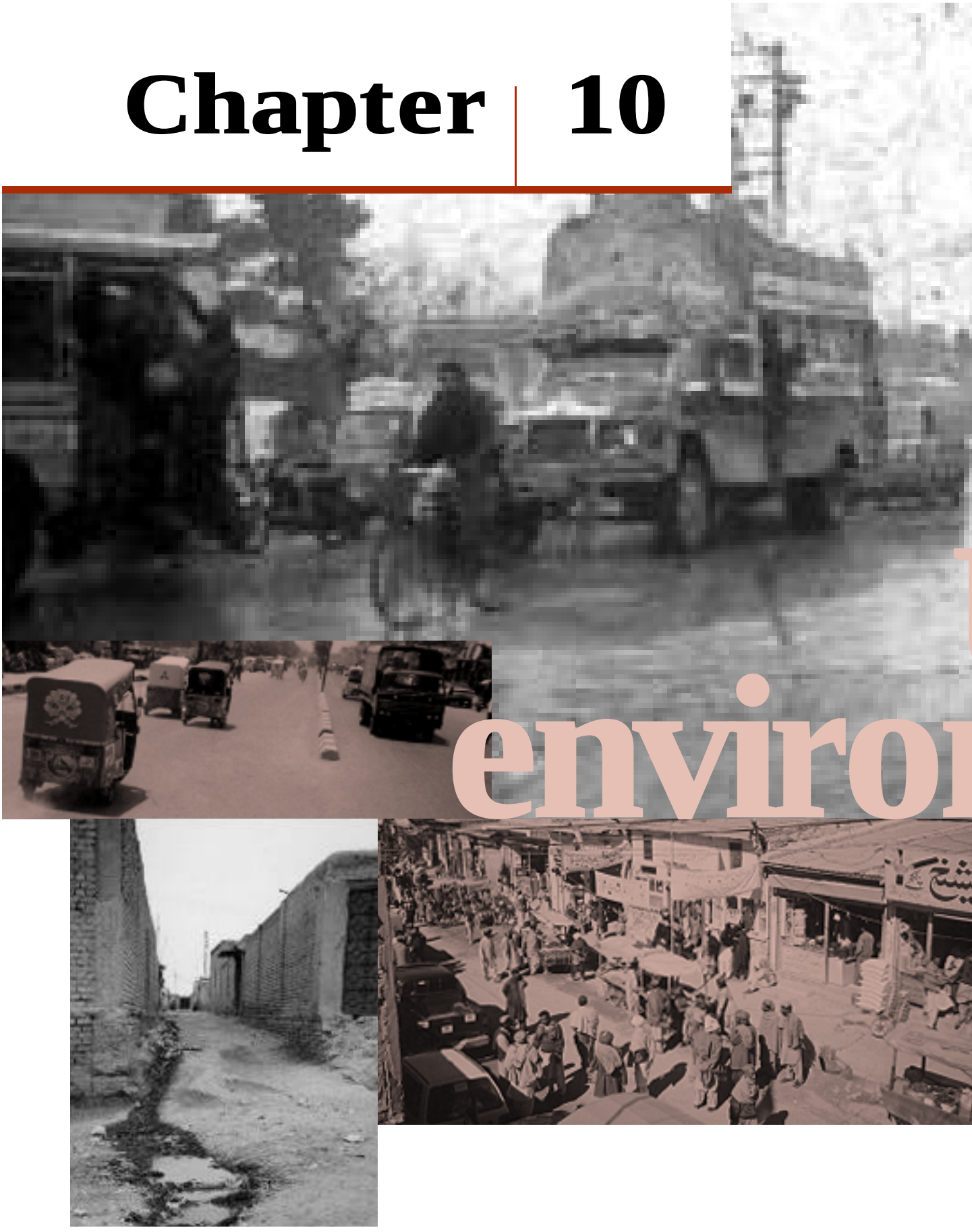
Shaukat Changezi

Both the cottage and the formal carpet industry will need to be assisted.

choices. Specialization in selected commodities has several strategic advantages, as is the case with Sialkot's booming leather industry. To exploit such advantages, the government will invest in technical education on a large scale.

- In industrial areas close to Karachi, market forces will be allowed to shape the pattern of industrial growth. LIEDA will play a lead role in helping establish combined waste treatment facilities.
- It may not be possible for Balochistan to attract R&D and engineering-based industries in the foreseeable future. This deficiency is already being taken care of by establishing links across the country on an as-and-when required basis. A good strategy will be to continue this approach.
- Small-scale livestock feed production units need to be established where local raw materials are available. Technical assistance will be sought from the National Agricultural Research Institute, Islamabad.
- As a forward-looking measure, the government will give high priority to attracting biotechnology-based industry. A good starting point would be seed potato and selected ornamental flower production on an industrial scale.
- The carpet industry needs to receive technical information on reducing acid use in washing.
- The marble industry requires highly experienced craftspeople. It may not be possible to attract these from the existing factories in Karachi in the foreseeable future. In the long term, the Balochistan government will consider appropriate incentives for attracting marble industries to industrial areas near Karachi.
- The EPA Balochistan and Industries Department will arrange awareness-raising sessions for industrialists on PEPA, National Environmental Quality Standards, Environmental Impact Assessment, environmental audit and quality standards like ISO 9000 and ISO 14000. The Sustainable Development Policy Institute, IUCN, WWF-P and the Pakistan Institute of Management, Karachi offer relevant training courses.

Chapter 10



Urban Environment

Urban areas are magnets for rural people seeking better socio-economic opportunities and access to facilities and amenities. When people from a rural area decide to leave their communities to improve their prospects, they tend to move to the large urban centres rather than to small or medium-sized towns close to their villages. There has been rapid urban expansion in Balochistan, particularly in cities such as Quetta.

Urbanization is an inevitable concomitant of modernization and development, a complement of the shift to industrial and service occupations. Investments required to absorb people into urban areas are typically many times greater than the costs of keeping people in rural areas. Paved roads, piped water, sewers and drains, electricity and telephone networks are all needed to make cities work. Rapid urbanization in Balochistan, as elsewhere in Pakistan, is accompanied by a severe resource crunch. Rapid urban expansion without effective governance means that in virtually every urban centre a substantial proportion of the population is at risk from environmental, social and economic threats (Government of Pakistan and IUCN 1992).

Few areas could be described as urban prior to British rule. Until then, human settlement in Balochistan followed traditional lines: compounds, small villages and towns located along transportation corridors, in strategic locations and close to dependable sources of water and fertile agricultural land. The District Gazetteers compiled at the turn of the century provide some insight into the numbers and distribution of population in major towns and villages on a district-by-district basis. The first regular census was carried out in 1901 and gives a breakdown of occupied houses, as well as urban and rural population figures. For example, the population of Quetta District in 1901 was reported to be 114,087, of whom 28,369 lived in an urban area. There were three towns in Balochistan at that time – Quetta, Pishin and Chaman – all of which have grown since the British occupation (Figure 13).

According to the 1981 census, the population of Balochistan was 4.33 million. By 1998, the census counted 6.51 million people, an annual growth rate of 2.42%. As compared with the total population, the change in urban population has been steady (Figure 14).

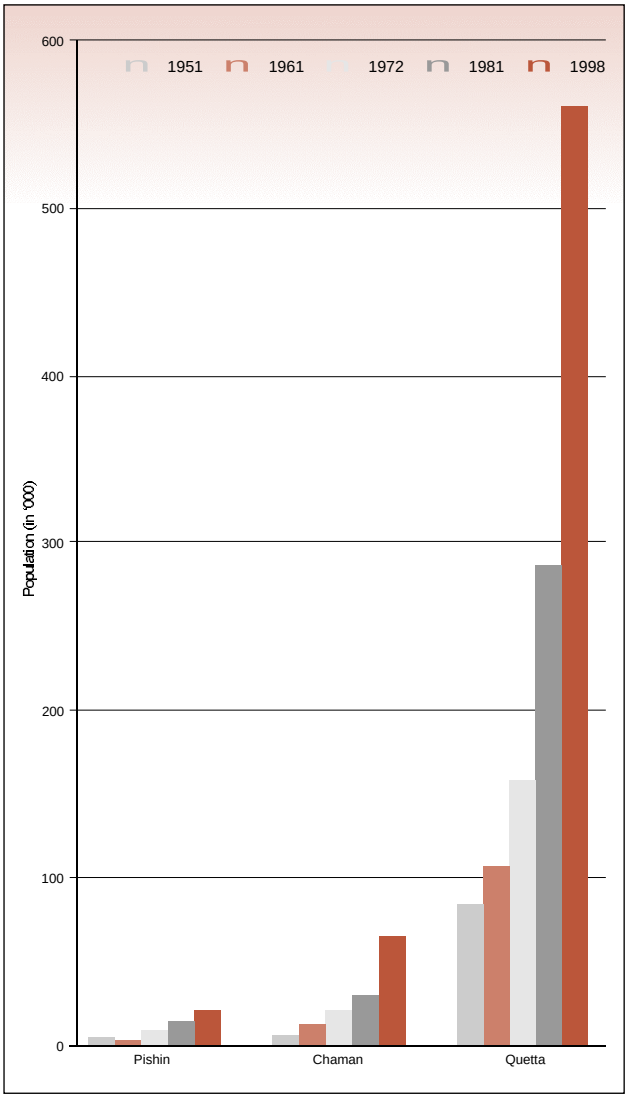
The share of the population living in urban areas increased from about 16% to 23% of the total, a rate of 4.8% per annum. By 1998, therefore, there were some 839,000 more people living in urban areas than 17 years earlier.

Urban population trends in Balochistan, based on census results, show that at the current rate of population growth, the population will reach 14 million by the year 2030, with 50% living in urban areas. Many of them will be attracted to the Quetta area.

In Balochistan, the definition of urban area has changed from one census to the next. This makes it difficult to interpret statistics on urban growth. The definition of urban areas is not given in the 1961 census report. In 1972, urban areas were defined as 'those areas which had municipal corporations, municipal committees, town committees and cantonment boards'. However, other places were also treated as urban areas. These included settlements having at least 5,000 persons in a continuous collection of houses, where the community sense was well developed, and where the community maintained public utilities such as roads, street lighting, water supply and sanitation. These places are generally centres of trade and commerce, with a population mostly non-agricultural and with a comparatively higher literacy rate. To further complicate the picture, some villages have been designated urban areas for administrative reasons, such as Ziarat, which has only a few hundred people. Other large centres, such as Qila Saifullah, are not given urban status.

The 1981 and 1998 censuses appear to have followed the intent of the 1972 census, but to base the definition of urban locality solely in terms of the type of local government institutions. Accordingly, urban centres are officially notified on this basis. Unorganized settlements are not included, no matter what their size. Quetta is over six times the size of the next largest city, Khuzdar (Table 24). Three other towns exceed 50,000 (Turbat, Chaman and Hab). In total, only 18 towns have populations exceeding 20,000 (Table 24). An approximate of population density is given in Map 11, in Maps section.

Figure 13 Population Growth in Pishin, Chaman and Quetta



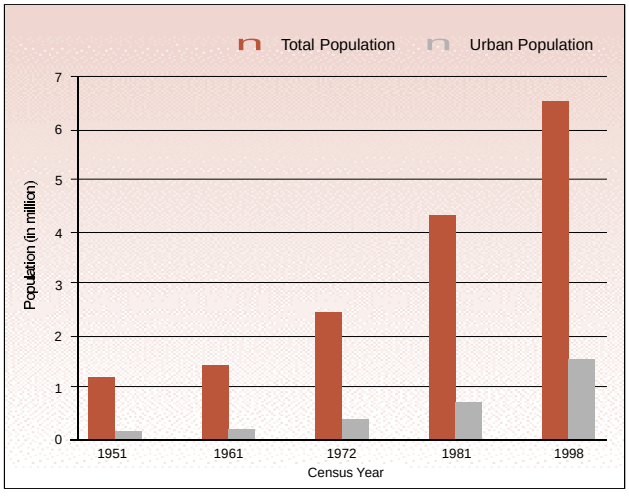
Source: Population Census Organization 1984; Ibid 1985; Ibid 1999b.

ISSUES

The major issues confronted by all urban areas in the province are:

- the absence of or uncoordinated development planning and adequate housing;

Figure 14 Balochistan's Total and Urban Population



Source: Population Census Organization 1984; Ibid 1985; Ibid 1999b.

- inadequate or non-existent administration and enforcement;
- a shortage of water for domestic, agricultural and industrial use;
- contamination of drinking water;
- inadequate or non-existent sanitation, and solid waste and effluent disposal facilities;
- air and noise pollution; and
- traffic congestion.

In discussing these issues, Quetta city is used as an example because information is not readily available for most urban areas.

Uncoordinated or Non-existent Urban Planning

The lack of effective planning, implementation and enforcement has contributed to the poor state of the housing stock, congestion and traffic problems in urban areas. Although Master Plans have been drawn up for 19 urban areas, including Gwadar (1983), Turbat (1985), Quetta (1986) and Ziarat (1994), few of the recommended planning measures have been implemented. The urban development planning and management process in Quetta illustrates some of the issues.

Quetta, the capital of Balochistan, is the province's only true urban area. It is also the best known in terms of available information on its development, functioning and administrative structure. With an official population of 560,307 in 1998, the city has nearly 9% of the province's population. The population of the greater Quetta urban area is estimated to be around 1 million, and several agencies use this number for planning purposes.

Quetta is located in a remote mountain valley, 1,700 metres above sea level, and bounded by towering mountain ranges. The site controls strategic passes and trade routes to Iran, Afghanistan and the Indus valley. Militarily, this remote location is as important today as it was to Cyrus the Great 2,500 years ago. The long, porous borders are hardly an obstacle to the steady flow of migrants, traders and refugees. It is this ever-changing interaction of cultures, and an unpredictable natural, socio-economic and political environment that has produced the Quetta we see today.

In the space of 50 years, Quetta underwent a series of profound changes in its make-up. A city planned for 50,000 people now supports a population of more than 1 million. It is estimated that up to half of the population is housed in kachi abadies and in slums on the fringes of the city. The cultural mix has changed dra-

Table 24 Population of Urban Localities, 1998

Rank	Locality	Population (1998)	% Increase (1981-98)
1	Quetta M Corp* + Cant.**	**560,307**	96.1
2	Khuzdar MC***	**93,060**	201.3
3	Turbat MC	**67,905**	29.7
4	Chaman MC	**65,477**	119.8
5	Hab TC****	**63,757**	1,400.5
6	Sibi MC	**48,219**	109.3
7	Zhob MC + Cant.	**44,248**	38.6
8	Gwadar MC	**43,850**	157.9
9	Dera Murad Jamali TC	**37,766**	313.5
10	Dera Allah Yar TC	**37,264**	453.7
11	Usta Muhammad TC	**37,160**	209.3
12	Loralai MC + Cant.	**31,925**	129.7
13	Pasni TC	**27,974**	55.5
14	Kharan TC	**26,057**	148.8
15	Mastung MC	**24,571**	49.4
16	Nushki TC	**23,386**	107.0
17	Kalat TC	**22,559**	104.4
18	Pishin MC	**20,479**	39.2
19	Chitkan TC	**19,816**	108.7
20	Bela TC	**16,998**	52.1
21	Dera Bugti TC	**15,309**	†
22	Mach TC	**14,304**	69.9
23	Uthal TC	**13,926**	48.1
24	Jiwani TC	**13,790**	†
25	Zehri TC	**13,158**	†
26	Dhadar TC	**12,749**	117.9
27	Dalbandin TC	**12,353**	†
28	Bhag TC	**12,297**	43.2
29	Winder TC	**11,465**	†
30	Gadani TC	**11,344**	73.3
31	Wadh TC	**11,105**	†
32	Surab TC	**11,071**	†
33	Ormara TC	**11,005**	33.2
34	Kohlu TC	**9,369**	†
35	Harnai TC	**9,349**	94.7
36	Sohbatpur TC	**7,553**	†
37	Barkhan TC	**7,401**	†
38	Duki TC	**5,394**	1.3
39	Ziarat MC	**619**	208.0
	Urban Balochistan	**1,516,339**	**124.0**

Source: Population Census Organization 1999b; Ibid 1984.
*M Corp: Municipal Corporation.
**Cant.: Cantonment.
***MC: Municipal Committee.
****TC: Town Committee.
†: All these towns were notified as urban in the period between 1981 and 1998.

Ghiasuddin Siddiqi, IMPLAN

Uncoordinated development planning is quite apparent in this baazar in Mastung.

matically, with a realignment of roles and responsibilities in trade, business and administration. A large number of migrants to the city are rural people who hold fast to their cultural traditions and are hardly urbanized. Communities are discrete and look inwards, with scarcely a sign of civic consciousness. In affluent areas, community cohesion has been replaced with high-walled compounds and disdain for the maintenance of common property. Poverty, unemployment and illiteracy are widespread, widening the divide between the disadvantaged and the sophisticated, affluent middle classes, entrepreneurs and 'influential'.

Experiments with elected municipal councils have met with little success. The last elections of local bodies were held in 1999 after a gap of 8 years. These institutions lasted for a few months only. The Municipal Corporation operates at low efficiency among accusations of poor administration, political influence, corruption and ineptitude. A new plan for devolution of power and local government has been presented by the federal government on August 14, 2000. This is likely to have major impct on the structure, authority and efficiency of local bodies.

The municipal limits of the city of Quetta were increased from 6.5 square kilometres to 19.4 square kilometres in 1975. The principal organizations responsible for the city are Quetta Development Authority (QDA, planning and development), Quetta Municipal Corporation (QMC, waste disposal and sanitary facilities) and the Balochistan Water and Sanitation Agency (BWASA). A number of other agencies have key roles to play.

Quetta Development Authority has all the powers required for the improvement of the town. It handles engineering, town planning and building control. Funding comes from the Annual Development Programme, from sales of property and from work done under Member of Provincial Assembly budgets. Housing schemes are planned according to the 1986 Quetta Master Plan. After completion, the schemes are handed over to the QMC for maintenance. Commercial schemes, such as markets, are turned over to the private sector. While the QDA lists many by-pass and link roads, bridges and street widening in its record of achievement, it is not clear how these relate to the objectives of the Master Plan and what, if any, stakeholder involvement has taken place. Nothing else has taken place according to the Master Plan, ren-

dering it an ineffective document. The Quetta Master Plan must first be notified as a legal document by the Balochistan legislature, in order for it to become a legally binding document for controlling further urban renewal and development.

Quetta is expanding rapidly, with few controls, onto good agricultural land and groundwater recharge zones. What little natural vegetation remains on surrounding mountainsides is being removed. The affluent are able to buy their way out of problems by building in the new residential schemes or in the cantonment. The kachi abadies make their own way, slowly upgrading to pakka dwellings, but constrained by lack of space, overcrowding and poor services. Self-reliance is the hallmark of these areas, some of which existed before the city of Quetta was laid out. Community action in these areas is discussed later in this Chapter. Residential colonies, common to the core of the city and established during the colonial era, have not improved much in that time.

At present, there is no single-minded vision of the city, nor the financial and human resources or strong administration and political will to implement one. The majority of today's inhabitants are rural people. A large middle class, the affluent and the influential dominate the inner city and new housing schemes. Those who can afford to, buffer themselves from many of the problems of day-to-day city living in the hope that government, or someone, will eventually emerge to take charge and 'do the needful' before the city completely collapses.

Jalal-ud-din Qureshi

The private sector meets Quetta's water demand in the summer.

Water: Supply, Distribution and Contamination

The availability of potable water is perhaps the most important environmental issue in the urban areas of Balochistan. The major sources of water are natural springs, karezes, wells and tubewells. Generally, almost half of urban population in the province has access to water supply schemes and hand pumps; it is the availability of water itself that is the core issue.

Administration of the drinking water supply to urban areas, except Quetta City which is under the jurisdiction of BWASA, is the responsibility of the Public Health Engineering Department. The municipal authority is responsible where the urban area is also the district headquarters. In the case of Quetta, the major responsibility for water supply lies with the BWASA. This water is also used extensively for irrigation within urban areas. It is common practice to use water from drainage channels for drinking, irrigation and vegetable and fruit production. There have been no concerted efforts in the province to conserve water resources or to investigate potential water sources for future use.

Each urban area of the province has its own unique set of circumstances related to water supply and distribution and each seems to tackle the problems as best they can. For example, water is supplied to Sibi for three hours a day through the public water supply system. If there is an electricity breakdown at the pumping station, crisis ensues, as the town has no other source of water. Ground water in Sibi District is saline and unfit for drinking. Sharing of canal water, the major source, cannot be increased as no one really wants to give up his or her quota. A large drinking water supply scheme is planned with the assistance of the Asian Development Bank (ADB). Although this may increase water distribution marginally, no real effort has been made by relevant authorities to develop new water supply sources to meet the present and future water needs of the town.

The water supply situation in Quetta is different. Prior to 1889, Quetta obtained its drinking water from natural springs, shallow hand-dug-wells and karezes. In

Nadir Gul, IUCN

Green areas are few: Sadiq Shaeed Park (Mali Bagh), Quetta, before its renovation.

1890, the government became involved when it acquired 50% of water rights at Urak Springs, 16 kilometres east of Quetta. Water was provided by pipeline to the cantonment and city. Subsequently, the system was augmented, and Quetta entered into an agreement with the cantonment to pay for a share of the water. The city's share dwindled, and by 1970 this arrangement had broken down. Only a small amount is provided to Quetta city from Urak Springs. Numerous tubewells were drilled in the 1960s to alleviate the water shortage. Tubewells have routinely been installed by a variety of agencies and individuals since that time to meet the needs of the rapidly growing population. But the installation of yet more tubewells is not the answer.

Quetta is located on a sub-basin of the Pishin Lora Drainage Basin. It has a total catchment area of 943 square kilometres. The annual recharge in Quetta sub-basin is estimated to be 38 cusecs, while the average annual withdrawal is calculated to be 67 cusecs, an overdraw of 29 cusecs. The 67 cusecs are being withdrawn through 1,508 points; 30 cusecs are used for water supply, 33 for irrigation and 4 for industry. On average, the water level is falling at an average rate of 0.5 metre per year, but in some areas the decline is as much as 3 metres per year (see Chapter 4).

A number of studies have estimated the amount of water available in the sub-basin. Given the rate of withdrawal, the reservoir will be fully exhausted in 20 years if the supply and demand situation remains the same. This projection is consistent with results of a tubewell installed for the new Children's Hospital in Quetta. This will tap aquifers at depths down to 300 metres, with a life expectancy of only 20 years. The situation is made more complex by the fact that some of the shallower aquifers are now contaminated by sewage, waste water and other pollutants. Though few data are available, it is likely that these sources will not be suitable for drinking in future. Water is used extensively for irrigation within the urban area. The sources are tubewells and waste water. Not only is there a concern for the unregulated use of water, but also for the health implications of using waste water from nullahs, contaminated by sewage, chemicals and other wastes, for vegetable and fruit production.

Notwithstanding the recognition of the problems created by groundwater mining in the Quetta sub-basin, many unauthorized tubewells are being drilled to meet demand, particularly in the suburbs. There are few effective controls. Urban development continues to expand into the recharge zone. In 1995, seven tubewells

in Quetta dried up, and discharge rates from others have fallen. Predicting the life expectancy of the groundwater reservoir requires accurate information on current and projected population levels, business and industrial development and agriculture. It also depends on accurate information on the rate of groundwater recharge. Information on recharge is scanty and there has been little experimentation or practical experience in undertaking groundwater recharge schemes.

For planning purposes, BWASA estimates the present population of Quetta to be about 1 million. Using an urban growth rate of 6% per annum, the population is projected to rise to 1.8 million by 2010. The projected shortfall in water supply is 65 million gallons per day by 2010 (Figure 15).

In essence, Quetta cannot rely on groundwater or the existing supply of spring water for much longer. A further concern is that major water supply projects take at least a decade to come to fruition. The government of Balochistan has responded to the problem by implementing a Quetta Water Supply and Environmental Improvement Project, with technical assistance from the ADB. The project will develop a plan to manage the water resources of the Quetta sub-basin.

In the meantime, water conservation measures are being taken. BWASA estimates that as much as 40% of the water is lost through leakage, and water pressure is also reduced. Apart from loss of water, broken pipes allow the mixing of potable water with sewage. There is little evidence of mass awareness or education programmes concerning the problems of water scarcity and quality, and the steps people can take to deal with the problem. There is little discussion of water recycling or of reducing the demand for water for irrigation purposes. Rehabilitating the old distribution system will certainly reduce shortages to some extent, as will promoting the economy of use. Further savings can be achieved by metering the actual use of water for domestic, agricultural and industrial purposes, and by imposing limits on the growth of the agriculture sector. Nevertheless, the long-term solution to the problem lies in bringing water from outside the Quetta sub-basin, or in limiting the growth of Quetta and constructing new towns in areas where a sustainable supply of water is available.

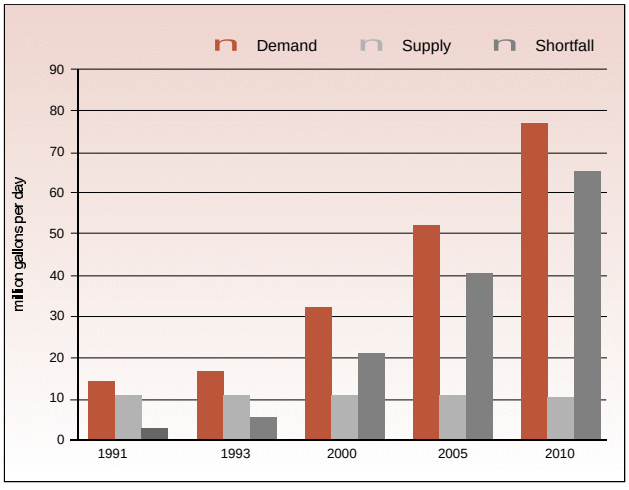
Sanitation and Solid Waste Disposal

Sanitation and solid waste disposal conditions in most urban areas of Balochistan are highly unsatisfactory. Although municipal authorities are responsible for sanitation and waste disposal facilities, they do not have the capacity to provide these services. Sewage and drainage systems are generally non-existent. Though a small percentage of households in various urban centres do have connections to septic tanks (for example, in Mastung, Kalat and Loralai) and connections to sewage and drainage systems where they exist, most urban dwellers dispose of household waste water in open drains, adjoining open spaces or fields. The same situation exists for solid waste disposal.

The sanitation needs of Quetta are not being met. About 800,000 people, the vast majority of the population, are without proper sanitation and drainage facilities. Rainwater and waste water stagnate in low-lying areas and along the roadsides, causing problems for traffic and pedestrians alike and providing breeding grounds for mosquitoes and parasites. The situation becomes worse during the rainy season in winter, when water sits for long periods. Apart from health hazards, road surfaces are severely damaged.

At present, both domestic waste water and storm water are collected through a system of surface drains discharging into the Habib Nullah in the north and the Sariab Lora in the west. Since these drains serve the dual purpose of carrying domestic and storm water, they are inadequate for the purpose. In addition, sewage is dumped directly into the drains, which are commonly blocked with solid waste, including animal remains from butcher shops and polythene bags. The seepage of waste water from these blocked drains is constant and poses a hazard to health and to the quality of groundwater. Furthermore, resulting water-

Figure 15 Quetta Water Supply Status, 1991–2010



Source: Majeed and Qureshi 2000.

UBS Cell

Wastewater is a common sight.

logged conditions promote the rapid deterioration of pipes and utilities.

The practice of using untreated waste water from nullahs for growing vegetables and irrigating orchards may result in the transmission of parasites such as roundworms or helminths, as well as gastrointestinal diseases. No research has been done to assess the situation. People often accept chronic infections as a nuisance to be tolerated, or treated with over-the-counter medicines. Cause-and-effect relationships are not clear in the public mind, even among the better-educated people of the city. Some believe that routine exposure to pathogens will result in increased immunity from serious health risks. A further major concern has been that Quetta's overcrowded hospitals are not yet connected to the sewage system.

The Quetta Sewerage and Sanitation Project was initiated in 1985–86 to remedy the situation. Plans were made to lay 150 kilometres of sewage lines, with a 12.5-kilometre transport main to a waste water treatment plant. Latrines and household connections were also included in the scheme. The treatment plant was to have a capacity of 25,000 cubic metres per day. Recycled water was then to be used to irrigate 270 hectares of land. By September 1994, only one third of the project had been constructed. Funding was withdrawn at that point. It will require an additional Rs. 500 million to complete. No other major sewage project is contemplated or under way, and no donor has stepped forward to complete the work. Upgrading storm water drains will require an estimated Rs. 100 million. Where sewage lines were laid, a small number of households have connected for discharging their sewage. The system has, therefore, not been effective and efficient because of reduced load of sewage and consequent choking.

Kachi abadies are settlements of predominantly low-income people, living in mud (kacha) houses served by substandard physical and social services. They have intermittent water supply, no sewers or drains, no garbage collection and unpaved lanes. The settlements are congested and the houses overcrowded. There are 15 kachi abadies in Quetta, some dating back to over a 100 years. Each has its own distinctive ethnic, tribal and family ties, and are more aligned to rural rather than urban life-styles.

A start has been made in providing sanitation systems using a community partnership approach. This involves residents, community-based organizations and local government. Donors may provide technical and financial support to 'kick start' the project. Government acts as a facilitator rather than a provider of urban services. The basic unit of cooperation is the lane, consisting of 20–30 houses. Lane organizations are formed with the help of a community-based organization. They then set their own priorities for the construction and management of sewers, drains and toilets. Money is collected in advance from the beneficiaries and deposited in a savings account. Once sufficient funds are available, the projects are implemented.

The people often do the work themselves, but technical know-how, in the initial stages, is provided by non-government organizations (NGOs). Donors may offer matching funds to accelerate the work. One such project in Quetta expects to improve sanitation facilities in 50 neighbourhoods over a period of three years. These are small projects, but well suited to the physical, cultural, socio-economic and political environment that characterizes present-day Quetta. Ambitious schemes have more often than not been hopeless failures, leading to widespread cynicism and indifference. The success of these small projects may give residents some confidence in their ability to make a positive change to the urban environment.

Responsibility for proper disposal of solid waste is vested with the municipal authority. For a variety of rea-

sons, the authority is dysfunctional, and seems likely to remain that way for some time. The government has acknowledged its inability to keep up with sanitation services, even in the city centre. Solid waste disposal statistics are not available for Quetta. Informal estimates suggest that the municipality collects about 50% of Quetta's solid waste on a routine basis. Residents have complained that what is collected is not properly disposed of. Some of the waste is lost along the roadsides during transport.

The disposal of waste from hospitals, health units and dispensaries has yet to be taken seriously by the authorities as a health and environmental issue. No accurate data are available for urban centres, with the possible exception of Quetta, to be able to conduct a comprehensive analysis of the volume, composition and disposal of these wastes. At present, most medical waste is dumped outside the gates of the hospitals.

While a donor has recently provided modern trash collection equipment, its efficacy is not immediately apparent, for the reason that if rubbish ever enters the containers, rag pickers swiftly remove it. In Quetta, rag pickers number in the hundreds. They are usually children between the ages of 3 and 10, often Afghan refugees of the Uzbek clan. They systematically sort rubbish for anything that can be sold, reused or burned. A kilo of plastic bags might bring two or three rupees. Paper and cardboard are more highly prized. In the process of picking through the rubbish, much of it is scattered about the streets. In one neighbourhood, a band of such rag-pickers charges each household 30 rupees a month to keep lanes clear of rubbish. On designated days, the municipal authority is called in to remove rubbish and debris that cannot be handled by the pickers.

Outside of the city centre and more prosperous neighbourhoods, waste is dumped on the streets and in vacant lots. The health hazards posed by the poor disposal of solid waste are not immediately apparent, as statistics are not available. The Environmental Profile Balochistan called attention to the widespread and debilitating problem of echinococcus infections. The report suggested that up to 40% of the population might be infected. This helminth parasite is spread through the close association of people, dogs and livestock. The problem is exacerbated through poor slaughtering and public health practices.

In summary, the municipality continues its struggle to keep the city clean, but there is no clear plan of action to cope with the existing situation or to plan ahead for the growing population. Recycling, such as it exists, seems to be in the hands of the local people.

A. L. Rao, IUCN

Rickshaws are a major source of air pollution in Quetta.

Air and Noise Pollution

In cities such as Khuzdar and Sibi, vehicle emissions result in serious air pollution. The use of contaminated and leaded petrol, poorly tuned diesel engines and rickshaws in Quetta create a pall of brown photochemical smog hanging over the cities (see Chapter 7). Respiratory and eye problems are of epidemic nature. There are over 5,000 rickshaws on the road in Quetta. They are powered by single cylinder, two-stroke engines fueled by a mixture of petrol and oil. Each rickshaw burns at least 16 litres of leaded petrol and two litres of oil every day. The simple solution is to take them off the road, as they are not allowed to ply in Islamabad.

But in a city where taxis are almost non-existent and out of the reach of most people, rickshaws offer many advantages. They are cheap, can manoeuvre in the narrow and crowded streets and alleys, and very importantly, are used extensively for security reasons by women to move about the city. In a culture where

A. L. Rao, IUCN

Systematic urban planning is a high priority for the province.

women are closeted indoors and cannot use public transport to travel around the city without an accompanying male member of the family, rickshaws offer a lifeline that cannot readily be replaced. Rickshaws are also an important source of income for the poorer people in the city. Two or three drivers working in shifts, operate a rickshaw for 18 hours a day. Each driver supports a family of five to eight people. At a minimum, 50,000 people may be supported, at least in part, from rickshaw operations.

If rickshaws cannot be eliminated, something must be done to control their emissions. The answer may lie in converting them to run on compressed natural gas (CNG). Gas is readily available, is cheap and is promoted as a fuel by the federal government, to reduce pollution and dependency on imported oil. A Canadian company has designed an inexpensive conversion kit. Rickshaw owners, drivers and mechanics have studied and endorsed the concept. Their enthusiasm was not solely related to a concern for the environment, but to the prospect of saving a few rupees a day. Converted rickshaws will also have access to areas of the city and cantonment where they are presently prohibited.

Getting this project off the ground has involved endless discussions with many stakeholders, including federal and provincial governments, municipal authorities, traffic police, the private sector, Sui Southern Gas Company, NGOs and donors. A consensus has emerged and it has now been approved. A CNG station will be installed in Quetta. The provincial Environmental Protection Agency will work in partnership with rickshaw owners and operators to implement the project with Canadian government assistance. The results will be immediate and will be one of the most visible examples of cooperative action ever seen in this ancient city.

THE WAY AHEAD

The process of urbanization can be slowed, but not reversed. Alleviating some of the factors that motivate people to leave rural areas is one step. That means providing jobs and delivering services such as education, health, housing, communications, water, sanitation and energy at the community level. The same process that attracts people to urban areas of Balochistan, also attracts them to other urban centres in Pakistan. A certain level of out-migration from Balochistan will be a continuous process.

Dealing with population growth is a long-term process. The benefits of current family planning programmes will not be evident for some time. In the meanwhile, steps must be taken to address urban environment issues and solutions must be found and implemented to reduce the stress arising from urban growth.

Urban Development Planning and Implementation Structures

Though a process for urban planning and management exists, there is no systematic housing or urban planning in Balochistan. A systematic urban planning and implementation process is a high priority for the province.

Basic infrastructure has to be provided, and the government is ultimately responsible for doing that. This means laying out roads and services, such as water mains, trunk sewers, gas, electricity and telephone lines and waste management facilities. It means providing basic services, such as schools, hospitals and clinics, markets, parks and recreation facilities. Building codes and construction standards have to be laid down, understood and enforced. Planning principles have to be adopted, and the parameters for planning have to be established. For example, residential planning must take into account the need to protect the recharge zones of the Quetta sub-basin and prime agricultural land, restore the catchment areas, and perhaps establish green belts. Industrial areas, solid waste disposal sites, slaughter houses, markets, dairy farms, schools, hospitals, mosques, petrol pumps, CNG stations and recreation facilities have to be zoned. Some guidelines for standard planning practices for new developments are listed in Box 20.

Government as Facilitator and Enabler of Urban Development

Urban populations look towards government to take action in order to resolve problems of water supply, sanitation, waste management, traffic congestion and pollution. Governments traditionally introduce and enforce legislation, rules and regulations that impose strict controls over every aspect of urban life and behaviour, but take punitive action against offenders. The effectiveness of these controls and the willingness to comply varies widely according to public behaviour and attitudes towards the environment and common property. Culture, socio-economic conditions, environment, education, awareness and incentives all play a part. In addition to strengthening law and enforcement measures,

Box 20 | Some Guidelines for the Preparation of Structural and Master Plans for Urban Areas

- Modify local government legislation to make it mandatory for each local body to prepare, or have prepared a Structure Plan, along with local plans such as Local District Plans, Action Area Plans and Subject Plans for their areas of jurisdiction.
- Prepare Structure Plans or Master Plans for all existing and potential urban areas as a basis for land use planning, housing, transportation and environmental planning.
- Review each Structure/Master Plan every five years to incorporate changes and new developments, thus making town planning of urban areas a continuous process, ensuring the sustainable development of human settlements.
- Initiate land pooling and readjustment of housing schemes in all urban areas, to cover all vacant areas and areas earmarked for city expansion in the Structure/Master Plan.
- Decentralize some Central Business District functions.
- Establish a land pooling and readjustment section, headed by a town planner, in each local body (Municipal Committee or Town Committee) to carry out land pooling and readjustment of housing schemes for the future expansion of urban areas in a planned manner.
- Carry out incremental development housing schemes on the pattern of Khuda Ki Basti for low-income people in all urban areas as an alternate to the current unauthorized subdivision of land, which is creating slums and squatter settlements.
- Encourage energy-efficient designs of housing schemes (through design competitions) so that electrical energy and gas consumption can be reduced and an increased use of solar energy can be made.
- Shift wholesale markets, slaughterhouses, cattle markets and poultry farms outside of cities, to avoid congestion and pollution in the inner city areas.
- Separate administrative offices from commercial areas to avoid congestion in the central areas of cities.
- Create new Central Business Districts in the newly developed areas, thus developing cities on a multiple nuclei pattern.
- Develop a proper building control system by dividing urban areas into zones of 50,000 population, each having a Town Planning cell. Encroachments and building control violations should be checked at the initial stage to avoid demolition at a later stage.

Source: Zaidi 2000.

Nadeem A. Khan

Planned urban areas provide citizens with liveable spaces.

government is responsible for the provision of infrastructure and services through public investment. Public agencies are largely responsible for initiating and implementing projects and programmes aimed at resolving urban environmental issues.

The use of legislation requires the ability and will to enforce it. It also implies that there are adequate financial and human resources. These conditions do not prevail in Balochistan, or anywhere else in the country, and unilateral attempts to impose controls through legislation will eventually only hurt those people who are most in need of help. This option is not likely to succeed. Instead, the goal must be to transform government from a controller and enforcer, to a facilitator and enabler of civil society, to mutually assist and reinforce the provision of services and utilities to all.

Public-Community Initiatives

Lack of resources and administrative shortcomings prevent local governments and development authorities from taking any effective action to resolve urban environmental problems. One way to solve this problem is the community partnership approach, which is useful in some circumstances. Since community members are directly affected by development, they often have a strong incentive to see development executed properly. Some examples of this approach are the Orangi Pilot Project in Karachi, the Khuda Ki Basti Project in Hyderabad and the Faisalabad Area Upgrading Project. Marriabad, a kachi abadi built on a Quetta mountainside is another example; it has distinctive features reflecting the preferences of the residents. These areas are by no means ideal examples of development, but the element of community participation has lead the development to be more need based, cost effective and worthy of maintenance by community.

Participatory Processes for Managing Urban Development

Urban development and renewal will not take place in isolation of the needs of the inhabitants. All have a stake in the development of the place where they live. Development planning undertaken without the participation of stakeholders, interest groups and the public at large have come to nothing, since ownership of the problems and their solutions was never established. A corollary of urban development, as a dimension of human development, is a sense of belonging. Processes that develop and integrate this sense, by changing from a mechanistic approach to a human approach, are more likely to be supported and more likely to succeed. Involvement of people in the urban planning process would kick-start this process. This also requires the involvement of local government, the private sector and the general public as partners in projects for the improvement of urban conditions.

Balochistan Urban Council will be created in P&D Department by restructuring the Quetta Development Authority. The Council will be assigned the role of coordinating and promoting sound urban development and renewal in the province. It will establish District Urban Committees with a focus on urban development in districts. Town Development Committees will be established for each of the existing or potential urban areas. These will oversee and guide planning, development and renewal of urban areas. Town development and renewal will be undertaken by the regular local government institutions with added expertise and capacity, if needed. An example of an Action Plan for Quetta City is provided in Table 25. The process for action planning would identify and establish priorities on issues and plan options for implementation.

Table 25 | Action Plan for Quetta

Action Fields			Activities		
WATER ACTION PLAN					
Institutional aspects	Strengthen BWASA & other water related departments	**Strengthen coordination between BWASA & other departments**	Strengthen irrigation department		
Awareness	Need to protect catchment areas, groundwater	**Protection of reservoirs, channels, distribution systems**	Irrigation efficiency, & reuse & recycling of water	**Avoiding wastage of drinking water & minimizing industrial use**	Programme on health & sanitation
Research	Geo-hydrological water quality & quantity	**Improvement of existing systems**	Development of new systems (open–close systems)	**Water use data collection & analysis**	Technical aspects: reuse & recycle, purification, & distribution (pipes)
Planning	Programme for catchment areas & reservoirs/buffer development	**Future service extension plan**	Integrated approach to water & sanitation, (green area development)	**Irrigation planning**	Industrial use planning
Training/ education	Technical staff on water resources research	**Technical staff in design of reservoirs & distribution systems**	Technical staff in system maintenance	**Technical staff in system monitoring**	Programme for health & sanitation
Legislation	Protection, use & management of catchment areas & reservoirs, control on installation of tubewells	**Compliance & enforcement of relevant laws, rules & regulation**	System & recovery of water charges	**Treatment & disposal of sewage, compliance of NEQS**	
SANITATION ACTION PLAN					
Institutional aspects	Strengthen QMC & other related departments	**Development of planning & implementation capacity**	Development of adequate management & control mechanisms	**Appropriation of operations & maintenance of equipment**	Rapid implementation of existing technical systems
Awareness	Health benefits motivation	**At source waste reduction**	Efficient water use	**Programme on health & sanitation**	Feasible options of effective disposal for practical use
Research	Waste disposal & recycling	**Development of new systems (open–close)**	Data collection of sanitation mix	**Water use data collection & analysis**	Technical aspects - reuse & recycle - purification - distribution (pipes)
Planning	Waste disposal control by spatial measures, such as appropriate collection sites & social management of open spaces	**Future extension of sewage & drainage systems**	Integrated approach for water & sanitation management	**Agricultural use of treated sewage & drainage water**	Efficiently using the existing sewage system
Training/ education	Staff for planning & O&M	**Technical staff in design of collection & disposal systems**	Technical staff in maintenance	**Technical staff in monitoring**	Programme for health & sanitation, city clean-up campaigns
Legislation	Development planning control, sanitary workers work conditions, incineration of hospital waste	**Waste disposal charges**	Compliance & enforcement of relevant laws, rules & regulations	**Strengthen system & recovery of sewerage charges**	

Action Fields			Activities		
GREEN SPACE ACTION PLAN					
Institutional aspects	Create responsibility (feasible structure)	**Strengthen maintenance department**	Establish monitoring system	**Budget**	Strengthen coordination with other departments (forest, agriculture, irrigation)
Awareness	Programmes for planners, decision-makers, stakeholders, public at large				
Research	Soil survey, topo mapping of existing green spaces and public open spaces	**Growing of appropriate plant saplings of very big size and transplanting technique**	Water collection, waste water reuse, climatic conditions	**Devegetation/ vegetation of watersheds including piedmont areas and their impact on water recharge/ sedimentation of reservoirs**	
Planning	Green lungs of city, recreation parks, playgrounds, flower shows and aesthetic (roadside) plantation	**Recycling/reusing water**	**Irrigation efficiency**		
Training/ education	Planning and implementation	**Maintenance**	Monitoring		
Legislation	**Compliance and enforcement**				
TRANSPORTATION ACTION PLAN					
Institutional aspects	Create responsibility (RTA, QMC, QDA)	**Strengthen control systems (traffic police, Motor Vehicle Examiner)**	Create information systems	**Create monitoring systems**	Arrange budget
Awareness	Use of media & driving institutes	**Target groups – drivers, pedestrians, public**	Legislators, enforcers, arbitrators	**Transport operators**	**Students and children**
Research	Vehicles, their types and use data	**Intersection designs/ traffic signalling**	Corridor carrying capacities	**Fuel types, quality, quantity and efficiency**	Safety related to transporting hazardous substances
Planning	Regional, district, city, local level	**Network management including signage**	Traffic management	**Re-orientation of traffic hubs**	Goods movement corridors
Training/ education	Driver education/testing	**Defensive driving**	Enforcement	**Monitoring**	Research
Legislation	Taxation	**Compliance and enforcement**	Parking	**Pollution control**	Encroachment
URBAN DEVELOPMENT ACTION PLAN					
Institutional aspects	Improve co-ordination among urban agencies	**Strengthen QMC, QDA, district council to manage urban growth**	Improve traffic management capacity	**Include the private sector in urban planning and management**	Identify and involve all other stakeholders and interest groups in development planning and management
Awareness	Economic opportunities	**Social and cultural opportunities**	City's macro and micro problems and their solutions	**Environmental degradation and its solutions**	Ownership of the city by inhabitants

Action Fields			Activities		
Research	Urban growth control, planning and management techniques and practices	**Development and management of natural resources, especially water and watershed areas**	Development and management of socio-economic and cultural resources	**Air pollution control, hospital/solid waste disposal, sewage treatment, and reuse strategies**	Financing mechanism/ resources for development programmes
Planning	Commerce and industry development	**Infrastructure**	Traffic	**Green/open spaces**	Development institutions strengthening
Training/ education	Urban planning	**Data collection, management, and use**	Identification and analysis of options and tools	**Participatory planning approaches**	Plan execution and monitoring mechanisms
Legislation	Legal status of Master Plan and enforcement/ compliance measures	**Fund generation and tax sharing by relevant agencies**	Trust Fund	**Bye laws, e.g., for buildings, zoning of functions, wall chalking, sewage and solid waste disposal**	Enforcement/ compliance responsibility

Water Supply

The acute problem of water scarcity, especially in Quetta, needs a fundamentally different approach. The present policy is based on the premise that Quetta will continue to grow (without limits), and that drilling deeper into the aquifers and arranging inter-basin transfers may meet the ever-increasing water requirements. This is fatal. The supply is unlikely to keep pace with the demand, and even if it could, it would be extremely expensive. Moreover, other urban problems will also escalate, as scarce funds must inevitably be spent on water supply as a first priority. Limits on the expansion of Quetta (and other towns and cities) may be possible, but to contain expansion settlements beyond these limits may not be easy. The underlying principle, however, will be 'containing the problem first'. Rehabilitation of the existing supply system, and education and awareness of the need to conserve water are supply management priorities.

Sanitation

The completion of sewage connections to hospitals and subsequent maintenance and safe disposal of medical waste must be given high priority. Hospitals will be required to develop, implement and monitor programmes for the disposal of their wastes. The existing sewage facilities in Quetta City are underutilized resulting in inefficient operation of the facilities and continuing sanitation problem. The residents need to be motivated to connect their household sewers with the sewer trucks. It is important that new developments, whether commercial or residential, meet all of the standards for proper sanitation.

Drainage systems must also be installed or improved to deal with runoff and waste water that collects and stagnates in low-lying areas and along the roadsides, and eventually creates health hazards. The community can do its part by draining areas of standing water in residential areas, that form breeding areas for mosquitoes and parasites. The dumping of waste from workshops and garages must also be controlled. At present, oily waste and lubricants are often dumped directly into open drains.

Solid Waste Management

Much of the problem exists due to the generation of many types of wastes in the city, and inefficient or ineffective collection and disposal procedures. Producers of waste include hospitals, fruit and vegetable markets and vendors, butchers and the numerous small businesses and workshops that crowd the city area. Donkeys, horses and livestock also contribute to the mess. The entire waste management system needs an overhaul. This includes waste generation, household and commercial disposal, collection, haulage, recycling, composting and landfill operations. Strengthening the ability of municipal authorities to dispose of solid waste effectively and efficiently will be a priority. An action plan for Quetta has been drawn to help deal with the problem. Regular city cleanup campaigns might also help.

The informal waste management system is alive and well in Quetta and in urban areas throughout the province and Pakistan. It is efficient, effective and

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Systematic urban planning will have many benefits.

quite sophisticated. A chain of collectors ensures that virtually anything of value is collected and recycled. However, the system has it problems. It results in the spreading of waste around the streets and open areas. It also leads to hospital waste and waste collected by the municipalities, being dumped for the benefit of this informal economy. Municipal authorities must develop more formal arrangements with the collectors to ensure that recyclable materials are collected in a systematic way that does not add to the problem. The National Conservation Strategy developed policies and measures on this subject. Experiences in implementing them will be evaluated and the lessons learned applied in Balochistan.

Air Pollution

Measures for dealing with air pollution involve use of alternative fuels, such as CNG, preventing the import, smuggling and use of substandard and contaminated petrol, introducing traffic management and stopping the practice of burning rubbish within city limits. The government of Balochistan will be actively promoting the use of CNG for rickshaws and government vehicles. This is a major step in dealing with the problem. Brick kilns will be relocated outside of Quetta valley to aircraft eliminate a major source of pollution and for the sake of aircraft safety at the time of landing. Power plants and rock quarries are not serious threats to air quality, but will need to comply with air quality standards. New facilities will be located and equipped to minimize their effects on air quality.

Transportation and Traffic Management

Transportation development and traffic management, though a fundamental pre-requisite of development affecting all human development activities, is ironically the most neglected development sector in the urban areas of Balochistan. The development of public and private transportation management systems, with a concurrent increase in transportation infrastructure, requires a comprehensive transportation management approach, with a well-conceived financing mechanism. In the absence of a viable rail and air transportation option for large-scale movement of commercial and goods traffic, the development of transportation systems, routes and traffic management techniques and enforcement will be given priority.

Communication and Awareness

The most effective set of measures that can be taken to improve the urban environment, are education and communication programmes. There is a lack of awareness of virtually every issue surrounding water, sanitation, waste disposal and air pollution. People freely acknowledge the problems, but are not aware of what they can do about it. There are good programmes in the schools, and some NGOs are active in this field. Unfortunately, the Balochistan Environmental Protection Agency could not launch a mass awareness activity fully as a component of the Balochistan Natural Resource Management Project. The EPA and every agency of government concerned with the use of resources, renewable and non-renewable, will develop education and communication materials and programmes to inform the public about how they can be used safely and in a sustainable manner. These programmes are likely to be far more cost-effective than a mere reliance on enforcement measures.

Other Measures

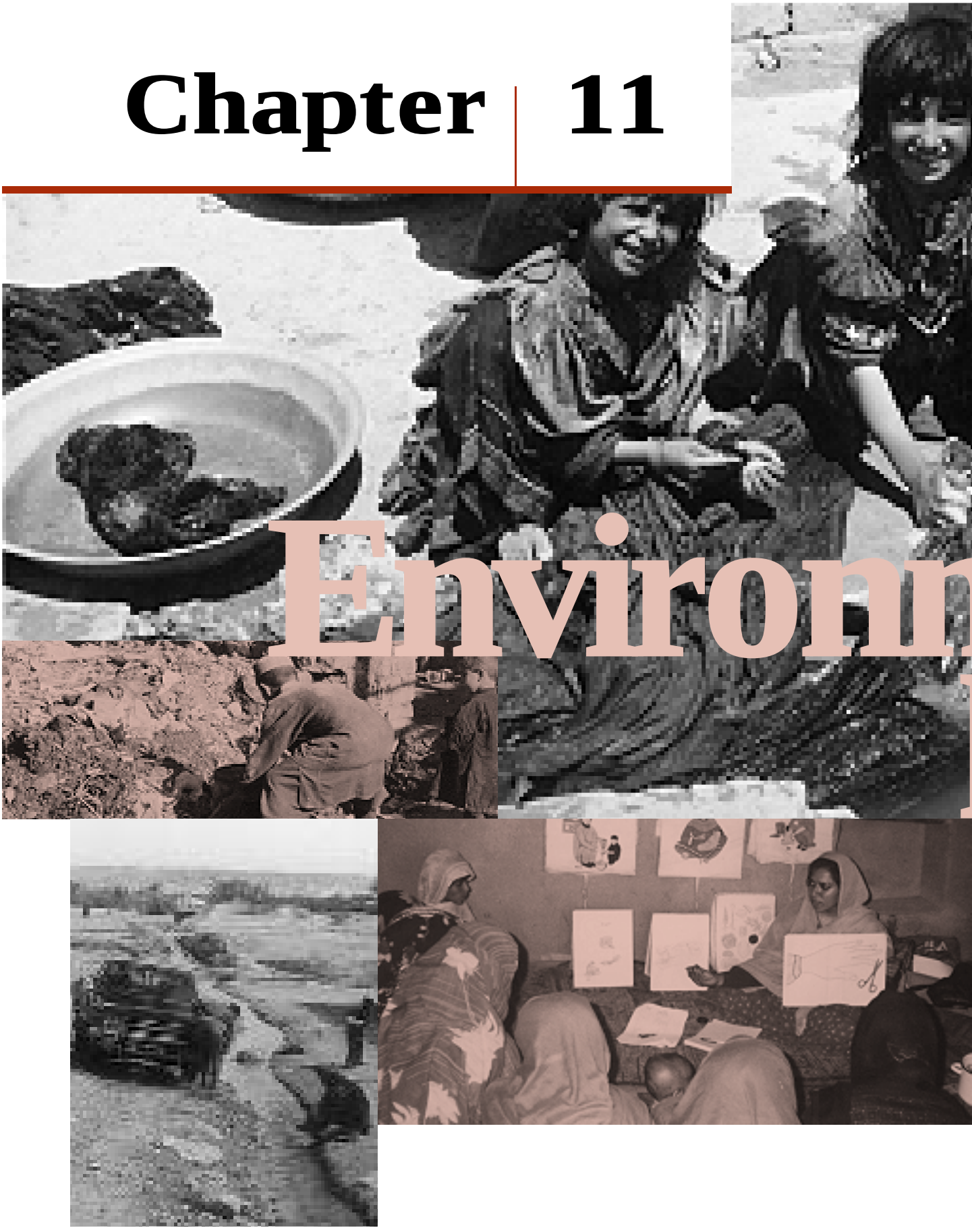
- Develop and promulgate guidelines for defining urban areas.
- Develop a comprehensive database containing details of size, location, population trends and land ownership records of all urban areas in the province.
- Develop a provincial Human Settlements Policy for Balochistan on guidelines similar to the National Human Settlement Policy. The former will be based on the following principles:
  - decentralized urban development;
  - decentralized implementation;
  - development of decentralized economic opportunity;
  - development of rural and semi-urban housing stock;
  - development of feeder transport network;
  - preservation of social and cultural values;
  - preservation of culture and heritage;
  - rural/urban revenue sharing and investments; and
  - rural access to soft loans/financing.
- Develop resource use profiles for all urban centres (including water supply, demand, treatment and recycling; sewerage and energy consumption; solid waste generation, reuse, recycling and disposal; and air pollution) as a basis for the planning and conservation of resources.

Environment Foundation, Balochistan

Inaugurating a city tree plantation campaign.

- Reduce the movement of the rural population to urban centres by improving rural and semi-urban settlements in physical infrastructure, provision of essential services (water, electricity, sanitation, education and health), and economic opportunities.
- Systematically renew or upgrade housing stock, infrastructure and services (water supply, sewers, drains and energy) in conformity with revised building regulations, construction standards and community needs, consistent with sound planning principles, updated master plans and the use of energy and resource conservation technologies.
- Plan proactively improvement and extension of mid-level urban centres for reducing migration of rural population to Quetta and other big towns in Balochistan.
- Start thinking on developing a sustainable and healthy city of the size of Quetta with a sustainable water source, economic opportunities and facilities and that may attract people desirous of migrating from rural or existing urban areas.
- Identify and take measures to control groundwater mining and pollution.

Chapter 11



Environmental Health

Environmental health is a relatively new concept in Balochistan. In the last decade, some understanding of preventive health has been reflected in public sector health policies and plans. The Eighth and Ninth Five-Year Plans mention it as a priority of the government of Balochistan, as opposed to the earlier stress on curative and tertiary health care. Yet the focus of preventive health remains narrow. It deals with the prevention of specific diseases through vaccinations, medicines, or some element of disease-specific health education.

According to the World Health Organization, 'health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity'. The changes posing threats to human health include population and resource imbalance, urbanization, industrialization, environmental pollution, natural resource depletion, social transformation and structural change resulting in psychosis, poverty and inequity on the basis of gender, ethnicity and power hierarchy.

The development of a common vision of health and social development – including equity, poverty alleviation, employment, social justice and provision of basic human needs – is necessary, with a realization that there are physical, biological and socio-cultural dimensions to the relationship between environment and human health. This calls for the attention of policy-makers, planners, donors, professionals in all relevant sectors, academia, media and the general public toward coordinated and integrated efforts for environmental health in Balochistan.

As far as environmental pollution is concerned, the impact on health is not as bad as in Pakistan's other three provinces. This may be due to the less developed state of the province, where major environmental pollution is an issue in the three or four large urban centres. The basic issue in describing the current situation in Balochistan is the lack of reliable and complete data. Available information being patchy, most of the analysis is based on the experience and observation of professional health workers.

Despite some improvements in health standards in recent years, Balochistan still has a lower life expectancy (57 for men and 56 for women) than in other parts of the country. Vaccine-preventable diseases are still prevalent as a threat to life, despite improved vaccination coverage. Nutritional status of neonates and the infant mortality have not improved (about 112 per thousand live births). The high growth rate reflects declining mortality (30 per thousand in 1947, to 12 in 1997) and a high and near stable crude birth rate (38 per thousand). The vast

majority of women do not use any method of fertility regulation. Family planning programmes are deficient, particularly in rural areas, and access to these services is difficult.

Malnutrition prevails, with a higher frequency and intensity in children below five years of age, pregnant women and lactating mothers. Seventy percent of children in Balochistan are malnourished. The inequity in distribution of food between regions, income groups and family members contributes to malnutrition, as does poor infant feeding practices and inadequate or delayed introduction of supplementary feeding. The situation is compounded by frequent and narrowly spaced pregnancies. Iron deficiency is widespread and vitamin A deficiency is believed to be a serious problem. A shocking 71 percent of Balochistan's children under five years of age, manifest stunted growth, and 56 percent are underweight. Perinatal deaths are due mainly to delivery complications, poor maternal health and tetanus. Post-neonatal deaths are common due to diarrhoea, malnutrition and communicable diseases.

However, a few initiatives have been taken by the Health Department to ameliorate this situation (Box 21). A resource unit is being established in the Institute of Public Health to coordinate and provide support to the environmental programme in the province. A PC-I for the Health Education Programme in Balochistan has been submitted. The Health Department intends to create awareness through environmental messages and will incorporate environmental aspects in its projects. A waste disposal programme is being designed for one hospital and one clinical laboratory.

ENVIRONMENTAL HEALTH THREATS

Threats to human and animal health derive directly or indirectly from environmental problems. Direct threats to health include accidents and occupational hazards. In the case of accidents, pollutants can be released into the atmosphere and have a direct effect on the human body. Such a large-scale accident has not been reported in Balochistan.

Occupational diseases occur as a result of long-term exposure to chemical or physical substances. These are less easily managed, particularly due to the absence of a regular medical check-up system, as the relationship between the injurious substance and the injury is obscured in most instances. In some industries, the exposure and the disease may have a very short interval. These also include infectious diseases, particularly among agriculture workers, miners and workers on petroleum production and drilling operations. People working on jobs where loud noise is a constant feature suffer from

Box 21 Existing Services and Programmes of the Health Sector

Services	Programmes
n Curative services against endemic diseases and other ailments, and follow-up of chronic problems	n Malaria Control Programme
n Preventive services, especially against diseases on the priority list	n Mother and Child Health Programme
n Rehabilitation services against disability and disconformity (both social and physical) caused by certain ailments like leprosy, AIDS and sexually transmitted diseases	n Leprosy Control Programme
n Pre-service training to undergraduate medical students, public health training for lady health workers, nursing training, medical health technician training, and post-graduate training in certain clinical subjects	n Nutrition, AIDS Prevention & Control Programme
n In-service training in priority areas like malaria, diarrhoea, acute respiratory infections and family planning	n Control of Diarrhoeal Diseases
n Support services for the provision of those listed above	n Control of Communicable Diseases
n Special services delivered through projects, especially in areas where regular services are deficient	n Control of Acute Respiratory Tract Infection
n Expanded programme on immunization	n Tuberculosis Control Programme
	n World Food Programme

Awareness about how water sources are polluted is needed.

hearing impairments. Apart from traffic police, noise has also affected many residents, who are suffering from mild, moderate, or severe stages of deafness.

There are occupational diseases occurring due to contact with hazardous materials found in tanneries, sewage treatment plants, laboratories, livestock farming, fisheries and coastal work. These could be further transmitted. In the recent past, hepatitis B has infected some surgeons in the province.

Indirect threats to health include water quality, food availability, air quality, waste disposal and problems that affect mental health.

Water Quality

Water testing is not performed in the province, and limited facilities are available. The testing that has been done has detected high levels of coliform bacilli and other harmful micro-organisms, even in deep wells. The problem is especially bad in Quetta.

The incidence of water-borne diseases has risen greatly, and infants, children and adults routinely suffer from gastrointestinal disorders. Dysentery, typhoid and hepatitis have now become common ailments.

Food

Poverty has affected much of the population to an extent that even basic food requirements are hardly met. This is particularly so in the barani (rainfed) areas. Malnutrition is most apparent in children and women, but is also evident among otherwise healthy adult males. Pesticides poisoning through food has been a recent introduction to this group of diseases. All this coupled with co-existence with bacteria, viruses and parasites results in epidemics and outbreaks of diseases.

Anaemia, usually caused by worm infestations, is common, especially among women. In some areas surrounding Mastung, yellow-brown discoloration of teeth is very common due to hyper-fluorosis. Another condition

Iftikhar, Oxfam

Waste dumps are breeding grounds for diseases.

common in Balochistan is the formation of oxalate stones in the urinary tract related to tomatoes, a basic ingredient in food.

Air Quality

Earlier in this century, the quality of air in and around Quetta was the healthiest. Tuberculosis patients from all over India were brought for treatment to the sanatorium near Brewery Hills, Quetta. Now, a cloud of smoke covers the valley like a blanket. The amount of dust and other pollutants that are ever present in the atmosphere of Quetta were not experienced by residents just 20 years ago. The extensive and uncontrolled emission from exhausts of vehicles leads to the formation of smog and creates serious health hazards (see Chapters 7 and 10). The rising incidence of respiratory problems is related to the high concentration of smog. The general state of child health in Quetta city is also deteriorating as a result.

Patients with acute respiratory tract infections crowd the health outlets throughout Balochistan. Many patients also use traditional home remedies. The infections reach a chronic stage with subsequent heart disease, cancer and exhaustion.

Land, including Waste Disposal

Solid waste and sewage disposal is a rapidly escalating problem in all urban centres of Balochistan (see Chapter 10). In rural areas, due to congested living, gradually changing patterns of consumption and lack of education, the issue of waste disposal is getting greater significance. Although the majority of people in the province are Muslim, and Islam has its basis in the principle of cleanliness, garbage and sewage are dumped openly, even outside mosques. Community-managed waste disposal is possible, as demonstrated by the Hazara community in the Marriabad area in Quetta. Badly managed waste

dumps are the breeding places for vectors for various diseases, such as cholera and malaria, which are on the rise in the whole province, especially in the urban areas. The Malaria Control Programme is being implemented, but the incidence of malaria has not shown any decline. Recently, cases of cerebral malaria have also been reported to be on the increase.

The introduction and uncontrolled and indiscriminate use of agro-chemicals is a major environmental threat to the health of the rural population; the full impact of this problem is still unknown, due to a lack of reliable data.

Community Mental Health

Balochistan has its own share of mental health problems, particularly in urban areas. The rising incidence of violence, drug abuse, frustration, anger, suicide and general moral degradation is an indication of civil society unrest. Ever-growing deterioration of the environment and increasing poverty further add to the adverse impact.

ISSUES

Legislation

Legislation is key to supporting an environmental health programme, especially for occupational health and safety. The regulatory framework must include practices concerning plants, processes, effluents, refuse, sanitation, national environment quality standards for solid wastes, effluents, air emissions and noise and other related aspects of an acceptable quality of life. The Mine Safety, Industrial Labour Safety, Prevention of Work Hazard Laws, the Pakistan Environmental Protection Act and others provide good legal coverage; the problem lies in their implementation. As a result, human injury and suffering are on the increase.

Health Education

Neither the general public nor decision-makers are well acquainted with the relationship between human health and exploitation of the environment, and the social costs or opportunities lost due to environmental degradation. Therefore planners, decision-makers and the public must be made aware of environmental health issues. Both formal and informal education is important, but this can be an uphill task, considering the low literacy rate in Balochistan. Informal education and exclusive campaigns with the involvement of government organizations, the private sector and NGOs would also be very useful.

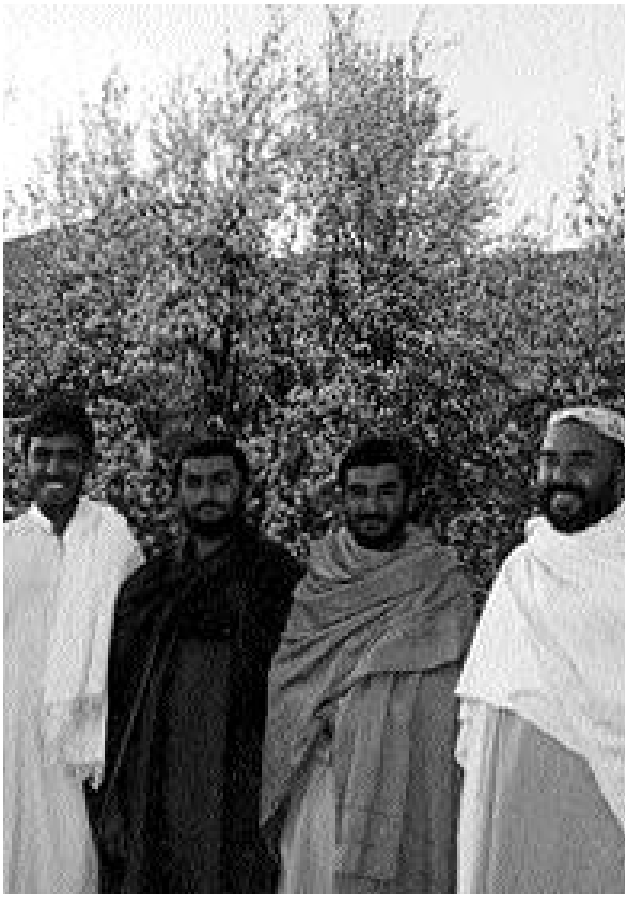
Liaqat, BCIAP

Involving women in health education.

Human Resources and Technical Skills

Health professionals in Balochistan do not usually relate the diseases of skin, lungs, eyes or other areas to the environment, except in some cases relating to coal mines. The problem lies in their training, which deals with environmental health in a summary manner and is confined to the treatment of water and causes of discomfort in an overcrowded room. Nothing is done to relate the causes of human suffering to the deteriorating state of the environment.

Environmental health has two distinct components – one relates to the effects on the general health of a polluted environment, and the second is occupational health. Not even a minimum level of technical skills, let



A. L. Rao, IUCN

Well-being for all.

alone diverse expertise and trained human resources, is available to deal with these two components in Balochistan.

General Management Issues

Health managerial systems remain inadequately developed. The Health Information Management System has only partially been implemented. A harmonious and supportive supervision system is yet to be put in place. A patient referral system is virtually non-existent. Expanded managerial decentralization is still to be achieved. Given the cross-cutting nature of health and environment, NGOs, the private sector and almost every government department and agency have a role to play.

THE WAY AHEAD

- A general awareness campaign will be developed to make the link between a healthy environment and a healthy population.
- Specific detailed information programmes will be developed for public and private-sector personnel involved in the design and implementation of development projects. These programmes will include:
  - information on the relationship between environment, development and health;
  - information on the impact of various processes and programmes on the environment;
  - information on occupational safety and health issues;
  - the means to address the existing situation with regard to environmental health;
  - the role of government in operations and processes to control environmental degradation;
  - the importance of alternative technology and its development;
  - the importance of inter-sectoral coordination and cooperation for sustainable development and environmental protection; and
  - the importance of observing safety regulations.
- Applied and coordinated research will be promoted extensively and its results be used. If needed, external assistance can be sought. The Institute of Public Health must take lead in research on the agreed parameters of environmental health for improving decision-making.
- Various agencies involved in planning, implementation, research, communication, education, regulation and monitoring regarding environmental health will be better coordinated, so that duplication and frustration are avoided and synergy is created. The Health Department is primarily a service delivery organization, and is mostly concerned with the curative aspect, with occasional advice on preventive control mechanisms. The environmental health aspects can be improved only if the Health Department gets assistance from or provides technical services to the line agencies through a well coordinated mechanism.
- The laws and regulation regarding solid waste disposal from hospitals and industries, noise levels, pesticide storage and use, water pollution and wastage, emergency medical care in the case of environmental disasters and accidents, control of spurious drugs and safe disposal of outdated medicines, and control of pests and spread of infections, including quarantine arrangements for plants, animals and human beings, will be implemented.
- The linkages of environmental health with other components of the BCS are strong and broad. The relevant specialized units in the Health Department

Shuja Zaidi

Cleaning up the environment will impact positively on everyone's health.

will be consulted in planning and implementation of such components.

The Health Department has key responsibility for the environmental health programme of the BCS, with the lead to be taken by the Institute of Public Health, where an Environmental Health Wing is being developed. This wing needs to develop its capacity and provide technical and other support required for implementing an environmental health programme that will include the following:

- The Health Education and Nutrition Sections in the Directorate General of Health will be strengthened. It will develop health education packages for raising the awareness of environmental health issues. Technical assistance and funding may be arranged to develop these packages.
- The in-service training modules of the Health Department will incorporate environmental health as an essential component.
- The Primary Health Care package being delivered by the Health Department will be further improved, regarding the strengthening of its environment health aspects.
- The Environmental Health Wing of the Institute of Public Health will be strengthened in terms of equipment and expertise. The existing capacity will be used fully to assist in the environmental health programme for research, programme development, implementation, monitoring and coordination.
- A formal link will be established between the Environmental Protection Agency and the Institute of Public Health. They will need to work together for action planning and implementation of the Environmental Health Programme.
- To guide and monitor the implementation of the Environmental Health Programme, a roundtable on Environmental Health will be established comprising the Secretary of Health, with representation from the Directorate General, the Institute of Public Health, EPA Balochistan, the media, relevant NGOs and other stakeholders.

Chapter 12

Popul
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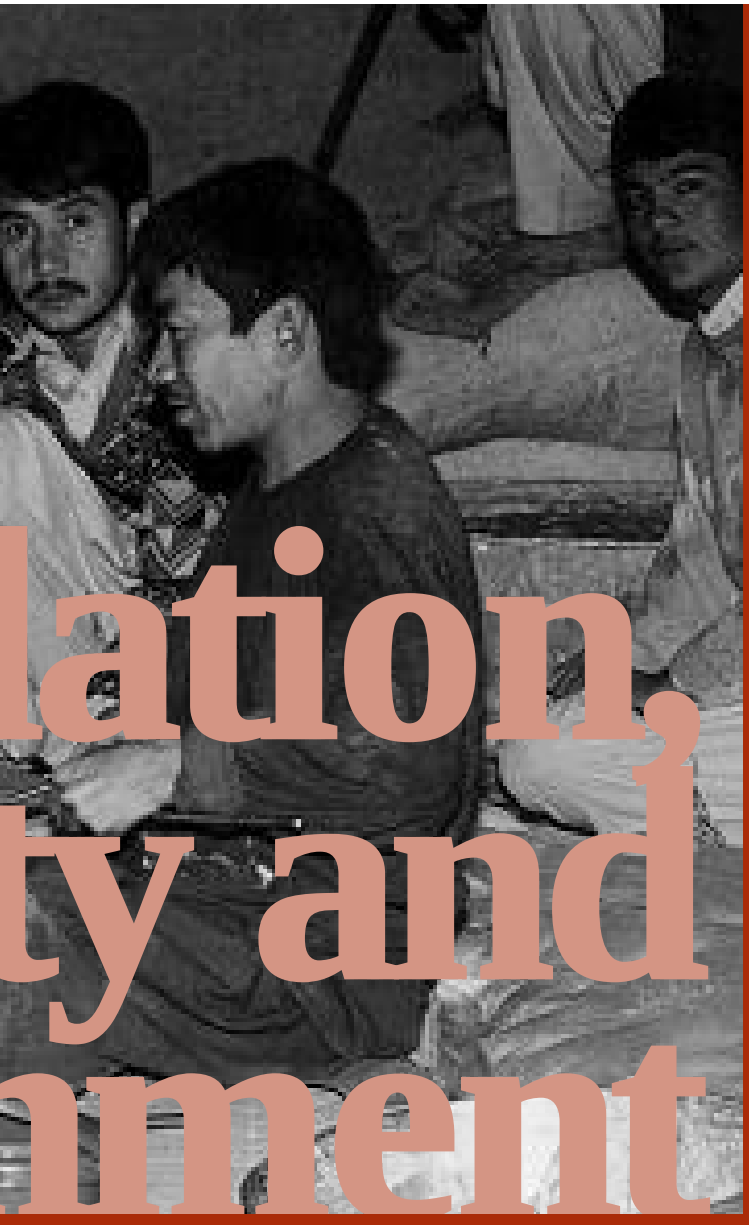


Population, Poverty and Environment

The development community is in general agreement that in a subsistence economy, a rapidly growing population in combination with high levels of poverty can result in environmental degradation and the unsustainable use of resources. A degraded environment and declining resource base can in turn exacerbate the problems associated with rapid population growth and further impoverish those who are already living at or below the poverty line.

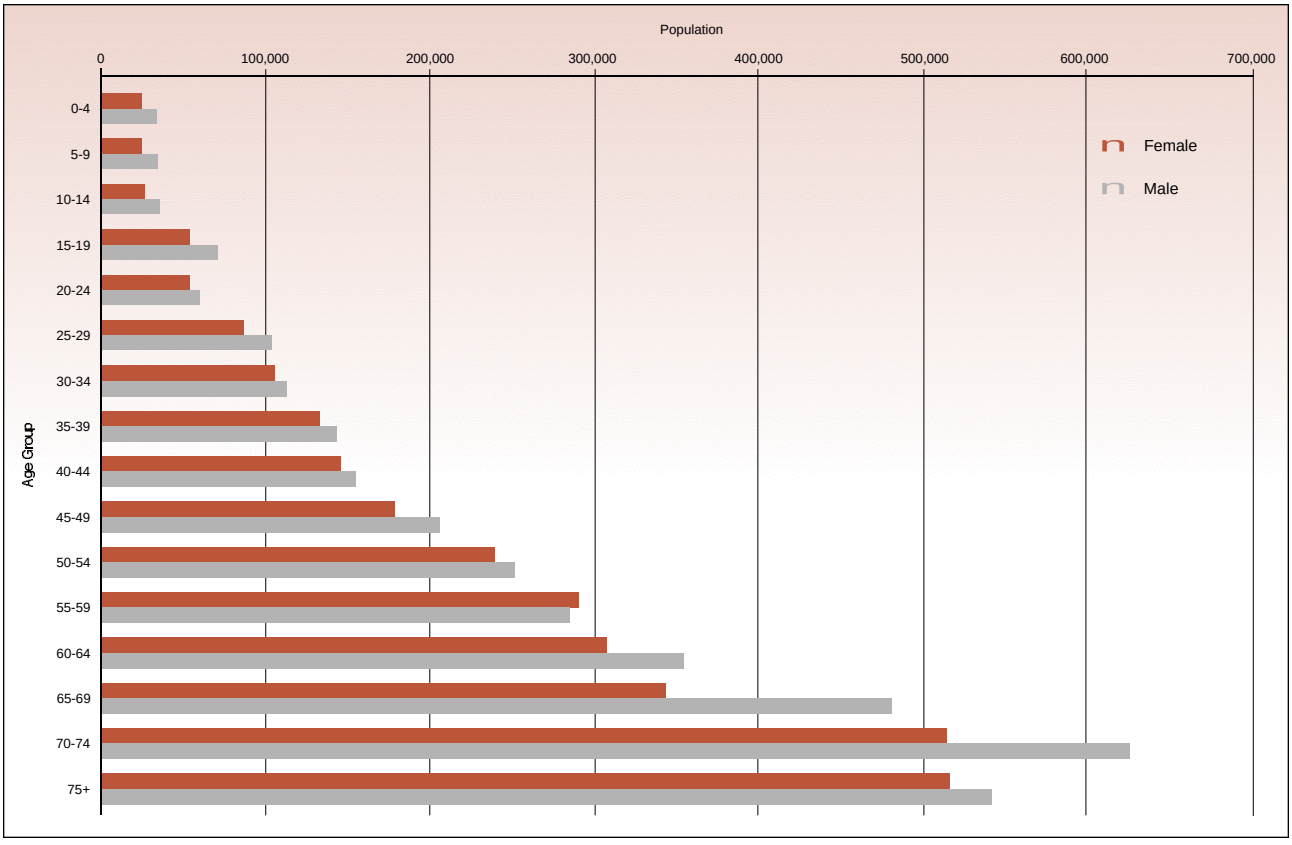
One manifestation of this relationship is the prevalence of large families, customarily seen as essential for income support. Unemployment is often high, wages low and economic gains diluted. There is increasing pressure on land resources and overstretching of limited social services. The imperative of meeting daily needs results in heavy demands being placed on resources that may already be under stress. On the ground, the consequences are seen in rapid deforestation; overgrazing and de-vegetation of rangelands; low and declining productivity in resource sectors, such as agriculture, livestock and fisheries; uncontrolled soil erosion, siltation and sedimentation of reservoirs; misuse of pesticides and fertilizers; and various forms of pollution. A major consequence of the instability resulting from these interactions is rural-urban migration. Rapid and unplanned urbanization exacerbates a suite of problems, such as overcrowding, inadequate sanitation, waste disposal and water supply, and the spread of disease (see Chapters 10 and 11).

The relationship among the three components of the population-poverty-environment nexus is a mutually reinforcing one, where change in one follows from a change in another. Addressing problems associated with one component must therefore factor in planning for and intervention in the other two. In the case of Balochistan, the population, poverty and environment model described here provides a basis for understanding and dealing with complex interrelationships, of which the dimensions have not been quantified, the trends not clearly defined and the solutions not fully explored or implemented.

POPULATION

According to the provisional results of the 1998 census, the population of Balochistan has been growing at an annual rate of 2.42% compared with the national average of 2.61%. It currently stands at 6.51 million. Some argue that this is an underestimate, as

Figure 16 Population of Balochistan by Age Groups and Gender



Source: Population Census Organization 1999b.

several areas of the province could not be enumerated (Population Census Organization 1999b). At the present growth rate, the population will reach 14 million by 2030. By that time, it is projected that half the people will be living in urban areas, compared with 23% at present (see Chapter 10).

In Balochistan, key demographic indicators are no better than in the rest of the country. The total fertility rate in the province is 5.8 children per woman of childbearing age, compared with 5.4 for Pakistan (National Institute of Population Studies 1992). The infant mortality rate is 117 per thousand in rural areas and 120 in urban areas. By way of comparison, the figure for Pakistan is 78. The crude birth rate is 38 per thousand population, compared with 35 for the entire country (National Institute of Population Studies 1992).

What is particularly significant about the population is its structure (Figure 16). Although the analysis is based on a small sample, and there are reporting errors, provisional figures show that about 45% of the population is of reproductive age, and almost half is under the age of 15 (Population Census Organization 1999b). Given the high fertility rates, prevalent social and cultural traditions and the limited reach of family planning programme, particularly in rural areas, this young population has the innate capacity to increase very rapidly.

POVERTY

The poverty line is the conventional measure that separates the poor from the non-poor. The poor are defined as those whose income or consumption falls below this standard. Calculations based on different approaches estimate poverty in Balochistan to range between 14.8% and 29.2% (Tables 26).

The calorie-based approach (based on 2,250 calories per person per day) indicates that poverty has

declined somewhat and is slightly lower than the national average. The basic needs approach, based on distribution of expenditure, shows a similar trend. But in terms of distribution of income, the trend is reversed, indicating that the situation has worsened. The gap between the rich and the poor is getting wider. The problem with using any one indicator, such as income or consumption, is that it paints only a partial picture and obscures the real magnitude of what poverty is. Living standards cannot be determined by income and consumption alone. In addition to non-economic measures of living standards or well-being – such as life expectancy and mortality, access to clean drinking water, education, health facilities, public transport, sewerage and electricity, security – of livelihood and opportunity are also important parameters for defining poverty.

Although the literacy rate has improved over the past 20 years, it presently stands at about 27%. There are major disparities between the urban and rural population, and between men and women. The literacy rate among rural women – those who are primarily responsible for many aspects of resource use – is currently less than 9% (see Table 36 in Chapter 18).

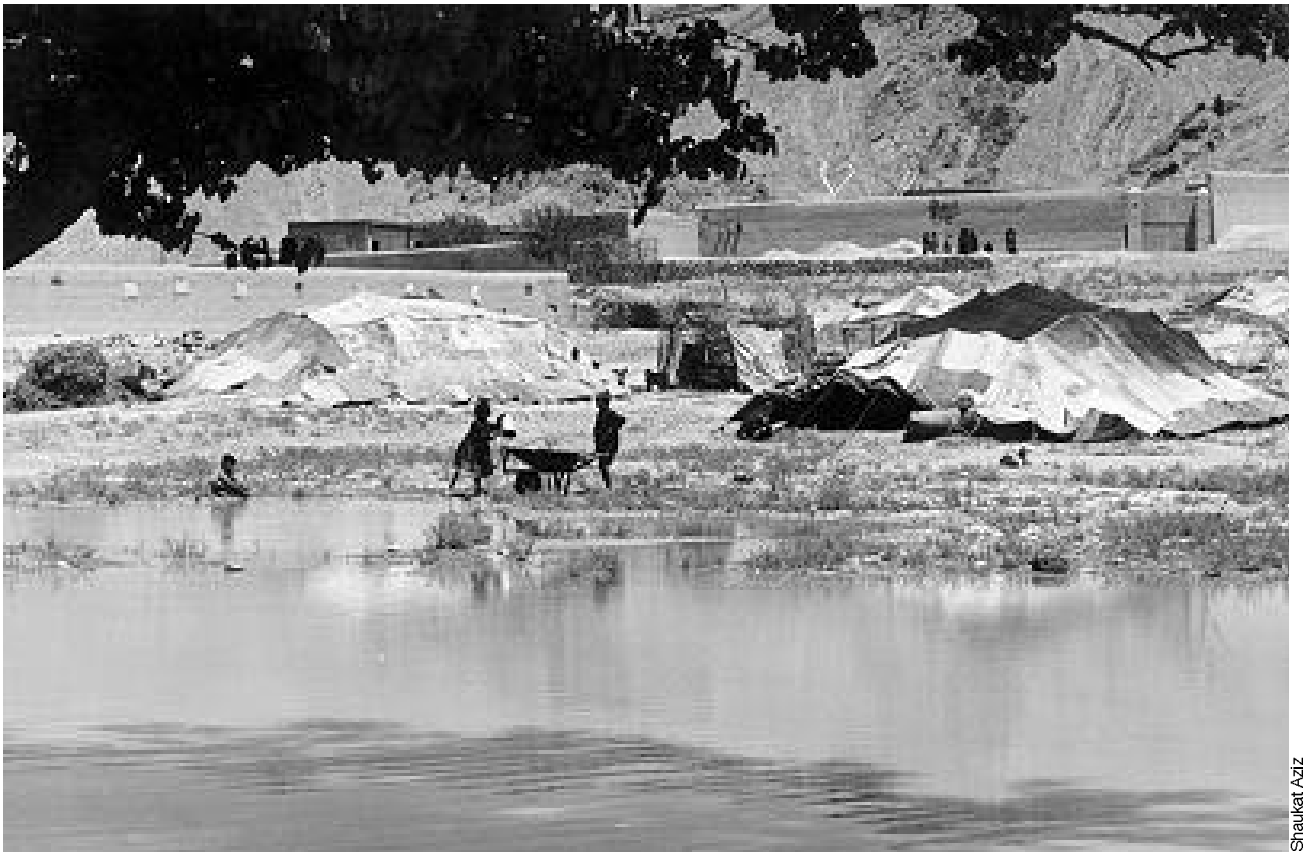
In terms of educational attainment, 25% of the population has been educated to the primary level, but only 7% continued beyond that. In rural areas, access to education beyond primary level is very limited, particularly for girls. In Pakistan, nearly half of the population does not have access to safe drinking water and primary health care, and about 38% of children under five are malnourished. This is true of Balochistan also. It is these types of deprivations that are the 'real' cause of poverty.

Table 26 Poverty Indicators

	Head Count[1]		Income Gap[2]		FGT Index[3]	
	Pakistan	Balochistan	Pakistan	Balochistan	Pakistan	Balochistan
CALORIE-BASED APPROACH[4]						
1986–87	26.9	27.5	**17.4**	**16.2**	1.2	1.2
1987–88	26.4	24.8	**17.6**	**15.7**	1.3	1.0
1990–91	23.3	16.4	**16.8**	**16.8**	1.0	0.7
1992–93	20.3	19.3	**16.7**	**14.7**	0.9	0.7
1993–94	20.8	19.6	**16.7**	**14.8**	0.9	0.7
BASIC NEEDS APPROACH BASED ON DISTRIBUTION OF EXPENDITURE						
1986–87	29.1	31.1	**19.7**	**17.4**	1.7	1.3
1987–88	29.2	28.8	**19.8**	**18.0**	1.7	1.5
1990–91	16.1	21.3	**19.7**	**22.0**	1.5	1.5
1992–93	26.8	26.4	**18.5**	**17.5**	1.4	1.2
1993–94	28.7	24.4	**19.3**	**16.8**	1.6	1.0
BASIC NEEDS APPROACH BASED ON DISTRIBUTION OF INCOME						
1986–87	28.6	26.9	**20.6**	**16.9**	1.8	1.2
1987–88	29.2	23.1	**21.1**	**18.1**	1.9	1.2
1990–91	29.4	23.5	**26.3**	**27.1**	3.1	3.2
1992–93	35.9	30.1	**28.9**	**27.5**	4.5	3.8
1993–94	35.7	29.2	**27.9**	**25.4**	4.1	3.1

Source: Mahbub-ul-Haq Centre for Human Development 1999.

Notes:
1. Head Count ratio is the proportion of individuals (or households) whose incomes (or consumption level) fall below the poverty line. This measure, while measuring the proportion of deprived persons, fails to differentiate between individuals or households who are nearer to the poverty line from those who are at a greater distance from it.
2. Income Gap ratio is a measure that takes into account the average income of the poor and its distance from the poverty line. This measurement, however, is insensitive to distribution among the poor.
3. FGTIndex provides an estimation of the severity of poverty among the poor, where the greater the figure, the higher the severity of poverty among the poor, e.g. a 0 FGTimplies that all the poor are equally poor.
4. 2,250 calories per person per day.



Shaukat Aziz

Seventy percent of the population follows a subsistence lifestyle.

In response to the need to estimate poverty more accurately, efforts have been made to develop and refine criteria that are more comprehensive. For example, the Human Development Report (UNDP 1998) introduced the concept of the Human Poverty Index. According to this measure, poverty in Pakistan was calculated to be 47%. The Mahbub-ul-Haq Centre for Human Development (1999) has worked with the index authors to further refine this approach. The result is the Poverty of Opportunity Index (POPI). This uses multiple variables for measuring deprivations in health, education and income. According to the POPI, 44% of the population in Pakistan in 1995 was impoverished. Information was not available upon which to calculate the POPI in Balochistan, but the results should be about the same.

In formulating the Poverty Alleviation Strategy for Balochistan the figure of 22% was used for the number of households living below the poverty line. However, it is recognized that 70% of the population follows a subsistence life-style, many of whom are close to, if not below, the poverty line.

The development of the POPI is an improvement on earlier methodologies for calculating poverty, but it is not perfect. There are many other important opportunities, such as access to land, credit, employment and political and social opportunities, that – while difficult to measure – could be included to capture the varied dimensions of human deprivation.

ENVIRONMENT

Few if any renewable resources in Balochistan have escaped the effects of human presence. As is the case in many regions of the world, forests are being cut, soil is being lost through erosion, water is being mined and polluted, agrochemicals are being used inappropriately, biodiversity is being lost and wildlife populations are being decimated. Desertification was identified in the Environmental Profile of Pakistan (IUCN 1998b) as a major consequence of human activity. Not all of the marine resources have been over-exploited, due perhaps to the lack of resources and technology to do so. These

issues are discussed in other chapters of this document. To deal effectively with these issues, it is important to understand how much can be attributed to population growth and poverty.

Population Growth and the Environment

The links between population growth and environmental degradation are complex and multidimensional. There has been no comprehensive assessment of the extent to which population growth affects the environment, or the processes at work. Balochistan is a large and diverse province, and it may be that the effects vary from one region to another. This suggests that universal remedies may not be appropriate, and that approaches have to be carefully tailored to suit the particular circumstances of each area.

An increasing population dependent on a finite resource base is bound, eventually, to find itself without enough for everyone to live on. This basic fact obscures larger realities, however. Other factors at play include control over resources, consumption patterns and institutional and structural inconsistencies and biases affecting the poor. In general, population growth in itself does not have a positive or negative correlation with pressures on the environment and natural resources. What determines the relationship between the two are factors such as the nature of public and social institutions, the status and carrying capacity of the resource base, resource distribution between the better off and the poorer segments of the population, government policies and practices, resource-use practices and the laws of the land. Similarly, the issue of population growth in Balochistan needs to be looked at in the context of the province's narrow and depleting resource base, the rising trend of rural-urban migration, the high incidence of poverty and the skewed distribution of wealth and benefits. As such, efforts aimed at reducing the population growth rate will have to address all causative factors before they bear any significant results.

Information is not available to support the view that an increase in rural population increases the rate at which, for example, juniper forests are being cut, or that it translates into increased pressure on the fisheries resource or wildlife populations. Yet, it is true that more people inevitably means more demand on agricultural production and water, both of which are finite commodities. The inexorable, rapid spread of settlements into cultivable areas, such as the floodplains of the Pishin-Quetta valleys, no doubt reflects a growing population as much as it does a desire to reap the benefits of horticulture. It is also true that the influx of refugees from Afghanistan led to sudden, severe, long-lasting impacts on forests, wildlife and rangelands.

Shuja Zaidi, BCIAP

Living standards alone do not determine poverty.

It is inevitable that a growing population will use more of the available resources. The continuing expansion of human settlements onto cultivable land and areas important for groundwater recharge is worrying, particularly in light of a recent study that concludes that Pakistan's land resources are close to the limit of their ability to provide sustainable support to its people (Young 1998). Rural-urban migration is a reflection of the limits of resources, and some of the greatest impacts will be in the urban conglomerations that emerge in the next 30 years (see Chapter 10). The problems faced by communities in areas where water is very limited, such as the Mekran coast, and in areas where groundwater resources are now in deficit are described in Chapters 4 and 6.

Poverty and the Environment

The relationship between poverty, the environment and natural resources is tied to the fact that the poor will do whatever they have to do in order to survive. In the process, the environment and resources will suffer. As the environment is degraded, impoverishment intensifies. As is often the case, the poor get the blame for the circumstances they find themselves in and the damage that is seen. There is little quantifiable evidence on which to make such a judgement in Balochistan. Nomadic pastoralism has been a way of life for centuries, practised in response to the distribution and abundance of range resources and to variations in climate that include frequent periods of drought. The traditional farming system is likewise adapted. Certainly overgrazing is a problem, and flocks are moving into increasingly marginal areas. This is not however, the direct result of poverty, but of poor range management systems, as described in Chapter 3. More likely, when traditional production systems can no longer provide the means of survival, people move on to other areas, or into towns. In many parts of the province, the tribal structure and tradition dictate the use and distribution of resources and how members respond.

Some generalizations have been made about subsistence farmers and pastoralists in Pakistan. These may also hold true for Balochistan. Subsistence-level farmers and pastoralists are most concerned about survival on a day-to-day basis, and their ability to plan for the future is often restricted to no more than days or weeks. This short-term horizon, however, is not an innate characteristic of the poor but rather a consequence of complex interactions between policy, institutional and social failures (Mink 1992).

The poor may have more inclination to forgo higher or more sustained returns in the future, in favour of immediate returns. The consequences for natural resources can be extremely damaging: "[T]he implications of a high subjective discount rate are rapid resource extraction to meet present income or consumption needs and low investment in natural resources to improve future returns" (Mink 1992). Hence, the poor are more likely to pursue strategies that result in, for example, the overgrazing of pastures and reduction in fallow time that would lower the productivity of the rangelands and farmlands, respectively, in the future. Similarly, the poor will also be disinclined towards making investments in farmland if the returns are beyond their time horizon, and if they lack the security of land tenure (Anderson and Lorch 1995).

A caveat to these assumptions is that not all poor farmers are myopic, nor do all well-off farmers possess long-term vision. The vision of each is determined by the combination of various social and institutional factors facing them. Poor farmers belonging to societies with strong social bonds and a tradition of reverence for nature have been known to demonstrate remarkable foresight in the face of mounting risks to their livelihoods. Such examples are becoming rare as population growth combined with environmental degradation strains the capacity of the poor to subsist (Anderson and Lorch 1995). Similarly, better-off farmers indulge in environmentally damaging and unsustainable resource management practices. For example, some orchard owners in Balochistan contribute to the depletion of water supplies by mining groundwater. Policy decisions, such as charging flat rates for the use of electricity to run tubewells and the failure to collect electricity dues, contribute to the problem.

The poor may experience higher levels of risk than higher-income groups do. Some of these emanate from badly conceived and poorly implemented government policies. For example, government involvement in input supply to farmers (credit, pesticides, seed and fertilizer) has been ineffective in that inputs are either not available or late. If they are available, they are beyond the reach of most farmers, except for those with higher incomes. Furthermore, lack of resources, market information and geographical isolation block the poor's access to private suppliers.

The poor also face higher risks with relation to land tenure. Often, poor farmers and pastoralists see their access to land as being tenuous. This may be due to disputes over ownership of the land with other groups. In Balochistan, large areas belong to the tribal chiefs and other influential people. The poor, who are either tenants or are allowed to use land for livestock grazing, have no legal title to that land. If farmers do not have a long-term lease on the land, they are less likely to use the land or water resources in a sustainable way. Without legal title, the farmers have no collateral to offer for loans and cannot make needed investments in the land. In comparison, better-off rural families are more likely to be able to establish firm claims to land where there is a transition from common property to private property systems, or where there are lengthy and costly administrative procedures for establishing title to land. Other kinds of risks the poor face arise as a result of environmental degradation. This can lower the productivity of land and can result in lower yields, yield fluctuations, soil erosion and decreased water availability.

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The poor will often do whatever they have to, to survive.

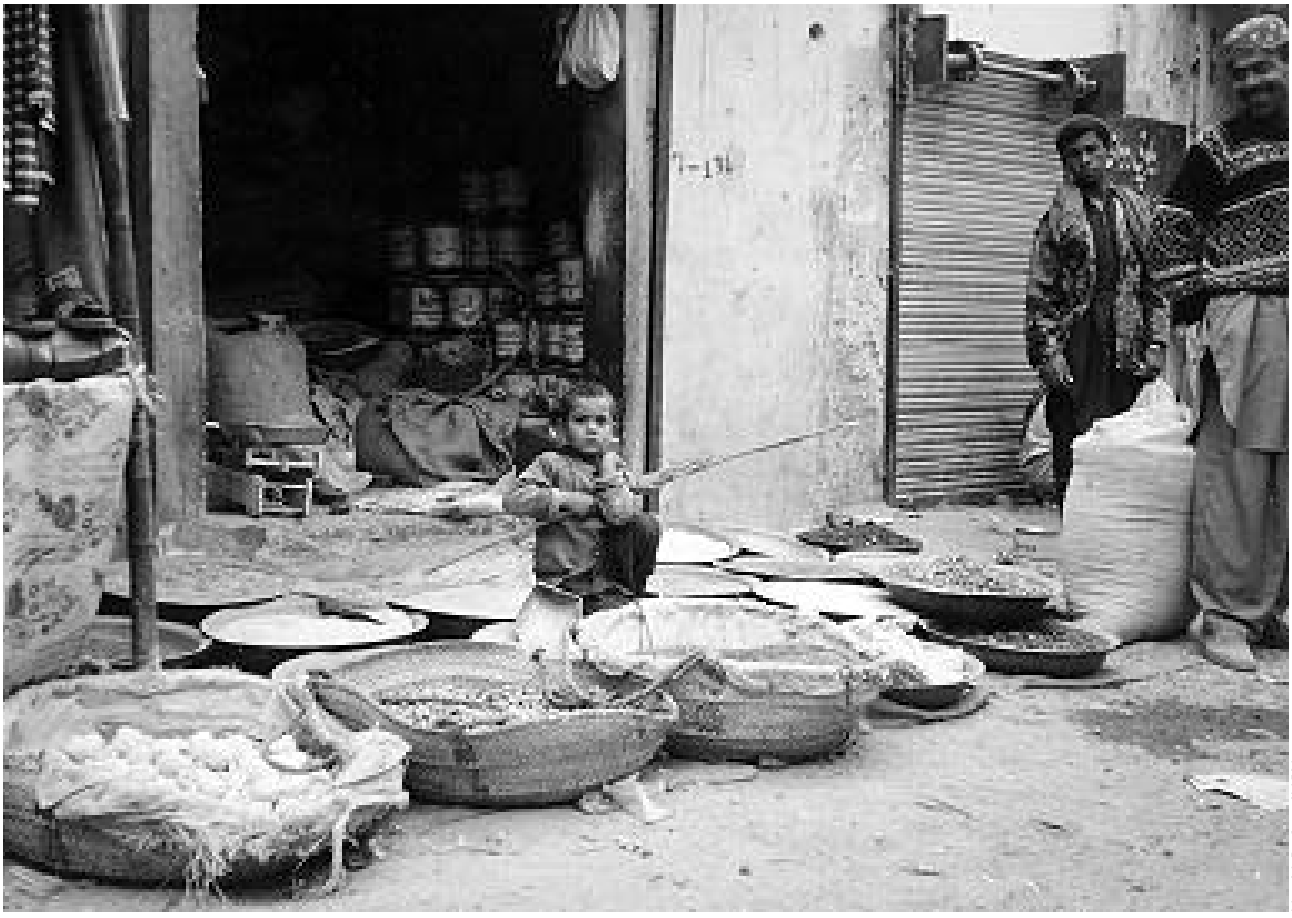
Experiences from other areas of Pakistan and the developing world suggest that the poor are especially prone to the effects of environmental degradation for two reasons:

- The places where they live are often environmentally fragile or degraded and have a high risk associated with the lack of income-generating possibilities and poor health conditions.
- They lack the capacity and resources to avoid exposure to environmental risks or to invest in alleviating the causes of degradation.

The poor are considered more likely to suffer from polluted water and from indoor and outdoor air pollution (see Chapters 10 and 15). Again, there is no statistical basis to assess the extent of the problem. It may be that lack of education and information on the issues and how to deal with them are as big a problem as the lack of resources. In rural areas of Balochistan, for example, women may have used a spring or well for generations. They may not understand the link between polluted water and the health problems they have traditionally had to live with. Men may not make the link between water, health and productivity, and may not see the need to change the way that things have always been done. Once the problem is identified and internalized in the community, the problems can be remedied without a great deal of effort.

In addition to affecting the health of the poor, environmental degradation affects the productivity of the poor by increasingly diverting labour away from productive activities, such as agriculture and livestock rearing, to routine tasks, such as fuelwood and water collection. It also lowers the productivity of the resources the poor depend on for their livelihood (Rao 1995).

As fuelwood and water become scarce, the poor, mainly women, have to spend more time collecting wood and water for household use, at the expense of time spent on income-generating activities. Evidence from independent studies conducted in Balochistan confirms that fetching water and fuelwood are time-consuming and physically challenging tasks. Women reported having



Hamid Sarfraz, IUCN

A child looks after the business in his father's absence, main bazar, Panjgur.

to fetch water two or three times a day from distant sources, while many complained about health problems associated with carrying heavy loads on a regular basis (P&DD 1993a).

Environmental degradation leading to lower productivity, can be attributed to both external and internal factors. The influences beyond the control of the poor include policies that encourage resource mismanagement, industrial development and resource exploitation by higher-income groups and commercial interests. Examples of this include pollution from industrial sources, flooding and resource exploitation by refugees. The factors within the control of the poor that decrease productivity are the outcome of complex interactions between poverty and population growth, where the poor are compelled to act in ways that further exacerbate environmental degradation. Often, as in the case of groundwater depletion in Balochistan, resource degradation is the result of interplay between both internal and external factors (see Chapter 4).

When confronted with the risk of falling below subsistence-level consumption, farmers are likely to try a wide range of mechanisms to cope with and manage the risks before resorting to unsustainable resource management practices. In times of crisis, farmers may resort to borrowing for consumption, altering farming practices, migrating, or taking on wage labour. Due to various institutional, social and physical factors, the options available to poor farmers are often limited.

Evidence to assess the extent of all these problems in Balochistan is not available.

GOVERNMENT'S RESPONSE TO THESE ISSUES

Traditionally, governments have responded to population, poverty and environment issues along sectoral

lines. A number of major social interventions, such as the Social Action Programme (SAP), that focus on family planning, education and health initiatives are being implemented in the province. The Poverty Alleviation Strategy (1999) is the most recent attempt to grapple directly with poverty, in line with Pakistan's 2010 programme. The provincial government moved swiftly in an effort to produce a comprehensive, gender and environment-conscious strategy, based on the concept of community participation. This was undertaken largely by sectoral task forces. The major components discussed in a public review of the strategy (P&DD 1999a) were:

- human resource development in the public and private sectors;
- governance; and
- income generation.

Many useful ideas emerged from the discussion on the first two components. The thrust of the strategy though, is focused on income generation, based on set targets for resource production, processing and export (see Chapter 9). These targets were to be met in a two-year Public Sector Development Programme (1999–2001). Efforts were also planned to improve the performance of the school system, to improve the delivery of social welfare programmes such as SAP through community participation, to promote rural development through the establishment of Village Development Committees and to reactivate the Technical Training Centres.

The development of the strategy was a very positive step, and acknowledged the importance of an integrated approach that includes the consideration of gender, environment and community participation. This approach is also reflected in the Ninth Five-Year Plan. The test of the strategy will be if it can continue the trend away from single-sector initiatives and can institutionalize the integrated approach required to deal with the complex issues surrounding population growth, poverty and the environment. Undoubtedly, an increase in food production and export would be good for the provincial economy. But it may not translate into employment opportunities and the 'trickle down' in economic benefits as was intended. The government is well aware that existing power structures need to be deconstructed if this is to happen (P&DD 1999a). This 'trickle down' effect did not work as was earlier planned, when capital was invested in big industry (see Chapter 9).

The other danger of pursuing traditional, resource-production-based approaches is that these may exacerbate the problems already confronting these sectors. For example, increasing production in the agriculture sector means drawing heavily on water resources that are already in deficit in some areas. Numerous tubewells are to be installed, solar pumps employed and the flat rate charged for electricity for tubewell operation is to continue (Govt. Restores Flat Power Rates … 1999). Increasing prawn exports may contribute to the unsustainable use of this resource. Increasing cotton production means using more agrochemicals, a source of many concerns for the environment and for public health. The 'green revolution', with increased mechanization and the introduction of new technologies, may actually reduce the number of jobs, particularly for women, and further concentrate benefits in the hands of those best equipped to take advantage of the new approaches.

The Poverty Alleviation Strategy (1999) strongly advocates community-based approaches. The benefit of this approach is that it puts the responsibility for sustainable use of the resource firmly in the hands of the people concerned. Examples are the minor irrigation projects conducted under the Balochistan Community Irrigation and Agriculture Project (see Chapter 4) and efforts to conserve biodiversity (see Chapter 5) where the communities are ultimately responsible for the success of the project and where the value of resources has been enhanced.

POVERTY ALLEVIATION STRATEGY

The government of Balochistan announced its Poverty Alleviation Strategy in March 1999. The thrust of this development programme is to raise the standard of living of the people of the province. The Strategy involves an initial investment of Rs. 1.27 billion with an estimated return of Rs. 2.26 billion. The strategy will provide employment for 270,000 people, and is aimed at providing a sustainable livelihood for 70% of the population of Balochistan, who are compelled to lead a life below subsistence level. The Poverty Strategy views the overall progress of Pakistan as dependent on the prosperity and development of Balochistan. Attention was drawn to the geo-political importance of Balochistan, providing land access to the Arabian Sea for the land-locked countries of Central Asia (Poverty alleviation strategy to cost Rs. 2.26 billion… 1999).

Agriculture

The drive to develop the agriculture sector is discussed in Chapter 3. Issues include selecting the land best suited to agricultural production, the sustainable supply and management of water for irrigation, provision of quality seeds and the effective and safe use of agrochemicals. It is suggested that over half of the increased production from irrigated agriculture will come from the canal-fed areas. Tubewells will be installed to augment canal water and other sources. Water management will be key to the success of these initiatives in the long term. Groundwater resources of Pishin and Loralai are already stressed, and it is not clear how the expansion of irrigated agriculture in these areas is to be achieved on a sustainable basis.

The use of integrated pest management techniques should go hand-in-hand with the expansion of cotton production. Mekran is well suited to growing high-quality dates. A host of problems surround their processing and marketing. New initiatives should only be pursued in light of the lessons learned from past experiences.

Livestock and Forestry

Livestock production has been a mainstay of the provincial economy for generations. The PAS proposes some useful approaches to improving the productivity and management of rangelands. A number of these approaches have been attempted since the mid-1950s without much success. For example, reseeding grasses and shrubs and improving seedbed conditions have not proved viable. The results of all previous work should be reviewed and taken into account before launching similar costly programmes.

Raising awareness about the benefits of good range management and improving the productivity of livestock may prove to be among the most useful interventions. Both entail demonstrating to skeptical producers that adopting techniques such as rotational grazing, and introducing more productive breeds, do provide enhanced benefits. Such demonstrations have to be planned with both receptive landowners and those concerned with raising livestock. The lack of ownership of earlier projects may have contributed to their lack of sustainability. Demonstration projects will take time and long-term support if they are to have the desired effect.

Fisheries

Issues surrounding the sustainable development of fisheries have been discussed in Chapter 6. It is difficult to put current and projected fish catch in any perspective, given the absence of data to support the sustainability of the fishery. Historical use might provide some insights. Balochistan's coastal waters are also fished in by boats from Sindh, as well as by other nationalities. The extent of their catch is not known to any degree of accuracy. The recent agreements as planned in 1999 with foreign interests to fish offshore would throw into question the future of the fishery. Until such time as sound fisheries management measures are put in place, a very conservative approach should be adopted.

No information is available on the potential for successfully farming and marketing sea prawns, or for the proposed fish farms to be established in each district. These projects should be subject to review under the provisions of the 1997 Pakistan Environmental Protection Act.

Industries

The promotion of craft and garment production is in keeping with the promotion of cottage and small-scale business. It provides a sustainable livelihood for women, while at the same time placing few demands on natural resources. Competitiveness will determine how successful these ventures will be in the long term.

Minerals

The minerals sector is likely to be one of the most promising in the long term. The marketplace, in terms of commodity prices, will ultimately determine what mining is commercially viable in the province. The experiences of Saindak should be taken into account. Mining companies also seek a conducive policy and regulatory environment. The mineral potential of the province is well-known to geologists and mining companies, and given the right conditions, they will certainly move quickly to exploit mineral resources.

It is essential that planning begins as soon as possible for areas where high potential for mining exists. This includes land use planning and management of water resources. One of the biggest challenges to the mining industry is obtaining a reliable supply of water. The demand for scarce water resources and potential competition for other uses, such as agriculture, is likely to be

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Improving the productivity of livestock will enhance benefits.

a major issue. This is particularly so where ore processing or the use of slurry pipelines is contemplated.

Environmental studies should be conducted well in advance of mine development. Once mining moves beyond the exploratory stage and agreements to develop ore bodies are put in place, there is often very little room to manoeuvre in terms of fulfilling the requirements of the Pakistan Environmental Protection Act, or satisfactorily addressing environmental issues.

Some of the most promising areas for mining are to be found in the more remote areas of the province, many of which are significant for biological diversity, such as Chagai. Measures to protect important habitats and wildlife populations should be taken before these areas are opened up for development. Large international mining interests have generally adopted environmental guidelines for their projects that exceed the current requirements in Balochistan. The government should ensure that the best practice is followed for mine development in the province.

As minerals fall under provincial jurisdiction, there is a much better chance that the government can negotiate the type of socio-economic agreements envisaged for the energy sector. Negotiating these types of agreements is critical to ensuring that benefits flow to the local people who need it most. In many countries, frontier resource development provides virtually no lasting benefits to local people, in spite of the value of the commodity being exploited.

Infrastructure

The identification of road requirements in rural areas has to be done in a systematic and planned fashion. This is one of the goals of establishing land use planning mechanisms in the province. Roads provide some benefits to local people. Recently, the lack of or inadequate communication infrastructure has hampered drought releif work to a great extent. They also open up areas to unintended development and the exploitation of wildlife. Four-wheel drive vehicles and a mobile urban population translates into easy access to many remote areas of the province. The construction of new roads should be rationalized not only on socio-economic grounds, but also in terms of the environmental consequences of opening up rural areas. Some communities have declined good road access in order to preserve their areas and life-styles. Communities must be consulted before roads are planned or constructed.

Tubewells

The PAS involves concerted action on the part of the Balochistan Development Authority and the Irrigation

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Education and training are key to improvements.

and Power Department to install tubewells to exploit groundwater 'wherever the potential exists'. But installing 1,360 tubewells over the next three years offers little prospect for developing and implementing water management procedures. It is essential that Water Boards are set up at the least for basins where water balance is deficit and where tubewell installation is planned (see Chapter 4).

Education and Training

Education and training are at the root of economic development strategies for Balochistan. The rapidly urbanizing population will need to adapt quickly and create new opportunities for business development and employment. The trend worldwide is for the government to shrink, and for the private sector and civil society to take on many of the roles formerly played by the public sector. Most countries can no longer afford to sustain a large public sector, and Pakistan is no exception. Education and training strategies need to focus on developing the skills required for Balochistan to compete in Pakistani and international markets. The emergence of a Central Asia trading block offers new opportunities. A human resources development strategy should be prepared with this in mind, and the appropriate institutions and programmes put in place as quickly as possible.

Rural Development

The rural development initiatives envisaged under the PAS offer an integrated approach to developing sustainable, village-level activities. The key is to involve the communities in designing, planning and implementing these schemes with the help of community-based organizations and appropriate credit arrangements. There have been many rural development schemes in the past, some more successful than others. A number of non-governmental and community-based groups are active in various parts of the province. The government should review with the communities and concerned groups the lessons learned from all of these initiatives, take the best of these approaches and avoid the mistakes.

THE WAY AHEAD

Understand the Population, Poverty and Environment Nexus

Models on the population, poverty and environment nexus are generalized from experiences in other areas of Pakistan, and from developing countries around the world. They are useful only as a starting point for discussion. Several of the hypotheses presented here may not hold true, given the diverse social, cultural, political and ecological environment of the province. Dealing effectively with these complex interactions therefore, requires a thorough understanding of linkages and trends at the provincial level.

A roundtable will be established involving government agencies, the private sector, civil society, academia and research institutions to elucidate these linkages, and to help develop and focus major interventions, such as the Poverty Alleviation Strategy, to deal with the issues in an integrated way. A seminar held by the Planning and Development Department in 1999

(P&DD 1999a) began the process, and drew attention to important components of the strategy, such as human resource development, governance and credit. It is important that these components are not lost in the effort to promote the production and export of commodities. Pursuing outside investment in the province is an important short-term goal. The greatest gains will probably come through a reallocation of existing resources, institutional reform and finding new ways of doing business in partnership with the private sector, civil society and communities.

Policy initiatives that will be considered by the forum include:

- taking steps to sustain a healthy natural resource base as an engine for economic growth;
- correcting the skewed distribution of resources by giving greater control over land and natural resources to the poor, and by bringing in structural and institutional changes, such as land and legal reforms;
- providing incentives for the production of value-added goods from locally available resources;
- implementing educational reforms and making education the number one priority for bringing about social and economic development; and
- taking measures to improve accountability and transparency.

The forum will discuss and analyze past and existing interventions as a basis for developing and applying the lessons learned. In this way, the focus will be on ensuring that the benefits of poverty alleviation strategies flow to those most in need.

The work of the forum will be supported by a well-thought-out research programme. It will include developing a detailed understanding of the demographics of the population in the various rural and urban areas of the province. A lot of work is required on the nature of poverty, which is after all, the object of development interventions, but which is poorly understood in many of its dimensions. The problem is probably much more extensive than is currently thought. Knowledge about the state of the environment is urgently needed, and recommendations to improve that are made in relevant Chapters.

There are many assumptions about the nature of population, poverty and environment linkages that may not withstand close scrutiny. For example, the nature of the relationship between population growth and environment is known to be complex and poorly understood. It is difficult to go beyond generalizations on poverty and environment. Interrelationships need to be demonstrated, supported by sound, quantitative data. These data will form the basis for a better understanding of the issues, and help ensure that initiatives are properly targeted.

Review Sustainability of Programmes Based on Renewable Resources

The provincial economy will continue to rely heavily on renewable resources for some years to come. The need to increase yields is being pursued aggressively through the development of additional water resources. Targets heavily dependent on water will be reviewed in light of the recommendations made in Chapter 4, to ensure sustainability. The integrated approach called for in the strategy is essential to ensure that all aspects are given proper weight in developing resources. Emphasis will be placed on improving the efficiency and effectiveness of renewable resource development. That involves training and providing extension services to those who can most benefit, so that the return on investment is maximized. It also means addressing issues of access to resources, such as land and water, strengthening delivery of government services and providing employment alternatives and training in off-farm activities, such as processing and marketing.

Reliance on wood for heating and cooking will be reduced through the introduction of alternative fuels and alternative technologies (see Chapter 8).

Innovative ways must be found to add value to resources. Enhanced production does not necessarily create jobs or improve financial returns to the poor. Jobs are created through value-added activities, such as sport hunting; the marketing of medicinal, economically valuable and organically grown plants; and handicrafts. The benefits are retained within the community.

Micro credit schemes offer one of the best ways to stimulate community-based development. Existing schemes need to be reviewed, and the lessons learned will be applied in developing and introducing new schemes.

Education, Health and Family Planning Programmes

Governments will continue their efforts to promote education, health and family planning programmes. These are fundamental to the future development of the province and will have a major impact on the population, poverty and environment nexus when planned and implemented to address the relationships among the three components, and when sensitive to the conditions that prevail and the needs that have to be met in different parts of the province.

Chapter 13

Cultural he

Cultural Heritage

In the story of mankind and civilization, Balochistan occupies a unique position. It contains evidence of early Stone Age man, and of their gradual development and struggle for existence. The antiquity of the cultural heritage of Pakistan, particularly of Balochistan, is as old as humanity itself.

The province of Balochistan has inherited relics of the Stone Age in the form of stone tools and rock paintings and engravings in caves and rock shelters. Since the primitive hunting stage of human history, various people with their distinct cultures came to this land and left behind a rich cultural wealth.

Today, the entire province is dotted with prehistoric and proto-historic settlements. The innumerable sites so far discovered, together with the historical monuments, provide a story of continuous human activity throughout the ages. They bear testimony to the greatness of its cultural heritage. These sites and monuments deserve a visible place in our national history, but unfortunately, some of them are getting lost, impoverishing the cultural heritage of the province. There are many reasons for this state of affairs; the major one is the absence of a proper state organization at the provincial level.

The culture heritage of Balochistan needs adequate elaboration in order to draw local and foreign attention. In this way, the importance of the national heritage will be reflected appropriately to people within and outside the country. Through tourism, it can also be a source of foreign exchange.

ARCHAEOLOGICAL RESOURCES

Balochistan has inherited relics in the form of stone tools found in caves and terraces that date back to the Pleistocene period. These have been discovered in Kot Mondai, Marri area and Khokar Kaur Lasbela, and belong to the Acheulian and Mousterian culture of the Palaeolithic period. In addition, some caves and rock shelter paintings have recently been found in the Sulaiman range and its subsidiary ranges, in Zhob and Musakhel Districts of Balochistan (Box 22). These paintings belong to the Gravettian and Magdalenian cultures of upper Palaeolithic, range from 22,000–18,000 BC and 18,000–12,000 BC, respectively (Table 27, Map 12, in Maps section).

The earliest stone tools found in eastern Balochistan at Kot Mondai, Marri area, belong to a primitive stage of human development, the Acheulian

culture. Found in 1898, these ancient remains of human activity link the Balochistan plateau to a vast complex of early centres of human activity, stretching from southern England, France and Spain through the Mediterranean, including the Sahara region and Egypt, south and east Africa, Palestine and Syria, across to southern India and then on as far as northeastern China. The Acheulian period, broadly speaking, extends from the end of the Abbevillian, perhaps around 400,000 BC, right up to the Middle Palaeolithic or Mousterian, which began around 100,000 BC. Stone tools (hand axes) of Mousterian culture were found at Khokar Kaur, Lasbela region, in southeastern Balochistan. The Mousterian period or cultures range from 100,000 to 40,000 BC.

The next stage in human cultural history is the Mesolithic (Middle Stone Age), but no site of this period has so far been discovered in Balochistan, though the engravings in Zhob District could be assigned to this period.

The third stage is the Neolithic (New Stone Age). In Balochistan, during the eighth millennium BC, there were at least seven Neolithic sites or remains, two of which have been scientifically excavated – namely, Mehrgarh in Kachhi plains and Killi Gul Muhammad in Quetta valley. The other sites, though not excavated, but known to be of the Neolithic period, are Baleli Mound in Quetta valley, Rana Ghundai and Surjangal in Loralai District, and Musazai in Zhob District. Other important sites of pre- and proto-historic periods from Chalcolithic to the Iron Age include the Pirak, Nido Damb, Daber Kot and Juder jo Daro (Table 28, Map 12).

The discovery and excavations of acronymic Neolithic (8000–2300 BC) at Mehrgarh, and the study of some other sites of Balochistan indicate that the prehistoric cultures of Balochistan underwent fundamental socio-cultural changes and ecological adjustments that permitted the two most important transformations in

Box 22 Rock Art

The stone age paintings and engravings recently discovered in caves and rock shelters in Musakhel and Zhob Districts, have remained undisturbed for 20,000–30,000 years.These caves and rock shelters are fabulous conservatories of prehistoric times, bearing testimony to the metaphysical concerns and aesthetic approaches of our direct ancestors.

Table 27 Pre-Historic Caves and Rock Shelter Dwellings

Name of Site	Period	District	Legal Status	Property	Salient Features / Location of the Sites
Torghar	22,000 BC	**Musakhel**	Unprotected	**2 caves and 20 rock shelters**	Natural caves and rock shelters in the Sulaiman Range. The rock shelters bear paintings of animals and humans along with abstract signs. Made by Stone Age man by using the natural pigments of iron oxide, manganese, and copper oxide. Some tools (hand axes) of stone were found in the caves and around the rock shelters of Acheulian culture, which were used by the Neanderthal man some half a million years ago.
Zuncari Village	22,000 BC	**Musakhel**	Unprotected	**7 rock shelters**	As above
Leaoha Ghozai	22,000 BC	**Zhob**	Unprotected	**5 caves and 6 rock shelters**	As above
Babar/Khosti	18,000 BC	**Zhob**	Unprotected	**10 rock shelters**	The Stone Age man of the Magdalenian culture has engraved various types of animals including leopard.
Lakaha Band	18,000 BC	**Zhob**	Unprotected	**4 rock shelters**	As above
Dhana Abdullahzai	18,000 BC	**Zhob**	Unprotected	**1 rock shelter**	As above, additionally for the first time they engraved wild boar in these rock shelters.
Gundriani	6,000 BC	**Bela**	Unprotected	**Man-made chambers in rock cliffs of conglomerate formation**	About 200 chambers, each with a veranda and one room made in a relatively vertical cliff of the conglomerate formation. These are mentioned by Cap. Careless and others as the Buddhist dwellings. But recent studies of material found around the cliffs, i.e., chert blades, and coarse handmade pottery indicate that actually these dwellings were built in Neolithic period about 6,000 BC.

Table 28 | Archaeological Resources

Name of Site	Period	District	Legal Status	Area	Salient Features/Location of the Sites
Periano Ghundai	Chalcolithic/ Bronze Age	**Zhob**	Unprotected	**457.2 x 320.04 m Height: 21.34 m**	Discovered in 1898 and excavated in 1927. Trail trenches were dug again in 1952 and 1970. The site is located 6 km, west of Zhob Town on the bank of the Zhob River; cultural materiels recovered were pear-shaped jars, patra-shaped cups, painted saucer. Painted designs were birds, fish, including chert blades, terracotta beads, and terracotta male and female figurines including animals.
Mughal Ghundai	Chalcolithic to Bronze Age	**Zhob**	Unprotected	**82.3 x 22.86 m Height: 6.71 m**	Located 15 km southwest of Zhob Town on the left bank of the Zhob River. Discovered and excavated in 1927. The site contains the same cultural material as Periano Ghundai.
Badanzai	Bronze Age	**Zhob**	Unprotected	**75.25 x 20.9 m Height: 6 m**	Located 35 km south of Zhob Town on left side of Zhob to Quetta road. Discovered in 1984 and not excavated. The surface cultural material is of Bronze Age.
Musazai	Neolithic to Bronze Age	**Zhob**	Unprotected	**95.45 x 75.5 m Height: 8 m**	Located 65 km south of Zhob Town on left side of Zhob to Quetta road. Discovered in 1984 and not excavated. The surface cultural material is of Bronze Age.
Ismailzai	Neolithic to Bronze Age	**Zhob**	Unprotected	**115.55 x 110.3 m Height: 7 m**	Located 77 km southeast of Zhob Town near the village of Ismailzai. Discovered in 1984 and not executed. Surface cultural materials range from Neolithic period up to Bronze Age.
Rana Ghundai	Chalcolithic to Bronze Age	**Loralai**	Unprotected	**143.26 m Circum Height: 12.2 m**	Located 16 km north of Loralai Town on the road to D. G. Khan. Discovered and excavated in 1927. Trail trenches were again laid down in 1946 and 1970. Cultural material includes flint blades, bone points, bone needles, painted pottery with designs of humped bull, black buck, geometric designs with polychrome.
Surjangal	Neolithic to Bronze Age	**Loralai**	Unprotected	**66.89 m² Height: 4.88 m**	Located 8 km northeast of Sinjawi Town in Baghave Valley on the road to Duki. Discovered and excavated in 1927. Trail trenches were again laid down in 1950. The recovered cultural material includes flint blades, hearths with charcoal, bone spatula, painted pottery of all types, terracotta bangles, and figurines of males and females.
Daber Kot 1927. down in 1950. surface Chalcolithic up to blades, all various designs other	Chalcolithic to Bronze Age up to	**Loralai** Sassanian	Unprotected period	**152.4 x 137.16 m Height: 34.44 m**	Located 18 km northeast of Duki Town at the plain, on the right side of the road to Kohlu. Discovered in 1898 and excavated in Trail trenches were also laid Cultural material recovered and collection range from Sassanian period, such as flint types of painted pottery with of Chalcolithic and Bronze Age found at sites of Balochistan, including terracotta figurines and burnt bricks drains.
Chinjan	Chalcolithic to Bronze Age	**Loralai**	Unprotected		Located 68 km southwest of Loralai. Discovered in 1984 and not excavated. Surface collection of cultural material contains painted pottery, flint blades, terracotta figurine, including balls. The site ranges from Chalcolithic up to Bronze Age.

Name of Site	Period	District	Legal Status	Area	Salient Features/Location of the Sites
Mehrgarh	Neolithic to Bronze Age	**Bolan**		**Approx. 4 ha.**	Located 18 km southeast of Dhadar Town on the right bank of the Bolan River. Excavated in 1974. The cultural material contains stone tools like flint blades, habitation structures, human skeletons, painted pottery, bones of domesticated animals, cultivated cereals, human and animals figurines, etc.
Noushero	Bronze Age	**Bolan**		**57.35 x 42.45 m Height: 7 m**	Located 21 km south of Dhadar Town on the left side of Sanni Shoran road. Excavated in 1982. Yielded house structures, painted pottery, animals and human figurines, including seals of Harappan type.
Pirak	Iron Age	**Sibi**	Protected	**67.45 x 8.5 m**	Located 17 km south of Sibi on the right side of the road to Jacobabad. Yielded many house structures, pottery, and various implements of Iron Age. Shows rice cultivation in this region as early as 1800 BC.
Killi Gul Mohammad cotta	Neolithic to Bronze Age	**Quetta**	Protected	**98.6 x 45.2 m Height: 8 m**	Located 3 km northwest of Quetta City on the left side of the road to Chaman. Discovered in 1949 and excavated in 1950. Cultural material recovered were chert blades, various types of painted pottery, bone spatula, and terra-humped bulls figurine.
Kechi Beg	Early Bronze Age	**Quetta**	Protected	**45.72 x 22.86 m Height: 4.52 m**	Located 8 km south of Quetta City on the road to Sibi. Excavated in 1950. Various pottery types were discovered with bio-chrome, monochrome, and polychrome painted designs.
Damb Saddat	Early Bronze Age	**Quetta**	Protected	**140 x 105 m Height: 14 m**	Located 13 km southwest of Quetta Town. Excavated in 1950. Yielded mud-brick walls on stone foundation. Cultural material consists of painted pottery, bone implements, beads, scrapers, cores, and terracotta figurines of humans and animals.
Ahmad Khanzai	Bronze Age	**Quetta**	Protected	**45.72 x 12.2 m Height: 3.5 m**	Located 5 km south of Quetta Town. Excavated in 1950. Yielded painted pottery of Bronze Age, including beads of lapis lazuli and chalcedony.
Kulli	Bronze Age	**Awaran**		**121.92 x 91.44 m Height: 9.14 m**	Located in Kolwa region on the border of Awaran and Lasbela at about 55 km west of Lasbela. Excavated in 1927. Yielded structure, beautiful pottery, terracotta animal and human figurines.
Nindowari	Bronze Age	**Lasbela**		**106 x 95.3 m Height: 9 m**	Located in Lasbela region between Porali and Kud Rivers, 250 km from Karachi. Excavated in 1962. Yielded structure, figurines of bulls and humans and very beautiful pottery.
Bala Kot	Bronze Age	**Lasbela**		**180 x 144 m Plain level of 2.8 Ht Height: 9.70 m**	Located in Lasbela region 88 km northwest of Karachi. Excavated in 1973. Yielded Harappan culture's artefacts and Nal polychrome type of pottery.
Miri Qalat	Chalcolithic to Bronze Age	**Kech**		**200.8 x 180.9 m Height: 17 m**	Located 6 km from Turbat Town on the bank of Kech River. Excavated in 1990. Yielded chert blades, painted pottery, including Harappan type.
Anjira	Chalcolithic to Bronze Age	**Kalat**		**228.6 x 106.7 m Height: 3.96 m**	Located 26 km south of Surab Town. Discovered in 1947 and excavated in 1965. Yielded chert blades, painted pottery, chert flakes, lunates, microliths, bull figurines, shell and bone beads.

Name of Site	Period	District	Legal Status	Area	Salient Features/Location of the Sites
Siah Damb	Chalcolithic to Bronze Age	**Kalat**		**37.16 m Height: 12.2 m**	Located 9 km southwest of Surab. Excavated in 1965. Yielded chert blades, structure, coarse and painted pottery, with various designs and bull figurines, bone and awl and bone beads.
Nal	Bronze Age	**Khuzdar**		**102 x 95.80 m Height: 9 m**	Located 35 km west of Khuzdar Town near the village of Nal. Excavated in 1903, 1923, and 1925. Yielded very beautiful pottery, besides the structural remains. Pot burials and mud-bricks chambers were predominant. Other cultural materials were beads, pendants, grinding stone, marble sling stone, and copper and silver implements.
Shahi Tump	Early Bronze Age	**Kech**		**170 x 80 m Height: 8 m**	Located 19 km east of Turbat Town on the left bank of Kech river. Excavated in 1927 and 1992. Yielded human skeletons, beautiful pottery of early and late Bronze Age.

later prehistory to occur – the development of an economy based upon domesticated plants and animals, and the formation of stratified societies, which later gave birth to the Indus Valley civilization.

ARCHITECTURAL RESOURCES

Architectural resources in Balochistan include constructions and structures (Table 29, Map 12) in the form of:

- forts, such as Fort of Jhalawar, Fort of Azad Khan, Nouroze Fort in Kharan, Sibi Fort, Mughal Fort at Loralai and Duki and forts in Turbat region;
- tombs and graves, such as the graveyard of Jam of Lasbela and Makli-type tombs at Bara Bagh, Ibne Haroon Tomb at Bela and those at Bhawany, Pasni, Jiwani, Hindian and Mashkel (Kharan);
- mosques, such as those built during the eighteenth and nineteenth centuries at Bela and Sohbatpur respectively; and
- historical monuments, such as those built in the beginning of the nineteenth century at Ziarat, the Residency, Jirga Hall at Sibi and Zhob, and Quetta Residency.

ARTS AND CRAFTS

Embroidery

The province of Balochistan is famous for its rich traditional arts and crafts. Each tribe has its original symbol of motifs and colours. These embroideries are handmade using different techniques and ornaments, such as beads, mirrors, threads, golden and silver kallabattoo, charma, wool thread, ribbons, shells, coins, sequins, gold, silver and semiprecious stones. The embroidery of Balochistan is so fine that it gives the impression of being machine-made, so the conspicuous value of the product is very popular amongst local people and tourists. Originally, natural herbal dyes were used, but synthetic dyes and materials are now frequently used. As women exclusively do the embroidery, it creates an income for poor village women. The artisans and distributors are people from local tribal communities.

Embroidery forms a part of domestic tradition of all three major ethnic groups in the rural areas of the province. These are the Pashtun, who constitute the majority in the north, and the Brahvi and the Baloch, who form the majority in the south and east. Their embroidery can be recognized and distinguished by the peculiar patterns, colour schemes, styles and materials used. For example, Pashtun embroidery has mostly geometric patterns and is done on the collars, back, sleeves, chest and shoulders of shirts; on women's wrappers, especially the head portion; and on caps. Women folk of Brahvi and Baloch origin produce works of embroidery that are highly regarded. The embroidery here is chiefly done on the shirts of married women, particularly on the long front pockets. The techniques and pattern are similar to some extent to those of Pashtuns in the north, but vary in some designs and colour schemes, with, for example, the shoulder bands invariably done in wool or silk. Afghan and Sindhi embroideries are also copied and are popular with both the men and women.

Table 29 Architectural Resources, Historical Forts, Mosques and Tombs

Name of Site	Period	District	Legal Status	Property	Salient Features/Location of the Sites
Fort wall of Jhalawar	1700 AD	**Kharan**	Protected	**Fort wall**	Mud bricks'wall with bastion at interval.
Kharan Fort (Azad Khan)	1700 AD	**Kharan**	Protected	**Fort**	As above, but occasionally burnt bricks have also been used.
Nouroze Fort	1600 AD	**Kharan**	Protected	**Fort**	As above.
Chakar Qila (Sibi Fort)	600 AD	**Sibi**	Protected	**Fort**	Made of mud bricks and pise, with two granary stores of oval shape and made of burnt bricks. It is commonly believed to have been built by Chakar Khan the Great, but the evidence suggests that it was built by Sewi Hindu tribe in 600 AD.
Mughal Qila	1500 AD	**Loralai**	Unprotected	**Fort**	Probably built by the Sassanians, but probably repaired and used by the Iranians and Mughals during 1500-1600 AD.
Sara Qila	800-1700 AD	**Pishin**	Unprotected	**Fort**	Originally built by the Sassanians. Later on repaired by the Safavids and Afghans and used by them until 1700 AD.
Miri Qalat	1300-1700 AD	**Kech**	Unprotected	**Fort**	Probably built around 1300 AD with mud bricks and boulders. Later on used by the local chiefs of the region. Basically, this fort is built on an archaeological site of the Chalcolithic period.
Kalatuk	1700 AD	**Kech**	Unprotected	**Fort**	A small fort of mud bricks built in the village of Kalatuk by the local chiefs with two watchtowers probably in 1700 AD for the defence of the village and cultivated land.
Jamia Mosque Bela	1838	**Bela**	Unprotected	**Mosque**	Located in Bela Town, this mosque was built by Jam Mir Khan II. The architecture is based on the central Asian style of fourteenth century.
Sohbatpur Mosque	1940	**Jaffarabad**	Unprotected	**Mosque**	Built by Sohbat Khan, a notable of the area, and embellished with fresco and secco work, besides the tile work of Hala and Multan.
Tombs in Mashkel, Nag and Panjgur	800 AD	**Kharan and Panjgur**	Unprotected	**Tomb**	Built of burnt brick with panels of various stamped and appliqué designs on the bricks, which consist of animals, humans, mythological figures etc. These are famous as Nikoderian tombs but actually are the Towers of Silence of the Zoroastrians.
Tomb of Bangi Ismail	1468 AD	**Gwadar**	Unprotected	**Tomb**	The tomb is made of sandstone, a dome resting on four monolithic quadrangular pillars with very interesting architectural features.
Tomb of Ibne Haroon	1600 AD	**Bela**	Protected	**Tomb**	Made of burnt bricks and comprising a dome; located in the north of Bela Town.
Graveyard of Jams of Lasbela	1800 AD	**Lasbela**	Protected	**Graveyard**	The graves are of the Jam and Mengal families. On the graves, attractive work of floral motifs in fresco has been done.
Graves and Tombs	1400 AD	**Bela**	Protected	**Graves and tombs**	Graves and a canopy have been constructed in yellow sandstone with jewels'motifs and with some inscriptions of Quranic verses. One tomb is built with burnt bricks.
Jiwani graves	1400 AD	**Gwadar**	Unprotected	**150 graves**	About 150 graves have been built in sand-stone with pattern and style, those found at Choukundi in Sindh. Located near the custom house at Jiwani.

Name of Site	Period	District	Legal Status	Area	Salient Features / Location of the Sites
Pasni graves	1400 AD	**Gwadar**	Unprotected	**250 graves**	About 250 graves constructed with sandstone and with patterns like those at Choukundi. Located 3 km northwest of Pasni Town on left side of the road to Turbat.
Ziarat Residency	1903	**Ziarat**	Protected	**Building 1,500 m**	Built in stone with porch and balcony of teakwood in 1903, for the summer vacation of the Assistant Governor General, Balochistan. The Father of the Nation spent his last days here. The building was declared a national monument in 1986.
Quetta Residency	1878 and 1936	**Quetta**	Unprotected	**Building**	Built of mud brick and partially with burnt bricks at Quetta for the residence of the Assistant Governor General, Balochistan. Now being used as Governor House.
Jirga Hall	1903	**Sibi**	Protected	**Building 1,000 m**	Built of burnt bricks, for Jirga of the elders of Balochistan.
Jirga Hall	1905	**Zhob**	Unprotected	**Building 750 m**	Built for similar purpose.

Other Crafts

Other crafts of Balochistan are felts, rugs and woolen items, belonging mainly to nomadic households, such as bags (for grains or flour), ropes and mattresses. The raw material used in most of them is basically obtained from camels, sheep and goats, which form the backbone of nomadic economy.

In the past, only owners of large flocks sold unprocessed wool, while poorer families usually processed it. The wool and hair was used to make tents, felts, bags, coats, felts with some designs for floors, and rugs with pile-work and flat weave for domestic purposes, thus trying to increase the modest surplus they made. The practice is still in vogue in rural Balochistan among all ethnic groups, but on a very limited scale, and tends to disappear gradually.

Some other crafts are made from leather and metals. Among leather crafts, only shoes and some arms cases and sheaths are being made in Dhadar–Lehri area. Metal and jewellery work is done by the Balochi nomads. Jewellery worn in the rural area consists of frontal jewellery, pendants, rings, collar studs, bracelets and amulets. These crafts are now being made in the large towns of Balochistan, instead of by the village smith. Besides these crafts, there are agricultural implements, everyday utensils of metal and wood and musical instruments. Mats, baskets, ropes and shoes made from dwarf palm trees (mazri) are also common in most parts of the province.

Traditional Music and Dances

The inhabitants of Balochistan have a melodious culture. Local musical instruments like Naisure, Tamborag, Dhol, Suroz, Sarangi and Rabab are popular. Tribal poems and folklores have been recited over the centuries by professional reciters. 'Attan', 'Balochi Chap' and 'Jaffarki dance' are some of the important local dances.

TOURISM

Balochistan is situated on the crossroads of the east and west, and presents a fascinating amalgam of the old and modern way of life. The land of Balochistan is relatively thinly populated and barren, but is rich in human history and traditions. Tribal people are well-known for their hospitality.

The main assets and tourist attraction of the province are its scenic beauty, golden beaches, hill stations, mineral wealth, natural gas, orchards, deserts, marine life, diverse and globally significant flora and fauna, archaeological sites, architectural resources and historical forts, prehistoric caves and rock shelter dwellings, mud eruption volcanoes and rich cultural heritage. There are excellent hiking, trekking and caving opportunities. The geographical contrasts from the golden beaches of the Arabian Sea to the Sulaiman Range, are wonderful, especially for a newcomer. This province has a 770 kilometre-long coastline and the second largest juniper forest in the world, in Ziarat, Zarghoon and Harboi Hills.

Famous for its fruits, Balochistan is known as the 'fruit garden of Pakistan'. It includes date fruit gardens in eastern and southern Balochistan and apples, grapes, almonds, cherry, apricot, plum and other fruit gardens/orchards in the north. The fishing industry, pristine sandy beaches, mangrove forests, turtle nesting beaches, Astola Island,

Jalal-ud-din Qureshi

A refreshing burst of colour in an all brown landscape.

geological features, religious sites and natural beauties of the coastal regions are of significant interest to tourists. Local handicrafts are very popular and can be a great source of profit if displayed and presented properly. The celebration of the annual Sibi festival creates opportunities for enhancing tourism in the area.

Keeping in view the potential of archaeological, architectural and other resources for tourism in Balochistan, these need to be conserved and interpreted for local and foreign tourists. Unfortunately, sheer neglect has allowed them to run down. By implementing the National Policy for Tourism, it would be possible to enhance the economic activity in the province significantly. An increase in tourist activities would also serve to introduce Balochistan at the international level, especially to the Economic Cooperation Organization (ECO) and the South Asian Association for Regional Cooperation (SAARC) countries. Balochistan fully realizes the importance of Central Asia and European overland markets, not only to its own tourism, but also to Pakistan as a whole.

Some important sites of interest to tourists are listed in Table 32.

ISSUES

Balochistan's tourist resources are immense, but tourism is still in its infancy stage, and is not developed as in the other provinces. About half a million tourists enter Pakistan every year, to visit the northern areas. Most of them do not head towards Balochistan, as they need special permission of the Home and Tribal Affairs Department to visit any area outside of Quetta. At present, domestic tourism in Balochistan is based mostly on the sale of smuggled goods. Unfortunately, the tourism potential of the province has remained underdeveloped in the past due to poor infrastructure, lack of concessions and incentives to the private sector and the low priority accorded by the government to this sector.

The provinces of the Punjab, Sindh and the NWFP have set up tourism development corporations, while Balochistan continues to ignore the pressing needs of this sector. The government established a Culture and Tourism Cell in 1988 to promote and develop tourism, as well as to patronize and encourage the unique and beautiful cultural heritage of Balochistan. This has some projects at hand, not all of which are functioning, due to various reasons including lack of resources. These include tourist motels and rest houses at Gwadar, Gadani, Dera Murad Jamali, Dalbandin and Dhadar; restaurants at Taftan, Ziarat, Loralai and Band Khushdil Khan; the development of recreational facilities at Pir Ghaib; and publishing of tourist brochures. It is important to review these projects in light of role of the private sector and consideration for sustainability. Strategic planning for privatization will help for effective use of limited resources.

There is an evident need to formulate a comprehensive plan for improvement of tourism and culture in the province. This would include advertising and publicizing places of tourist interest and projecting Balochistan as an attractive tourist destination, developing tourist spots all over the province and ensuring adequate transport and logistic arrangements, encouraging more participation of the private sector and coordinating with their activities, encouraging local artisans, organizing cultural shows and introducing folk songs, music, dances and festivals.

The tourism industry revolves around the availability of accommodation, transport, information and recreational and trade facilities. Moreover, tourist spots need to be safe, publicized and accessible, with reasonable entertainment, restaurants and other supporting facilities. Unfortunately, the facilities available in Balochistan are limited. Poor and almost non-existent infrastructure in many parts of the province is the main hurdle, another bottleneck being lack of information for tourists.

Table 30 Tourist Sites

Place	Significance	Location
Quetta City	Situated at the mouth of historically significant Bolan Pass, Quetta City is famous for carpets, Balochi mirror work, other embroidery, chappals and fruits. Quetta is particularly important for visitors coming from Iran through Taftan and from Afghanistan through Chaman. There are many archaeological sites within and around Quetta City	
Hanna Lake and Spin Karez	Their greenish-blue calm waters provide a rich contrast to the sandy brown hills in the background. Hanna Lake is a fine picnic spot where boat and chairlift rides can be enjoyed.	**10 km from Quetta**
Khojak Pass	The Khojak pass 7,575 ft. above sea level leads directly to the border of Afghanistan, 150 km from Quetta; the scenery is breathtaking, with picturesque mountains.	**135 km from Quetta**
Ziarat	Scenic holiday hill resort amidst one of the largest juniper forests in the world, at 8000 ft.	**122 km from Quetta**
Sandeman Tangi	A small waterfall as the mountain springs flow down. Ideal for picnics.	**10 km from Ziarat**
Prospect Point	It lies at a height of 8500 ft. above sea level. The view from Prospect Point is rewarding. Down in the valley one can pay homage to Baba Kharwari.	**6 km from Ziarat**
Bolan Pass	Along Bolan Pass the road winds through picturesque mountains, one is reminded of the huge odds that the armies from central Asia and the north must have faced in their raids on present-day Pakistan. The train passes through 21 tunnels which are a great architectural resource.	**40 km from Quetta**
Pir Ghaib	Near the shrine of Pir Ghaib (a saint that disappeared without clue) boasts waterfalls and turquoise green pools surrounded by palm trees.	**80 km from Quetta**
Sibi	Great historical importance is attached to Sibi, Qila Chakar Khan and Jirga Hall. The annual Sibi Festival marks the famous horse and cattle show, with other festivities held in the month of February.	
Chagai/Khaisar	The Khaisar is the only river in the district of Chagai with a perennial flow of water. It is an interesting place for an outing near Nushki.	**20 km from Nushki**
Zangi Nawar	Zangi Nawar Lake forms an oasis among high sand dunes. Is is important for migratory wintering and breeding waterfowl. Unfortunately, it dries during drought cycles which occur every 10 years or so. The sandy desert has many endemic reptile species.	**15 km southwest of Nushki**
Kalat	Kalat is historically significant as the seat of the noble dynasty of Khans, who for centuries held a small and unruly empire. There are three archaeological sites near Kalat and a religious site as well as deciduous fruit orchards.	**140 km from Quetta**
Harboi	Harboi lies at a height of 2,440 m above sea level. It is important for juniper forests and associated wild plants and animals.	**30 km from Kalat**
Takht-e-Sulaiman	The highest point of Sulaiman Range is Takht-e-Sulaiman (Solomon's Throne). It offers excellent trekking and mountaineering opportunities on all sides. There are edible pine (chilghoza) and blue pine forests and fascinating wildlife in the surrounding hills.	**Northwest of Zhob**
Shinghar	Shinghar is a well wooded hill with edible pine and ash trees. A holiday resort to the northeast of Zhob at 2,650 m on the Sulaiman range.	**48 km from Zhob**
Lasbela	Bela Town is historical and well known for architectural resources (mosques, tombs and graveyards), fertile lands and date palms.	
Hinglaj	The abode of Hinglaj, a Hindu goddess, is a popular religious site. Hindus visit this in April for pilgrimage. The adjoining hills support good populations of urial, Sindh ibex, leopard and marsh crocodiles in habitat. The Hingol River mud volcanoes can be seen enroute.	**130 km from Karachi**
Mekran Coast	The most parts of Mekran Coast are pristine sandy beaches. The culture is distinct. Astola Island, turtle nesting beaches, migratory waterfowl, Peregrine falcon, mangrove forests and archaeological sites are other attractions. Important places worth visiting are Ormara, Pasni, Gwadar and Jiwani. All these are served with air links.	

Hamid Sarfraz, IUCN

Fort of Habibullah Khan, Nawab of Kharan at Khudabadan, Panjgur.

Needed in this connection are good guidebooks, advertisements in newspapers and magazines, and a tourist guide in Balochistan to recount its history, culture and economy and mention the attractions of the province. In addition, there should be detailed guidebooks on the natural beauty and historical monuments of Balochistan, hotels/restaurants, shopping and handicrafts, emphasizing the reasonable prices of goods here. Other media channels should also be used for this purpose. A basic necessity in this connection is the establishment of a tourist information centre at Quetta. Potentials need to be explored in cultural tourism, ecotourism, marine tourism and adventure tourism in Balochistan.

Most of the protected and unprotected archaeological sites and monuments are privately owned. There are clear legal clauses for declaring any site protected under the Antiquity Act 1975. Acquisition of land has a number of complications however, in spite of the law. Out of the 400 protected sites in the four provinces of Pakistan, only about 20% of the sites or monuments are owned by the state. The protected sites in urban areas face the problem of encroachments and misuse. The owners intend to construct residences and other buildings for commercial purposes. Section 22 of the Antiquity Act is violated. There are other issues associated with implementing the Antiquity Act that need to be resolved in a participatory fashion, involving individuals from the public, private sector, legal community, media, academia, local communities and the non-governmental sector.

Illegal digging is another issue involving individuals (sometimes professionals) digging in search of treasure. Natural wear and tear is deteriorating the conditions of the archaeological sites and monuments, which, with a few exceptions, are lying open to the weather. The processes of summer expansion and winter contraction are accompanied by elements like winds, air, rainfall and human vandalism. Apart from security issues, the public's lack of awareness about the importance of cultural heritage is another root cause for this sector lagging behind in Balochistan. There is also a lack of structural mechanism to support artists and artisans.

THE STAKEHOLDERS

For development of the culture and tourism sector, a combined approach of partnership between the public, the private sector (such as hotels, tour operators and tourist guides), civil society, academia, media, adventure groups and interested individuals is needed. Specific roles of policy-making, coordination and networking, administration and management, research, education and training should be distributed and shared.

THE WAY AHEAD

Cultural Heritage

A team of people with an interest in cultural heritage will be brought together in one forum. UNESCO and the Pakistan Commission for UNESCO will be closely involved in matters of international importance. A comprehensive survey of the different tribal and cultural heritage aspects of Balochistan will be undertaken and its results will be documented and made public with the support of the relevant organizations. Brochures and booklets on festivals, artisans at work, local games, handicrafts, music and dance, with a directory of artists and artisans of the province will help publicize its cultural heritage. Structural arrangements for financing and supporting the artisans will be taken up on a priority basis.

Archaeological Resources

Site excavation will be opened for the international market. The government will assign special magistrates to decide cases of protected property rights and those related to the Antiquity Act in the shortest possible time. All legal aspects related to heritage conservation will be reviewed and revised by a group of experts. Information on archaeological sites will be communicated through the Internet, brochures and other modes, to other institutions and organizations concerned with archaeology, especially educational institutions throughout the world. Local and international student exchange programmes will be conducted.

Architectural Resources

Measures will be taken to promote mud construction. Technical backstopping, including funding for promotion of mud construction, will be sought from agencies such as the Smithsonian Institution in Washington.

Embroidery, Arts and Crafts

A two-pronged approach to protecting and conserving currently available pieces, and development of the art in future will be adopted. An arts and crafts museum will be established in Quetta. Private collectors will be involved in the process of collection and maintenance of pieces in the museum. Measures will be taken to shift into standard commercialization of arts to good quality original crafts for a selected market.

Shuja Zaidi

A Balochi folk music group.

Tourism

A general measure will be to frame the provincial policy on tourism. Moreover, security for domestic as well as international tourists will be ensured through government-community partnership.

Tourist sites will be developed, and educational institutions will have close collaboration with tourism efforts. A calendar of events for Balochistan will be developed, and more non-governmental organizations will be encouraged to enter the tourism sector.

Restrictions on the movement of international visitors to the province will be lifted. Local persons will be recruited as guides and local hosts. A tourist guide training facility would be established. Until such schools are available, guide training will be linked up with existing facilities such as those established by the Sarhad Tourism Corporation. Hotels and service vendors will be provided with technical know-how on tourist guidance.

Chapter 14

Govern
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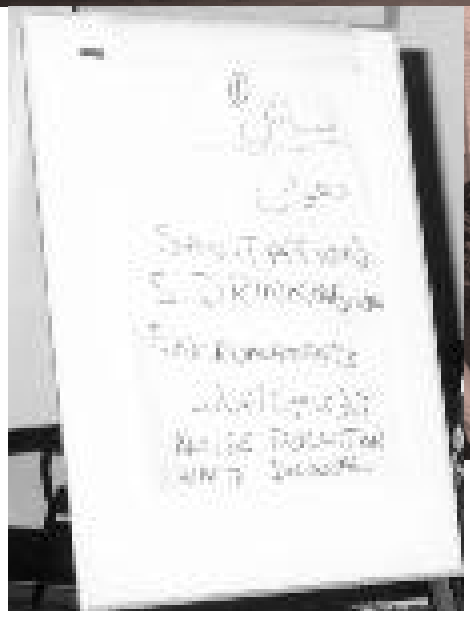


Governance, Institutions and Capacity

Governance emerged as a widespread concern during the process of public consultation for the BCS. The discussions ranged from political instability at the national level to the malfunctioning of water supply systems in the streets. This warrants a concerted effort across the country, which is beyond the scope of a provincial conservation strategy. Nonetheless, in addressing some of the governance issues through the BCS, the government and the people of Balochistan can make a significant contribution to the much-needed national effort. They are resolved to do so. Accordingly, the discussion here focuses on governance as it relates to the BCS implementation, but in due consideration of the wider context.

The breakup of the Soviet Union and continuing concerns about pervasive poverty in much of the developing world, along with recent emphasis on sustainable development, have lent a new recognition and currency to the term 'governance', which is being interpreted differently in varied contexts. The World Bank (1996) has defined governance as 'the manner in which power is exercised in the management of a country's social and economic resources for development'. Thus, good governance is premised on efficient and accountable management by the public sector, and a predictable and transparent policy framework is considered critical for the efficiency of markets and governments, and hence to economic development. It warrants the government's role in defining its priorities, through participation of the private sector and civil society, so as to provide an effective and enabling environment for economic and social development.

Banuri and Holmberg (1992) have emphasized governance to be also the manner in which a society governs itself, which alongside the state, recognizes the importance of the existence, role and functioning of civil society institutions, such as local (self) government, non-governmental organizations, research organizations, judiciary, quasi-judicial institutions, the systems of legal and property rights, trade unions, business associations, political parties and religious and civic organizations.

For the purpose of the BCS, governance is taken to be the system of decision-making and implementation as it affects people, and the environment they live in. It encompasses both the elements of 'power' as well as 'civil society', but additionally, of 'capacity' and 'accountability'. This definition is premised on consideration that the quality of decisions and their implementation is a factor of competence that includes knowledge; the process of decision-making, especially its proximity to the level

at which decisions are enforced; and the opportunity for stakeholders to freely, wilfully and effectively participate in decision-making as a measure of their support for the decisions taken.

Consequently, the discussion of governance for the BCS is organized around the four themes of competence or capacity, devolution, participation and accountability – all predominantly in the context of institutions. The key institutions in this regard are those of government; autonomous organizations supported by the government; civil society institutions, including NGOs, community organizations and other associations of various kinds and interests; and institutions of the private sector, including chambers of commerce and industry, trade associations and others. The discussion about the government organizations is focused on institutions of the provincial government, with reference to natural resources and environment, as well as parts of the federal government that are coordinating environment-related work – notably, the Ministry of Environment, Local Government and Rural Development.

ISSUES

Capacity

The lack of capacity in general, and particularly for the environment, is perhaps the single most important impediment to attaining the goal of sustainable development. The problem is more acute in Balochistan. The capacity issue has several important dimensions. One of them is knowledge. A combination of the deteriorating quality of education and inattention to research are creating a knowledge crisis. Existing research institutions are grossly under-resourced, and the research that does take place is often driven by academic interest, rather than by the need for relevant knowledge. The research system is fragmented and suffers from a lack of coordination.

There is a local scarcity of technical expertise, especially in the areas of environment and sustainable development. This has steadily increased reliance on contracting outside consultants, often with expensive loans. But ironically, the knowledge and skill (if not the will) to benefit from the contracted consultants is also diminishing. The knowledge that does exist resides in individuals; the documented and institutional knowledge is at best scattered, and mostly in State custody, inaccessible to the general public.

Within the government, the civil service is best informed. However, a clear vision and definition of objectives is wanting in most agencies, which together with outdated systems and lack of suitable equipment, prevents the effective use of the knowledge and expertise that do exist. The polity continues to get as much knowledge as might seem necessary from the civil service. The policy interaction with civil society institutions is seldom institutional, and therefore public decision-making does not optimally benefit from the collective wisdom in society. Related to this, is the concern for the lack of political will for the environment. The much-needed political interest and support can only be mobilized by an informed and organized public opinion that is wanting in Balochistan.

The lack of expertise is not limited to government departments only. NGOs and the private sector are equally starved of technical capacity and have increasingly drawn on government institutions, attracting some of their best people to the freedom of thought and action offered by these sectors, along with the better remuneration. Thus, while at times NGOs and the private sector may seem to have more resources, the net technical capital of the society might have only marginally increased. Within the environment field, an acute shortage is experienced in terms of the usable capacity in natural resource management, environmental economics, the integration of the environment in economic development planning and environmental technologies related to the manufacturing and processing industry.

Equally important are monitoring and accountability. Currently, these are weak in government institutions. In the event of bad decisions or undesirable outcomes, the private sector is immediately punished by the market, or is coerced by the government, or gets bad press. Similarly, NGOs lose their donors and constituency, in addition to facing government threats and actions. In contrast, the government has a linear accountability only that seldom takes effect due to shared vested interests through the ranks and/or misdirected political interventions.

Centralized Decision-Making

Pakistan has broken the shackles of colonial rule, but much of the colonial legacy remains. Hierarchical and compartmentalized decision-making is one that is premised on the assumption that positions higher in the hierarchy are best informed, and thus most competent to take decisions. This is true, at least partly, for several apex and sub-apex positions that do have an overall sectoral view. What is not available to a linear and centralized decision-making process is knowledge

in other sectors of government and outside government institutions.

There was, and still is, a mechanism to harness the lateral knowledge in other sectors, but it has steadily eroded. Even when intact, however, it would not capture the larger societal wisdom. Over time, governments have expanded in size, apparently in response to the increasing population and its civic needs. In effect, the capacity for good governance has shrunk. Decision-making is remote from implementation and increasingly oblivious to people's needs at the local level. This has contributed to continued poverty and diminished internal accountability by the government, which has been further affected by the severe politicization of the civil service in the past three decades.

In addition, political instability and resulting short spans of successive governments have prevented a long-term view in public decision-making. The institutions of local government have existed only intermittently, with government-appointed administrators managing the municipalities and other such institutions much of the time.

UBC Cell

Planning needs participation at all levels.

Participation

Participation is closely related to devolution, and rooted in the concept of empowerment, which means granting the various elements of civil society the mandate, space and ability to take part in making public decisions and be responsible for them, especially at the local level. Therefore, it would not be enough to co-opt communities at discretion. They must participate in public decisions as their legitimate right, and the government should create an environment in which they can exercise this right freely. This calls for legal and institutional reforms, as well as a continued effort to create the much-needed awareness and change in peoples' attitudes about civil society's role, potential and problems.

In the traditional sense, participation refers to the engagement of NGOs by the public sector. Ideally, the two may work not only together, but also alongside and independently, as they have separate roles to perform. The details to this effect are contained in Chapter 15; here, it will suffice to state that past experience has been mixed. Governments in some places have been more supportive than others. In Balochistan, the government's means to support NGOs may have been limited, but it has been willing to allow them a greater space and freedom.

The performance of NGOs has also been uneven. Most have successfully filled in the space created by the lack of objectivity, capacity and accountability in government; several have stumbled however. NGOs are increasingly required to be more transparent and accountable; most are donor-dependent, and almost all are constrained by a lack of capacity, especially technical expertise. Thus, participation and hence good governance, not only depends on the government's will and action, it also depends on the strength, ability and resolve of civil society. The communities' interests and concerns are perceived to be represented by NGOs, but mainstreaming communities and their organizations remains a cherished goal.

In its wider meaning, participation would also encompass the engagement of the private sector as an important part of society. The strength of this sector is in its financial and entrepreneurial capital. It is well organized and influential, largely driven by self-interest, and perhaps not fully aware of its impact and potential, in terms of the health and integrity of the environment.

Private-sector decisions are essentially shaped by government polices; the lukewarm response of industry to compliance with National Environmental Quality Standards (NEQS) has certainly been in part due to the extensions granted by government in compliance deadlines. At times, the state and the private sector are per-

Environment Foundation, Balochistan: gathering people at the start of a campaign.

ceived to be in alliance against the environment. However, popular pressure on the state for a healthy environment are increasing, and the growing consumer activism and awareness is fostering the concept of 'corporate environmental responsibility'. Private-sector entities around the world, and several in Pakistan, are seeking the re-engineering of their operations (ranging from the interiors of their offices to the lifestyles of their employees) to build their images as energy-efficient and eco-friendly organizations. In Balochistan, this is yet to take place.

Thus, in terms of governance, the participation of the private sector may have to be motivated by a combination of incentives, an enabling framework and regulations that are adequately enforced. This is especially important for Balochistan, given its potential for industrial development at Hab, Windar, Gadani and elsewhere along its long coastline.

Accountability

Accountability is the most widely understood dimension of governance. Its main elements include prudence in the exercise of authority, transparency in decision-making, responsibility for decisions' outcomes and the existence of an overall system of accountability that functions effectively.

Accountability is a growing concern in Pakistan, with Balochistan having its own share of the problems. In 1999, accountability for public and donor funds became a major issue, especially with those financing economic development initiatives in the province. The government of Balochistan is grappling with the situation, but a lot remains to be done.

The lack of transparency in public decision-making seriously impedes good governance, but this is seldom recognized. Instead and often, the need for 'secrecy' is used to repulse any calls for transparency. The documentation of major public decisions is frequently inadequate and, at times, missing. Moreover, political considerations and interventions are believed to override merit in assigning civil servants to positions of responsibility, which has essentially dis-empowered the civil service from undertaking the accountability of its employees.

At the higher level, political instability has seldom allowed the government to complete its term. In their short spells, the governments' struggle for survival; accountability escapes their attention and priority. There have been some attempts, but few have gone far enough. The little accountability that does take place is perceived as skewed and biased. This justifiably leaves the political system suspect. Increasingly, the judiciary is taking action on its own, which bears testimony to the erosion of the normal system of accountability.

Accountability in the case of environmental (mis)management is even more demanding. Most environmental resources are common property, which causes public interest in the environment to be very diffused. This increases the temptation for infringement, and environmental mismanagement becomes a norm rather than an exception.

Civil society can play a useful role in mobilizing the much-needed political interest and support for accountability. It is increasingly doing so, but its efforts are constrained by several factors: NGOs are few and lack capacity; the institutional space available to them is limited; and they lack access to reliable information.

Policy and Law

Policy-making is a privilege of the government, which is organized in a hierarchy of federal, provincial and local. Ideally, all three should have policies that are mutually consistent, complementary and supportive. Practically, it

varies. The policy framework at the federal level is fairly strong, with national policies having been defined for most sectors. However, the policy-making process is mostly exclusive, with little or no participation from the wider society. Even within the government, the process is inadequately coordinated, resulting in gaps and difficulties in implementation.

At the provincial level, the government of Balochistan adopts federal policies as necessary, but has not developed its own overall or sectoral policies. Instead, it seeks the opportunity and mechanisms of the Five-Year Plans to bridge the gap. These are essentially the tools for development investments, and do not necessarily provide for fiscal, regulatory or other types of policies. The government does develop policies on specific and emerging issues, but these are intermittent. The need for a comprehensive policy framework remains unfulfilled.

Consequently, short-term considerations override the long-term objectives of sustainability in the name of 'prosperity' and 'development' that continue to remain illusive. For example, tubewell owners are charged for electricity at flat (uniform) rates, regardless of the power consumed or water abstracted. This has encouraged mining of groundwater that is becoming ever scarcer in Balochistan. A related example is housing on alluvial fans in Quetta valley. This is believed to limit the potential and effective recharge of the groundwater that is the main source of water supply for over a million people residing in the valley.

The Pakistan Environmental Protection Ordinance, 1983 was the first piece of law that sought to address the environment, alongside the various sectoral laws that already existed. It remained on the books for 15 years, but was little implemented until it was replaced by the Pakistan Environmental Protection Act (PEPA) of 1997. The main responsibility for implementing the act in the province rests with the Environmental Protection Agency of Balochistan. To be able to effectively implement the act, the agency needs to be significantly strengthened. Its main problems include acute shortage of staff, expertise, systems and funds. Even without these problems, enforcement of the PEPA would remain illusive due to the lack of adequate sub-ordinate legislation, procedures and institutional infrastructure.

The subjects of ecology and environment are on the Concurrent List of the Constitution of Pakistan, meaning that both federal and provincial governments can legislate in these matters. This allows the government of Balochistan the initiative to undertake provincial legislation for the environment, which would fulfil its own needs and aspirations, as well as bridge the gaps in the federal law, which have impeded enforcement for so long. In doing so, however, the provincial government would need to ensure that its legislation is not in conflict with federal laws, because in the event of any conflict, federal laws prevail; also, provincial laws cannot be more lenient than federal ones.

Although enforcing the PEPA or enacting provincial legislation is necessary to address environmental problems in general, attention must also be paid to reforming and effectively enforcing the various sectoral laws, such as Balochistan Forest Regulation (1892), Pakistan Forest Act (1927), Balochistan Wildlife Act (1974) and others. Many of these laws are outdated and some of them have lost importance, besides being on the statute books. A list of major sectoral laws is given in Appendix 3.

The other key issues with respect to environmental legislation include the punitive nature of laws whose enforcement heavily relies on regulations, with little provisions for incentives; the discretionary powers of, and indemnity enjoyed by authorities; lenient interpretation and awarding of penalties for violations; fragmentation of laws; and failure to take international conventions and agreements into account.

Lack of enforcement is a major problem common to both policies and laws. This is attributed to the lack of political will, resulting in part in the political instability in Pakistan, as well as to the numerous other issues of governance discussed in this chapter. Moreover, implementation of policies is often sought through administrative measures. The tool of legislation in support of policies is scarcely used. Other options, such as economic tools and awareness raising, are even rarer. Therefore, a concerted effort in all aspects of environmental policy and legislation is required.

Recent Progress

There is always a silver lining to dark clouds. Several actions taken recently promise hope for resilience and even excellence. In 1997, the government established the Balochistan Environmental Protection Council to oversee and guide the implementation of PEPA. The Council is active, and has met three times to take important decisions, including the establishment of an Advisory Committee and a Technical Committee. An Environment Section has been created in the Planning & Development (P&D) Department to integrate environmental concerns in economic development planning. An Environmental Protection Agency for the province is already functioning, albeit slowly; intermittently, steps have been taken to further strengthen the agency and

its leadership. Institutional reforms in the Irrigation Department are being catalyzed through the National Drainage Programme.

The government is also engaging civil society more proactively, as exemplified by the consultative process of BCS preparation, and inclusion of the representatives of NGOs and the private sector on the Balochistan Environment Protection Council, the Balochistan Wildlife Management Board and others from time to time.

Recently, the federal government presented a plan of devolution of power to the district level on August 14, 2000.

Finally, while the NCS recommendations for sensitizing and adopting economic policies to incorporate environmental considerations remain to be implemented at large, the government of Balochistan has sought opportunities for capacity-building in environmental assessment, mainly through training staff in strategic assessment of policies and programmes and in Environmental Impact Assessment (EIA) of projects. By the same measure, several federal policies have been analyzed for the BCS, especially with a view to recommending guidelines for the development of sectoral policies for the province. These include the National Minerals Policy 1995, the National Petroleum Policy 1997 and the draft Pakistan Forest Policy.

Together with the federal government's initiatives of devolution and decentralization of powers and accountability, the efforts in Balochistan represent a step towards realizing the goals of the Pakistan National Conservation Strategy through the BCS.

THE WAY AHEAD

Policy and Legal Reforms

The policies of the provincial government in various sectors, either written or as practised by tradition, will be reviewed with a view to filling in the gaps and developing new policies where necessary in order to provide a policy framework for BCS implementation, particularly for the legislative reforms emanating from it. Priority will be given to policies in the areas of natural resource management, industry, urban environment and governance. The reviews will be guided by the excessive difficulties and costs involved in enforcing laws effectively, and therefore, the need to combine regulations with fiscal and policy incentives as feasible. The required policy framework on becoming available, will accelerate the implementation of the BCS for natural resource conservation and sustainable development in Balochistan.

All policies, existing or new, shall be subject to strategic environmental assessment in order to ensure that they meet the expectation of the government and people of Balochistan for sustainable development.

Taking guidance from the BCS and the policy framework that will be developed in its support, it will be essential to undertake legislative reforms. Priority will be given to developing sub-ordinate legislation (rules, regulations, administrative procedures), which is believed to be impeding the implementation of the Pakistan Environmental Protection Act in Balochistan.

PEPA has significantly evolved from its predecessor, the Pakistan Environmental Protection Ordinance 1983. But it continues to be predominantly a pollution control law. The government of Balochistan will examine the need for a provincial Environment Act that will give greater attention to the issues of specific interest to Balochistan. As the environment is on the concurrent list for legislation, of the Constitution of Pakistan, such an undertaking would be legitimate and constitutional. However, it is important to ensure that the Provincial Act is consistent with the Federal Law.

The government will encourage and require its various departments, especially those of Local Government, Forestry and Wildlife, Irrigation, Fisheries and Coastal Development, Livestock, Agriculture, Health and Industry, and Mineral Development, to review the respective legislation with a view towards reforming it in the spirit of sustainable development.

The government will also require the various local governments and development authorities to review and reform their building regulations and other rules to internalize the concerns for safety and environment.

For people to support the process of policy and legislative reforms, it will be necessary not only to involve them in the reform processes, but also to continuously educate them about various policies and legislation, especially with regard to their rights and obligations. The participatory processes deployed in developing the PEPA and the BCS have already set good examples of this.

To institutionalize the participation of civil society in public decision-making, the processes and institutions of community organization and roundtables may be anchored in the law. Giving community organizations a legal recognition and identity will improve their access to credit and other facilities, and will significantly contribute to their sustainability.

Good governance greatly depends on political will that is a factor of public awareness. Therefore, awareness raising will be pursued as a tool for good governance, target-

CDAofficials brief BCS stakeholders on the Islamabad Master Plan in Islamabad.

ed especially, and appropriately, at the polity and senior bureaucracy. A more institutionalized interaction between the polity and civil society organizations, such as through roundtables and workshops, will go a long way in this direction.

It will also be very useful to invest some effort in the orientation of the Bar and the Bench with respect to environmental laws whose effective enforcement so heavily depends on them.

Finally, as a part of the impending civil service reform, arrangements need to be made for career planning of government officials and encouraging continuity in jobs for better performance; currently performance is seriously affected by frequent transfers that are motivated or manipulated politically.

Devolution and Empowerment

A thinly spread population, a vast area, inadequate communication infrastructure, the time and expense involved in travel and the need to ensure that development investments are truly needs-based, all make a very strong case for decentralizing the processes of development planning and implementation in Balochistan. The district administration had been relieved of a major part of its judicial responsibilities, creating the space and opportunity for it to take on the development coordination function. This called for a fundamental change in its orientation and approach however, so that it coordinated and enabled development, rather than 'controlling' or 'directing' it. However, it did not happen. But recently the new government has come up with a plan of devolution of power to local government at district, tehsil, union council and village levels. Given the enormity of the task and the need to build people's confidence in the new system, it would be appropriate to experiment with the concept of devolved development planning, coordination and implementation in a phased manner rather than covering the whole province.

This might entail allocating public-sector development funds into district pool(s), which would be available to gov-

ernment agencies and NGOs at the district level; procedures and criteria will need to be elaborated for this purpose. This system also envisions a change in the present system of closed and linear accountability to a more transparent system that would involve true representatives of communities.

Decentralized and locally coordinated development allows for more efficient delivery of public services through one window; it will also augment the capacity to learn and apply lessons from one place to another.

The burden of development falls disproportionately on the shoulders of the provincial government. It ought to be shared by local bodies, but they have existed only intermittently and have few resources. Hopefully, the envisioned plan will address these issues. The government of Balochistan will, in collaboration with other provinces, seek constitutional protection for the local bodies so that they can effectively take on the role of local development, and thus allow the provincial government to focus on major issues.

Institutional Reforms

At the highest level, the Balochistan Environmental Protection Council will be reorganized into a Balochistan Council for Sustainable Development, with an expanded mandate to include, beside environment protection, the larger issues of sustainable development. In the spirit of the BCS, it will be essential to include in the reformed council an adequate representation from civil society and the private sector, taking due care that the council does not become unduly large.

The Steering Committee for the BCS, following its completion, will be transformed into an Executive Committee of the Council, subsuming into it any other similar committees or boards that might exist, in order to avoid duplication of mandate and efforts. The Executive Committee will facilitate and oversee the implementation of the Council's decisions.

The Environmental Section in the P&D Department shall serve as the secretariat to both the Council and the Executive Committee. To this end, the section will require considerable strengthening, principally by giving it adequate expert knowledge and appropriate systems. In fact, the P&D Department as such, would need to be suitably strengthened, and if necessary reorganized, to enable it to coordinate and monitor the BCS implementation effectively, which will remain its mandate.

Many government departments have gone through a process of growth, and at times, fragmentation, driven by 'projects' or other opportunistic considerations. Perhaps none has had the benefit of a holistic review of its mandate, structure, function and work in relation to the present context, which has drastically changed since these institutions were created. However, it is only prudent that the organizational reviews and reforms in the different departments are undertaken in a phased manner, in order not to overwhelm the government.

The government departments at the secretariat level have been restructured on October 29, 1999 and May 4, 2000 (see Figures 17 and 18). The institution of new local government system will also profoundly change the existing structures. There is, however, a long way to go to fully overhaul the structure. The priority departments for institutional strengthening and reform include the P&D Department; Environmental Protection Agency; Environment, Wildlife, Livestock, Forest and Tourism Department; Agriculture, Cooperatives, Food and Fisheries Department; Irrigation and Power Department; Public Health Engineering Department; Education, Culture, Sports and Youth Affairs Department; and Local Bodies and Rural Development Department.

Towards this end, and in anticipation of larger reforms, wherever possible a 'one-window' operation principle should be introduced to reduce wastage of resources. For example, in the health sector, a variety of services are independently delivered by different programmes. Bringing them together will increase public convenience and benefit, while saving considerably on cost and effort.

The institutional reforms and capacity-building will take into account the current trend of downsizing and decentralizing the government. The creation of new institutions at the provincial level would be neither affordable, nor popular. It should be possible to further amalgamate or reorganize some departments (and their wings and sections) with others, to reduce administrative costs and ensure greater coordination. For example, the subjects of forestry, wildlife, livestock, agriculture and inland fisheries would lend themselves to be grouped together under one Natural Resources Department at the secretariat level. However, this must not mean a move backward towards a more centralized authority. Instead, it may be regarded and pursued as the teamwork of directors responsible for their respective portfolios (agriculture, forests and so on) that are required and enabled to work with fully devolved authority, under the effective coordination of the Secretary to the Government of Balochistan for Natural Resources. But fisheries and coastal develop-

Figure 17 Organogram of the Government of Balochistan, before October 1999

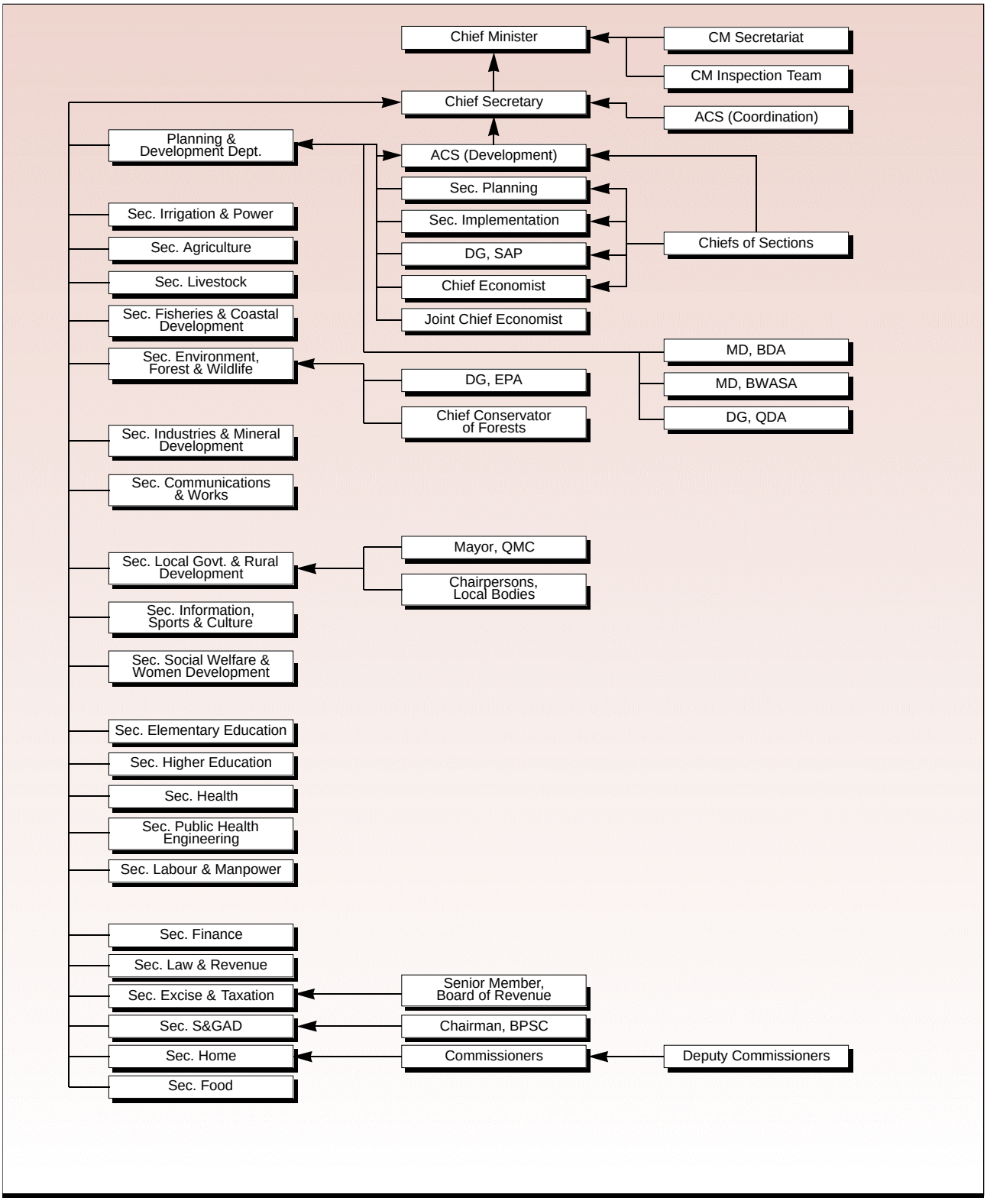
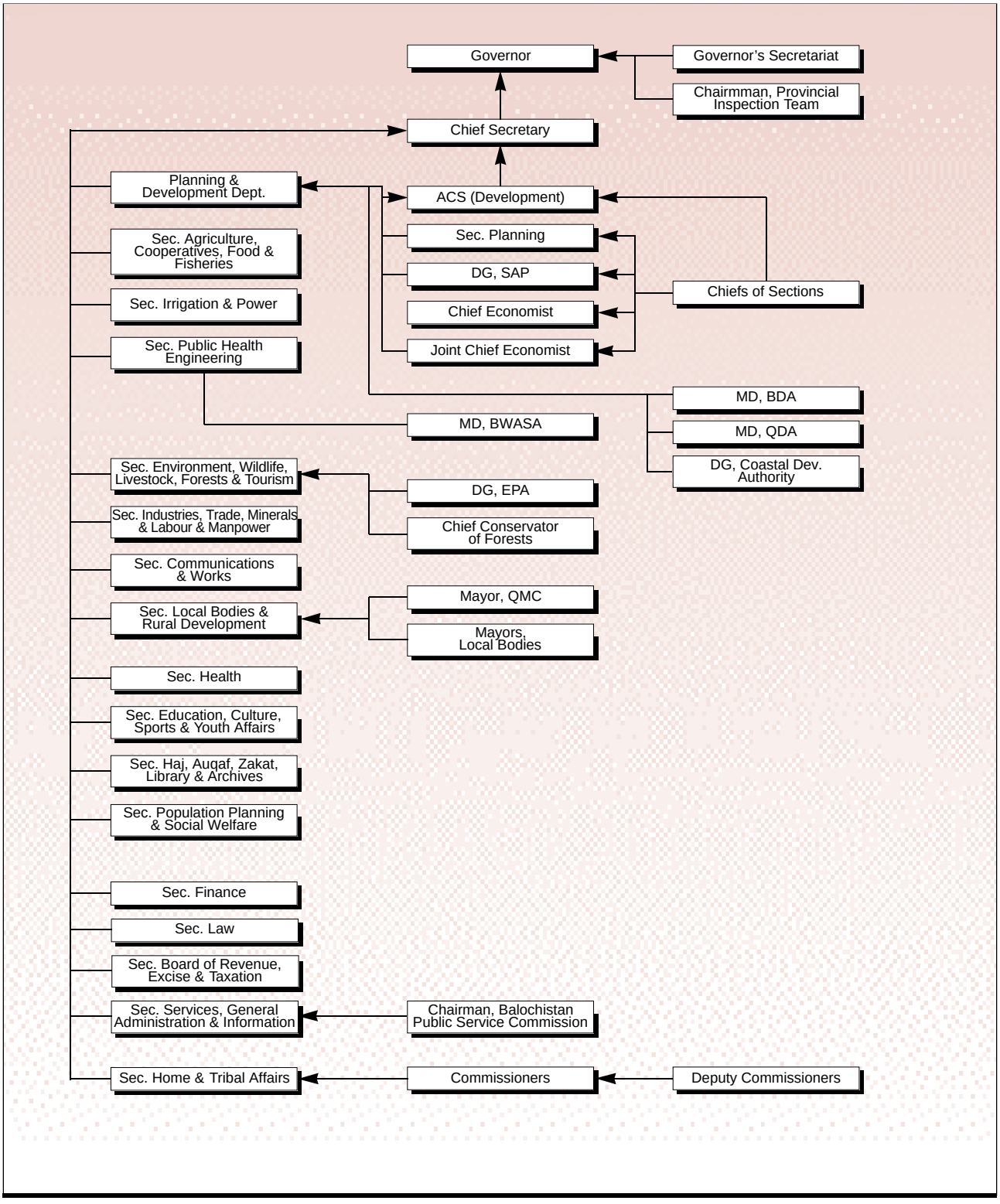


Figure 18 Organogram of the Government of Balochistan, since October 1999



ment needs to be managed by a separate department or authority keeping in view the envisioned and potential development of coastal areas and the need for coordination, integration and incorporation of environmental considerations. Similarly, environment, as it is a cross-sectoral subject with prime emphasis on considering environmental concerns. This fits in well with the Planning and Development Department (as in the NWFP).

The Social Action Programme obligates the government to invest a major part of public funds in education and health. It is unlikely that the provincial government would be able to further enhance investments in these sectors. Considering that past investments have mostly gone into raising the infrastructure, frequently at the expense of the delivery of quality services, the future strategy will move away from constructing more buildings and creating more vacancies. Instead, the focus will be on increasing the efficiency, spread and quality of existing services. A functioning school or health centre under the shade of a tree is better than an expensive concrete structure without any service.

Likewise, the emphasis of public investment should be on the universal provision of primary services (education and health) managed locally by the communities. The private sector should be encouraged to take up secondary and tertiary services. The introduction of a decentralized and devolved system of community-based management and accountability will go a long way in this direction.

The lack of coordination between public-sector institutions and civil society is a key issue. The Rules of Business of the government of Balochistan are generally helpful in defining the roles, responsibilities and jurisdiction of public-sector institutions, but they lack adequate attention to cross-sectoral linkages. The Secretariat Instructions of 1991 does require coordination among different government departments on certain matters, but these are not yet used effectively. Attention will be paid to making the coordination among various government agencies more effective, and to instituting mechanisms (such as roundtables) that would provide for interface between government institutions and civil society.

The need for additional research in environment or other areas, acute as it is, may not necessarily warrant heavy investments in new institutions and equipment. The fact is, that research capacities are overlapping and idling for want of operational funds. Therefore, the strategy to meet the research needs will include:

- providing resources to and mobilizing existing research capacities, in preference to adding new infrastructure when the present capacity is idling for want of funds, direction and leadership;
- privatizing research as far as possible, encouraging the various research establishments to work in consultancy mode, to raise funds for themselves by writing fundable research proposals for clients (including donors and private-sector institutions) and by competing for government funds, whose allocation may be revamped;
- upgrading the existing Agriculture Research Board into a Research Coordination Board, with appropriate high level membership of all research organizations, the private sector and reputed scientists, collapsing into it all the other apex research coordination mechanisms (if any) operating in the province, with the funds that Balochistan might wish to invest in research in any sector being pooled together into a Balochistan Research Fund that will be in the custody of the Board, which will allocate funds for the research projects it might require various organizations to undertake individually or collaboratively; and
- improving the process of allocating research funds and their monitoring, with the Research Coordination Board meeting twice a year to review the progress on each project it funds, and deciding on future research and allocations, with a view towards ensuring that research is driven by need and not by academic interests alone.

Upgrading Knowledge and Skills

Attention to the acute shortage of knowledge and expertise is critical and will have a profound effect on sustainable development in the long term. Thus, alongside the improvements in research just recommended, and notwithstanding the recommendations in Chapter 18, foremost consideration will be given to the quality and delivery of education in the public and private sectors, including due emphasis on environmental education.

In Balochistan, there is no institution imparting environmental education at the technical or professional level. Either an existing department in the University of Balochistan will be reorganized, or a new department will be created to impart quality education on the environment. Until this is done, the government will sponsor promising individuals, for environmental education in institutions elsewhere, such as the National University of Science and Technology (Rawalpindi), University of Karachi, University of

Engineering and Technology (Lahore), University of Peshawar, GIK Institute and others.

The curricula of training institutions in various sectors will be reviewed, to incorporate environmental concerns; additional support for material development and training of trainers will also be provided to these institutions.

Specific training courses will be designed for relevant public-sector organizations, based on their immediate needs, in relation to compliance with environmental laws and integrating environment in economic development. To this end, priority attention will be given to training in IEE, EIA and Strategic Environmental Assessment; enforcement of NEQS; strategic planning for environment; and environmental communications.

One of the tested ways of enhancing skills and expertise is on-the-job training. To this end, it will be useful to conceive and consistently implement an internship programme for young professionals, in order to make up for the deficiencies in their knowledge, and to prepare them better for the job market in environment, and to develop and implement a programme of staff exchanges between the government, NGOs and private-sector institutions in order to enhance mutual learning and expand the expertise base of the province. The dividends may be even greater if the exchange programme is extended to organizations and institutions outside Balochistan.

To enable the government and people of Balochistan to better harness the financial and donor market, their capacity in conceiving and developing creative, innovative and fundable proposals must be enhanced. This seems a binding constraint, stemming essentially from weak writing and presentation skills. Two steps would be useful in this regard: designing and commissioning tailor-made English writing courses offered to relevant public servants, as well as to fresh graduates in the job market, and creating a fund that can be accessed by these trained professionals as well as others to develop ideas, concepts and proposals. It will be essential that the usual consultant selection procedure not be applied to this fund. These procedures are long and tedious, and would act as a disincentive to apply for the modest grants the fund will provide. Instead, a simple procedure may be developed that will ensure prompt and effective use of the fund in a responsible manner.

Inventories will be done of the resources and capacity of existing training institutions, and their training programmes will be coordinated for synergy. Any deficiency will be made up by undertaking an additional support programme. These recommendations are also targeted, in parts, at NGOs (see Chapter 15) and the private sector. In the private sector, the most commonly expressed need is access to affordable environmental technology and expertise. Additionally, the private sector will benefit from greater awareness, knowledge and expertise as to its obligations under the environmental laws; ways and options for compliance with these laws at reasonable costs; the sector's potential for a positive contribution to environment while doing business (for example, energy-saving and waste-minimizing approaches); and the role and vulnerability of the sector in relation to international trade negotiations and resulting multilateral agreements.

The existence of knowledge and expertise in itself is of little value unless it is accessible. Therefore, environmental communication and awareness will have a very important role in making people aware of the existence, sources and locations of the various information, technologies and expertise, and how best to gain access to them (see Chapters 18 and 21).

Greater Engagement of Civil Society

Roundtables make up, at least partly, for the government's constraints in investing in expensive advice; allow public decision-making to benefit from the collective wisdom of society; and encourage greater accountability. Towards good governance, the concept of a roundtable, initiated as a part of the BCS process, will need to be recognized, further developed and supported.

The interest groups established during the formulation of the BCS will be formalized into roundtables on water, agriculture, livestock and rangelands, forestry and biodiversity, fisheries and coastal development, urban environment, environmental communication and education, NGOs, population and poverty, and environmental health.

The roundtables will be supported by the relevant line departments, which will provide and house secretariats for them.

Roundtable members will need to be confident if they are to remain supportive and sustain the process. This will be pursued by assuring the members of the government's resolve and commitment, ensuring that the agenda for meetings is meaningful and substantive, giving the roundtables the necessary freedom, refraining from imposing on them the department's own authority and views, ensuring that the Administrative Secretary personally participates in the meetings, and ensuring follow-up action on the recommendations and decisions of the roundtable.

The roundtable will have adequate representatives from all relevant sectors, organizations and groups of the government and civil society, considering their interests, availability and ability to contribute to the group's work.

Related to roundtables is the concept of focal points. To implement the BCS in their respective sectors, different government departments require a greater understanding of their roles and responsibilities, as well as of the BCS priorities, recommendations and approaches. They would also need to conceive programmes in support of the BCS and coordinate their implementation. This will require assigning a senior person in each of the relevant line departments as a BCS focal person who will also be the convenor of the respective roundtable. The NCS implementation has stumbled for want of such an institutional arrangement. In the NWFP, Additional Secretaries or Chief Planning Officers have been entrusted this task. The same arrangement would be necessary for the BCS in Balochistan.

Transparency and Accountability

A policy of open access to information will be followed, and public-sector development and other unrestricted information will be placed in the public domain. This is one simple and low-cost policy measure that will significantly advance good governance.

The situation in Balochistan is additionally constrained by the very lack of information itself. The Bureau of Statistics in the P&D Department is currently inactive. It will be re-activated to collect, analyze and disseminate relevant data.

Concern about the unreliability of information will be addressed through the systematic collection of data by the Bureau of Statistics, improved coordination among the agencies and the availability of information in the public domain.

Towards a greater transparency and accountability, the various government departments and organizations will be required to produce and publish an annual report highlighting their performance and problems in areas of administration, finance and public service(s). The reports will also carry information about the amount and sources of their funds and beneficiaries. The reports will be discussed in the Provincial Assembly.

The processes of devolution of power to and reconstruction of local government, and impending civil service reforms will be supported, for a significant improvement in the performance of the civil service; attention will be paid to systems of performance appraisals, promotions and accountability.

All must participate in governance.

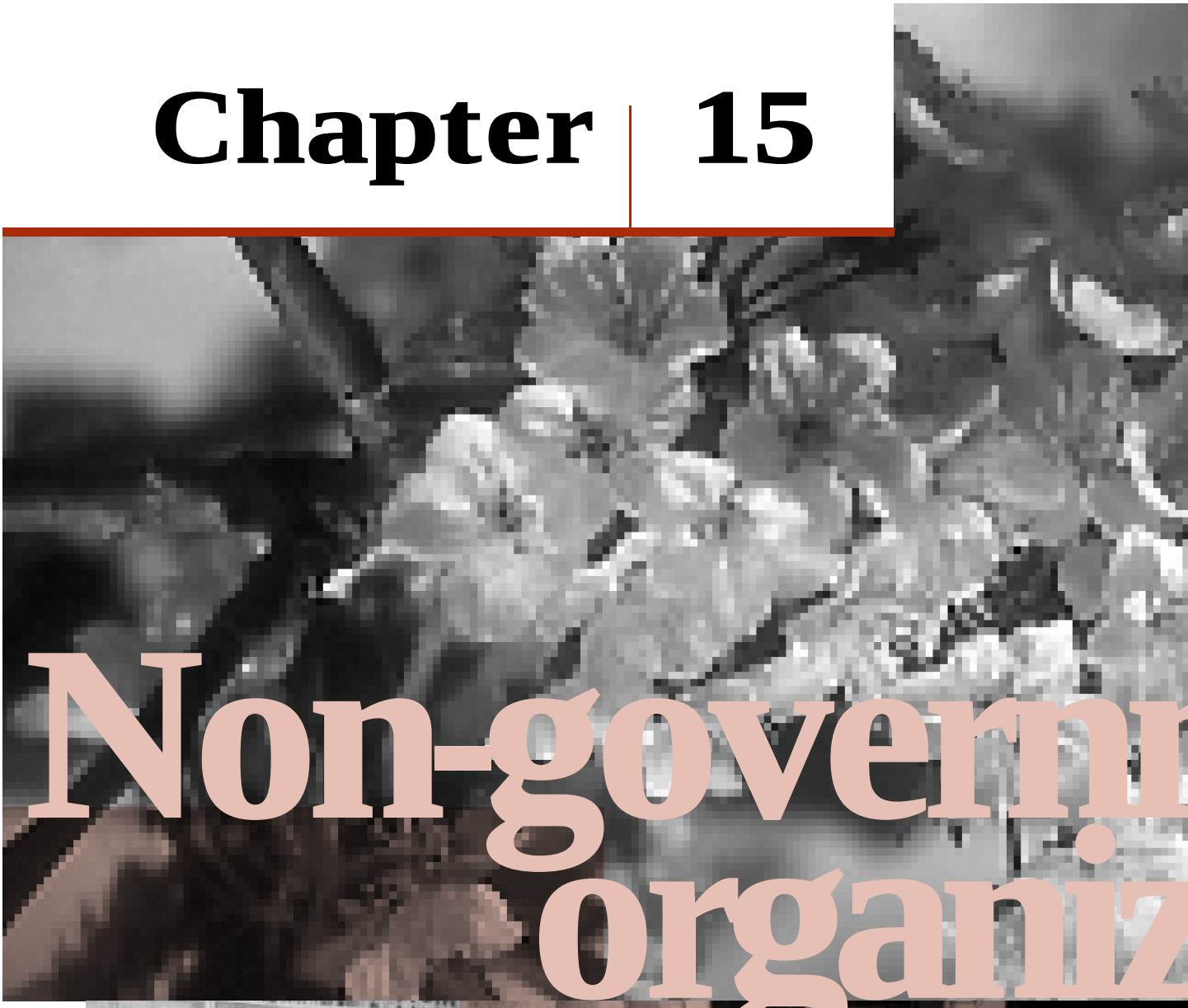
A sovereign institution of ombudsman at the provincial level and of monitoring committees will be created and supported to free the civil service from political intervention and manipulation, and to ensure accountability of the civil service as well as the polity. To be effective, the ombudsman and monitoring committees must be neutral and non-partisan institutions.

The quality of the civil service, at least for a major part, is a product of its professional work-force, which is mostly inducted through the Balochistan Public Service Commission. The government will undertake a periodic review and necessary reform of the Balochistan Public Service Commission, to enhance the transparency, efficiency and quality of its performance.

The processes of involving people in public consultation and in decision-making will be further supported, strengthened and expanded. This will, hopefully, be a measure towards greater transparency and accountability.

Chapter 15

Non-governm organiz



Non-Governmental Organizations

The last two decades have seen a shift in development trends in which the role of civil society has been emphasized as a means of working towards the sustainable use of resources and protection of the environment. While activist groups have been on the scene for many years, formally organized bodies are a more recent phenomenon. The mushrooming growth of non-governmental organizations is part of a new development paradigm that moves away from top-down approaches to development. It is important to look at the role NGOs can play within civil society in promoting policy development and implementation, and their potential for developing linkages with communities. The role of community groups in the management of their natural resources, advocacy, institutional strengthening and social mobilization is very important. The aim of strengthening the NGO sector is to ensure Balochistan's development on a sustainable and equitable basis, with the involvement of all sectors of society.

The concept of participatory approaches to development, places more emphasis on community participation than the conventional development model. Prescriptive modes of working are now being replaced by a trend to letting 'people', especially the marginalized, identify and decide their needs and development priorities. One type of participatory development has focused on community-based conservation. This type of approach ensures that communities are in the forefront of conservation efforts and are inherently aware of the benefits that flow from it. Furthermore, it involves shifting the ownership and the responsibility for resources and their benefits to local groups.

In Pakistan, lack of resources, both human and capital, has resulted in weak governance, especially at the local level. This vacuum has opened the way for NGOs to organize people at the village-level and begin the process of participatory development. Examples of such organizations include the Aga Khan Rural Support Programme, the Balochistan Rural Support Programme (BRSP), the National Rural Support Programme (NRSP), the Sarhad Rural Support Corporation and more recently the Punjab Rural Support Programme. The impact of their programmes justifies the further strengthening of the NGO sector so that they can complement the efforts of governments. This is particularly true in the Balochistan context, considering the paucity of resources, the extent of the geographical area involved and limited accessibility to some areas.

Another facet of the potential role for NGOs is at the macro policy-making level. Under the present

Environment Foundation, Balochistan

Dutch, NGO and IUCN representatives at a BCS discussion.

circumstances, for historical, conceptual and logistical reasons, public participation in policy-making has been for the most part limited to politicians, bureaucrats and the elite. Government policies, particularly those relating to trade and economics, are framed with a view to benefiting a few. Often they are dictated by global economic trends or international monetary institutions, by structural adjustment policies rather than internal priorities. Their overall impact on social and cultural systems is either overlooked or deliberately ignored. Social policies that have a direct bearing on people are designed in a similar fashion, without ever understanding the specific needs and priorities of people. A prime example is the Education Policy. NGOs, particularly those that have direct links with Community-Based Organizations (CBOs), have the potential to develop a real understanding of local communities and to analyze priorities determined by local needs. Their potential role in bringing about just and equitable development, a process driven by government policies, is far reaching.

In Balochistan, NGOs are registered under various legislations, according to their focus (Table 31). In addition to these, there are NGOs operating in Balochistan as regional branches of parent organizations registered at the national level. These include the Aurat Foundation, the Family Planning Association of Pakistan, NRSP, Strengthening Participatory Organization (SPO) and the Trust for Voluntary Organizations. Regional offices of some international NGOs and conservation and development organizations, such as IUCN-The World Conservation Union Pakistan, Oxfam, Save the Children Fund (SCF), Sustainable Use Specialist Group-Central Asia (SUSG-CA) and World Wide Fund for Nature Pakistan (WWF-P) are also found in Balochistan.

About 175 NGOs, registered under Voluntary Social Welfare Agencies Ordinance (1961), were provided

Table 31 Legislation and NGOs

Legislation	Type of Organizations	No. of Organizations
Voluntary Social Welfare Agencies Ordinance (1961)	NGOs, CBOs	**850**
Societies Act (1860)	NGOs, Anjumans	**267**
	Educational societies	**148**
Company Ordinance, (1984), Section 42	Guarantee Limited (NGO)	**1**
	Associations	**10**
	Foreign companies	**3**
Cooperative Societies Act (1925)	Agriculture co-operative societies	**652**
	Non-agriculture co-operative societies	**157**
Trust Act (1882)	NGOs	**1**
Water User Ordinance (1981)	CBOs	**Not available**

Source: IUCN 1999b.

grants in aid by the Balochistan Provincial Council of Social Welfare until 1995–96. Grants ceased after 1996 due to lack of funds.

Broadly speaking, NGOs can be categorized as:

- indigenous NGOs formed by philanthropists – individuals with vision and a commitment to the welfare and development of communities;
- bilateral projects/programmes that have transformed into NGOs, such as BRSP, TARAQEE Trust and SPO;
- branch/regional offices of international NGOs/development organizations; and
- branch/regional offices of national NGOs.

From a geographical coverage point of view, NGOs can be categorized as:

- community-based;
- regional/provincial;
- national; and
- international.

Thematic Areas

NGOs in Balochistan work in a wide variety of thematic areas (Table 32). Top-ranking themes are community mobilization and development, gender, income generation and education.

Geographical Coverage

While NGOs and CBOs are found in almost all parts of Balochistan, there was little information available on the full range of development activities being undertaken or the scope of geographical area covered prior to the development of the BCS. A Quetta-based survey was carried out by IUCN in an attempt to fill this gap (Table 33).

ISSUES

NGO Sector Constraints and Weaknesses

The major growth in the NGO sector in Pakistan has occurred over the last few years. A number of reasons can be attributed to this; the important ones are the increased availability of funds for NGO-led development activities, a growing number of development activists and practitioners with a vision and desire to translate that vision into action, a desire to replicate the successful experiences of the South Asian countries (Bangladesh and India) in Pakistan, the maturation of community groups (unregistered and geographically limited) into larger organizations, and the spin-off of bilateral and multilateral projects into NGOs. While the sector has grown fairly quickly, it is also faced with its own share of growing pains: absence of government support and recognition, limited impact, gaps in strategic focus, dearth of human resources and absence of long-term sustainability, to cite a few. The full potential of NGOs' role as a part of civil society, particularly on issues relating to development, has yet to be fulfilled.

In the case of Balochistan, there are similar trends emerging in both the growth, constraints and difficulties faced by NGOs. There are certain realities in Balochistan that are peculiar to it as a region and cannot be ignored in predicting or analyzing the growth of the NGO sector. These relate primarily to socio-cultural systems (such as rural versus urban, decision-making systems, governance at the rural level) prevalent in the

Table 32 Work of NGOs by Thematic Area

Thematic Areas	Percentage
Community/CBOs development	11
Gender/women and development	9
Education	8
Employment and income generation	8
Forestry/tree plantation	7
Health and nutrition	7
Rural development	7
Agriculture	5
Family planning/population welfare	5
General social welfare	5
Humanitarian relief	4
Rehabilitation of drug addicts	4
Youth affairs	4
Urban environment	4
Human rights	3
Fisheries	2
Culture/art/heritage	2
Urban planning and development	1
Water and sanitation	0.5
Industry	0.5
Other	3

Source: IUCN 1999b.

Table 33 Geographical Coverage of NGOs

Name of NGO/ Project	Category	Geographic Coverage	Sector	Theme
Aurat Publication and Information Service Foundation	Umbrella	**20 districts of Balochistan**	Women's development (all issues).	**Advocacy, training, legislation and empowerment**
Balochistan Community Irrigation and Agriculture Project (BCIAP)	Multilateral project	**20 districts of Balochistan**	Irrigation, agriculture, income generation, and rural and community development.	**Training, research, funding, extension, and irrigation infrastructure**
Balochistan Environment and Sanitation Training Centre	Service delivery	**Quetta District**	Water and sanitation.	**Extension and training**
Balochistan Rural Support Programme (BRSP)	Umbrella and support	**Barkhan, Musakhel, Jhal Magsi, Qila Saifullah, Pishin, Quetta, Mastung, Kalat, Bolan, Nasirabad, Jaffarabad and Lasbela Districts**	Poverty alleviation, rural development, institutional development at the grassroots, income generation and human resource development, forestry, micro credit, environment, health and sanitation.	**Social mobilization, training, extension and networking**
Development Association of Youth (DAY)	Service delivery	**Quetta, Zhob, Loralai and Sibi Districts**	Tree plantation, education, health and women and development.	**Advocacy and networking**
Environment Foundation Balochistan (EFB)	Service delivery	**Quetta District**	Drinking water and sanitation, income generation, health and nutrition, urban environment, women and community development.	**Extension, advocacy and training**
Family Planning Association of Pakistan (FPAP)	Service delivery	**Quetta, Pishin, Panjgur and Kech Districts**	Urban environment, family planning, education, women and development, health and nutrition, income generation, youth welfare, community development.	**Extension, training, advocacy and networking**
Institute for Development Studies and Practice (IDSP)	Support	**Entire Balochistan**	Training on participatory action research, power structure and organizational theory.	**Training, advocacy and research**
LAFAM, Loralai	Service delivery	**Loralai, Zhob, Lasbela, Barkhan, Musakhel, Kohlu and Qila Saifullah Districts**	Education, water and sanitation and rehabilitation of drug addicts.	**Advocacy, training and networking**
Organization for Community Development (OCD)	Service delivery	**Entire Balochistan especially Quetta City**	Poverty reduction, community development, rural development and water and sanitation.	**Advocacy, training and project implementation**
Oxfam	Support and service delivery	**Quetta, Bolan, Sibi, Loralai and Zhob Districts**	Agriculture, family planning, water and sanitation, urban environment, health, humanitarian relief and drug abuse.	**Advocacy, training, funding, extension and networking**
Pak Public Development Society	Service delivery	**Quetta, Jhal Magsi, Sibi, Dera Murad Jamali, Mach, Khuzdar, Panjgur and Kalat Districts**	Education, child labour, health, drug abuse, human rights, poverty alleviation and women and development.	**Extension, advocacy and training**
Rural Community Development Council (RCDC)	Service delivery	**Kech, Gwadar and Panjgur**	Education, women and development, community development and rural development.	**Training, advocacy and networking**
Salamti Welfare Society	Service delivery	**Quetta City**	Education, water and sanitation and community development.	**Advocacy, training, networking and extension**

Name of NGO/ Project	Category	Geographic Coverage	Sector	Theme
Society for Community Organization and Promotion of Education (SCOPE)	Service delivery	**Jaffarabad, Nasirabad, Bolan, Jhal Magsi, Dera Bugti and Sibi Districts**	Education, income generation, women and development and community development.	**Advocacy, training, networking and research**
Society for Community Support for Primary Education in Balochistan	Service delivery	**Entire Balochistan**	Education, water and sanitation, women and development, community development/human resource development and primary environmental care.	**Advocacy, research, training and networking**
Society Environmental Awareness (SEA)	Service delivery	**Quetta District**	Environmental education and water and sanitation.	**Advocacy and training**
Society for Torghar Environmental Protection	Service delivery	**Qila Saifullah**	Conservation and sustainable use of natural resources, agriculture and income generation.	**Advocacy, management and research**
South Asia Partnership-Pakistan (SAP-Pak)	Support	**Entire Balochistan**	Rural development.	**Training, and technical and financial support**
Strengthening Participatory Organization (SPO)	Support	**Pishin, Loralai, Kalat, Khuzdar, Kech, Bolan, Lasbela, Qila Saifullah Ziarat, Quetta and Zhob Districts**	Agriculture, forestry, education, water and sanitation, health, humanitarian relief, human right, community development and rural development.	**Capacity building, training, advocacy, networking, funding, research and technical assistance in proposal development**
Sustainable Use Specialist Group - Central Asia (SUSG-CA)	Service delivery	**Entire Balochistan**	Natural resource, sustainable use of and conservation including wildlife, fisheries, biodiversity, income generation and rural development.	**Advocacy, extension, training, planning and management**
Taleem Foundation	Service delivery	**Quetta, Zhob, Kohlu, Loralai, Pishin, Mastung, Qila Saifullah and Dera Bugti Districts**	Education, environment, poverty alleviation and women and development.	**Education, extension and training**
Tanzeem Idara Bahali-e-Mustehqeen (TIBM)	Service delivery	**Quetta, Barkhan, Pishin, Qila Abdullah, Bolan, Ziarat, Sibi and Jaffarabad Districts**	Forestry, education, family planning, water and sanitation, income generation, health and nutrition, women and development, and urban environment.	**Advocacy, education, training networking and material support**
TARAQEE Trust	Service delivery	**Quetta and Nasirabad Districts**	Water and sanitation, women and development, income generation and credit.	**Advocacy, training, networking and extension**
Trust For Voluntary Organizations (TVO)	Support	**Entire Balochistan**	Agriculture, family planning, water and sanitation, income generation, health, education, rural development and community development.	**Funding and training**
UNDP/Area Development Programme (UNDP/ADP)	UNDP funded project	**Quetta, Pishin, Mastung, Kalat, Musakhel, Qila Saifullah, Loralai and Khuzdar Districts**	Local institution development, agriculture, livestock and range, water, watershed, women's development and gender.	**Social mobilization, planning, training and service delivery**
UNDP/Balochistan Trial District Management Project	Multilateral project	**Loralai and Jhal Magsi**	Institutional development and strengthening, community development and Gender and Development.	**Decentralized government, participatory approach, training and advocacy**
World Wide Fund for Nature-Pakistan (WWF-P)	Service delivery	**15 Districts of Balochistan**	Natural resource conservation - wildlife protection, forestry, wetland rehabilitation and environmental education.	**Education, advocacy, planning, research, training, extension, networking and funding.**

Source: IUCN 1999b.

province, social sector and economic policies as defined by the federal and provincial governments, the scope of the strategic interests of various foreign missions in the region and tribal and ethnic makeup and infrastructure.

Lack of Adequate Government Recognition and Support

Over the last few years, there has been growing interaction between various government departments and NGOs. In terms of collaboration and institutional recognition, little evidence is available to show that there is a true collaborative spirit. Organizations such as IUCN have perhaps the best record in terms of gaining support from the highest levels of government. This is not to say that government-NGO collaboration does not exist. Its existence is often at the field level of line agencies and not across the spectrum of government bureaucracies.

Another gap in the interaction between government and NGOs is the absence of linkages between NGO representatives and politicians. There are bigger political issues that prevent this from happening. A manifestation of the tension between government and NGOs in recent years has been the NGO Bill. The controversy and damage that resulted from the NGO Bill has another side to it. It was perhaps the first time that NGOs in Pakistan at the national and provincial levels organized themselves to challenge and protest the content of the bill. Networks of NGOs and CBOs were formed all over Pakistan. They lobbied various groups to prevent the bill from being passed and succeeded in their move. Although formed for the singular reason of opposing the bill, these networks have moved on to addressing other national and provincial issues. The NGOs also stood together successfully in the wake of efforts of the federal and some provincial governments (not the government of Balochistan) to control the funding and activities of NGOs.

Overlap Between NGOs and Government

Overlap is often cited as one of the biggest weaknesses and sources of confusion within the NGO sector. There is a lack of understanding and acceptance of the role NGOs play in providing critical analysis of development processes and facilitating the development of disadvantaged and marginalized groups. There is an unwillingness to accept that neither government nor NGOs can be the leading force behind development or to acknowledge their limitations in understanding and implementing development activities. There is no recognition of the need to work together and to see that the primary actors in development are the people themselves.

Donor Priorities

The issue of donor priorities as a constraint on NGOs is a widely cited and recognized source of pressure all over the world. NGOs are heavily dependent on foreign aid to support their efforts and activities. The groups believe, for the most part, that they are unable to influence donor policies, and some see themselves as victims of the whims and fancies of donor missions and donor review teams. Donor priorities keep shifting, resulting in lack of sustainability in the development activities of NGOs. Donor agencies in turn are at the mercy of the changing priorities and policies of their own governments.

Sustainability

Sustainability is a critical issue, particularly to those NGOs in Balochistan that are externally funded. This is not just limited to money and human resources but goes beyond that to sustaining the development process. In other words, this relates to the internalization of development processes within the systems for which they are designed or 'targeted'. An element of financial support is important to the extent that initial support may be needed to establish the processes themselves.

Development programmes involving community participation take time not only to get established, but also to stabilize and consolidate. This requires changes in the attitude of communities and in the practices, procedures and attitude of various stakeholders, such as the government. Moreover, it is particularly challenging to sustain and stabilize community participatory development programmes in an environment where non-participatory approaches are also in play.

Absence of Effective Coordination Amongst NGOs

This issue is particularly relevant to large NGOs involved in capacity-building or integrated rural development. Communities often complain of 'development organiza-

tion–related fatigue'. This is usually a result of NGOs working in the same area providing the same type of assistance. Frequent visits by social organizers to villages often disrupt village life. Attempts have been made to try and improve coordination amongst the various support organizations through the development of networks. Concentrations of NGOs in specific geographical areas are also influenced by factors other then just lack of coordination. These include donor policies and priorities, the existing level of infrastructure available to the support organization working in that area and accessibility. It is a common practice to establish projects in areas that already have a track record of success and have easy access.

Access to Information

Issues of access to and management of relevant and updated information is not limited to just the NGO sector. What is significant perhaps, is that for NGOs, the infrastructure related to information access and the understanding of the type of information needed is even weaker (see Chapter 17).

Human Resource Inadequacy

With the rapid growth and expansion of the NGO sector in Balochistan, there is a dearth of qualified personnel to manage and operate NGO programmes. There is a shortage of qualified personnel in both environment-related activities, as well as in generic fields of practice. Also, there is diminishing interest in volunteerism. There is a lack of recognition that volunteers as well as qualified professionals are required in the NGO sector, particularly in the field of environment.

THE WAY AHEAD

Resource Management and Environmental Protection

NGOs have exhibited a strong trend away from the charity approach and towards the empowerment approach. The role of NGOs is therefore not limited to being a conduit for a greater role for communities. The sector in itself contains a variety of different organizations, working at different levels with varying mandates and philosophies/ideologies, research, advocacy and service delivery, to name a few. In Balochistan, however, the thrust of development efforts seems to be concentrated on community projects concerned with the capacity-building of CBOs and service delivery type of activities. There is a need to promote institutions or organizations focusing on macro issues relating to development, both on the international and national fronts. It is essential that this element of development be incorporated into the NGO sector in Balochistan. Otherwise, the sector will not be in a position to make an impact at a level where decisions and policies are made.

Networking

NGO networks exist in Balochistan to deal with various issues. The Balochistan NGO Federation was established in 1995 to develop a network for improving communication and coordination amongst NGOs. Others include the NGOs Network Balochistan, the Women in Development network, Participatory Coalition, Balochistan Coordination Council, Media Watch, Gender Resource Group and more recently established Raabita, meaning coordination. These networks play a useful role for improving coordination and communication. NGOs also have the potential to influence macro issues of environment and sustainable use of resources. The approach to networking will therefore be based on coalition-building rather than just information exchange.

NGO networks will be supported through:

- understanding and building the real potential of networks as mechanisms of influence;
- obtaining and providing relevant information that can be used by networks in their efforts to influence; and
- providing platforms such as the BCS network to communicate, convey and influence policy-making processes.

A different level of networking is required on NGO-government linkages. At present, no such institutionalized networking occurs in Balochistan. Roundtables can be created to achieve this. Roundtables will include representatives of NGOs supported by the larger NGO sector. This can be done through bringing in members of the various networks.

Establishment of an NGO-government network in Balochistan is seen as a desirable option by the NGOs themselves. The role of government-NGO networks and their mandate need to be elaborated. The credibility of such networks will only be established if there is a sense that they are needed, enabled and capable of influencing policy decisions.

Donor-NGO Relationship

Building coalitions, networking and developing linkages with NGOs in industrial countries are important steps towards finding allies in the cause of just and equitable development, and a way to influence aid policy. While NGOs need to decrease their reliance and dependency on foreign aid in the long run, foreign aid will not be treated or viewed as a handout, or alms given by the more powerful to the less powerful. Networks and coalitions are the forums through which such understanding can be promoted. International NGOs working in Pakistan are also useful channels for enhancing understanding and promoting such interventions.

Capacity-Building on Macro Issues

NGOs need to develop an understanding of macro-level issues and work with policy-making bodies. The NGO sector has to link its work, particularly on community development and poverty alleviation, to the real causes of poverty defined at the global level. Poverty is often the result of land use policies, infrastructure growth, promotion of a cash crop economy and economic incentives that degrade the environment. Knowledge and information about macro issues in Pakistan is either absent, or is extremely fragmented.

A resource centre or information cell will be set up that can act as a link between Balochistan and the rest of the globe. IUCN Balochistan Office, Quetta is in a good position to undertake this responsibility. A directory of all NGOs and CBOs in Balochistan will be developed to provide situation analysis regarding the constraints and potential of the sector. An existing initiative is the IUCN-managed Sustainable Development Networking Programme that provides the link to various resources around the world through its electronic network. This will be supplemented by developing a resource base on issues of sustainable use of resources, environment and development that are specific to Balochistan and its socio-cultural systems.

Capacity-Building Initiatives on the Environment

NGOs in Balochistan are working in different areas of the environment, ranging from education to natural resource management. As with mainstream development, an understanding of environment needs to be strengthened and the link between it and development needs to be highlighted. Capacity-building for NGOs, particularly those working on environment with community-level groups, will be designed to ensure that cutting edge approaches to natural resource management are adopted in their work. NGOs not working directly on the environment will be encouraged to take environmental considerations into account in their development activities.

In attempting to build capacities on the environment, organizations working with community groups will be sensitive to, understand and recognize indigenous, traditional and natural resource management practices in Balochistan.

Another way to build capacities of NGOs in this area is to design and implement pilot projects with a strong emphasis on community-based conservation. These will be established within a participatory development framework, and will have built-in monitoring and training processes to ensure regular review of their impacts and usefulness.

Institutional Development of the NGO Sector

Institutional development is one of the most important needs of the NGO sector. Within that, human resource development is the priority. This means increasing the availability of qualified people in the NGO sector. The growth of the non-government development scene in Pakistan and in Balochistan has outpaced the growth in the number of professionals or people who understand the complexities or the holistic nature of development.

Most NGOs and their work are concentrated in and around Quetta. The spread and reach of NGOs must be increased. In this regard, the responsibility lies on both the government (in creating an enabling environment) and on NGO support organizations (to reach out, create and nurture as many non-governmental and community-based organizations as possible).

Image-Building of NGOs

Some groups in Pakistan see NGOs as corrupt and wasteful. While these perceptions stem from a few corrupt NGOs, the whole sector has suffered from the backlash. NGOs are in the business of ensuring that people, especially the marginalized, have greater access to their rights through advocacy or through service delivery. It is essential that NGOs take a posi-

NGOs exchange expertise.

tion to eliminate corruption within the NGO sector. As donor and government funds are involved, NGOs need to adopt prudent spending habits and build the trust of communities, the government and donors by adhering to practices of transparency and accountability in all their activities. To that end, NGOs will be required to publish annual reports on performance and problems in administration, finance and other areas. To combat the misuse of funds, NGOs have to take great care to ensure that a code of ethical conduct is followed by the sector in general and by individual organizations.

NGOs need to develop strong and effective communication strategies to highlight their work and its impact on development. This awareness will be targeted towards various groups in society and will be launched on both a collective and individual basis. This means improving the communication capacities of NGOs to discern and distinguish the multifaceted nature of communications and its importance to their work.

Fund for Sustainable Development

Limited financial resources are a constraint for NGOs in Balochistan. The concept of a Fund for Sustainable Development was first floated during the formulation of the Sarhad Provincial Conservation Strategy. PEPA provided legal cover for the establishment of such a fund by the provinces. The need for such a fund will be explored in Balochistan. Care will be taken to see that the fund remains independent of vested interests. The fund will be established within a culture of openness, accountability and transparency.

Chapter 16

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Gender, Development and Environment

All development is about change of one kind or another. It may attempt to enhance the resource base within an area, or modify existing economic structures; it may introduce new technologies or methods of production, or develop the skills and competence of the human resource. Whether directly or indirectly, development efforts affect the culture of the area where they are focused. They affect current roles, relationships, access to and control over resources, as well as the behaviour patterns of people – both men and women.

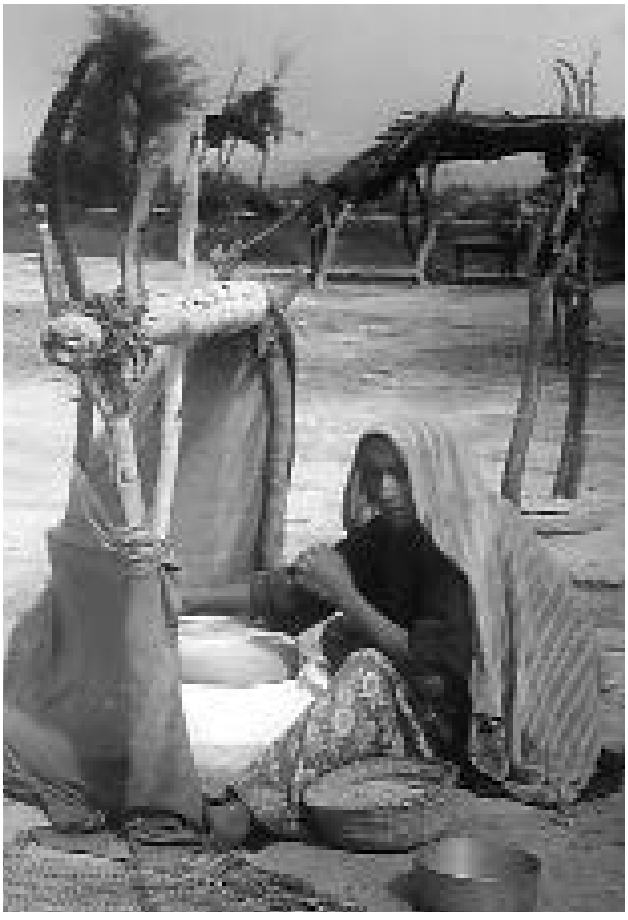
When development initiatives are designed, planners try to assess how these initiatives affect people in the area. It is assumed that this means both men and women. But the reality is that most development has been designed to meet the specific needs of men. This is no different in Balochistan, where women are practically invisible in public life.

Gender and development (GAD) is a consciously designed approach that forces development practitioners to ask how development affects both men and women and how men and women can contribute. When these questions are asked separately, the information search becomes very different, as do the answers. This is a pragmatic and market-oriented approach to development, if it can be assumed that development practitioners have an inherent responsibility towards the well-being, prosperity and progress of both men and women.

The differing relationships of men and women to development can be more clearly understood by analyzing the structure of a community. Every community undertakes four broad roles, each of which involves specific activities: reproduction (childbearing and nurturing); caring (cooking, cleaning, fetching, looking after children and the aged and family health); production (both income saving and income generation); and community management (maintaining social and political contacts within the community).

The reproductive role is biological, limited to women. But the other roles are not specific to either sex. Labour is divided between men and women in any community based on the economic status and class of the community, its cultural and religious values, ethnicity and types of productive activity within the community and household. It is safe to assume, therefore, that socially defined gender roles will differ from area to area within Balochistan.

Some statisticians, economists and development interventionists are gender-blind. They are unable to perceive certain gender roles within communities. For example, agricultural policy-makers



Shuja Zaidi

A woman farmer at work.

have for decades turned a blind eye to women farmers because they think of farmers as men, thus denying women's claim to participation in farming and other activities that directly affect their lives. All inputs to increase farming skills are directed towards men, and so women farmers' output remains limited, which has a negative impact on the total benefit to the family.

Since it is the gender roles of men and women that really determine who would be affected, positively or negatively, by any development initiative and who can contribute to the intervention, it is critical for development practitioners to be able to define these roles properly. Policy-makers should also appreciate that it is development projects and a changing economic environment that have in the past been potent change agents for redefining gender roles in a community. The Balochistan Community Irrigation and Agriculture Project has actively involved women in designing the irrigation and potable water supply schemes and selecting locations for washing structures along the irrigation channels. Women have also been trained in operation and management of potable water supply facilities. Another example of this is training of women in processing dates that previously were sold unprocessed. This added value to the resource, improved the use of their time and increased their incomes.

Significant changes in gender roles are evident in areas where men have migrated in large numbers, and where women undertake productive activities in addition to their other tasks. In Mekran, for example, where the fishing industry has developed extensively, women are active in the productive role, and men and women are together responsible for caring and for managing community activities.

All roles and activities are significant within a community. But the greatest contribution to personal power – self-confidence, self-image and decision-making – comes from both productive and political roles. With very few exceptions, both these roles are primarily within male domains in all the provinces of Pakistan. When power reposes solely with any particular community, ethnic group, individual, or gender, there is a risk of unbalanced development and exploitation.

Development practitioners should understand existing gender roles within a community and design their interventions in a manner that ensures greater balance between the roles and responsibilities of both men and women. If this is not done, then one gender ends up with greater access to and control over resources and benefits. This could mean that one gender now has greater access to education, health facilities, mobility, income-generating opportunities, information, communication, recreation and general well-being. Over time, the gap will continue to widen.

Numerous examples of gender-insensitive development can be cited:

- Inputs are given to one gender to perform his/her role more efficiently and effectively, while the other gender continues to labour away. For example, men are given technology to ease their productive role, whereas women continue to put in a long day, working hard to fetch water and fuelwood.
- An existing gender role is replaced by technology, and passed over to the other gender. For example, mechanization has significantly decreased work opportunities for women. It reduces their income, and makes the agricultural by-products they traditionally used less available.
- An existing gender role is invisible. It is neither reported nor supported. For example, women who grow potatoes and tomatoes, process dates, grade and clean fish and tend livestock and poultry are generally unpaid and unacknowledged. During development

interventions, they receive marginal inputs for doing their work better or faster. Men who receive proper training and technology thus leave women far behind, unable to compete. By the same token, much health training is focused on women, when many men are directly involved in looking after family health. This leaves men unable to cope with changing health information.

- Equal weight is not given to problems of scarcity of resources. For example, the burden of dwindling resources is borne by women because of their role as family sustainers and primary users of natural resources.
- The role is performed by one gender, and only the other gender receives training to perform it more effectively. For example, livestock training is given to men where women are actually the ones responsible for tending livestock and poultry.
- The major concern of one gender is ignored, leading to undue burden and discomfort. For example, this occurs when agricultural research and extension largely ignores the major concerns of women farmers. These concerns may not be for commercial crops but for food production, hardy planting materials, household food security, home storage and small-scale processing.

These highlight gender issues that arise in spite, or often as a result, of well-intentioned development interventions. And it is usually women, rather than men, who are negatively affected by development. It is not the conscious intent of development practitioners to disadvantage women, but that is what occurs as a result of unconscious oversight. This is generally because it has been men who have been in the forefront of development, both as recipients and implementers. Development implementers can more easily empathize with the roles and responsibilities of other men. They can approach men more easily. What can be seen and heard is more easily understood. Development policies and programmes in the past have therefore been skewed to favour men and their priorities. Women and their concerns have remained largely invisible and ignored, although there have been a few signs of improvement recently (Box 23).

THE WAY AHEAD

All initiatives undertaken within the scope of the BCS will ensure that gender issues are fully addressed. There are three broad strategies to ensure this:

- Both men and women will be trained, at their appropriate levels, and supported to perform their existing roles, responsibilities and activities in ways that can most effectively conserve resources and protect the environment. A gender analysis will be conducted as part of project design. Gender roles and responsibili-

Box 23 | WID/GAD Initiatives

- The Eighth Five-Year Plan mentions the Women In Development (WID) approach and the Ninth Five-Year Plan elaborates the guidelines for Gender And Development (GAD).
- Under the Planning and Development Department (P&DD), the government:
  - established a Women Coordination Cell under IMPLAN Project, which later transformed into the Women Development Department and has now been merged with the Population Planning and Social Welfare Department;
  - mobilized non-governmental organizations and relevant government departments to participate in the Country Report on Women for the International Beijing Conference in 1995;
  - followed up on the Beijing recommendations and participated in the formulation of the National Plan of Action, and later its translation on a provincial level;
  - designated WID focal persons in all relevant line departments;
  - created a Women Section in the Pⅅ
  - developed a WID library and database which was later transferred to the Women Studies Centre in the University of Balochistan;
  - developed gender guidelines for PC-1 formulation; and
  - established a Gender Resource Group.
- Establishment of primary schools for girls, under the Primary Education Development Project with the assistance of Society for Community Support for Primary Education in Balochistan.
- Application of GAD approach under the Food and Agriculture Organization–supported Upland Rehabilitation Project.
- Prime Minister's Lady Health Workers Programme.
- Establishment of Women Studies Centre in the University of Balochistan.
- Establishment of WID Network, Balochistan.

Shuja Zaidi, BCIAP

Women in Balochistan manage livestock and poultry.

ties will not be assumed, since they may differ from area to area within the province.

- If the roles of men and women within a community or household result in an uneven or unfair distribution of assets or benefit from resources, then development interventions will create opportunities to reduce this gap. This may require specially designed programmes for the disadvantaged gender.
- Women, along with men, will be actively involved as collaborators and decision-makers.
- The envisioned roundtabels will comprise of both women and men.

Effective Implementation of Current Activities

Widespread and continuing degradation of resources in any one sector has a harmful effect on the men, women and children of the area. But women and children are more vulnerable, for they are directly involved in activities such as grazing animals and collecting water and fuelwood. Their current practices affect the environment, and the quality of their life is in turn affected by the environment.

Women in Balochistan have a wide range of roles and responsibilities. In some areas they are confined within four walls, while in others they are seen to perform a vast range of caring and productive roles. Women can be supported in the performance of some of their current roles in numerous ways:

- Ensuring a supply of clean, potable water for household needs is a woman's responsibility. In areas where women fetch water, this task involves a substantial amount of time and physical exertion. Interventions will focus on conserving natural sources of water, such as perennial springs, and guaranteeing that this community resource is not negatively affected by other interventions, such as tubewell drilling.
- The water resource, particularly in rural areas, is traditionally distributed on the basis of the number of individuals or 'heads'. This generally refers to the number of men in a household. And it is men who manage the water. But it is women who use the water source, and they walk for miles at a stretch on rocky and rugged paths to fetch it. For women, the inconvenience is worth it, for the water collection points are the only places where they can gather with other women and socialize. Recently, the gov-

ernment of Balochistan provided drinking water near the communities. But most hand pumps installed have been mismanaged and now do not work. One reason could be that women and children handle these pumps, whereas men received the training on use and maintenance. Also, most women are not involved in critical decisions such as site selection, thus resulting in hand pumps being installed near public places, for example next to a village mosque. This prevents women from interacting. Such interventions result in waste, since in this instance, many women still prefer to walk for long distances to access even muddy water. Any intervention with regard to water resources will involve women in all stages of decision-making.

- Animal grazing, fuelwood collection and collection of edible forest products are tasks undertaken by women and children in many areas of Balochistan. When developing any policy that might have an impact on these tasks, women and children will be consulted as well as the men. Alternate sources of cooking fuel and energy will be looked at to help lighten the burden on women.
- The agriculture sector will conduct substantive research on women's changing roles in farming. The fact that women are not directly trained for the role they are currently performing in this sector could be one reason for low yield. Though the Agriculture Department has a women's section, the training designed and imparted bears little relationship to what is actually required. Women extension workers will receive adequate training so that they can perform more effectively.
- Currently, women and children manage livestock and poultry, while men market them. Processing products, such as milk, cheese and wool is the sole responsibility of women. It is imperative that training in vaccination and disease control, milking and milk processing and wool processing is provided to women with the assistance of women livestock extension workers.
- Most development initiatives in the fisheries sector focus on developing the coast and exploiting the resource rather than responding to the needs of the fishermen, and even less so to the women. Men are not formally trained for the work they do. Women are involved in many productive activities, including net-making, net repairing, fish sorting, grading and cleaning, all undertaken for long hours under difficult situations. Women receive neither technology nor training to conduct their work better or faster. Where training is provided to men to fish properly and responsibly, women will also receive training and market orientation on sorting, grading, preserving and packaging fish. Awareness and skills to manage the occupational health hazards of fish processing will be an integral part of the training provided to women.
- Crafts from Balochistan have a special recognition and are marketed both nationally and internationally. While large and medium-scale industries are located at Hab and Quetta, small-scale industries are widely dispersed throughout Balochistan. Well-known handicrafts from Balochistan include embroidery, wool and leather products, and carpets and rugs. Women, as unpaid family workers, make up the dominant work-force in this sector. Most of the labour is untrained and is not exposed to changing designs, colour combinations and market requirements. Women will receive appropriate training in the production aspects, and men will be trained to reach out to appropriate national and international markets. This will improve family income, as well as lead to economic gains for the province.
- Due to lack of access to a supply of natural gas, wood is burnt as fuel throughout the province. Indiscriminate use of the forest is causing major ecological and environmental problems. The world-renowned juniper forests of Balochistan have also been affected. With the involvement of the Forestry Department, a communication programme could be developed for women, to make them aware of the dire consequences of deforestation and to train them in planting fast-growing varieties that are more suitable for burning.

New Roles in Production and Community Management

Women are already involved in a variety of income-generating activities. In communities where women have the time and the interest to be further and more effectively involved in income-generating opportunities, additional activities could be undertaken:

- Undertake an inventory of women's skills and their specific involvement in income-generating activities, and identify opportunities where value can be added to existing skills. For example, women who tend poultry and livestock can be trained to vaccinate and treat them; women who collect herbs and spices can be trained to produce them organically; women who already shear wool can learn to process it; women

can grow flowers for commercial purposes and learn to extract perfume from them.

- Ensure that women's involvement in productive activities is offset by greater efficiencies in their household tasks. Both must be addressed conscientiously. Women will be involved in all decisions that directly affect their current and potential roles within the community.
- Earmark new avenues for women to earn income, which after training can be performed by both men and women. These may include production and use of solar energy, solar cookers, solar cells, solar heaters and wind energy. Activities such as cutting and polishing gemstones and studding ornaments may be appropriate for women, given their inherent dexterity and attention to detail.
- Encourage formal education, especially for girls. It is only though education that a broader range of opportunities for new roles can emerge for women. Communities can be given incentives to educate their girls in terms of new economic opportunities, skill enhancement, credit and technology.
- Ensure equal access for men and women when formal studies in electronics and information technology are introduced in urban colleges.

Implementation of Resource Management and Conservation Programmes

Women will be given an orientation to, and be consulted on, the planning and implementation of resource management and environmental conservation programmes. Generations of knowledge and practice have been passed down through women, and will continue to pass down through them. If some practices need to be changed, women must be actively involved to ensure sustainability. Some areas of particular interest and concern for women are strategies for conservation, developing and deploying renewable energy, water use, protection of forests, preventing and abating pollution, at household, street and village levels, small desalination plants in south-western and coastal areas, shifting of wholesale markets, managing urban wastes and conserving biodiversity.

Institutional Support for Gender and Development

Several measures are required to ensure institutional support for gender and development. There needs to be awareness and acceptance at the policy level of the importance of ensuring gender balance through gender analysis. This will lead to a commitment at the highest level to obtain gender differentiated and dis-aggregated data for macro (regional) and micro (intra-household, farm, community) planning. It will be recognized that biased data can cause skewed policies in favour of one gender, most frequently men.

Institutions (ministries, parastatal, non-governmental organizations (NGOs)) with a demonstrated capacity to address existing and potential gender issues must be identified. This is possible if the men and women working in these various institutions are gender-sensitive, and therefore committed to the development needs of both sexes. Stakeholders in programme implementation will have gender-sensitive questionnaires to collect information in needs assessment and monitoring/evaluation phases. Most of these institutions presently have all-male staffs. They therefore, are constrained in efforts to directly reach out to women. This may be a major reason why most government line departments do not address women's issues and concerns through their development initiatives. This constraint can be initially overcome by coordinating with those organizations within Balochistan that specifically address women's needs. In the longer term, the government will proactively recruit more women in all line departments.

Particular attention needs to be given to women-focused NGOs. Although it is unintentional, women can be pushed further away from power by the introduction of new technologies (for example, farming technology and extension services), which are often more accessible to men. Opportunities for women must be expanded if their energies and talents are to be harnessed for sustainable development. More specifically, the government will allocate quota for women in public-sector jobs, include them in various government-appointed committees and fora and maintain, and if possible, enhance their representation in the Provincial Assembly and the National Assembly.

The Population Planning and Social Welfare Department, in collaboration with the P&DD, must play a vital role in programme design, implementation and monitoring for gender integration. These departments will be a catalyst for providing policy guidelines to ensure women's participation in all development programmes. While the Women Development Wing is the institution within the government with a mandate to integrate women's concerns in all development initiatives, it will be recognized that its role is that of a facilitator to support the line departments, NGOs and community-based organizations. It is not their task to take on a limited role to

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Self-help: rural women repairing the tap.

provide development interventions for women on behalf of the line departments.

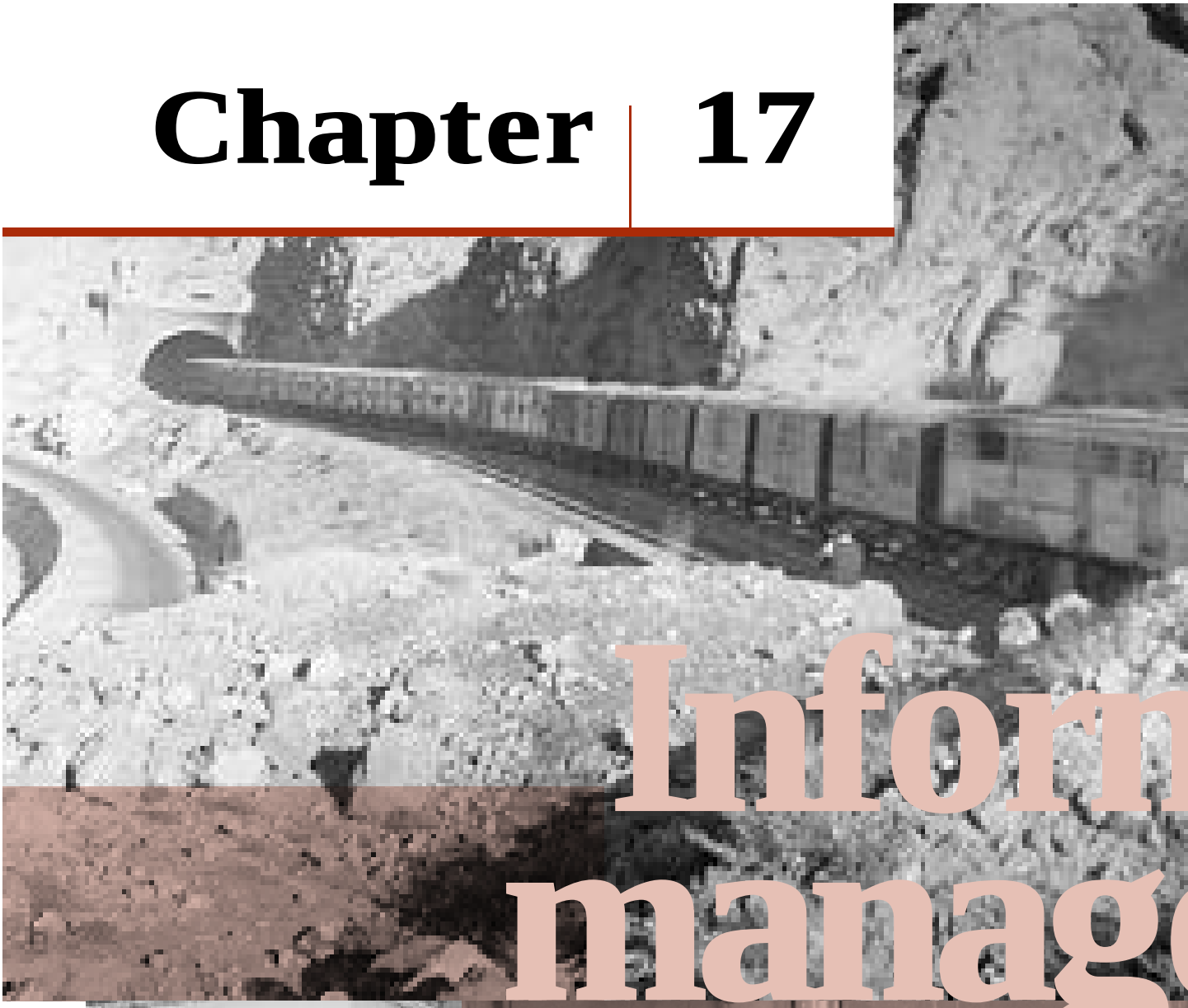
Since 1995, the federal and provincial governments have put Gender and Development on a higher agenda. As a result, women have received a more defined focus in development initiatives than in the past. A major driving force behind this shift has been the nation-wide Social Action Programme, which supported the Beijing Conference on Women. Other important structures and forums that can be approached for assistance to support women's development include the Beijing Follow-up Committee, Sector Focal Point Forum and Women Studies Centre in the University of Balochistan.

Gender-differentiated and dis-aggregated data based on authentic research and monitoring outputs will be created to provide continued support to future gender-sensitive project planning. Each line department must commit itself to this, with the technical assistance of the Bureau of Statistics and field support from the Population Planning and Social Welfare Department.

Conscious efforts must be taken to educate and interest women and children in implementing resource management and conservation programmes. To do this, innovative ways must be designed to reach out to the women of Balochistan. A first step may be the participation of gender-sensitive media personnel in this effort. With their support, the government could create an integrated orientation package that simply but creatively explains relevant aspects of the programmes to target groups in a way that can be understood easily by men, women and children. The orientation would be developed keeping the geographic area and its associated economic activities and ecology in mind. The delivery of the orientation may be through interpersonal contact, where NGOs and community groups carry the message through visuals and puppet shows for groups of men, women and children. Radio would prove a powerful media. Other existing channels of communication include health workers, schoolteachers, birth attendants (dais), family health workers and religious educators. Women would have to be mobilized into community groups to ensure their participation. Though expensive initially, this is a proven mechanism for women's participation and project sustainability. A cost-effective way to mobilize is for all line departments to invest collectively in the formation of community groups, through which they together can have an input.

Chapter 17

Inform manag



Information Management

Decision-making is based on information. That information might come in many forms – the radio, television, newspapers, or discussions with family, friends, colleagues and advisors. It might involve information acquired over a long period of time, in the course of education, research, management, or from past experience. Decision-makers must weigh a great deal of information, considering what is reliable, what to disregard, and whose opinion to trust. Whether buying livestock or a new car, the process is much the same, but the sources of information might be quite different. In the first case, the opinions of people skilled in livestock breeding might be very important. The experience and knowledge of skilled, but uneducated people might be more valuable than research reports and databases. The second case might depend on comparative statistics of cost, performance and reliability, supplemented by the opinions of other car owners and personal preferences. The tactics are quite different. The best strategy is to draw on as many sources of information and advice as possible.

Managing natural resources follows the same pattern. It is important to have the right kind of information and to use it effectively. Acquiring useful information means asking the right questions, understanding the answers, analyzing the results and comprehending the consequences of various courses of action. In a single sector, there may be a library of documents recording the results of past research programmes and field projects, as well as up-to-date reference works. There may be sector specialists who can interpret information and offer the benefit of experience and knowledge. There may be other sources, such as the internet, that can provide information from a multitude of sources. And then there are the beneficiaries who may know a great deal about the sector and may be willing to share their knowledge. But sectoral solutions may be more complex, requiring inputs from many sources and needing to take into account socio-economic variables. Integrated approaches are required. These are complex and demand an enormous array of inputs.

Government departments are commonly described as 'watertight compartments'. That is to say, information is held closely by officials in a cell, section or directorate. In line with time-honoured administrative procedures, responsibilities are closely defined and the decision-making process is adapted to it. Matters that are not assigned to a department, are not addressed. The principle of 'need to know' is followed closely. The concept of 'right to

know' is seldom accepted. The process militates against collective action.

Balochistan is not particularly accustomed to working with reports and publications. The working language of government is English and all correspondence and documentation is in that language, although the working language may be one of several local languages. Newspapers are read assiduously, but little else is. Poetry draws rapt attention and admiration, but project reports and statistical digests end up gathering dust. Visual media are closely scrutinized, but facts and figures seem to attract little interest. It is hard to find copies of the many development-related reports that have been produced.

Information documented in the course of scientific research, investigations, project development, implementation, monitoring and evaluation are contained in the many reports filed by research agencies, line departments, district administrations, projects, academics, consultants and others. Non-governmental organizations may also hold a great deal of useful documentation. Much of it is unavailable, kept within the confines of a particular organization, of dubious quality, discounted, or generally ignored. Too much time is spent in tracking down documentation, assessing its usefulness, duplicating it and keeping track of it. Too often, work is duplicated either because the existence of earlier documents is not known, or they cannot be traced. This causes consternation on the part of decision-makers, who are generally not specialists and have little time to explore the technicalities behind the issues. They see an endless duplication of effort and disagreement, and begin to discount the value or validity of the studies in the first place. The end result is that much of the work done is not given due consideration in the decision-making process.

DATA COLLECTION: CURRENT SITUATION

Departments generate reports and statistics as input to the development process. This is done on a departmental level. The Bureau of Statistics is the organization responsible for compiling available information. For planning and budgeting purposes, reliance is placed on statistics compiled by each sector. Disagreement among the sectors on the significance of their contributions is commonplace.

The main sources of information on the sectors come directly from the departments concerned. Key amongst these sources, are the Agricultural Statistics of Balochistan 1996-97, 1990 Census of Agriculture, and Livestock Census 1996. Additional information is reported by the departments dealing with fisheries, forest, industries and tourism. Energy falls within federal jurisdiction and is reported annually.

The provincial Bureau of Statistics (BoS) is part of the Planning and Development Department. It was created in 1970 and works under the Provincial Statistical Council (PSC). The PSC, composed of departmental secretaries, met for the first time in December 1998 to discuss the mandate of the BoS and assign priorities for the collection and timely dissemination of reliable data. BoS should furnish data according to the provisions of the General Statistical Act (1975), but it was never structured, managed, directed or supported to perform as such. One of the first tasks of the PSC is to determine what kind of information should be collected for development purposes. This requires a thorough review of socio-economic indicators in use in Pakistan, and by the international community.

A recent study of the BoS reveals how information on various resource sectors is collected, processed and disseminated (National Management Consultants 1999). The study reviewed data collection processes in line departments and found that:

- funds and logistic arrangements are not available to send staff into the field to collect the information;
- departments were unsure about the authenticity of the data, as there was no system or priority to check up on the field staff;
- staff are not suitably qualified and trained; hence data lacks quality, credibility and timeliness;
- there is no validation of data by any other agency;
- staff are under the supervision of officers who have other work priorities;
- there is a lack of cooperation in filling in questionnaires; and
- computer resources are not available.

The study also found that of 49 posts, only 19 staff members are actually working in the Bureau. BoS is not in a position to visit the field and provide guidance, supervision and monitoring. The ability of departments to compile useful information varies widely (Table 34). Agriculture has the advantage of having a province-wide network and access to the village level. The Department of Industries has very limited resources to get the information it needs. Information held by the Irrigation Department could be of use to other departments, but little new information is being collected. The Health Department has good access to the village and district-level data, but their data are not verified at any level. Information collection by other agencies is limited. The BoS is not producing statistics, but rather, is reproducing summaries of old data reported from line departments. The study concluded that "the way the statistical data is produced in Balochistan has lit-

Table 34 Government Departments and Information

Departments	Source of Information	Type of Information	Notes	Issues
Agriculture	Union councils	**Land use by district. Irrigated and unirrigated areas by crop and district. Total area and production of fruit and vegetables. Sources and extent of irrigation. Number of tractors. Consumption of fertilizer by district and cropped area. Consumption of fertilizer by type and season. Plant protection.**	Lack of computers and transport. Field assistant does the data collection. Department feels it is collecting the necessary data.	**No checking on field staff who are not trained for the work, are primarily involved in extension work, and do not attach importance to data collection; no compliance with Federal Bureau of Statistics schedules for data collection.**
Industries	Industrial units	**Profiles of industrial estates. Industrial units by district. Date of establishment, investment, installed capacity, manpower and status.**	Small staff based in Quetta. The Federal Bureau of Statistics conducts the census of manufacturing industries. Department does not collect any data of its own.	**The 1994 Directory of Industrial Establishments is unreliable and cannot be used for planning purposes, as the information it contains is not credible. Industrial units do not co-operate Staff are not trained No budget for data collection.**
Irrigation and power	Canal systems and water management projects	**Water availability from canals for different crops. Number of consumers in canal system. Number of dams and water management projects. Number and status of tubewells.**	No separate unit for collection of statistics; no equipment or budget. Recently, Bureau of Water Resources (BWR) has been transferred from P&DD to the Irrigation Department which has the mandate for collection of water related data. Data collected for PC-1 purposes and monitoring progress of projects and schemes. The publication *Inventory of Irrigation Works in Balochistan* is out of date.	**A great deal of information is contained in departmental documents on canals, reservoirs, tubewells, stream flows, soil conditions, and socio-economic conditions. The department does not have data on climate, geological and hydrological conditions, physical geography and site-specific information. The transfer of BWRwith information and some capacity should be useful.**
Public health engineering	Village level and sub-division level	**Demographic and socio-economic data at village level. Expenditures, connections, staff, operations and management, tariff collection, tube-wells and project status**	Management Information System unit has some computers. Most of the data collected relates to monitoring and evaluation activities. Community development unit has transport.	**No reliable and authentic population or socio-economic information.**
Health	Primary healthcare units at village level;. hospitals at district level	**Communicable diseases and patients. Immunization. Inventory of hospitals, dispensaries, rural health centres, basic health units, patients and medical staff.**	Statistical cell publishes quarterly report on communicable diseases and annual report on infectious diseases and annual health statistics. Health Management Information System (HMIS) unit established. Statistical cell and HMIS have good computer facilities and vehicles.	**Real situation regarding number of patients and medicine usage may not be available; under and over reporting are common. No check on data at any level; authenticity questionable. Insufficient funds for dissemination of results.**

Departments	Source of Information	Type of Information	Notes	Issues
Education	Government schools	**Education system up to secondary level, including enrolment and staff.**	Balochistan Educational Management Information System (BEMIS) collects and compiles data; geographic information system. Good computer facilities.	**Only government schools are included. Budgetary limitations. No validation of data; erroneous and questionable data. Sustainability of BEMIS uncertain.**
Labour	Government offices and industrial units	**Percentage of unpaid family workers over 10 years, by sex and level of education. Labour force and unemployment. Percentage of employed persons, by industry and district. Surveys of disabled, women and child labour.**	Statistical cell with some computer equipment but no transport.	**Poor response from government offices and industrial units. Lack of funds, training, and logistic support.**

tle credibility in the eyes of the users, it is not thought reasonably accurate, valid and authentic" (National Management Consultants 1999).

The government of Balochistan recognizes the problems with statistical data and acknowledges that corrective action is required (Box 24).

DISSEMINATION OF INFORMATION

There is very limited dissemination of information within the government or to the general public. As a step towards remedying this, Improving the Systems for Development Planning in Balochistan (IMPLAN) has been working to introduce information technology within P&DD and between P&D and related departments. A Local Area Network has been functioning within P&D Department for some time. The system is being redesigned as an intranet to enable Chiefs of Sections and Finance to use the Project Management Information System (PMIS). The PMIS provides information on the financial status of projects. It is currently being upgraded to include information on physical progress, and to produce the Public Sector Development Programme (PSDP) for 1999–2000. The system will be expanded to include line departments and divisional and district offices. It will extend electronic messaging to all staff. Additional developments involve linking departmental databases with the intranet.

Box 24 State of Statistical Data

As the database is still relatively weak, only a limited degree of accuracy can be obtained in these descriptions (of the main social and economic characteristics of the province). Therefore, quantifications have to be interpreted carefully and mainly serve the purpose of a rough order of relative magnitude. The recently completed District Profiles of the 26 districts form a valuable source of additional information, adding a spatial element to what is known already. The Profiles are a secondary source; they contain statistical data that was already available. Planning without adequate factual information imposes a bias towards qualitative analysis, which is acceptable given the prevailing circumstances. The task of collecting more reliable data still remains a priority in the years to come.

Source: P&DD, 1998a.

The District Profiles compiled by IMPLAN have been placed on a website to facilitate public access. The BoS will update these. The District Profiles will be distributed on CD-ROM, intranet and internet. The PMIS database will eventually be moved to the internet. Additional services will include a Women Information System Balochistan database and a geographic information system (GIS). These are the first steps being taken by the government of Balochistan to promote transparency in development.

In terms of hardware, many of the computers in current use are outdated and plagued with problems, including viruses. They are not able to run commonly used office software suites. Furthermore, software is not standardized, and is of poor quality.

Many of the projects and NGOs operating in Balochistan have developed report libraries and databas-

es specific to their needs, and they often support sophisticated information management systems. The information they manage is not readily available. This is not necessarily because of any reluctance to share it, but rather the investment of time and resources it requires. In general, NGOs and projects are willing to share the information they have.

Projects and NGOs do not communicate routinely with one another on issues of common interest, although the means to do so are improving. Electronic mail is available in Quetta and some other major urban areas and there are several hundred subscribers. Electronic conferences, such as listservs, have the potential to enable exchange of ideas and information within the NGO community and within projects, but they have not been used as yet. Large urban centres, such as Quetta have a substantial, computer-literate population, well informed about the potential of computer-mediated communications. At present though, internet service is very limited and slow. Once the communications infrastructure is in place, access will improve dramatically. Demand for the service will be strong and will spread quickly throughout the province. Web sites hosting information on resources and environment will quickly follow.

The opportunity to share computer technology also exists. GIS is in use in Quetta, with the Area Development Programme Balochistan; the Primary Education Directorate; and the Quetta Water Supply project. There is a growing acceptance of the need to share such important and expensive tools. The technology involved is expensive to acquire and even harder to maintain. Effective operation of high-end GIS requires trained and experienced staff, maintenance and a long-term commitment of resources.

LOCAL KNOWLEDGE

A great deal of lip service has been given to the importance of community and grassroots participation in development. Some progress is being made in this regard, as local people become increasingly involved as partners in development programmes, such as water management, sanitation, horticulture, conservation of forests and wildlife, and fisheries. It is acknowledged that local people are the beneficiaries of development, that the government at present has little effective control over the use of natural resources, and that the government has few resources to dedicate to the collection of information it requires.

What has not been appreciated to any extent is that local people themselves have knowledge. This is not derived from books but from generations of observation and tradition. People have survived in Balochistan for at least 10,000 years, have lived subsistence lives, are skilled nomadic herders, have domesticated plants and animals, have developed artisanal fisheries and still use all the resources around them. This indigenous knowledge has not been drawn on to any extent in developing a deeper understanding of the environment and the functioning of Balochistan's ecosystems. Not every local person is an expert, but many do know a lot about their local environment. They know about:

- biodiversity: the variety, local and seasonal distribution and abundance of plants and animals;
- the household, economic and medicinal uses of plants and animals;
- ecological relationships, behaviour and migratory patterns;
- long-term trends and cycles of abundance in fish and wildlife populations;
- effects of hunting, fishing and grazing;
- effects of development activities on the environment, such as irrigation and drainage, agriculture, and coastal development;
- the indicators of long-term change; and
- climate and weather patterns.

THE WAY AHEAD

Information Management Policy

The government of Balochistan will give high priority to developing a Development Information Management Policy (DIMP). The objective of the policy would be to ensure that the information required for decision-making on natural resources and environment is made available in a timely fashion to all of those involved. The policy will promote the acquisition, management and dissemination of accurate and up-to-date information. In particular, the policy will promote the identification and use of indicators for monitoring progress towards achieving well being of people and ecosystems, socio-economic goals and the sustainable use of resources. Implementation of the DIMP reinforces the need for user training at all levels, from clerical to senior management. Everyone will need to have access to a computer and know how to use it. Computers are no longer a luxury, but an indispensable tool for productivity and effective use of human and financial resources, and for development.

Sustainable Development Networking Proramme of UNDP-IUCNPin Quetta.

The DIMP will be specific to Balochistan's needs, consistent with the emerging draft National Information Technology Policy (NITP) produced in 1998 by the Deputy Chairman, Planning Commission and Chief Coordinator, Pakistan 2010 Programme and as to be finalized in mid 2000. The draft NITP was based on a review of existing information technology, a critical analysis of the present situation and an assessment of future needs and policy directions. The draft policy was circulated to the provinces for comment in November 1998. This is an important and welcome initiative. The scope of the draft policy is very broad and the implications far-reaching. It is vital therefore that Balochistan develops its own policy while playing an active role in the process of developing the NITP.

The draft NITP rightly points out that isolated information management systems and database resources must be integrated to a level that can improve decision-making. There is much in the draft NITP and a lot more is expected in the final NITP2000 that will support the development of the DIMP for Balochistan.

It is important that the provinces are represented on both the federal committees for information technology. They will be mirrored at the provincial level to ensure coordination with those at the federal level.

The assessment of the current environment in the draft NITP is presented in a realistic way. One important aspect was lacking, however. That concerns the attitude of government agencies, particularly those that are custodians of information. These agencies use one pretext or another to hinder information sharing. The draft NITP points out that everything is centred on the citizens of Pakistan, and that information access to the people will be easy and guaranteed in legislation. The practice of withholding information from the general public is common. But these agencies quite successfully control the flow of data to other government departments. The draft NITP did not deal with this issue at any length. Hopefully, this issue will be addressed in NITP to be commissioned in the near future.

It is recommended that access to certain levels of information that are unrelated to national security issues, will be freely available to the public and private agencies. This is particularly relevant to geo-spatial data. The Survey of Pakistan is reluctant to grant permission to other government organizations with GIS facilities to use their maps. Yet geo-spatial information is routinely available in the market-place from numerous sources outside Pakistan. If Balochistan is to enter the 'knowledge age', then opening up information resources vital to economic growth is an important step.

All levels of government have to formulate policies to encourage development and sharing of databases. This involves:

- Standardization of databases. This is very crucial, and government must take immediate action to build these standards.
- Spatial Data Infrastructure (GIS/Digital Map Project). Apart from the Survey of Pakistan, the Space and Upper Atmospheric Research Commission is acquiring remotely sensed satellite data on a regular basis. An annual, geo-corrected digital map of merged satellite data every year would be a valuable contribution to the Digital Base Map project. Once a digital base map showing topography has been prepared, then updated satellite images can effectively enhance its usefulness for natural resources assessment, management and monitoring. The Electronic Resource Atlas of Balochistan proposed in Chapter 3 elaborates this concept.

The Soil Survey of Pakistan is preparing a Digital Soils Base Map. This will also be a valuable source of information for land use planning in the province. These soil maps will be made available to Balochistan in digital form.

Knowledge, Understanding and Wisdom

Information is organized and interpreted to provide knowledge. The goal is to make development decisions based on knowledge and, it is hoped, with understanding and wisdom.

In developing an information management policy, it is important to keep firmly in mind the several steps involved in the pursuit of knowledge and how these might eventually translate into understanding and wisdom. Each step in this process is important to the decision-making system. The roles and responsibilities for each step may be quite distinct. An information management policy must consider each step and concomitant roles and responsibilities, and design decision-making processes accordingly. Processes based solely on technocratic inputs will not be very successful in Balochistan.

Knowledge begins with observations or measurements. A set of observations or measurements becomes data. When data are selected, tested for reliability and related to a subject or problem, they become information. If that information is organized, interpreted or applied to some problem or issue, it becomes knowledge. If that knowledge is assimilated together with other knowledge, and integrated with what is already known, it can become understanding. Understanding, with judgement based on respected societal values, can lead to wisdom. The relationship among these steps, from observation to wisdom, was elaborated in The Staircase of Knowing (Box 25). As you move up the staircase, the content and ideas become more subjective and carry more human values.

Science is concerned with the first four steps of the staircase. This is the work of research and monitoring agencies, line departments, academia and technical projects. It is generally assumed that the various stakeholders will translate the data, information and knowledge they generate, and turn them into understanding to apply it. Local knowledge (also known as traditional or indigenous knowledge) is focused on the top three steps – knowledge, understanding and wisdom.

About Data

The restructuring of the Bureau of Statistics, a process initiated by the P&D Department to improve performance, will be revitalized. As a matter of policy, all the agencies responsible for the collection of data for resource management will undertake a comprehensive review of their data collection needs, assess their ability to collect the required data, make the necessary changes and ensure that what is collected is checked and validated. The BoS will ensure that staff are properly trained in data

Box 25 | About Wisdom and Influence

> How many times have you heard it said – that only if we had more data, or more information, we could make better decisions? And yet, there has never been a society with so much data, on almost any conceivable subject and problem. Our experience with the problems of (Canada) and the world does not give assurance that better decisions will come from putting most of our effort into the bottom steps of the staircase. What we need is help from the upper steps. I would ask you also, to think of the wisest person you know – wise in any subject you choose, or wise in general. Is that person wise in your estimation because she or he is full of data and information, or because of the ability to distil information into wisdom?
>
> Roots 1998.

In Balochistan, there are well-defined social and cultural traditions for decision-making. Those with knowledge and wisdom include elders and tribal and religious leaders. Those with influence include senior bureaucrats, consultants, and family members. The government structure is geared to defer to those who enjoy seniority by reason of age, educational background, or rank. Consultants might enjoy a special status, driven in part by donor support. The role of the extended family and professional connections cannot be discounted.

A. L. Rao, IUCN

Information Center, IUCN Balochistan Office, Quetta.

collection techniques, that the work is completed in a timely manner and that approval and quality control systems are in place and functioning.

The BoS will have the responsibility for compiling and disseminating data in formats useful to users. The Bureau will work in close collaboration with the line departments that have a good reach to the community level. The Provincial Statistical Council will place a high priority on reviewing and adopting socio-economic and environmental indicators as a basis for data collection.

Mobilizing Information

The government will collaborate with the private sector, research institutions, academia and NGOs to mobilize information in support of the decision-making process. Donors too, hold a great deal of information about Balochistan. This information will also be mobilized in support of resource management.

Libraries are traditionally the repositories of documentation, and their present and future role in information management needs to be assessed. Holdings of libraries and resource centres will be catalogued and the catalogues placed on-line so that prospective users have access to them.

The P&D Department has made a good start in developing and implementing an information technology system within the department and between departments, particularly to prepare the PSDP and to include information on the physical progress of projects. This work will continue, particularly the process of using electronic networks to disseminate information in forms useful to decision-makers and stakeholders. This will be reflected in the DIMP.

The internet is clearly the vehicle of choice for making much of the government's information holdings widely available. Top priority will be given to developing the necessary communications networks, either by landline or by satellite link, to connect all government departments to the internet and to extend this facility to the public. Government users will have access to an intranet to serve their specific information needs. Intranets may also be used to serve the information needs of the proposed Water Board, the Land Use Planning Commission and supporting organizations.

Policy on the Use of Local (Indigenous) Knowledge

Article 8j of the Convention on Biological Diversity (1992) states that:

> Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

The government will develop and implement a policy that recognizes and defines local or indigenous knowledge and ensures that it is given due attention in policy development, legislation and decision-making on the management of natural resources and conservation of biodiversity. This means that land use planning, the management of water through Water Boards, environmental impact assessments, protected area management and programmes geared to the sustainable use of resources, such as wildlife, would take into account the knowledge of the people and their communities in the area concerned. The policy would apply to all departments. In addition to mobilizing local knowledge for planning and development programmes, the policy will promote the identification, compilation, documentation and management of this knowledge by local people themselves. The collection and use of local knowledge will be guided by a Code of Ethics drawn up through consultations at the local level.

The Convention on Biological Diversity recognizes the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components. This will be reflected in the policy.

Development Information Users Group

A Development Information Users Group can assist all stakeholders in finding out more about information that has been collected, where it is held, and how to get access to it. Such a group can provide useful advice to the government in the development of the DIMP. More specifically, this group would operate as a 'think tank' and look at effective and efficient ways of mobilizing information, particularly in light of the government's commitment to decentralize decision-making to the local level. Discussion could be organized around the various communication needs, and review the efficacy of traditional and electronic techniques (Table 35).

Some of the activities of the group might include:

- building a distributable database of natural resources and environmental information to complement the District Profiles;
- setting up a web site and distributing information on CD-ROMs;
- setting up or maintaining a resource centre;
- setting up a group to recommend on the process of information management, with a separate geomatics group on geo-referenced information;
- promoting electronic networking, communications and conferencing;
- capitalizing on the knowledge of former civil servants through their involvement in interest groups or roundtables; and
- recommending training needs.

Part of the rationale for a Development Information Users Group is the belief that information and communications technology, including access to low-cost telecommunications, will be integral to life in Balochistan in the twenty-first century.

Sharing Common Resources in Support of Information Management

As much as possible, common services will be developed and supported to serve the needs of projects, programmes and departments. This includes services such as GIS, cartography, printing, remote sensing and aerial photography. These services could be provided either by the private sector or run on a cost recovery basis. This would minimize competition for funds and trained personnel and would ensure the availability and maintenance of up-to-date, well-maintained and well-run facilities. It would help ensure that the costs of new technologies and the development of commonly used products are available on a cost-shared basis.

In terms of sharing geomatics technologies, a working group will be established to determine:

- the nature of information held by projects and agencies;
- information collection, storage and retrieval (the current use of GIS);
- information needs of projects and agencies now and in the future;
- issues involved in sharing information;
- development of a strategic approach to sharing resources;
- making best use of tools such as GIS;
- developing capacity to enhance information exchange and analysis; and
- establishment of sub-groups to deal with specific issues.

Table 35 Communication Needs: Traditional and Electronic Media

Communication	Traditional	Internet
One to one	Conversations, letters, memos, notes, telephone and fax.	**E-mail**
One to many	Print and broadcast media, film, video and theatre.	**E-mail broadcast mailing lists, e-zines (online magazines), static web documents and internet audio/video**
Many to many	Congresses, conventions, workshops, symposia and meetings.	**E-mail interactive mailing lists, internet 'chat' sessions and virtual conferencing**
Many to one		**Searchable databases**

Chapter 18

Environm
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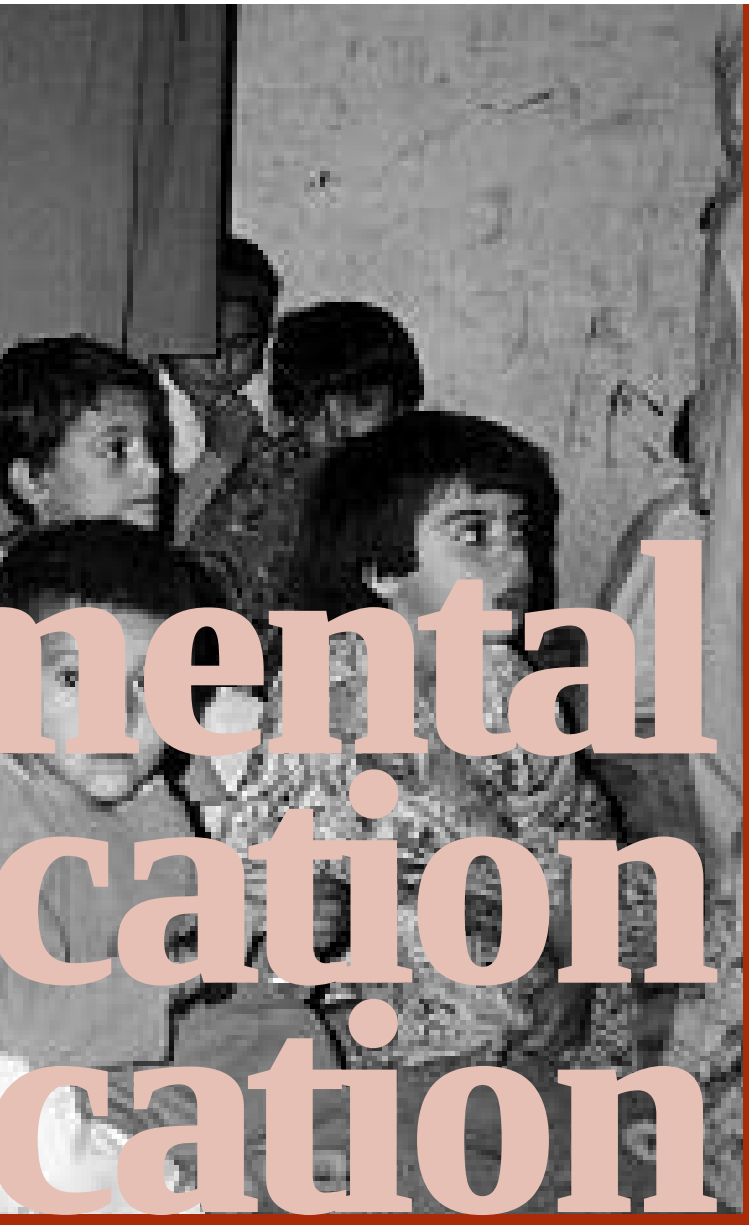


Environmental Communication and Education

Balochistan's environmental problems, like those elsewhere in the world, will not be solved easily or quickly. They will require a comprehensive long-term effort and simultaneous action on many fronts. For government action to be successful, it must have public support. Changes must be seen as the responsibility of all members of society, and must relate to their decisions as private and professional consumers and producers.

The BCS is promoting the social, economic and ecological well-being of the people of Balochistan through the conservation and sustainable management of the province's natural resources. Recognizing this, the Strategy must proactively focus on raising awareness and educating all stakeholders about its vision and the principles of sustainable development.

The IUCN Commission on Education and Communication contends that conservation strategies will not work if education and communication are overlooked or carried out in a reactive manner. The challenge, therefore, is to put in place effective communication and education programmes for key groups – decision-makers, stewards of natural resources and the general public – to enable them to take informed action.

CURRENT STATUS

The growing interest in the province's environment is evident from the increasing number of non-governmental organizations, schools and private institutions involved in raising awareness about environmental issues. There is also a growing trend in the Balochistan media towards environmentally oriented programmes. But there is still a long way to go, as the province is faced with numerous constraints due to its limited human and financial resources. These constraints are further exacerbated by the province's poor communication and education infrastructure.

With access to schools being more or less limited to those who can afford it (both financially and in terms of physical access), the literacy rate is higher among the middle and upper classes. In 1998, a mere 26.6% of the total 6.5 million population was literate (Table 35).

This suggests that while the print media is not the most effective means of communicating with the public, it is a way of communicating with decision-makers. Total readership of newspapers is only about 3-4%. In contrast, nearly 87% of the population listens regularly to local radio. In rural Balochistan, with

Table 36 Literacy Rates of Balochistan's Population*

Year	Total			Rural			Urban		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
1998	26.6	36.5	15.0	18.9	27.8	8.8	50.3	62.4	35.3
1981	10.3	15.2	4.3	6.2	9.8	1.7	32.2	42.4	18.5

Source: Population Census Organization 1984; Ibid 1999b. *age 10 years and above.

few roads and limited access to electricity, radio carries messages very effectively. The six radio stations in the province broadcast Urdu, Pashto, Balochi, Brahvi and Persian.

Television could be another effective communication channel in the province. The installation of boosters at Lak pass, Loralai, Khojak pass, Sibi, Khuzdar, Kalat, Gwadar, Kohlu and Ghazaband have made it possible for nearly 70% of the people to receive Pakistan Television's broadcasts. Now with the advent of satellite communication, foreign television networks have become more accessible, albeit to a small but increasing segment of the population.

There are important non-formal channels of communication as well. These include local melas (festivals) such as those held at Sibi and Pishin, jirgas (village councils) and the ulema (religious leaders). Street theatre groups have also begun to emerge in Balochistan. The annual sale and marketing shows, such as the fruit and handicrafts exhibitions organized regularly, have potential for communicating information on the province's environmental issues.

Balochistan's education sector is characterized by low enrolment and high dropout rates, untrained teachers, poor-quality teaching aids and a curriculum having little relevance to the present or future needs and interests of students. The situation is worse in rural areas, primarily due to vast distances, low population density, lack of infrastructure, poor communications and limited human resources. Women in general, and those in the rural areas in particular, are by far the worst off. With an acute shortage of women teachers and only one girls' school for every four for boys, few girls enrol in school and fewer still complete their education.

Acknowledging the importance of the education sector in human resource development, the government endeavours to provide a developmental budget for the sector. In 1999–2000, 26% of the total developmental budget was allocated for the enhancement of this sector. This allocation was 32% and 34% in 1997–98 and 1998–99 respectively.

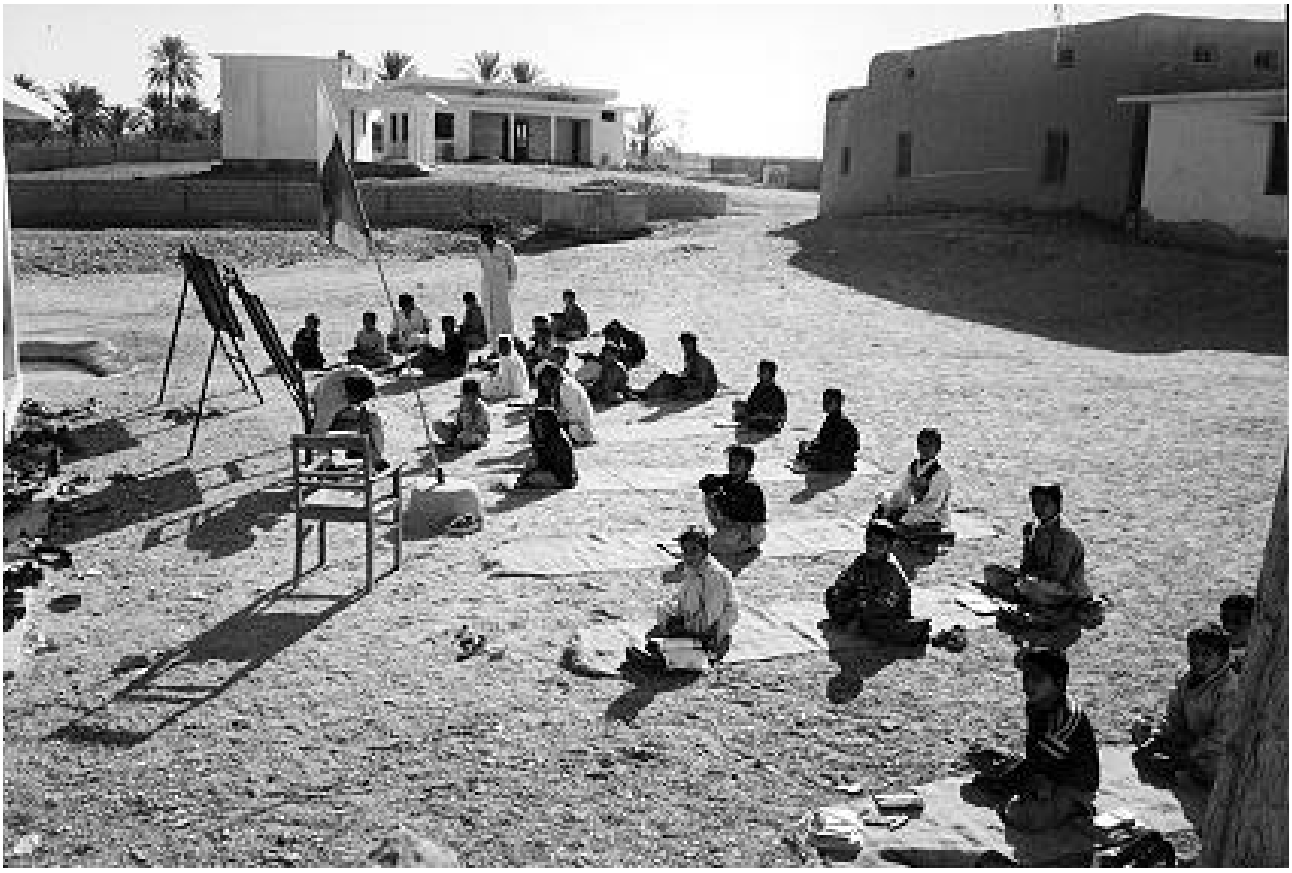
INITIATIVES IN ENVIRONMENTAL COMMUNICATION AND EDUCATION

Some environmental communication and education programmes are already taking place throughout the province. The Area Development Programme, Balochistan 1998–2003, a collaborative effort between the government and the United Nations Development Programme, has taken a holistic approach to the development of the province. In 1998, a comprehensive area review of the entire province with a focus on eight districts was completed. Education for sustainable livelihoods emerged as a major thrust area.

The Environmental Protection Agency, Balochistan has envisioned several environmental awareness raising and educational programmes. These include seminars and workshops on environmental issues, establishment of environment clubs, competitions and production of posters with environmental themes and radio and television discussions. EPA works in collaboration with other government departments, various NGOs and the media.

The Bureau of Curriculum and Extension Wing has been at the forefront in demonstrating the government's resolve to make formal education more relevant to future needs. In 1997, an Environmental Education Cell was constituted within the Bureau. Some teachers were sent to the Centre for Environmental Education, India for an intensive three-month course in environmental education. The Bureau also works closely with organizations such as IUCN and the World Wide Fund for Nature Pakistan (WWF). A number of the Bureau's master trainers have received training in environmental education through workshops arranged by these organizations.

A number of NGOs are active in the field of environmental communication and education in the province. Environmental awareness raising and education is a key



Hamid Sarfraz

An open-air school in Gwadar.

area of WWF Pakistan's Quetta Office. Its Quetta Environmental Education Programme, launched in 1990, has used both formal and non-formal approaches. WWF Pakistan has worked with the private sector, media and other NGOs in promoting environmental awareness in the province. The mandate of the Balochistan Rural Support Programme is to improve the quality of life of the rural population, especially women. Through its environmental awareness and education programmes, information is provided on how excessive resource use can lead to environmental degradation, the long and short-term impacts and possible remedial measures. The Society Environmental Awareness has been active in the province since early 1997. The group endeavours to support and promote initiatives and professional development in the field of environmental education. The Shajar Environmental Society has also been active in trying to raise awareness about the environment. It has launched an environmental awareness programme and publishes a quarterly environmental magazine, Shajar.

In 1996, Allama Iqbal Open University initiated the Green Action Programme. This is meant to raise the awareness of students and to bring about a healthy change in their attitude towards the environment. Under this programme, each student undertakes research work to contribute towards solving an environmental problem in his or her own area.

Several journalists from Balochistan are active members of the Forum of Environmental Journalists Pakistan. This is a countrywide network of people in the press who are interested in environment and development. The Forum's chief aim is to support, encourage and assist the media in advocating for sustainable development. It works in close association with environmental NGOs in the country and with similar forums regionally.

Since 1995, a number of professionals from academia, business, NGOs, government, military and the media have benefited from the Leadership for Environment and Development programme. This is designed to enhance the understanding of national and international environment and development issues, and to build the planning, policy-making and decision-making capacities of participants.

IMPLEMENTATION OF ENVIRONMENTAL COMMUNICATION AND EDUCATION PROGRAMME

A number of realities need to be taken into account while undertaking environmental communication and education programmes in Balochistan. These relate to difficulties in reaching out to people, the limited human capacity available in the field of environment; the current situation of women and prevalent gender disparities; the newness of the NGO sector; and the socio-economic and political structure of the area. There is a need therefore, to:

- Raise awareness and educate tribal elders and other local opinion leaders about environmental issues and the sustainable use of resources. Their participation and commitment is imperative for the effective implementation of any strategy to deal with these subjects.
- Build the capacity of staff in the government, media and the NGO sector that are going to be involved in environmental communication and education. This could be in awareness raising, advocacy and environmental education.
- Raise environmental awareness and promote participation of local women's groups in all education and communication consultations. For this, it is necessary that gender sensitivity be maintained while developing environmental awareness and education material.
- Make the best possible use of funding. Priority should be given to how environmental communication and education programmes are to be funded. This includes consideration of how existing resources are allocated and how priorities for funding are determined between various sectors.
- Incorporate environmental communication and education in all development initiatives at the provincial and local community level.

Environmental communication and education programmes can contribute both to appropriate solutions to environmental problems and to the development of potential for long-term change. A range of communication and education strategies is required to achieve these short and long-term goals. In the short term, the objective would be to raise the awareness regarding environmental issues and constituency-building, in both the public and private sectors. The long-term objective would be the capacity-building of key stakeholders and the institutionalization of sustainable development principles in the communication and education sectors of Balochistan or vice versa.

THE WAY AHEAD

The success of any strategy geared towards bringing about a change in people's attitudes and behaviour depends very much on the process of its development. Care needs to be taken that the process of consultation used to develop the Strategy is continued through implementation, so that the strategy is a living process that can change over time. The existing Communication-Education Interest Group will be developed into a Roundtable on Environmental Communication and Education. The members – including representatives of provincial departments and line agencies, NGOs, opinion leaders and members of other sectoral interest groups or roundtables – will assist in the implementation of the Strategy, its review and updating.

Specific actions are listed below. Priorities on these will be set by the roundtable, submitted to the government and other stakeholders, and implemented according to the availability of resources.

- Develop and implement tailor-made environmental awareness raising programmes for selected stakeholders.
- Develop and disseminate target-specific awareness material in Urdu, to promote sustainable development in the province.
- Appoint focal persons in key line departments (Health, Education, Agriculture, Social Welfare, Irrigation, Forestry & Wildlife, Livestock, Industries, Fisheries & Coastal Development, Public Health Engineering and Local Bodiesand Rural Development) for environmental communication and education.
- Design and implement capacity-building programmes for key line departments, to enable them to incorporate environmental communication and education in their respective areas of work.
- Ensure the regular flow of information and sharing of experiences amongst various line departments.
- Encourage and support the Ulema to raise environmental awareness and promote sustainable development in the province.
- Involve traditional communication channels in Balochistan (such as jirga and melas) in raising environmental awareness.
- Support the Balochistan section of the Forum of Environmental Journalists Pakistan to promote environmental journalism in the province.

- Build the capacity of the local press for writing on environmental issues.
- Support the producers of radio and television programmes to infuse conservation and sustainable development issues in their work.
- Institutionalize environmental journalism in the Department of Mass Communication at Balochistan University.
- Assist the Sustainable Development Networking Programme in Balochistan to raise awareness about environmental issues and promote sustainable development in the province.
- Influence and encourage the armed forces institutions to participate in environmental awareness raising and rehabilitation programmes.
- Incorporate environmental education in text books through the Text Book Board, Balochistan.
- Work with the Environmental Education Cell in the Bureau of Curriculum and Extension Wing to ensure the adoption of a multidisciplinary and balanced approach to environmental education in the Bureau's curriculum development and training programmes.
- Develop training modules to incorporate environmental awareness and education in pre-service and in-service teacher education/training programmes.
- Develop tailor-made training programmes for faculties at the tertiary education levels (such as technical colleges and different departments at the University of Balochistan, including Sociology, Social Work, Mass Communications, International Relations, Public Administration, Education, Botany, Zoology, Biochemistry and Law) to incorporate environment and sustainable development in their teaching programmes.
- Institutionalize environmental education in teaching programmes of the private sector and armed forces' educational/training institutions.
- Incorporate environmental awareness and education in the curriculum and teacher training programmes of the Non-Formal Education Directorate and educational NGOs.
- Design and implement environmental orientation and education programmes for teachers.
- Develop courses in natural resource management (such as land resource rehabilitation, water management, sustainable agriculture and forestry) by supporting tertiary-level institutions to collaborate with relevant institutions and government departments.
- Establish information resource centres in the province to ensure open and effective communication about sustainable development and associated issues.

Technolgy in education.

- Develop further the Environmental Resource Centre established by IUCN in Quetta, for use by government, media, NGOs, the private sector, academia, students and others.
- Organize capacity-building programmes for selected NGOs and community-based organizations to incorporate environment in their respective areas of work.
- Enhance environmental awareness and education programmes of institutions and organizations offering distance-learning courses (such as Allama Iqbal Open University).
- Institutionalize environmental components into the training programmes of professional development institutions (such as National Institute of Public Administration and Pakistan Institute of Medical Sciences).
- Build the capacity of the Balochistan Chamber of Commerce and Industries to promote environmental awareness among the business community in the province.
- Infuse the concept of environmental health in existing training programmes for Traditional Birth Attendants and Lady Health Workers/Visitors, who are effective channels for raising awareness among women.

Part III

Implementation

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Chapter 19


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HEALTHY CITIES FOR BETTER LIFE
ONE DAY SEMINAR ON HEALTHY CITY
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GOVT. OF BALOCHISTAN (QUETTA MUNICIPAL CORPORATI
IN COLLABORATION WITH WORLD HEALTH ORGANIZATI
FEBRUARY 9, 2000 AT QUETTA SERENA HOTEL.

Implementation Framework

Unlike other planning initiatives in Balochistan, the BCS has been developed through a wide planning process aimed at creating ownership and commitment amongst stakeholders, including political leaders, senior bureaucrats, government line departments and field agencies, the private sector, non-governmental organizations (NGOs), media and academia. The implementation framework has also been developed in consultation with them so that the BCS document receives serious attention in its implementation.

The framework has benefited from the experiences gained in the implementation of the National Conservation Strategy (NCS) and the Sarhad Provincial Conservation Strategy (SPCS).

THE NCS EXPERIENCE

Work on the preparation of the National Conservation Strategy started in 1987, but the document was not finally approved by the Federal Cabinet until 1992. The NCS was instrumental in bringing about the establishment of environmental policy and institutional and legal mechanisms: the standing Senate and Parliamentary Committee, the Ministry of Environment, Local Government and Rural Development–NCS Unit, the Environment Section of the Planning Commission, provincial Environmental Protection Agencies (EPAs), the Pakistan Environmental Protection Act and environmental tribunals.

Despite these advances in setting up a framework for the institutional management of the environment, the current situation presents a bleak picture. All key environmental indicators point towards increased – often critical – levels of pollution and degradation of water, air and soil. In fact, this across-the-board deterioration was largely a symptom of institutional failure, reflecting human, technical and financial resource deficiencies. Other contributing factors were lack of inter-sectoral interfaces, inability to mainstream the environment into national development policies and marginalization of communities and civil society representatives in policy planning, decision-making and implementation. Some other critical issues are:

- The lack of political will and foolproof mechanisms are key elements inhibiting the implementation of the NCS. Policy-makers pay lip service to the environment, but do not translate this into on-the-ground activities.

Sajjad Ahmed

A briefing to BCS stakeholders on SPCS implementation.

- Frequent changes in government policies have had a damaging effect on both the environment and the economy.
- Programmatically, there were problems with the NCS. Relative to its broad operational sweep (14 core areas), the NCS has not devised a workable management strategy. Moreover, institutions responsible for the implementation of environmental policies, such as forestry and agriculture departments, lack the capacity, expertise and financial resources for effective outreach to farmers and communities.
- Some aspects of process and operational failure involved lack of cost-benefit analysis and the absence of private/government partnerships to implement various programmes in the NCS core areas.

The extent to which some of these and other issues are valid and relevant will be verified by the more comprehensive and research-oriented mid-term review of the NCS that was undertaken under the lead of the Ministry of Environment, Local Government and Rural Development recently.

THE SPCS EXPERIENCE

The SPCS was approved in June 1996 and was officially launched in November 1997. The SPCS, like the BCS, covers a wide spectrum of issues requiring massive human, financial and legal inputs. Although the NWFP's human and financial resources are large compared to Balochistan's, they are still not sufficient to meet the province's development needs.

The SPCS has laid emphasis on building human resources to institutionalize strategic environmental processes as a means to foster implementation. Various initiatives have been undertaken. The environment is the responsibility of the Planning, Environment and Development Department (PEDD) in the NWFP due to the cross-sectoral nature of the subject and the need to improve coordination in planning, implementation and monitoring of SPCS-related programmes and projects.

SPCS implementation is the main agenda of the Environment Wing in PEDD, which has reasonable resources. Full-time focal persons for the environment have been provided by PEDD to key line departments for integrating environment in sectoral policies, programmes and projects and catalyzing and supporting environment-friendly initiatives and building capacity.

Roundtables have been established in key sectors and are effectively operating. The EPA, Sarhad is active and effectively performing its role. The restructuring of the Forest Department is under way. The approach of community participation in resource management is being implemented. The Environment Rehabilitation in NWFP and Punjab project, funded by the European Union and the Mountain Area Conservancy Project, funded by the Global Environment Facility/UNDP are worth mentioning in this context.

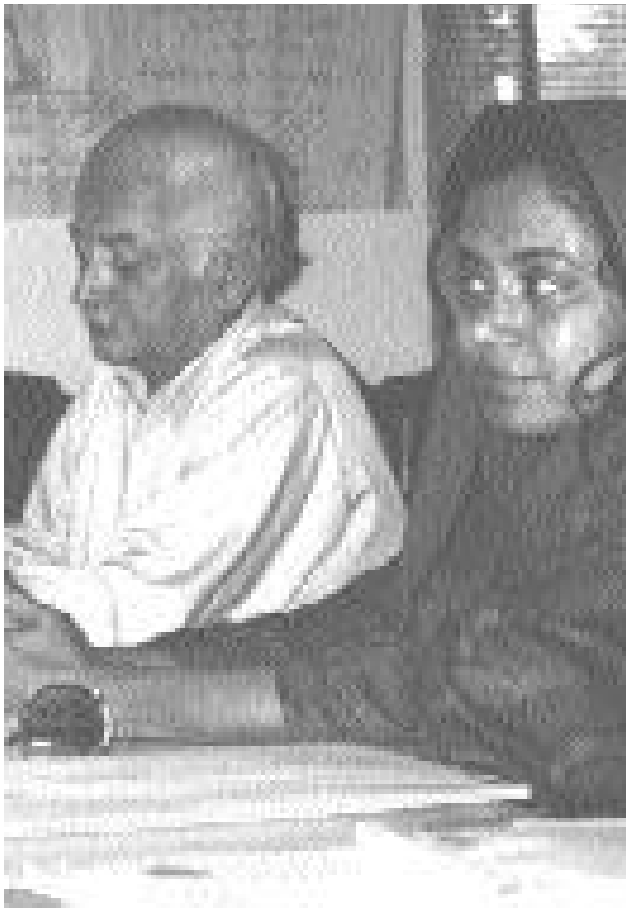
Conservation strategies are being formulated for the Chitral and Abbottabad Districts. Drafts of a Provincial Environmental Protection Act, Good Governance Act, Land Use Planning Act and Forest Act have been prepared, distributed for discussion and processed for enactment.

Human resource development needs of implementing organizations and training needs of their employees have been assessed and training courses have been conducted. This is an on-going process. Existing pre-service and in-service training programmes in agriculture, forestry and education sectors have been strengthened, and a new programme is being developed for the Local Bodies and Rural Development Department.

Sector-specific guidelines are being produced in some cases to facilitate environment-friendly development, appraisal, implementation and monitoring of sectoral programmes and projects.

Donor assistance has increased manifold for the environment. IUCN is supporting the government of NWFP in SPCS implementation through a Support Unit established in and working closely with PEDD. The government is keenly pursuing the following innovative approaches for mobilizing additional funds and human resources for implementation:

- Fund for Sustainable Development – this will be a revolving fund for the environment.
- Debt swaps for environment and conservation – this mechanism will also be useful for reducing foreign debts.
- District Development Fund – this is a lump-sum development fund directly provided to a district for appropriate use as determined by the people of the district through an appropriate process. Chitral and Abbottabad Districts are being targeted initially.



Umer Afridi, IUCN

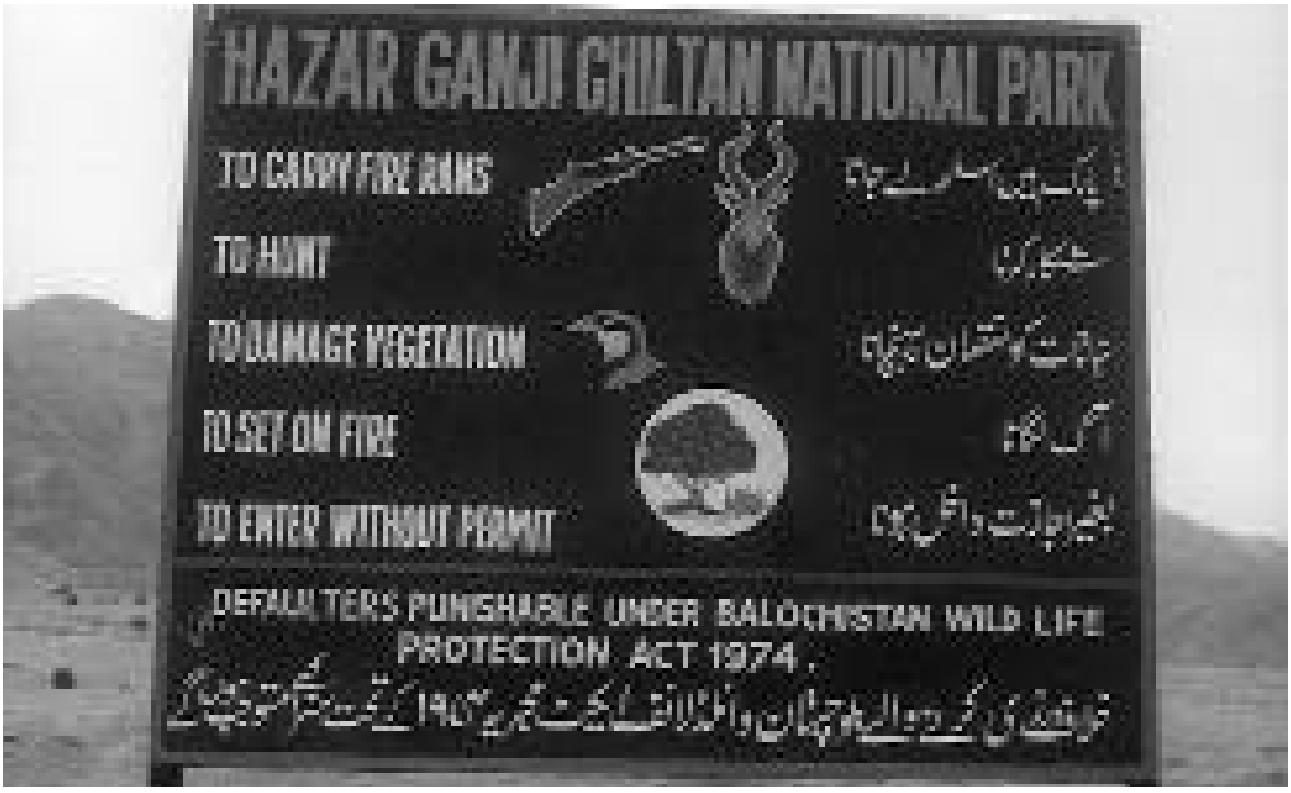
One of the BCS workshops.

- Greening of development finance institutions and efforts to include the private sector in environmental protection are also under way.
- Support is provided in programme and project development to line agencies, and a project development fund has been established to enhance SPCS implementation.

THE BCS EXPERIENCE

The long lists of recommendations relating to the various sectors and themes appearing in the previous chapters of this report have been transformed into an implementable and prioritized agenda and presented in 14 core programmes. The BCS has taken a long-term vision but its implementation agenda is for 10 years. The sectors relevant to the BCS include:

- natural resources – water, agriculture, forestry and biodiversity, livestock and rangelands, and coastal fisheries and development;



WWF Pakistan

Some level of environmental protection has started.

- economic – industries, mining and energy;
- socio-economic – urban environment and cultural heritage; and
- social – environmental communication and education and environmental health.

There are also cross-cutting themes relating to these sectors: population and poverty, governance, environmental legislation, gender and involvement of stakeholders, including NGOs.

The framework identifies BCS core programmes (see Chapter 20) and their implementation mechanisms. The topics requiring further discussion and details – such as partners in implementation, communicating the BCS, resources for implementation and assessing sustainability and BCS implementation – are dealt with in much greater detail in separate chapters.

INSTITUTIONALIZING BCS IMPLEMENTATION

The following arrangements will be made for institutionalizing BCS implementation:

- The BCS Steering Committee will continue under a revised mandate and composition.
- The Environment Section at P&DD will take a lead in co-ordinating and supporting BCS implementation.
- The responsibility for monitoring BCS implementation will rest with the beefed-up Monitoring & Evaluation Section at P&DD, which will be supported by the Environment Section, P&DD.
- Multi-sectoral and multi-stakeholder roundtables will be established at the provincial level.
- A multi-stakeholder Development and Environment Committee will be established in each district.
- Senior officials will be designated or appointed as BCS focal persons by the public-sector and independent-sector institutions.
- BCS implementation will be incorporated in the Rules of Business, as a mandatory responsibility of all relevant public-sector institutions.
- Requirements for a project will be in line with the principles, objectives, approaches and guidelines of the BCS, incorporated in the PC-I and PC-II.
- The private sector, civil society institutions, media and academia will be encouraged and facilitated to play their roles in BCS implementation.

IMPLEMENTATION MECHANISMS

The key mechanisms for implementation of the BCS core programmes are:

- institutional strengthening;
- raising awareness and improving environmental education;
- policy and legal reform, including the use of economic tools; and
- human and financial resource mobilization.

Institutional-Strengthening

The measures relating to governance, institutions and capacity are important and have been discussed in detail in Chapter 14 under the following broad categories:

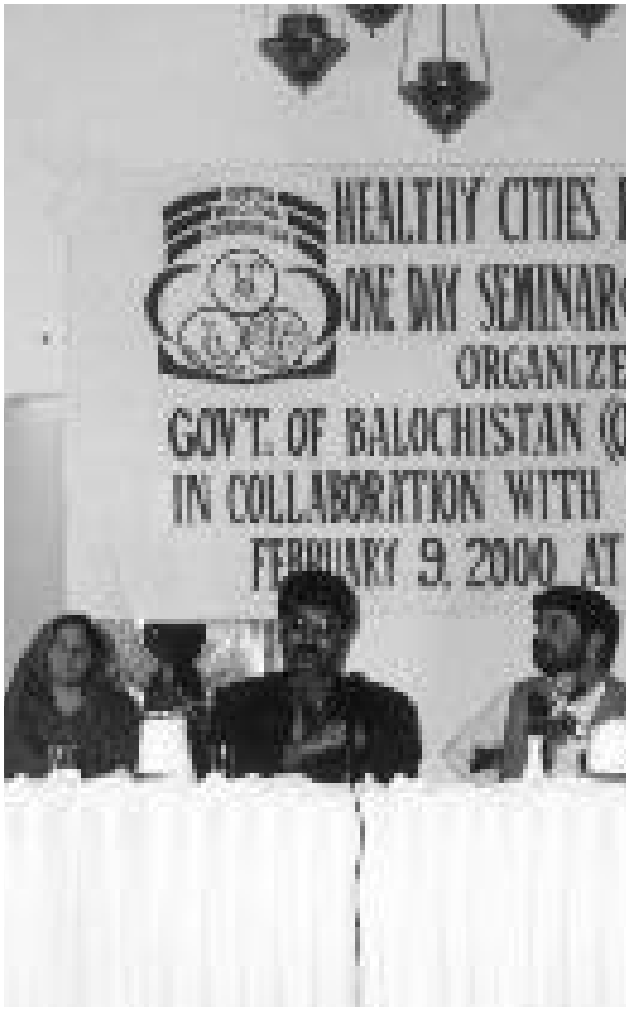
- capacity: upgrading knowledge and skills;
- centralized decision making: devolution and empowerment;
- participation: greater engagement of civil society;
- transparency and accountability;
- policy and legal reforms; and
- institutional reforms including roundtables, BCS focal persons in line departments, restructuring of public sector institutions and improving coordination.

Existing capacities of the P&DD, line departments, field agencies, the private sector, academia and civil society institutions for BCS implementation are limited. These will be enhanced. This would require external support similar to that used for formulation of the BCS. Ideally, support mechanism should be established at the provincial and district levels. However, the priority is for the former. It would be useful to use external support at least in three districts to be taken as a model. A diagrammatic presentation of the institutional framework for BCS implementation is given in Figure 19.

Environmental Communication and Education

Environmental awareness is a prerequisite for taking any positive action. Only then are motivation, mobilization and action possible. Environmental communication and education is an important independent programme of the BCS for common environmental issues, and for a common foundation for building sector and theme-specific environmental communication and education programmes. The magnitude of the kind of support needed by the BCS implementing agencies in this area being colossal, an effective support mechanism within the Environment Section of P&DD, EPA Balochistan or even outside of public sector institutions is needed. Prioritization and focus will be needed, keeping in view the needs of large number of institutions and options to maximize results of human and financial investment in this programme area. The following three key areas will be focused on:

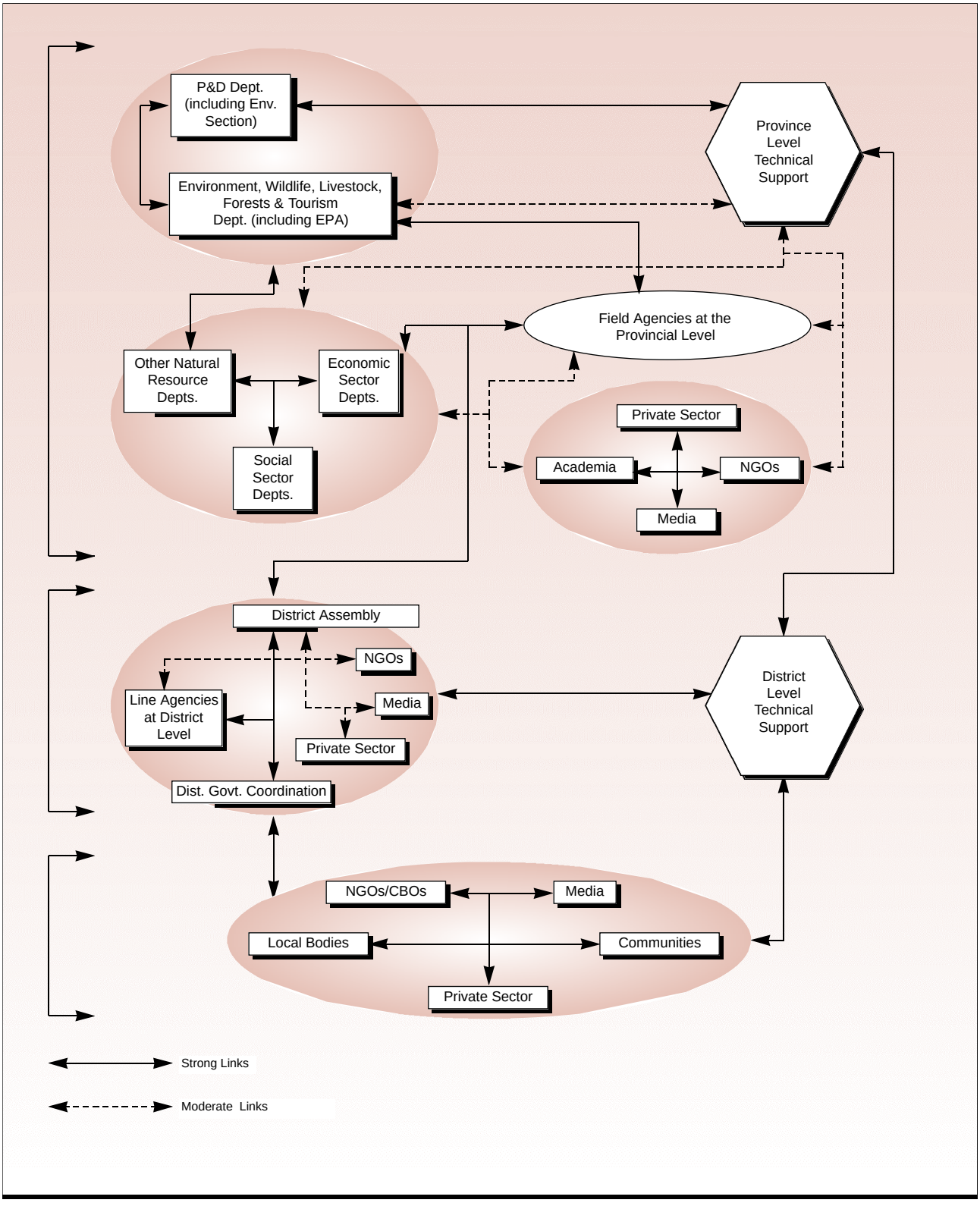
- orientation of and improving the capacity of both formal media (print and electronic) and informal media personnel (ulema, tribal elders, opinion leaders and theatre) through meetings, workshops and training courses;
- institutionalizing environment in formal and non-formal education through training of master trainers, curricula development, teaching and extra-curricular



UBC Cell

Environment awareness seminar organized by QMC.

Figure 19 Institutional Framework for BCS Implementation



activities, such as establishing and operationalizing environmental clubs; and
- developing and implementing sector and theme-specific environmental communication and education programmes.

Policy and Legal Reform

Policy, legislation and use of economic incentives and disincentives are powerful tools that have been used all over the world for the conservation and sustainable use of natural resources, protection of the environment and sustainable development. But the use of policy and economic tools and enforcement of legislation in Balochistan has been rather weak. Thus, policy and legal reform will be an important mechanism for BCS implementation. The details are contained in Chapter 14.

Finding Resources for BCS Implementation

Human and financial resources are key to implementation, but it would not be wise to link BCS implementation with the availability of additional resources.

The following interventions will be made regarding financial resources for BCS implementation:
- The implementation of a large part of the BCS will be made possible by putting the house in order and using existing resources – both human and financial – properly and wisely.
- Interventions such as policy and legal reforms, restructuring of public-sector institutions and use of economic tools do not require additional financial resources and will be implemented with the existing resources.
- The private sector, NGOs, community-based organizations (CBOs), citizens' fora, political leaders, tribal elders, ulema, communities and individuals will be made aware of their roles and responsibilities and motivated, mobilized and helped to play a role in BCS implementation. Financial investment for making this intervention would be relatively low, but would yield great benefits.
- Re-prioritization and re-orientation of investments will be undertaken.
- Additional resources will be generated through revenue budget, rational consumer charges, establishing the Fund for Sustainable Development and donor funding.

This section has been discussed in detail in Chapter 22.

PARTNERS IN IMPLEMENTATION

Because of the large number of core programmes and multi-sectoral focus of the BCS, the following stakeholders will have roles in BCS implementation:
- political leaders;
- federal and provincial governments;
- the judiciary;
- armed forces;
- district-level civil administration and government field agencies;
- the private sector;
- NGOs, CBOs and citizens' fora;
- tribal elders, ulema and community leaders;
- communities and individuals;
- the academia;
- the media; and
- donors.

Their specific roles are defined in the matrices presented in Table 39 in Chapter 21.

COMMUNICATION, NETWORKING AND MONITORING

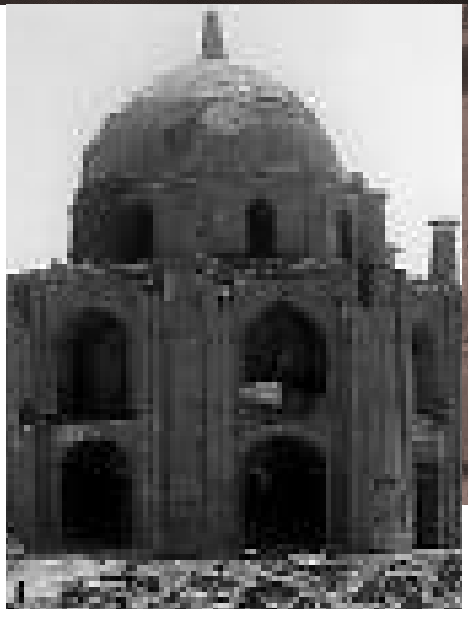
The most important task for promoting the implementation of the BCS would be to communicate its concepts, approaches, programmes, interventions and recommendations, as well as the methodology for implementation to all relevant organizations and stakeholders. This responsibility will be shared between the Environment Section of P&DD and the relevant line departments. Following this the implementng agencies will be assisted in action planning for BCS implementation.

Linking with contemporary initiatives of conservation strategies, such as the NCS, SPCS, Northern Areas Conservation Strategy and Nepal Conservation Strategy, will be important and useful.

Monitoring and evaluation will be undertaken at two levels – that is, overall sustainability and BCS implementation – by a beefed-up M&E Section in the P&DD, supported by the beefed-up Environment Section. Both will be assisted by an external BCS Support Unit as discussed earlier. Details of the assessment and monitoring mechanism are given in Chapter 23.

Chapter 20

BCS Progra



BCS Core Programmes

There is a long list of recommendations relating to sectors and themes because of a wide range of issues. It is important to assess the strategic importance of individual recommendations to be able to prioritize them, and to encapsulate them in implementable programmes. As a result, the following 14 programmes have emerged.

1. Raising public awareness.
2. Improving governance and effectiveness of institutions.
3. Institutionalizing environmental education.
4. Arresting depletion and pollution of groundwater and increasing irrigation efficiency.
5. Making agriculture sustainable.
6. Managing rangelands and enhancing productivity of livestock.
7. Developing coastal and marine resources sustainably.
8. Sustainable planning and management of urban areas.
9. Creating and sustaining environment-friendly development.
10. Conserving, rehabilitating, developing and using forests sustainably.
11. Conserving and using biodiversity and wetlands wisely.
12. Conserving cultural heritage and developing tourism.
13. Collecting authentic data and managing information.
14. Alleviating poverty.

These programmes have been elaborated in this chapter by listing priority interventions and measures under each programme.

Raising Public Awareness

1. Improving coordination and consultation between relevant agencies, media (formal and informal), NGOs and interested individuals by transforming the existing Interest Group on Communication into a roundtable, to be hosted by the Information Wing of the Services and General Administration and Information Department.
2. Developing and implementing a general environmental communication strategy and specific sectoral and thematic communication strategies for the BCS by the relevant organizations.
3. Developing capacities of relevant organizations and skills of individuals in environmental communication.

A. L. Rao, IUCN

The well-being of the people and ecosystems of Balochistan is the goal of the BCS.

4. Supporting the focus of media and other communication channels on key issues, with sound information and appropriate direction.
5. Monitoring the impact of various kinds of efforts and resetting priorities and approaches, if needed.

Improving Governance and Effectiveness of Institutions

1. Establishing sectoral and thematic roundtables to improve coordination and consultation.
2. Undertaking management reviews of key line departments including their field agencies relevant to BCS implementation, and implementing the recommendations of that review. The organizations to be reviewed include:

- Water-related: Irrigation Department (BIDA); Agriculture Department; Public Health Engineering Department; Local Bodies and Rural Development Department; Balochistan Water and Sanitation Authority; Quetta Development Authority; Quetta Municipal Corporation; Balochistan Development Authority; Forest Department (watershed management and ecosystem requirements); and Fisheries Directorate.
- Rangelands-related: Forest Department and Livestock Department.
- Biodiversity-related: Forest Department; Livestock Department; Agriculture Department; and Fisheries Directorate.
- Pollution-related: Environment, Wildlife, Livestock, Forest and Tourism Department; Environmental Protection Agency; Industries, Trade, Mineral and Labour and Manpower Department; Industries Directorate; Lasbela Industrial Estate Development Authority; Mineral Development Directorate; Balochistan Development Authority; Local Bodies and Rural Development Department; Quetta Municipal Corporation, municipal committees, town committees and local councils; Health Department (environmental health, hospital waste); and Traffic Police.
- Social action–related: Health Department; Education, Culture, Sports and Youth Affairs Department; Population Planning and Social Welfare Department; Services and General Administration and Information

Department (governance and institutional reform), Law Department (environmental legislation); and Planning and Development Department (developing protocols for disasters and emergencies).

- Coordination-related: P&D Department, Additional Chief Secretary (Coordination) for proactive planning and managing disasters and emergencies and coordination of other activities at the provincial level including inter-sectoral coordination.

3. Improving objectivity, transparency and accountability of the public-sector, local government and independent-sector institutions by:

- encouraging and ensuring the participation of communities and other stakeholders in planning, implementing and monitoring development and other agendas;
- promoting and encouraging access to information through media and civil society institutions;
- appointing committees of credible citizens to assess the performance of public-sector institutions annually, and instituting a system for reporting to the Provincial Assembly;
- improving the performance appraisal system of government employees and providing rewards and penalties for performance;
- simplifying procedures for disciplinary action and introducing a monitoring system for tracking progress on the finalization of disciplinary cases;
- sharing responsibility for and consequences of wrong and inappropriate decisions and actions by political leaders;
- controlling misuse of facilities;
- ensuring merit-based recruitment, posting and promotion, and discouraging frequent transfers;
- doing away with discretionary powers, indemnity against wrong decisions and actions, and the culture of taking decisions with a relaxed attitude towards rules and procedures;
- making nepotism and favouritism criminal offences, which if proved in a court of law would entail punishing the person(s) responsible for wrong decision(s);
- providing constitutional protection to civil servants against victimization, which if proved in a court of law would entail court trial of the person(s) responsible;
- improving the working conditions, facilities and procedures for improving efficiency;
- improving the capacity of all stakeholders at all levels, to enable them to perform their roles efficiently; and
- improving databases and the authenticity of information for appropriate decision-making.

4. Removing malfunctions and delays by establishing the office of provincial Mohtasib (ombudsman).

A. L. Rao, IUCN

Developing centres of arts and crafts to enhance appreciation of Balochistan.

5. Decentralizing authority and functions from the federal to the provincial government, and from the latter to local government institutions (district government, tehsil council, union council and village council).
6. Providing constitutional protection to local government institutions.

Institutionalizing Environmental Education

1. Improving coordination and consultation by formally establishing the Interest Group on Education as a roundtable, with representation from all stakeholders and hosted by the Education Wing of the Education, Culture, Sports and Youth Affairs Department.
2. Undertaking the orientation and training of staff of formal and informal educational institutions at all levels for raising awareness, developing understanding and building capacity, especially of planners and master trainers.
3. Making education relevant to the needs of the province and improving its quality.

4. Reviewing the existing curricula, syllabi, course books and material and infusing the environment into these, starting from primary level and moving upwards.
5. Developing extra-curricular materials on environment for teachers and students and encouraging them to use these.
6. Involving civil society institutions and parents in supporting and monitoring educational institutions.

Arresting Depletion and Pollution of Groundwater and Increasing Irrigation Efficiency

1. Improve coordination and consultation by formally establishing the existing Interest Group on Water as a roundtable, with representation of all stakeholders, and hosted by the Irrigation and Power Department, and Public Health Engineering Department.
2. Improving the irrigation efficiency of groundwater and canal water.
3. Improving the recharge of groundwater and discouraging its excessive use.
4. Encouraging rainwater harvesting for sailaba cultivation.
5. Controlling the pollution of surface and groundwater.
6. Accommodating the freshwater requirements of ecosystems in development planning.
7. Using environmental impact assessment (EIA) procedures in development planning to eliminate or minimize adverse social and environmental impacts.
8. Establishing a Water Board to coordinate, plan, manage and monitor the rational and efficient use of water resources by river basins, initially focusing on deficit water balance river basins (e.g. Pishin Lora Basin and Nari Basin), and districts and valleys including Quetta, Mangochar, Mastung, Pishin, Qila Abdullah and Qila Saifullah.

Making Agriculture Sustainable

1. Improving coordination and consultation by formally establishing the existing Interest Group on Agriculture as a roundtable, with representation of all stakeholders, hosted by the Agriculture Wing of the Agriculture, Cooperatives, Food and Fisheries Department.
2. Improving irrigation efficiency.
3. Controlling groundwater mining (discharge not to exceed recharge), and encouraging the harvesting of rainwater and floodwater.
4. Rehabilitating waterlogged and saline soils in canal-irrigated tracts.
5. Promoting integrated pest management and making proper use of agrochemicals.
6. Conserving topsoils in agricultural lands and maintaining their fertility.
7. Preserving the genetic diversity of native cultivars and wild relatives of agricultural crops.
8. Propagating artificially and commercializing the cultivation of wild plant species of economic importance, such as cumin, to reduce the pressure on wild resources and raise the income of farmers.
9. Promoting agro-based industries, such as rice husking and polishing, cotton ginning factories and oil expellers in Nasirabad Division, and fruit preservation and processing in upland districts.
10. Improving the marketing of agricultural produce and encouraging the export of fruits.
11. Improving research as well as education for professionals and technicians.

Managing Rangelands and Enhancing Productivity of Livestock

1. Improving coordination and consultation by formally establishing the existing Interest Group on Livestock and Rangeland as a roundtable, with representation of all stakeholders, co-hosted by the redesignated Livestock and Rangelands Wings of the Environment, Wildlife, Livestock, Forests and Tourism Department.
2. Reorganizing the management structure of the Livestock Department, Forest Department and Agriculture Department to establish a multi-disciplinary unit at the field level by adjustment of appropriate staff with expertise in livestock, veterinary, rangelands, agriculture (especially in fodder production), marketing and social organization, motivation and mobilization for promoting the sound management and development of rangelands in the province.
3. Improving breeds for higher productivity.
4. Improving grazing capacity and managing the sustainable use of rangelands.
5. Improving preventive and veterinary care.
6. Assisting grazing communities in organizing themselves, preventive and veterinary care of livestock, breed improvement, accessing credit, and marketing and combating epidemic diseases, drought and other disasters.
7. Preserving the genetic diversity of native breeds and of wild flora and fauna in rangelands.

WRRC, Quetta

Providing training in how to layout an irrigation system to optimise water usage.

8. Encouraging and supporting, especially women, in improving the quality of handicrafts made of animal products for generating and enhancing income.

Developing Coastal and Marine Resources Sustainably

1. Improving coordination and consultation in fisheries and coastal development by formally establishing a Roundtable on Fisheries and Coastal Development, with representation of all stakeholders, hosted initially by the Fisheries Wing of the Agriculture, Cooperatives, Food and Fisheries Department and later by proposed Fisheries and Coastal Development Department.
2. Undertaking Integrated Coastal Zone Management Planning, keeping in view all existing, planned and potential developments.
3. Undertaking the sustainable development of the coastal zone, especially by planning and implementing the following elements:
   - sustainable management of coastal fisheries, biodiversity and protected areas;
   - desalinization of seawater for settlements, tourism, industry and other uses (although it may not be economically viable to develop commercial agriculture with desalinized water);
   - arranging a ferry service between coastal settlements and Karachi City;
   - building the Coastal Highway and some key link roads;
   - establishing a Fisheries Centre at Gwadar or Pasni for education and training of technicians and fisherman;
   - developing local, national and international tourism;
   - establishing non-polluting (or with pollution control) small, medium and cottage industries after undertaking feasibility studies, initial environmental examinations (IEE) and EIAs;
   - planning new sustainable townships; and
   - cleaning existing settlements by collecting and safely disposing solid waste and sewage.
4. Conserving, developing and sustainably using mangroves, coastal fisheries and renewable resources by establishing and managing protected areas, such as

A. L. Rao, IUCN

Proper planning will help accommodate the influx of people migrating from rural areas.

Sonmiani Bay, Kalmat Hor, marine turtle feeding areas and nesting beaches, estuaries and Astola Island, for an appropriate regime of use.

5. Controlling land-based pollution of coastal waters, especially from existing industries in Hab, Windar and Gadani, and likely pollution from future development along the coast.
6. Promoting and supporting local, national and international coastal tourism as an economic incentive for the involvement of local communities.

Sustainable Planning and Management of Urban Areas

1. Improving coordination and consultation by formally establishing the existing Interest Group on Urban Environment as a roundtable, with representation of all stakeholders, and hosted by the Local Bodies and Rural Development Department.
2. Placing implementing agencies dealing with urban environment under the Local Government Wing of the Local Bodies and Rural Development Department, including the Quetta Municipal Corporation, Quetta Development Authority and Balochistan Water and Sanitation Agency.
3. Augmenting the supply of drinking water to Quetta from a source outside the valley.
4. Controlling, in Quetta valley, new housing, industry, agriculture and activities that demand water, in order to contain the pressure on groundwater, air and land.
5. Managing, treating and reusing the sewage of Quetta city for orchards, vegetables, lawns, gardens and trees.
6. Planning proactively to manage and develop towns and new potential areas for accommodating the influx of people migrating from rural areas to Quetta and other big towns.
7. Planning for the future, a new city like Quetta, in another river basin with positive water balance.
8. Managing the watersheds of all settlements for improving the recharge of groundwater and discouraging excessive use of water.
9. Meeting the water and sanitation requirement of settlements.
10. Collecting and safely disposing of domestic solid waste, hospital waste and industrial waste.
11. Updating, approving and implementing an environment-friendly master plan of Quetta, with a focus on meeting the requirements of the existing population, and containing further growth of the city, while also planning parking space for vehicles in shopping areas.

12. Controlling air, water, land and noise pollution, especially in Quetta and Hab, and reducing traffic congestion.
13. Maintaining all existing open spaces in settlements as green spaces, and planning for over 10% of all new towns to be covered by green spaces with treated sewage.

Creating and Sustaining Environment-Friendly Development

1. improving coordination and consultation by formally establishing the existing Interest Groups on Industries, Minerals and Energy as roundtables, with representation of all stakeholders, and hosted by the Industries, Trade, Minerals, and Labour and Manpower Department.
2. Controlling existing industrial, vehicular and municipal pollution and complying with and enforcing National Environmental Quality Standards.
3. Using the tool of IEE/EIA for assessing and mitigating adverse social and environmental impacts of all new developments, whether infrastructure, industry, energy, mining or another kind.
4. Improving and ensuring occupational health and workers' safety.
5. Promoting cottage industries, as well as small and medium agro-based industries.
6. Promoting arts and crafts and tourism.

Conserving, Rehabilitating, Developing and Using Forests Sustainably

1. Improving coordination and consultation by formally establishing the existing Interest Group on Forests and Wildlife as a roundtable, with representation of all stakeholders, and co-hosted by the Forest and Wildlife Wings of Environment, Wildlife, Livestock, Forest and Tourism Department.
2. Encouraging and supporting community based management of communal forests, such as chilghoza forests in Zhob District, and collaborative management of state-owned forests, such as Juniper, scrub and mangrove forests.
3. Managing forests sustainably for subsistence grazing, fuelwood and environmental value.
4. Encouraging farm forestry and tree plantation on farmlands in canal-irrigated areas and northern uplands, especially on boundaries of properties, along banks of rivers, streams, water channels, water reservoirs and ponds, as well as alongside roads and canals, in houses and other buildings, and beside tubewells.
5. Improving and managing watersheds through contour ditch planting, regulated grazing, check damming and subsequent tree planting.
6. Encouraging the use of alternatives, such as corrugated iron sheets, iron doors, girders, windows, barbed wire, bottled gas and coal.
7. Reorganizing the Forest Department and re-orienting and training all the staff.

Sajjad Ahmed

Balochistan has its own distinctive fauna.

Conserving and Using Biodiversity and Wetlands Wisely

1. Improving coordination and consultation by formally establishing the existing Interest Group on Forest and Wildlife as a roundtable as mentioned above.
2. Raising awareness and understanding of and implementing all international conservation conventions to which Pakistan is a contracting party, including CITES, Ramsar Convention, Bonn Convention, World Heritage Convention and Biodiversity Convention as well as Man and Biosphere Reserve Programme of UNESCO.
3. Assessing the existing protected areas for their appropriateness, and designing a Protected Areas

System for all key areas, whether currently protected, state-owned or in private ownership.

4. Undertaking the management planning of protected areas, especially of national parks and those created for conserving endemic, endangered and migratory species, with a focus not on infrastructure, but on human resource development and conservation of species, habitats and landscape.
5. Managing the protected areas in accordance with the management plans (for example, the Management Plan of Hazarganji Chiltan National Park is ready and must be implemented).
6. Developing recovery plans of globally, nationally and locally endangered species found in Balochistan, such as the marsh crocodile, Balochistan black bear, goitered gazelle, straight-horned markhor, Kabul markhor, urial, chinkara, Sindh ibex, marbeled teal and the breeding population of houbara bustard.
7. Managing Houbara hunting, and capturing and trading of Saker falcon and Peregrine falcon and other raptors according to national and regional plans, the development of which should be pursued with national and regional (range states of the species) governments and agencies.
8. Encouraging and supporting local communities in community-based management of communal resources, and collaborative management of state-owned protected areas by enhancing understanding, building capacity and providing economic incentives.
9. Improving the existing policies and legislation on wildlife, forests, wetlands and fisheries.
10. Changing the existing institutional arrangements for conserving and sustainably using biodiversity and ecosystems.
11. Implementing a crash programme of orientation and training of the staff of the Forest Department and other relevant agencies on integrated planning and management of forests, watersheds, rangelands, wetlands, wildlife and biodiversity and protected areas.

Conserving Cultural Heritage and Developing Tourism

1. Improving coordination and consultation by formally establishing the existing Interest Group on Cultural Heritage as a Roundtable on Culture and Tourism, with representation of all stakeholder organizations, specialists and interested individuals, and co-hosted by the Education, Culture, Sports and Youth Affairs Department, and the Environment, Wildlife, Livestock, Forests and Tourism Department.
2. Developing, publishing and distributing an authentic inventory and map of the cultural and natural resources of Balochistan, including:
   - archaeological sites, architectural resources, properties and places of religious significance, centres of arts and crafts, places of key festivals and fares; and
   - forests, protected areas and wetlands, and unique or interesting geological features, such as mud volcanoes, gorges, caves, faults and mountaineering and trekking areas.
3. Improving Sibi and Quetta museums by adding the antiquities being recovered from the excavation of archaeological sites in Balochistan by foreign teams, and by their proper exhibition and interpretation.
4. Accommodating the exhibition of arts and crafts in Quetta Museum until such time that a separate display centre is established for these in Quetta.
5. Publicizing the cultural and natural resources for local, national and international tourism.
6. Doing away with 'no objection certificate' requirement for foreigners visiting Balochistan.
7. Preparing for '2001 – Pakistan's Year of Tourism' and attracting national and international tourists.
8. Involving local communities in tourism for income generation, in the capacity of services providers, such as tourist guides, transport, souvenir shops, restaurants and accommodation, and developing their capacities to manage tourists, enhancing their appreciation of the cultural and natural heritage of Balochistan.
9. Encouraging foreign teams to excavate important sites.
10. Conserving rock carvings and archaeological and architectural resources.
11. Documenting local traditions, customs and traditional knowledge relating to the management of natural resources.
12. Improving institutional framework, especially for archaeology.

Collecting Authentic Data and Managing Information

1. Improving coordination between organizations and projects by establishing a committee under the chairman ship of ACS (Development) and with representation from all relevant organizations and projects.
2. Strengthening the Bureau of Statistics in the Planning and Development Department to perform its functions efficiently.
3. Developing a common framework for information management in the province, with the Bureau of

Shuja Zaidi, BCIAP

A tomb at Mekran highlights the need to conserve Balochistan's archaelogical heritage.

Statistics taking the lead and all other organizations and projects feeding into and assisting it and using data and information.

4. Disseminating information relating to sustainable development through the Sustainable Development Networking Programme (SDNP) of UNDP and IUCN.
5. The IUCN Balochistan office at Quetta managing a central information centre on environment, natural resources and sustainable development, with all public-sector organizations, civil society institutions and the private sector making available copies of their publications, study reports, projects, evaluation reports and other non-confidential materials, which the information centre will put on the SDNP networks and disseminate through other ways.
6. The government promoting access to information for civil society institutions, the private sector and the general public, and sharing information proactively.

Alleviating Poverty

1. Establishing a coordination and consultation forum, or roundtable of representatives of all relevant organizations, programmes, projects and stakeholders, to be hosted by the Planning and Development Department.
2. Raising the awareness of the poor and marginalized classes regarding opportunities for education, skill development and jobs.
3. Encouraging the involvement and participation of the representatives of the poor in the planning, management and monitoring of projects and other development initiatives.
4. Integrating poverty alleviation elements in policies, programmes and projects.
5. Increasing literacy, encouraging population planning and improving health care.
6. Conserving and sustainably using natural resources, especially water and rangelands, because of the great dependence of the poor on such resources.
7. Improving the environmental health of the living and working areas of the poor, to minimize disease.
8. Diversifying income by developing skills for income generation activities, including tourism, cottage industries and small agro-based industries.
9. Promoting vocational training in educational systems and institutions.
10. Encouraging and supporting the poor and marginalized groups in organizing themselves for collective action for their welfare and development.

Chapter | 21

Implement
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Implementation: Roles and Responsibilities

Although the BCS has been formulated by the government of Balochistan, with technical assistance from IUCN, it is by consensus, the future vision and strategic plan of the people of Balochistan. Likewise, responsibility for its implementation is not limited to government agencies or to the provincial level. Political leaders, federal and provincial organizations (at the national, provincial, district and local levels), judiciary, armed forces, the private sector, civil society institutions, tribal elders, community leaders, academia, media and donors all have to play roles in its implementation.

Relevant organizations, institutions and even individuals are stakeholders and partners in BCS implemention (Table 37). Academia has not been separately categorized in this table because of the long list of partners, but has been dealt with in a list of federal and provincial institutions (Appendix 4).

The current state of coordination and collaboration is poor. BCS implementation needs even greater consultation, coordination and collaboration among various organizations. The partners have diverse roles to perform in implementing the programmes. Again, the presentation in Table 37 falls short of a complete list, but major roles have been listed. Further action planning will need to be carried and the purpose of Table 37 is to facilitate that exercise.

COMMUNICATING THE BCS

The most important task for promoting the implementation of the BCS, would be to communicate its concepts, approaches, core programmes, committed interventions and recommendations, as well as methodology for action planning and implementation to all stakeholders. This responsibility could be shared between the Environment Section and other relevant sections in the Planning and Development Department, relevant line departments, support organizations and formal and informal media.

The framework for communicating the strategy (Table 38) had identified the agencies responsible for implementing of the BCS programmes and those responsible for communicating the BCSactions to them as well as those who can assist them in this endeavours. This framework may be further refined and elaborated during the action planning of the BCS. The framework will also be useful in getting feedback on implementation from the implementing agencies.

The matrix in Table 37 lists the critical and important interventions under each of the 14 core programme areas. Chapter 20 contains details of these.

Table 37 Implementation – Roles and Responsibilities

Programmes/Interventions	Communication Roundtable	Sectoral & thematic communication strategies	Capacity building	Support/involve media/others	Monitoring impact & re-planning	Roundtables	Management review of key institutions	Improving objectivity/transparency /accountability
◆ Critical								
□ Important								
RAISING PUBLIC AWARENESS								
Political Leaders								
Policy & Legal Reforms/Good Governance	□		◆			□	□	◆
Resource Allocation/Monitoring				◆				◆
Federal and Provincial Government								
Co-ordination/Collaboration/Information Sharing	□		□	◆		□	□	
Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	□		□	□	◆	□		◆
Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆		◆	◆		◆	◆	◆
Applied Research & Development/Information Management			□	□			□	◆
Awareness/Behavioural Change/Mobilization		◆	◆	◆	◆			
Extension/Mobilization/Facilitation (Sectoral)		□	◆	□	◆		□	□
Economising/Re-orientation/Increased Resource Generation & Allocation			◆			□		◆
Planning & Management - Consultations/Integration	□		◆	◆		□	□	◆
Judiciary								
Public Interest Litigation			◆	□				
Improving Enforcement of Environmental Laws							□	□
Armed Forces								
Environmental Awareness/Behavioural Change/Mobilization		◆	◆	◆	◆			
Identifying/Planning & Implementing Environmental Activities	□	□	◆	□		□	□	
Understanding & Taking Care of Environment in Exercises/Conflicts		□	□				□	
District Authorities and Local Bodies								
Awareness/Behavioural Change/Mobilization		◆	◆	◆	◆		□	
Participatory/Integrated Planning & Management	□		◆	□		□	□	◆
Governance/Strengthening/Law Enforcement & Decision-making	□		◆	□		□	◆	◆
Creating Enabling Environment/Inter-agency Relations	□		□			□	□	□
Project Planning/Re-orientation/Implementation/Monitoring	□		◆	□	□	□	□	◆
Private Sector								
Environmental Awareness/Behavioural Change/Mobilization/Action		◆	◆	◆				
Co-ordination with Govt. Agencies, NGOs & Others/Funding	◆			□	◆	◆		
Improved Management Practices/Processes		□	◆	□				◆
NGOs, CBOs and Citizens' Fora								
Awareness/Advocacy/Motivation/Mobilization		◆	◆	◆			□	
Co-ordination/Networking	◆			□	◆	◆		
Capacity Building (Self/Others)			◆	◆			□	
Integrating Environment, Poverty Alleviation & Gender in Mandate & Action			◆	□				
Facilitating Management of Communal Resources			□					
Development Project Planning/Implementation & Facilitating Maintenance by Communities	□		◆			□	□	◆
Service Delivery					□		□	◆
Tribal Elders, Ulema & Community Leaders								
Environmental Awareness/Advocacy/Motivation/Mobilization		□	◆	◆	□			
Community Organisation/Mobilization of Own Resources			◆		□			◆
Community								
Developing Understanding/Behavioural Change/Self Mobilization/Action		□	◆	□				
Development Planning/Investing Capital & Labour			◆		□		□	◆
Improving Management Practices			◆		□			
Media								
Environmental Awareness/Advocacy/Dissemination Information		◆	◆	◆		◆		□
Roundtable/Integrating Environment/Gender & Poverty Alleviation	◆		◆	◆	◆			
Investigative Journalism/Reporting on Environmental Issues			◆	◆				□
Donors								
Policy Reform/Programme Approach								◆
Technical Assistance/Joint Programmes & Monitoring		◆	◆		□			◆
Capacity Building		◆			□			
Prioritisation of Investment & Resource Allocation		◆	◆	◆	□			◆
IMPROVING GOVERNANCE & EFFECTIVENESS OF INSTITUTIONS								

	Programmes/Interventions	Participation of stakeholders	Access to information	Annual performance of government organizations	Improving performance appraisal system	Merit based recruitment, promotion, posting	Improving disciplinary action system	Sharing of responsibility by political leaders	Controlling misuse of funds & facilities	Withdraw discretionary powers & indemnity	Nepotism & favouritism - a crime	Constitutional protection against victimisation
	◆ Critical											
	□ Important											
Political Leaders	Policy & Legal Reforms/Good Governance	□	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Resource Allocation/Monitoring	□	□					◆	◆	◆	◆	
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	◆	◆									
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆	◆			□				◆	◆	◆
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆
	Applied Research & Development/Information Management	□	◆	◆	◆							
	Awareness/Behavioural Change/Mobilization	□	□									
	Extension/Mobilization/Facilitation (Sectoral)	□	□									
	Economising/Re-orientation/Increased Resource Generation & Allocation	◆	□							◆		
	Planning & Management - Consultations/Integration	◆	◆									
Judiciary	Public Interest Litigation		□			□						
	Improving Enforcement of Environmental Laws	◆	□		◆		◆				□	
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization	□	□									
	Identifying/Planning & Implementing Environmental Activities	◆	□									
	Understanding & Taking Care of Environment in Exercises/Conflicts		□									
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization		□									
	Participator/Integrated Planning & Management	◆	◆								□	
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆
	Creating Enabling Environment/Inter-agency Relations	◆	□									□
	Project Planning/Re-orientation/Implementation/Monitoring	◆	◆						◆	◆	□	
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	◆	□									
	Co-ordination with Govt. Agencies, NGOs & Others/Funding	□										
	Improved Management Practices/Processes	□	◆									
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization	◆	□									
	Co-ordination/Networking	◆										
	Capacity Building (Self/Others)	◆	□									
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action	□	◆									
	Facilitating Management of Communal Resources	◆	□									
	Development Project Planning/Implementation & Facilitating Maintenance by Communities	◆	◆						◆			
	Service Delivery	◆	◆						◆			
Tribal Elder's, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	◆	□									
	Community Organisation/Mobilization of Own Resources	◆	◆									
Community	Developing Understanding/Behavioural Change/Self Mobilization/Action	◆	□									
	Development Planning/Investing Capital & Labour	◆	◆						◆			
	Improving Management Practices	◆	□									
Media	Environmental Awareness/Advocacy/Dissemiinating Information	◆	□									
	Roundtable/Integrating Environment/Gender & Poverty Alleviation	◆	□									
	Investigative Journalism/Reporting on Environmental Issues	□	◆						□			
Donors	Policy Reform/Programme Approach	◆	◆			□						
	Technical Assistance/Joint Programmes & Monitoring	◆	◆						◆			
	Capacity Building	◆										
	Prioritisation of Investment & Resource Allocation	◆	◆									

	Programmes/Interventions	Improving working conditions	Capacity building	Authenticity of information	Provincial ombudsman	Decentralization of powers	Establishing Land Use Planning Directorate & Urban Planning Council in P&DD	Developing electronic atlas of Balochistan	INSTITUTIONALIZING ENVIRONMENTAL EDUCATION	Roundtable on Environmental Education	Building capacity - orientation, training, environmental education	Education relevant to the needs of Balochistan
	◆ Critical											
	□ Important											
Political Leaders	Policy & Legal Reforms/Good Governance	□	◆	□	◆	◆	□	□		□	□	◆
	Resource Allocation/Monitoring	◆	◆	□		◆	□	□				
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing						□	□		□		□
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment		◆		◆	◆				□	□	◆
	Good Governance/Local Government/Mountables/Strengthening (Self/Others)	◆	◆	◆	◆	◆	◆	□		◆	□	◆
	Applied Research & Development/Information Management	□	◆	◆				◆			□	□
	Awareness/Behavioural Change/Mobilization		□				□				◆	
	Extension/Mobilization/Facilitation (Sectoral)	□	◆								◆	□
	Economising/Re-orientation/Increased Resource Generation & Allocation		◆				□			□	◆	□
	Planning & Management - Consultations/Integration		◆		□		□	□		□	□	□
Judiciary	Public Interest Litigation		◆								◆	
	Improving Enforcement of Environmental Laws		□								□	
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization		◆								◆	
	Identifying/Planning & Implementing Environmental Activities		◆							□	◆	
	Understanding & Taking Care of Environment in Exercises/Conflicts		◆								◆	
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization		◆								◆	
	Participator/Integrated Planning & Management		◆				□	□			◆	□
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆		◆	◆			□	◆	
	Creating Enabling Environment/Inter-agency Relations		□				□			□	□	□
	Project Planning/Re-orientation/Implementation/Monitoring		◆			◆	◆			□	◆	
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action		◆				□				◆	
	Co-ordination with Govt. Agencies, NGOs & Others/Funding		□				□	□		◆		□
	Improved Management Practices/Processes		◆	◆			□				◆	
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization		◆								◆	□
	Co-ordination/Networking		□				□	□		◆		
	Capacity Building (Self/Others)		◆								◆	
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action		◆								◆	
	Facilitating Management of Communal Resources		□								□	
	Development Project Planning/Implementation & Facilitating Maintenance by Communities		◆							□	◆	
	Service Delivery		□									
Tribal Elder's Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization		◆				□				◆	□
	Community Organisation/Mobilization of Own Resources		◆				□				□	
Community	Developing Understanding/Behavioural Change/Self Mobilization/Action		◆				□				◆	
	Development Planning/Investing Capital & Labour		◆				□				◆	
	Improving Management Practices		◆				□				◆	
Media	Environmental Awareness/Advocacy/Dissemination Information		◆	◆						◆	◆	□
	Roundtable/Integrating Environment/Gender & Poverty Alleviation		◆								◆	
	Investigative Journalism/Reporting on Environmental Issues		◆	◆							□	□
Donors	Policy Reform/Programme Approach											□
	Technical Assistance/Joint Programmes & Monitoring		◆				□	□			◆	
	Capacity Building		◆				□	□			◆	
	Prioritisation of Investment & Resource Allocation	□	◆				□	◆			◆	□

	Programmes/Interventions	Infusing environment in curricula & training	Developing extra-curricular materials	Involving NGOs & parents	ARRESTING DEPLETION & POLLUTION OF GROUNDWATER & INCREASING IRRIGATION EFFICIENCY	Roundtable on Water	Improving irrigation efficiency	Improving recharge	Rain water harvesting/reducing excessive use	Controlling water pollution	Ecosystems in development planning/EIA	Establishing a sovereign provincial Water Board
Political Leaders	Policy & Legal Reforms/Good Governance			◆		□	◆			◆	◆	◆
	Resource Allocation/Monitoring	□					◆	□	◆	◆		◆
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing					□				◆	□	◆
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment			◆		□	◆			◆	◆	◆
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)					◆				□		□
	Applied Research & Development/Information Management						◆	◆	◆	◆	□	◆
	Awareness/Behavioural Change/Mobilization	◆	◆	◆			◆	◆		◆		□
	Extension/Mobilization/Facilitation (Sectoral)	□	□				◆	◆	◆	◆	◆	◆
	Economising/Re-orientation/Increased Resource Generation & Allocation	□				□	□	□	◆	□		□
	Planning & Management - Consultations/Integration			◆		□	□	◆	□	◆	◆	◆
Judiciary	Public Interest Litigation									◆	□	
	Improving Enforcement of Environmental Laws						◆			◆	□	◆
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization		◆					□		□		
	Identifying/Planning & Implementing Environmental Activities					□	□	□		□		
	Understanding & Taking Care of Environment In Exercises/Conflicts	□								◆		
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization	◆	◆	◆			◆	□		◆	□	□
	Participatory/Integrated Planning & Management			◆			◆	◆	◆	□	◆	◆
	Governance/Strengthening/Law Enforcement & Decision-making					□	◆	□		◆	□	□
	Creating Enabling Environment/Inter-agency Relations					□	□	□		□		◆
	Project Planning/Re-orientation/Implementation/Monitoring			◆		□	◆	□	□	□	◆	□
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	◆	◆	◆			□	□		◆	□	□
	Co-ordination with Govt. Agencies, NGOs & Others/Funding					◆				◆	□	
	Improved Management Practices/Processes						□	□		◆	□	
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆			◆	◆		◆	◆	□
	Co-ordination/Networking					◆					□	□
	Capacity Building (Self/Others)	◆					◆	◆	□	◆		□
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action						□	□		◆	□	
	Facilitating Management of Communal Resources						◆	◆	□	□		
	Development Project Planning/Implementation & Facilitating Maintenance by Communities			◆		□	□	□	□	□	◆	□
	Service Delivery		□									
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆			◆	◆	□	◆	◆	□
	Community Organisation/Mobilization of Own Resources						◆	◆	◆	◆	□	□
	Development Planning/Investing Capital & Labour						◆	◆	◆	◆	◆	□
	Improving Management Practices						◆	◆	◆	◆		◆
Community	Environmental Awareness/Advocacy/Dissemination Information	◆	◆	◆			□	□	□	◆	◆	□
Media	Roundtable/Integrating Environment/Gender & Poverty Alleviation					◆	◆	◆	□	□		
	Investigative Journalism/Reporting on Environmental Issues						□	□		◆	◆	
Donors	Policy Reform/Programme Approach			◆			◆	◆		◆	◆	
	Technical Assistance/Joint Programmes & Monitoring						◆	◆		◆		◆
	Capacity Building	◆					◆	◆		◆	◆	◆
	Prioritisation of Investment & Resource Allocation	◆					◆	◆	◆	◆	◆	◆

◆ Critical

□ Important

	Programmes/Interventions	MAKING AGRICULTURE SUSTAINABLE	Roundtable on Agriculture	Improving irrigation efficiency	Controlling groundwater mining/rainwater harvesting for a sailaba cultivation	Re-claiming waterlogged & saline soils	Promoting integrated pest management	Conserving topsoils on agricultural lands & maintaining fertility	Preserving genetic diversity	Cultivation of economic wild plants	Promoting agro-based industries	Improving marketing
	◆ Critical											
	□ Important											
Political Leaders	Policy & Legal Reforms/Good Governance		□	◆	◆	□	◆		◆	□	◆	◆
	Resource Allocation/Monitoring			◆	◆	□			□		□	
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing		□		◆	□	□		□		□	◆
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment		□	◆	□	◆	◆		◆	◆	◆	◆
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)		◆	□	□	□	□		□			◆
	Applied Research & Development/Information Management			◆	◆	◆	◆	◆	◆	◆	◆	◆
	Awareness/Behavioural Change/Mobilization			◆	□	□	□	□	□	□		
	Extension/Mobilization/Facilitation (Sectoral)			◆	◆	◆	◆	◆	□	◆	□	◆
	Economising/Re-orientation/Increased Resource Generation & Allocation		□	◆	◆	□			□			
	Planning & Management - Consultations/Integration		□	◆	◆	◆	◆	◆	□			◆
Judiciary	Public Interest Litigation								□			
	Improving Enforcement of Environmental Laws			◆	◆							
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization			□	□							
	Identifying/Planning & Implementing Environmental Activities			□	□							
	Understanding & Taking Care of Environment In Exercises/Conflicts											
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization			□	□	□	□	◆	□	□	□	
	Participator/Integrated Planning & Management			◆	◆	◆	◆	□	◆	□		◆
	Governance/Strengthening/Law Enforcement & Decision-making		□	◆	□							
	Creating Enabling Environment/Inter-agency Relations		□		□				□		◆	◆
	Project Planning/Re-orientation/Implementation/Monitoring		□	◆	□	◆	◆			□		
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action			□	□		◆		◆	◆	◆	
	Co-ordination with Govt. Agencies, NGOs & Others/Funding		◆		□		□		◆	◆	□	◆
	Improved Management Practices/Processes			□	□		◆		◆	◆	◆	◆
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization			◆	◆	◆	◆	◆	◆	□		□
	Co-ordination/Networking		◆	□	□		□	□	□	□		□
	Capacity Building (Self/Others)			◆	□	□	◆	◆	□	◆		◆
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action				□		□		□	□		
	Facilitating Management of Communal Resources			◆	□	□		□	□			◆
	Development Project Planning/Implementation & Facilitating Maintenance by Communities		□	◆	◆	◆	◆	□		□		◆
	Service Delivery						□					
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization			◆	◆	◆	◆	◆	◆	□		◆
	Community Organisation/Mobilization of Own Resources			◆	◆	◆	◆	◆	◆	□		◆
	Developing Understanding/Behavioural Change/Self Mobilization/Action			◆	◆	◆	◆	□	◆	□		◆
Community	Development Planning/Investing Capital & Labour			◆	◆	◆	◆	◆	◆	□		◆
	Improving Management Practices			◆	◆	◆	◆	◆	◆	□		◆
Media	Environmental Awareness/Advocacy/Dissemintating Information			□	□	◆	◆	◆	□	□		
	Roundtable/Integrating Environment/Gender & Poverty Alleviation		◆	◆	□							
	Investigative Journalism/Reporting on Environmental Issues			□	□	□	□		◆	□		
Donors	Policy Reform/Programme Approach			◆	□		□					
	Technical Assistance/Joint Programmes & Monitoring			◆	□		□					
	Capacity Building			◆	□		◆					
	Prioritisation of Investment & Resource Allocation			◆	◆	◆	◆		◆			

	Programmes/Interventions	Improving research & education	MANAGING RANGELANDS & ENHANCING PRODUCTIVITY OF LIVESTOCK	Roundtable on livestock & Rangelands	A multi-disciplinary unit	Improving livestock breeds	Improving grazing capacity & organizing grazing	Preventive & veterinary care	Assisting grazing communities	Preserving genetic diversity	Supporting women in handicrafts	DEVELOPING COASTAL & MARINE RESOURCES SUSTAINABLY	Roundtable on Fisheries & Coastal Development
Political Leaders	Policy & Legal Reforms/Good Governance	◆		□	◆					□	□		□
	Resource Allocation/Monitoring	◆			□	◆	◆	◆	◆	□	□		
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	◆		□	◆		□		□	◆			□
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆		□	□					◆	□		□
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆		◆	◆		□		□				◆
	Applied Research & Development/Information Management	◆			□	◆	◆	□		◆	□		
	Awareness/Behavioural Change/Mobilization				□			□	□	□	□		
	Extension/Mobilization/Facilitation (Sectoral)	◆			◆	◆	◆	◆	◆	◆	◆		
	Economising/Re-orientation/Increased Resource Generation & Allocation	◆		□	□	◆	◆	◆	◆	□			□
	Planning & Management - Consultations/Integration	◆		□	◆	□	◆	◆	◆	◆	□		□
Judiciary	Public Interest Litigation									□			
	Improving Enforcement of Environmental Laws												
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization												
	Identifying/Planning & Implementing Environmental Activities												□
	Understanding & Taking Care of Environment in Exercises/Conflicts	◆											
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization					◆	◆	◆	◆	◆	◆		
	Participatory/Integrated Planning & Management					□	◆	◆	◆	□			
	Governance/Strengthening/Law Enforcement & Decision-making			□									□
	Creating Enabling Environment/Inter-agency Relations	◆		□				□	◆	□	□		□
	Project Planning/Re-orientation/Implementation/Monitoring			□			□	◆	◆	□			□
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action						□	□		□	◆		
	Co-ordination with Govt. Agencies, NGOs & Others/Funding	◆		◆		□	□	◆		□			◆
	Improved Management Practices/Processes	◆					□	□					
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization	□				□	□	□	◆	◆			
	Co-ordination/Networking	□		◆		□	□	□	□	□			◆
	Capacity Building (Self/Others)	□					□	□	◆		◆		
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action								□		◆		
	Facilitating Management of Communal Resources						◆	□	◆				
	Development Project Planning/Implementation & Facilitating Maintenance by Communities			□		□	□	□	◆				□
	Service Delivery							□	◆				
Tribal Elder's, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	□				◆	◆	◆	◆	◆	◆		
	Community Organisation/Mobilization of Own Resources					□	◆	◆	◆	□			
	Developing Understanding/Behavioural Change/Self Mobilization/Action					◆	◆	◆	◆	◆	◆		
Community	Development Planning/Investing Capital & Labour					□	◆	◆	◆	◆	□		
	Improving Management Practices					◆	◆	◆	◆	◆	□		
Media	Environmental Awareness/Advocacy/Dissemintating Information	□				□	□	□	□	□			
	Roundtable/Integrating Environment/Gender & Poverty Alleviation			◆							□		◆
	Investigative Journalism/Reporting on Environmental Issues												
Donors	Policy Reform/Programme Approach												
	Technical Assistance/Joint Programmes & Monitoring					◆							
	Capacity Building	◆									□		
	Prioritisation of Investment & Resource Allocation	◆			◆	◆	◆	◆	◆				

◆ Critical

□ Important

	Programmes/Interventions	Integrated Coastal Zone Management Planning (ICZMP)	Environment-friendly development of coast	Sustainable management of natural resources	Desalination of sea water	Ferry service	Coastal highway & key link roads	Fisheries centre	Developing tourism	Non-polluting industries or with abatement/ pollution control	Sustainable new townships	Cleaning existing settlements
Political Leaders	Policy & Legal Reforms/Good Governance	◆	◆	◆		◆			◆	◆	◆	◆
	Resource Allocation/Monitoring	◆	◆	◆	◆		◆	◆	◆	◆	□	□
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	◆	◆	◆	□	◆	◆	□	◆	◆	◆	□
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆	◆	◆		◆			◆	◆	◆	□
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆	◆	◆				□	◆	◆	□	◆
	Applied Research & Development/Information Management	◆	◆	◆	◆		□	◆	◆	◆	□	□
	Awareness/Behavioural Change/Mobilization	◆	□	□					□	□	◆	◆
	Extension/Mobilization/Facilitation (Sectoral)		◆	◆					◆	◆	◆	□
	Economising/Re-orientation/Increased Resource Generation & Allocation	◆	◆	◆	◆			◆	◆	◆	□	◆
	Planning & Management - Consultations/Integration	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Judiciary	Public Interest Litigation		□	□						□		□
	Improving Enforcement of Environmental Laws	□	◆	◆						◆		□
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization	◆	□	□						□		
	Identifying/Planning & Implementing Environmental Activities	□	□	□						□		□
	Understanding & Taking Care of Environment in Exercises/Conflicts	□	□	□					□			
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization	◆	◆	◆				□	◆	◆	◆	◆
	Participatory/Integrated Planning & Management	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆				◆	◆	◆	◆	□
	Creating Enabling Environment/Inter-agency Relations	◆	◆	◆		◆	□	□	◆	◆	◆	□
	Project Planning/Re-orientation/Implementation/Monitoring	◆	◆	◆	◆		◆	◆	◆	◆	◆	□
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	◆	◆	◆					◆	□	◆	□
	Co-ordination with Govt. Agencies, NGOs & Others/Funding	◆	◆	◆	◆	◆	◆	□	◆	◆	◆	◆
	Improved Management Practices/Processes	◆	◆	◆			◆	□	◆	◆	◆	◆
	Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆		◆	□		◆	◆	◆	◆
NGOs, CBOs and Citizens' Fora	Co-ordination/Networking	□	□	□			□	□	□	□	□	□
	Capacity Building (Self/Others)	◆	◆	□				◆	□	□		□
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action	◆	□	□		□		□	□	□	□	□
	Facilitating Management of Communal Resources	◆	◆	□	□			□	□	□	□	□
	Development Project Planning/Implementation & Facilitating Maintenance by Communities	□	□	◆	□		□	◆	□	□	□	□
	Service Delivery		□	□	□				◆	□		
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆	◆		□	□	◆	◆	◆	◆
	Community Organisation/Mobilization of Own Resources		◆	◆	◆			□	◆	◆	◆	◆
	Developing Understanding/Behavioural Change/Self Mobilization/Action	□	◆	◆	◆		□	□	◆	◆	◆	◆
Community	Development Planning/Investing Capital & Labour	□	◆	◆	◆		□		◆	◆	◆	◆
	Improving Management Practices	□	◆	◆	◆		□		◆	◆	◆	◆
Media	Environmental Awareness/Advocacy/Disseminating Information	□	□	□	□	◆	□	□	◆	◆	□	◆
	Roundtable/Integrating Environment/Gender & Poverty Alleviation		□		□				□	□	□	□
	Investigative Journalism/Reporting on Environmental Issues		□	□	□					□		
Donors	Policy Reform/Programme Approach	◆	◆	◆						◆		
	Technical Assistance/Joint Programmes & Monitoring	◆	◆	□	◆			◆	◆	◆		
	Capacity Building	◆	◆	◆	◆			◆	◆	◆	◆	
	Prioritisation of Investment & Resource Allocation	◆	◆	◆	◆		◆	◆	◆	◆	◆	

◆ Critical

□ Important

	Programmes/Interventions	Developing & sustainably using natural resources	Controlling land-based pollution	Developing coastal tourism	SUSTAINABLE PLANNING & MANAGEMENT OF URBAN AREAS	Roundtable on Urban Environment	Placing QDA, BWASA, QMC under LG&RD&AD	Water supply for Quetta from an outside source	Controlling new developments in Quetta valley	Treating & re-using sewage of Quetta	Planning & development of existing & new towns	Planning a Quetta-like new city	Managing watersheds of all settlements
Political Leaders	Policy & Legal Reforms/Good Governance	◆	◆	◆		□	◆	◆	◆		◆	◆	◆
	Resource Allocation/Monitoring	◆	◆	◆				◆		◆	◆	◆	◆
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	◆	◆	◆		□		◆	◆	◆	◆	◆	◆
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆	◆	◆		□		◆	◆	□	◆	◆	◆
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆	◆	◆		◆	◆		◆	□	◆	◆	◆
	Applied Research & Development/Information Management	□	◆	◆				◆		◆	◆	◆	◆
	Awareness/Behavioural Change/Mobilization	□	□	□					◆	□	□	□	□
	Extension/Mobilization/Facilitation (Sectoral)	◆	◆	◆						◆	◆	◆	◆
	Economising/Re-orientation/Increased Resource Generation & Allocation	◆	◆	◆		□		◆		◆	◆	◆	◆
	Planning & Management - Consultations/Integration	◆	◆	◆		□		◆	◆	◆	◆	◆	◆
Judiciary	Public Interest Litigation	□	□						◆				
	Improving Enforcement of Environmental Laws	◆	◆						◆				
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization	□	□					□	◆	◆	□	□	□
	Identifying/Planning & implementing Environmental Activities	□	□			□				□	□		□
	Understanding & Taking Care of Environment in Exercises/Conflicts	□		□							□	□	□
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization	◆	◆	◆				□	◆	◆	◆	◆	◆
	Participatory/Integrated Planning & Management	◆	◆	◆				□	◆	◆	◆	◆	◆
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆		□	◆		◆	□	◆	◆	□
	Creating Enabling Environment/Inter-agency Relations	◆	◆	◆		□		□		◆	□	□	□
	Project Planning/Re-orientation/Implementation/Monitoring	□	◆	◆		□		□	□	◆	◆	◆	◆
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	□	◆	□					◆	□	◆	◆	□
	Co-ordination with Govt, Agencies, NGOs & Others/Funding	◆	◆	◆		◆		□	◆	◆	◆	◆	□
	Improved Management Practices/Processes	◆	◆	◆					◆	◆	◆	◆	◆
	Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆			□	◆	◆	◆	◆	◆	◆
NGOs, CBOs and Citizens' Fora	Co-ordination/Networking	◆	□	□		◆			□	□	□	□	□
	Capacity Building (Self/Others)	◆		□						□			□
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action	□	□	□					◆				□
	Facilitating Management of Communal Resources	□		□					□	□			□
	Development Project Planning/Implementation & Facilitating Maintenance by Communities	□	□	□		□				□	□		□
	Service Delivery			□									
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆					◆	◆	◆	◆	◆
	Community Organisation/Mobilization of Own Resources	◆	◆	◆						◆	◆	◆	◆
	Developing Understanding/Behavioural Change/Self Mobilization/Action	◆	◆	◆					◆	◆	◆	◆	◆
Community	Development Planning/Investing Capital & Labour	◆	◆	◆						◆	◆	◆	◆
	Improving Management Practices	◆	◆	◆					◆	◆	◆	◆	◆
Media	Environmental Awareness/Advocacy/Dissemination Information	□	◆	◆				◆	◆	◆	◆	□	□
	Roundtable/Integrating Environment/Gender & Poverty Alleviation	□	□	□		◆							
	Investigative Journalism/Reporting on Environmental Issues	□	□	□				□	□	□	□	□	□
Donors	Policy Reform/Programme Approach		◆	◆					□		□	□	□
	Technical Assistance/Joint Programmes & Monitoring	□	◆	□				◆		◆	◆	□	
	Capacity Building	◆	◆	□							□		
	Prioritisation of Investment & Resource Allocation	◆	◆	□				◆		◆	◆	◆	◆

◆ Critical

□ Important

	Programmes/Interventions	Water & sanitation for settlements	Safe disposal of all kinds of solid wastes	Environment-friendly master plan of Quetta City	Controlling air, water, land & noise pollution	Green spaces in settlements	CREATING & SUSTAINING ENVIRONMENT-FRIENDLY DEVELOPMENT	Roundtables on Industries, Minerals & Energy	Controlling pollution & complying/ enforcing NEQS	Undertaking SEA of policies/programmes & IEE/EIA of projects	Occupational health & workers safety	Cottage, small & medium agro-based industries
Political Leaders	Policy & Legal Reforms/Good Governance	◆	◆	□	◆	◆		□	◆	◆	◆	◆
	Resource Allocation/Monitoring	◆	◆	◆	◆	◆			◆	□		□
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	◆	◆	◆	◆	□		□	◆	□	□	□
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆	◆	◆	◆	◆		□	◆	◆	◆	◆
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆	◆	◆	◆	◆		◆	◆	◆	◆	□
	Applied Research & Development/Information Management	◆	□	◆	◆	◆			◆	□	□	□
	Awareness/Behavioural Change/Mobilization	□	□	□	□	□			◆	◆	□	□
	Extension/Mobilization/Facilitation (Sectoral)	◆	◆	◆	◆	◆			◆	◆	◆	□
	Economising/Re-orientation/Increased Resource Generation & Allocation	◆	◆	◆	◆	◆		□	◆	□		□
	Planning & Management - Consultations/Integration	◆	◆	◆	◆	◆		□	◆	◆	◆	◆
Judiciary	Public Interest Litigation		◆		◆	◆			◆	□	□	
	Improving Enforcement of Environmental Laws	□	◆	◆	◆	◆			◆	□	◆	
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization		◆	◆	◆	□			◆	□	◆	
	Identifying/Planning & Implementing Environmental Activities	□	□	◆	□	□		□	□	□	□	
	Understanding & Taking Care of Environment in Exercises/Conflicts			□	◆					□		
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization	◆	◆	◆	◆	◆			◆	◆	◆	□
	Participatory/Integrated Planning & Management	◆	◆	◆	◆	◆			◆	◆	◆	◆
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆	◆	◆		□	◆	◆	◆	◆
	Creating Enabling Environment/Inter-agency Relations	◆	◆	◆	◆	◆		□	◆	□	◆	◆
	Project Planning/Re-orientation/Implementation/Monitoring	◆	◆	◆	◆	◆		□	□	◆	◆	□
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	□	□	◆	◆	◆			◆	◆	◆	◆
	Co-ordination with Govt, Agencies, NGOs & Others/Funding	□	□	◆	◆	◆		◆	◆	◆	◆	◆
	Improved Management Practices/Processes	◆	◆	◆	◆	◆			◆	◆	◆	◆
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆	◆	◆			◆	◆	◆	□
	Co-ordination/Networking	□	□	◆	□	◆		◆	□	□	□	
	Capacity Building (Self/Others)	◆	□	◆	□	□			□	□	□	
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action	□	□		□	□			□	□	□	
	Facilitating Management of Communal Resources	◆	□	◆	□	□			□			□
	Development Project Planning/Implementation & Facilitating Maintenance by Communities	□	□	□	□	□		□	□	□	□	□
	Service Delivery			□		□			□			
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	◆	◆	□	◆	◆			□	◆	◆	□
	Community Organisation/Mobilization of Own Resources	◆	◆	□	◆	◆			□		◆	□
Community	Developing Understanding/Behavioural Change/Self Mobilization/Action	◆	◆	□	◆	◆			□	□	◆	□
	Development Planning/Investing Capital & Labour	◆	◆	□	◆	◆			□	□	◆	□
	Improving Management Practices	◆	◆	□	◆	◆			□	□	◆	□
Media	Environmental Awareness/Advocacy/Dissemination Information	◆	◆	◆	◆	□			◆	◆	◆	
	Roundtable/Integrating Environment/Gender & Poverty Alleviation	□	□		□	□		◆	□		□	
	Investigative Journalism/Reporting on Environmental Issues	□	□	□	□	□			◆	◆	◆	
Donors	Policy Reform/Programme Approach			□	◆				□	◆	◆	
	Technical Assistance/Joint Programmes & Monitoring	□	□	◆	◆				◆	◆	◆	
	Capacity Building			◆	◆				◆	◆	□	
	Prioritisation of Investment & Resource Allocation	◆	◆	◆	◆				◆	◆	◆	

◆ Critical

□ Important

	Programmes/Interventions	Political Leaders	Federal and Provincial Government	Judiciary	Armed Forces	District Authorities and Local Bodies	Private Sector	NGOs, CBOs and Citizens' Fora	Tribal Elders, Ulema & Community Leaders	Community	Media	Donors
	◆ Critical											
	□ Important											
	Promoting arts, crafts & tourism	◆	◆			◆	◆		◆	◆		
CONSERVING, REHABILITATING, DEVELOPING & USING FORESTS SUSTAINABLY	Policy & Legal Reforms/Good Governance	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Resource Allocation/Monitoring	□	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Co-ordination/Collaboration/Information Sharing	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	□	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Applied Research & Development/Information Management	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Awareness/Behavioural Change/Mobilization	□	□	□	◆	◆	◆	□	◆	◆	◆	□
	Extension/Mobilization/Facilitation (Sectoral)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Economising/Re-orientation/Increased Resource Generation & Allocation	□	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Planning & Management - Consultations/Integration	◆	◆	□	◆	◆	◆	◆	◆	◆	◆	◆
	Public Interest Litigation											□
	Improving Enforcement of Environmental Laws					◆						◆
	Environmental Awareness/Behavioural Change/Mobilization					□	◆	◆	◆	◆		□
	Identifying/Planning & Implementing Environmental Activities			□		□	◆	◆	□	□		□
	Understanding & Taking Care of Environment in Exercises/Conflicts					□	◆					□
	Awareness/Behavioural Change/Mobilization	◆			◆	◆	◆	◆	◆	◆		◆
	Participatory/Integrated Planning & Management	◆			◆	◆	◆	◆	◆	◆		◆
	Governance/Strengthening/Law Enforcement & Decision-making	□		□	□	◆	□	◆	◆	◆	□	◆
	Creating Enabling Environment/Inter-agency Relations	◆		□		□	◆	◆	◆	◆	□	□
	Project Planning/Re-orientation/Implementation/Monitoring	□		□	◆	◆	□	◆	◆	□	□	□
	Environmental Awareness/Behavioural Change/Mobilization/Action	◆				□	◆	◆	◆		◆	◆
	Co-ordination with Govt. Agencies, NGOs & Others/Funding	◆		◆		□	◆	◆	◆			◆
	Improved Management Practices/Processes	◆				◆	◆	◆	◆	□		◆
	Awareness/Advocacy/Motivation/Mobilization	◆			◆	◆	◆	◆	◆	◆	◆	◆
	Co-ordination/Networking	□		◆	□	□	◆	□	□	□		□
	Capacity Building (Self/Others)	□			□	◆	◆	□	□	□		□
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action					□	□	□		◆		□
	Facilitating Management of Communal Resources	□		□	◆	◆	□	□	□	□	□	□
	Development Project Planning/Implementation & Facilitating Maintenance by Communities	□		□	◆	◆	◆	□	□	◆		□
	Service Delivery					□	□	□	◆	□		□
	Environmental Awareness/Advocacy/Motivation/Mobilization	◆			◆	◆	◆	◆	◆			□
	Improving Organisation/Mobilization of Own Resources	◆			◆	◆	◆	◆	◆			□
	Developing Understanding/Behavioural Change/Self Mobilization/Action	◆			◆	◆	◆	◆	◆	◆		◆
	Development Planning/Investing Capital & Labour	◆			◆	◆	◆	◆	◆	◆		◆
	Improving Management Practices	◆			◆	◆	◆	◆	◆	◆		◆
	Environmental Awareness/Advocacy/Mobilization/Demonstrating Information	□			□	◆	◆	◆	□		◆	◆
	Roundtable/Integrating Environment/Gender & Poverty Alleviation			◆				□				□
	Investigative Journalism/Reporting on Environmental Issues					□	□	□				□
	Policy Reform/Programme Approach					◆						□
	Technical Assistance/Joint Programmes & Monitoring	◆				□						◆
	Capacity Building											◆
	Prioritisation of Investment & Resource Allocation					◆		◆	□		◆	◆
CONSERVING & USING BIODIVERSITY & WETLANDS WISELY	Roundtable on Forests & Biodiversity	□	□	□							◆	
	Implementing international conservation conventions	◆	◆	◆							◆	◆

	Programmes/Interventions	Designing a Protected Areas System	Management planning of PAs	Managing PAs scientifically	Recovery plans of endangered species	Houbara hunting & capturing/trading of falcons	Involving communities in managing natural capital	Policies & legislation	Institutional arrangements	Orientation & training	CONSERVING CULTURAL HERITAGE & DEVELOPING TOURISM	Roundtable on Cultural Heritage & Tourism	An authentic inventory & map of cultural & natural heritage
Political Leaders	Policy & Legal Reforms/Good Governance	◆	□	◆		◆	◆	◆		◆		□	
	Resource Allocation/Monitoring	□	◆	◆	□					◆			
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	◆	◆	◆	□	◆	□	◆	◆	◆		□	□
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆	◆	◆	□	◆	◆	◆	◆	◆		□	
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆	◆	◆	□	◆	◆	◆	◆	◆		◆	
	Applied Research & Development/Information Management	◆	◆	◆	◆		□	□	◆	◆			◆
	Awareness/Behavioural Change/Mobilization	◆	◆	□	□	◆	□	◆	◆	◆			
	Extension/Mobilization/Facilitation (Sectoral)	◆	◆	◆	□	□			◆	◆			
	Economising/Re-orientation/Increased Resource Generation & Allocation	◆		◆			◆			□		□	
	Planning & Management - Consultations/Integration	◆	◆	◆	◆	◆		□	◆	◆		□	◆
Judiciary	Public Interest Litigation	□				◆			□	□			
	Improving Enforcement of Environmental Laws	□	◆			◆	□	◆	◆	□			
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization	□	□			□		◆	□	□			
	Identifying/Planning & Implementing Environmental Activities	□	□	◆		□		□	□	□			
	Understanding & Taking Care of Environment in Exercises/Conflicts	□	□	□		□		□	□	□			
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization	◆	◆	◆	□	◆	◆	◆	◆	◆			
	Participator/Integrated Planning & Management	◆	◆	◆	◆	◆	◆	◆	◆	◆			□
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆	□	◆	◆	◆	◆	◆		□	
	Creating Enabling Environment/Inter-agency Relations	□	◆	◆	□	□		◆	□	◆		□	
	Project Planning/Re-orientation/Implementation/Monitoring		◆	□	□	□	◆		◆	◆		□	
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	□	◆	□	□	◆	□	□	◆	◆			
	Co-ordination with Govt. Agencies, NGOs & Others/Funding	□	◆	□	□	◆		□	◆	□		◆	□
	Improved Management Practices/Processes		◆	□	□	◆	□	□	◆	◆			
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆	□	◆	◆	◆	◆	◆			
	Co-ordination/Networking	□	□	◆	□	□	◆	□	□	□		◆	□
	Capacity Building (Self/Others)	□	□	□		□		□	◆	◆			
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action			□				□		□			
	Facilitating Management of Communal Resources	□		□				□	□	◆			
	Development Project Planning/Implementation & Facilitating Maintenance by Communities		□	□	□		◆		□	◆		□	
	Service Delivery						□		□	□			
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	◆	◆	◆	□	◆	◆	□	◆	◆			
	Community Organisation/Mobilization of Own Resources	□	◆	◆	□	□	◆	□	◆	◆			
	Developing Understanding/Behavioural Change/Self Mobilization/Action	◆	◆	◆	□	◆	◆	□	◆	◆			
Community	Development Planning/Investing Capital & Labour		◆	◆	□	□	◆	□	◆	◆			
	Improving Management Practices	□	◆	◆	◆	□	◆	◆	◆	◆			
Media	Environmental Awareness/Advocacy/Disseminating Information	◆	□	◆	□	◆	□	◆	◆	◆			□
	Roundtable/Integrating Environment/Gender & Poverty Alleviation							□	□	◆		◆	
	Investigative Journalism/Reporting on Environmental Issues			□		□				◆			
Donors	Policy Reform/Programme Approach							□					
	Technical Assistance/Joint Programmes & Monitoring	◆	◆	◆	□	□							
	Capacity Building	□	◆	□	□	□							
	Prioritisation of Investment & Resource Allocation	◆	◆	◆	□	□							

	Programmes/Interventions	Improving museums	Exhibiting arts & crafts in Quetta museum	Publicizing cultural & natural heritage	Quashing 'No Objection Certificate' for foreigners' visit	Preparing for 2001-Pakistan's Year of Tourism	Involving local communities in tourism	Excavating key sites	Conserving heritage	Documenting traditional knowledge	Institutional strengthening	COLLECTING AUTHENTIC DATA & MANAGING INFORMATION	Improving coordination
	◆ Critical												
	□ Important												
Political Leaders	Policy & Legal Reforms/Good Governance				◆				◆		□		□
	Resource Allocation/Monitoring	◆	◆	◆		◆		◆	◆	□	□		
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	□	□	◆		◆	□	◆	□	□	□		□
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment				◆				◆		□		□
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆		□			◆		◆		◆		◆
	Applied Research & Development/Information Management	□	◆	◆		◆		◆	◆	◆			
	Awareness/Behavioural Change/Mobilization			◆	◆	□	□	□	□				
	Extension/Mobilization/Facilitation (Sectoral)	□	□	□	◆	◆	◆	□	◆				
	Economising/Re-orientation/Increased Resource Generation & Allocation	◆	◆	◆		□		□	□	□	□		□
	Planning & Management - Consultations/Integration	◆	◆	◆		◆	◆	□	◆	□			□
Judiciary	Public Interest Litigation												
	Improving Enforcement of Environmental Laws								◆				
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization	□											
	Identifying/Planning & Implementing Environmental Activities	□				□			□				
	Understanding & Taking Care of Environment In Exercises/Conflicts								□				
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization		◆	◆	□	□	◆	□	◆		□		
	Participatory/Integrated Planning & Management	□	□	□		□	◆	□	◆	□	□		
	Governance/Strengthening/Law Enforcement & Decision-making						◆		◆		□		□
	Creating Enabling Environment/Inter-agency Relations	□	□			□	□	◆	□	□	□		□
	Project Planning/Re-orientation/Implementation/Monitoring	□	□			□	◆						□
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	□	□	◆	□	◆	□		□				
	Co-ordination with Govt. Agencies, NGOs & Others/Funding	□	□	◆	□	◆	□		□				◆
	Improved Management Practices/Processes					◆			◆				
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization	□	□	◆	□	□	◆	□	◆	□			
	Co-ordination/Networking	□	□	□		□	□		□	□	□		◆
	Capacity Building (Self/Others)					□	□		□				
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action					□	□						
	Facilitating Management of Communal Resources									□			
	Development Project Planning/Implementation & Facilitating Maintenance by Communities		□			□	□				□		□
	Service Delivery												
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	□	□	◆	□	◆	◆	□	◆	◆	□		
	Community Organisation/Mobilization of Own Resources		□			◆	◆		□				
Community	Developing Understanding/Behavioural Change/Self Mobilization/Action	□	□	◆		◆	◆	□	◆	◆	□		
	Development Planning/Investing Capital & Labour		□			◆	◆		□				
	Improving Management Practices					◆	◆		□				
Media	Environmental Awareness/Advocacy/Disseminating Information	□	◆	◆		◆	◆		◆	◆	□		
	Roundtable/Integrating Environment/Gender & Poverty Alleviation								□				◆
	Investigative Journalism/Reporting on Environmental Issues		□					◆	□	◆			
Donors	Policy Reform/Programme Approach							□	□				
	Technical Assistance/Joint Programmes & Monitoring							◆	◆		□		
	Capacity Building							◆	□		□		
	Prioritisation of Investment & Resource Allocation		□					◆	◆	□			

	Programmes/Interventions	Strengthening the Bureau of Statistics	Information management in the province	Disseminating information through SDNP	Managing Information Centre in IUCN Balochistan office	Promoting access to information	ALLEVIATING POVERTY	Roundtable on Poverty Alleviation	Raising awareness regarding opportunities	Involving representatives of the poor	Integrating poverty alleviation in policies & development planning	Improving literacy/health care & encouraging population planning
Political Leaders	Policy & Legal Reforms/Good Governance		◆	◆		◆		□			◆	◆
	Resource Allocation/Monitoring	◆	◆									◆
Federal and Provincial Government	Co-ordination/Collaboration/Information Sharing	◆	◆	◆	◆	◆		□	◆	□	□	□
	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment		◆	◆		◆		□			◆	◆
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆	◆	◆		◆		◆	□	□		◆
	Applied Research & Development/Information Management	◆	◆	◆	◆	◆			◆		□	
	Awareness/Behavioural Change/Mobilization		□	◆	◆	□			◆			□
	Extension/Mobilization/Facilitation (Sectoral)	◆	□	◆	◆				◆			◆
	Economising/Re-orientation/Increased Resource Generation & Allocation	□	□					□				◆
	Planning & Management - Consultations/Integration	◆	◆	◆	◆	□		□	□	□	◆	□
Judiciary	Public Interest Litigation											
	Improving Enforcement of Environmental Laws											
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization				□	□						
	Identifying/Planning & Implementing Environmental Activities											
	Understanding & Taking Care of Environment In Exercises/Conflicts			□								
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization		◆	◆	□	◆			◆			□
	Participatory/Integrated Planning & Management	◆	◆	□		◆			□	◆	◆	◆
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆	□	◆		□	◆	□		□
	Creating Enabling Environment/Inter-agency Relations	◆	◆	□		□		□				□
	Project Planning/Re-orientation/Implementation/Monitoring	□	◆	□		◆		□	◆		◆	◆
	Environmental Awareness/Behavioural Change/Mobilization/Action	□	□	□	□	□			◆	□		
Private Sector	Co-ordination with Govt. Agencies, NGOs & Others/Funding		□	□	□	□		◆	□	□		□
	Improved Management Practices/Processes					□						◆
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization		□	◆	□	◆			◆			□
	Co-ordination/Networking	◆	□	□	□	◆		◆	□	□		□
	Capacity Building (Self/Others)		□	□						□		◆
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action	◆		□					□	□		□
	Facilitating Management of Communal Resources		□						□	□		◆
	Development Project Planning/Implementation & Facilitating Maintenance by Communities		□	□		◆		□	◆	◆	◆	◆
	Service Delivery	□	□						◆	□		□
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	□	□	□	□	□			◆	◆		◆
	Community Organisation/Mobilization of Own Resources								□	◆		◆
	Developing Understanding/Behavioural Change/Self Mobilization/Action			□	□	□			□	◆		◆
Community	Development Planning/Investing Capital & Labour	□	□			□			◆	◆	◆	◆
	Improving Management Practices					□				◆		◆
Media	Environmental Awareness/Advocacy/Disseminating Information	□	□	◆	◆	□			◆			◆
	Roundtable/Integrating Environment/Gender & Poverty Alleviation							◆				□
	Investigative Journalism/Reporting on Environmental Issues			□	◆	◆						□
Donors	Policy Reform/Programme Approach		□									◆
	Technical Assistance/Joint Programmes & Monitoring	□	◆								◆	◆
	Capacity Building	□	◆								□	◆
	Prioritisation of Investment & Resource Allocation	◆	◆	◆	◆					□	◆	◆

	Programmes/Interventions ◆ Critical □ Important	Conserving natural resources for the sake of poor	Improving environmental health in poor localities	Diversifying income & developing skills	Vocational training	Organizing the poor for collective action	
Political Leaders	Policy & Legal Reforms/Good Governance	◆	◆	□			
	Resource Allocation/Monitoring		□		◆		
	Co-ordination/Collaboration/Information Sharing		□		□		
Federal and Provincial Government	Policy Review/Legal Reforms/Use of Economic Tools/Enabling Environment	◆	◆	□			
	Good Governance/Local Government/Roundtables/Strengthening (Self/Others)	◆	□	□	◆		
	Applied Research & Development/Information Management		◆	◆	◆		
	Awareness/Behavioural Change/Mobilization	□	□	◆	□		
	Extension/Mobilization/Facilitation (Sectoral)	◆	◆	◆	□		
	Economising/Re-orientation/Increased Resource Generation & Allocation		□	□	◆		
	Planning & Management - Consultations/Integration	◆	◆	□	◆		
Judiciary	Public Interest Litigation	□					
	Improving Enforcement of Environmental Laws	◆					
Armed Forces	Environmental Awareness/Behavioural Change/Mobilization						
	Identifying/Planning & Implementing Environmental Activities		□		□		
	Understanding & Taking Care of Environment in Exercises/Conflicts						
District Authorities and Local Bodies	Awareness/Behavioural Change/Mobilization	◆	◆	◆	□		
	Participator/Integrated Planning & Management	◆	◆	◆	□		
	Governance/Strengthening/Law Enforcement & Decision-making	◆	◆	◆	□		
	Creating Enabling Environment/Inter-agency Relations	□	◆	◆	□	◆	
	Project Planning/Re-orientation/Implementation/Monitoring	□	◆	◆	◆		
Private Sector	Environmental Awareness/Behavioural Change/Mobilization/Action	□	◆	◆	□		
	Co-ordination with Govt, Agencies, NGOs & Others/Funding	□	◆	◆	◆		
	Improved Management Practices/Processes	◆	◆	◆	◆		
NGOs, CBOs and Citizens' Fora	Awareness/Advocacy/Motivation/Mobilization	◆	□	◆	◆	◆	
	Co-ordination/Networking	◆	□	□	□	□	
	Capacity Building (Self/Others)	◆	□	◆	□		
	Integrating Environment, Poverty Alleviation & Gender in Mandate & Action	□					
	Facilitating Management of Communal Resources	◆		□	□	◆	
	Development Project Planning/Implementation & Facilitating Maintenance by Communities	□	□	◆	◆	□	
	Service Delivery						
Tribal Elders, Ulema & Community Leaders	Environmental Awareness/Advocacy/Motivation/Mobilization	◆		□	◆	◆	
	Community Organisation/Mobilization of Own Resources	◆	◆	◆	□	◆	
	Developing Understanding/Behavioural Change/Self Mobilization/Action	◆	◆	◆	□	◆	
Community	Development Planning/Investing Capital & Labour	□	◆	◆	□	□	
	Improving Management Practices	□	◆	◆	□	◆	
	Environmental Awareness/Advocacy/Dissemination Information	□	◆	◆	◆	◆	
Media	Roundtable/Integrating Environment/Gender & Poverty Alleviation	□					
	Investigative Journalism/Reporting on Environmental Issues	□	□	□	□		
Donors	Policy Reform/Programme Approach			□	□		
	Technical Assistance/Joint Programmes & Monitoring		◆	□	□		
	Capacity Building		◆	□	□		
	Prioritisation of Investment & Resource Allocation	◆	◆	◆	◆	◆	

Table 38 **Communicating the BCS**

BCS Programme Area	Agencies Responsible for Action	Responsibility for Communicating the BCS & Required Actions to the Implementing Agencies	
		Primary	Assisted By
Raising public awareness	■ Planning & Development Department ■ Environment, Wildlife, Livestock, Forest & Tourism Department ■ Education, Culture, Sports & Youth Affairs Department ■ Local Government & Rural Development Department ■ Health Department ■ Services, General Administration & Information Department (Information Wing) ■ Population Planning & Social Welfare Department including Women Section ■ EPA Balochistan ■ Industries, Trade, Minerals, Labour & Manpower Department including the Directorates of Industries, Mineral Development & Lasbela Industrial Estate Development Authority (LIEDA) ■ Agriculture, Cooperatives, Food & Fisheries Department ■ Irrigation & Power Department/BIDA ■ Media (radio, television, & press)	■ **Environment/Information/ all other relevant sections in P&DD** ■ **All institutions listed in column 3** ■ **Relevant interest groups/ roundtables** ■ **Balochistan Chamber of Commerce & Industries Lasbela Chamber of Commerce & Industries**	■ **Press clubs** ■ **Academia** ■ **Development Finance Institutions (DFIs)** ■ **Projects in environment-related sectors** ■ **SDNP & all other electronic communication networks** ■ **Informal media including Ulema, tribal elders, TBAs, theatre groups, & organizers of melas** ■ **IUCN Pakistan** ■ **Select NGOs**
Improving governance & effectiveness of institutions	■ Federal government (e.g. National Reconstruction Bureau) ■ Provincial Assembly ■ Cabinet ■ Political parties & leaders ■ Judiciary ■ Local Government & Rural Development Department ■ Home & Tribal Affairs Department ■ Services, General Administration & Information Department ■ Senior bureaucracy & district administration ■ Line Departments, & their field agencies at district & local levels ■ NGO networks & umbrella/support NGOs	■ **Environment/Information & other relevant sections in P&DD** ■ **All institutions listed in column 3** ■ **Interest groups/ roundtables**	■ **Information Wing of Services, General Administration & Information Department** ■ **Media (print & electronic)** ■ **IUCN Pakistan** ■ **NGOs & multi/bilateral projects working in the sector** ■ **DFIs** ■ **SDNP & other electronic networks** ■ **Academia** ■ **Donors**
Institutionalizing environmental education	■ Planning & Development Department ■ Education Wing of Education, Culture, Sports & Youth Affairs Department ■ Provincial Institute of Teachers Education ■ Training institutes/training programmes of other field agencies (such as Health, Labour & Manpower, Population Planning, Agriculture, Irrigation, & Livestock Departments) ■ University of Balochistan ■ Text Book Board ■ Private schools & teaching institutions ■ Commercial coaching centres ■ Religious institutions ■ NGOs & multi/bilaterally funded projects working in education sector	■ **Environment, Wildlife, Livestock, Forests, & Tourism Department** ■ **Environment/Information/ Education Sections in P&DD** ■ **All institutions listed in column 3** ■ **Interest Group/Roundtable on Environmental Education** ■ **EPA Balochistan**	■ **Information Wing of Services, General Administration & Information Department** ■ **Relevant sections in P&DD** ■ **Media (electronic & print)** ■ **SDNP & other electronic communication networks** ■ **Ulema** ■ **IUCN Pakistan**

BCS Programme Area	Agencies Responsible for Action	Responsibility for Communicating the BCS & Required Actions to the Implementing Agencies	
		Primary	Assisted By
Arresting depletion & pollution of groundwater & increasing irrigation efficiency	■ Proposed Balochistan Water Board ■ Planning & Development Department ■ Environment, Wildlife, Livestock, Forest & Tourism Department & its field agencies – EPA Balochistan, Forest Department, Livestock Department. ■ Irrigation & Power Department & its Bureau of Water Resources ■ Industries & Mineral Development Wings of Industries, Trade, Minerals, Labour & Manpower Department ■ Agriculture, Cooperatives, Food & Fisheries Department ■ Development Authorities (e.g. BDA, QDA, BWASA) & Quetta Municipal Corporation ■ Public Health Engineering Department ■ Local Government, Rural Development Department ■ NGOs & multi/bilaterally funded projects in the sector especially the irrigation & agricultural projects ■ Forums such as Farmers' Association, Anjuman-e-Zamindaran ■ District Administration & District Water Committees ■ Private sector (LCC&I, BCC&I, Chamber of Agriculture)	■ **Environment/Information/ Water/Irrigation Sections in P&DD** ■ **All organisations listed in column 3** ■ **Interest Group/Roundtable on Water**	■ **Information Wing of Services, General Administration & Information Department** ■ **Informal media including communicators, such as ulema, tribal elders & TBAs** ■ **Health Department** ■ **Population Planning & Social Welfare Department** ■ **Education Wing of Education, Culture, Sports & Youth Affairs Department** ■ **DFIs** ■ **Academia** ■ **IUCN Pakistan/SDNP** ■ **Formal media (electronic & print), press clubs** ■ **Drama & theatre groups** ■ **Select NGOs & civil society institutions**
Making agriculture sustainable	■ Planning & Development Department ■ Agriculture, Cooperatives, Food & Fisheries Department ■ Irrigation & Power Department/BIDA ■ Plant Protection Department of federal government ■ Environment, Wildlife, Livestock, Forest & Tourism Department ■ Balochistan Chamber of Agriculture ■ Export Promotion Bureau ■ Public sector, NGOs & multi/bilaterally funded projects in the agriculture sector ■ Co-operative Societies ■ Forums such as Farmers' Association, Anjuman-e-Zamindaran	■ **Environment/Information/ Agriculture & other relevant sections in P&DD** ■ **All organizations listed in column 3** ■ **Agriculture Interest Group/ Roundtable**	■ **Information Wing of Services, General Administration & Information Department** ■ **Health Department** ■ **Education, Culture, Sports & Youth Affairs Department** ■ **District field agencies** ■ **ADBP** ■ **Population Planning & Social Welfare Department** ■ **Media (electronic & print)** ■ **Press clubs** ■ **Traditional communicators, such as ulema, tribal elders & TBAs** ■ **Academia** ■ **IUCN Pakistan/SDNP** ■ **Select NGOs** ■ **BCCI**

BCS Programme Area	Agencies Responsible for Action	Responsibility for Communicating the BCS & Required Actions to the Implementing Agencies	
		Primary	Assisted By
Managing rangelands & enhancing productivity of livestock	■ Planning & Development Department ■ Environment, Wildlife, Livestock, Forest & Tourism Department ■ Agriculture, Cooperatives, Food & Fisheries Department ■ Arid Zone Research Centre ■ BCC&I, Balochistan Chamber of Agriculture, & other private sector institutions ■ Co-operative societies ■ Export Promotion Bureau ■ Forums such as Farmers' Association & Anjuman-e-Zamindaran ■ District administration & local government institutions ■ NGOs & multi/bilaterally funded projects in the sector	■ **Environment/Agriculture/ Information Sections, in P&DD** ■ **All organizations listed in column 3** ■ **Interest Group/Roundtable on Livestock & Rangelands**	■ **Information Wing of Services, General Administration & Information Department** ■ **Population Planning & Social Welfare Department** ■ **Local Government & Rural Development & Agrovilles Department** ■ **Education, Culture, Sports & Youth Affairs Department** ■ **Health Department** ■ **Line agencies at district level** ■ **Traditional communicators such as ulema, tribal elders & TBAs** ■ **Media (electronic & print)** ■ **IUCN Pakistan/SDNP** ■ **Select NGOs & civil society institutions** ■ **ADBP/DFIs** ■ **Press clubs** ■ **Academia**
Developing coastal & marine resources sustainably	■ Planning & Development Department ■ Agriculture, Cooperatives, Food & Fisheries Department ■ Balochistan Coastal Development Authority ■ Environment, Wildlife, Livestock, Forest & Tourism Department ■ Public Health Engineering Department ■ Irrigation & Power Department/BIDA ■ Information Wing of Services, General Administration & Information Department ■ Communication & Works Department ■ Local Government & Rural Development Department ■ Home & Tribal Affairs Department ■ Education, Culture, Sports & Youth Affairs Department ■ Health Department ■ Population Planning & Social Welfare Department ■ EPA Balochistan ■ Federal agencies (MFD, ZSD, NIO), Marine Centre of Excellence, University of Karachi ■ Local government institutions ■ NGOs & multi//bilaterally funded projects in the sector	■ **Environment/Information/ Fisheries/Agriculture/ Irrigation & other relevant sections in P&DD** ■ **All organisations listed in column 3** ■ **Interest Group/Roundtable on Fisheries & Coastal Development** ■ **District administration**	■ **Information Wing of Services, General Administration & Information Department** ■ **Traditional communicators such as ulema, tribal elders & TBAs** ■ **IUCN Pakistan/SDNP** ■ **Select NGOs** ■ **Theatre groups** ■ **DFIs** ■ **Media (electronic & print)** ■ **Press clubs** ■ **BCC&I/LCC&I** ■ **Academia**

BCS Programme Area	Agencies Responsible for Action	Responsibility for Communicating the BCS & Required Actions to the Implementing Agencies	
		Primary	Assisted By
Sustainable planning & management of urban areas	■ Planning & Development Department ■ Local Government & Rural Development Department ■ Environment, Wildlife, Livestock, Forest & Tourism Department ■ Irrigation & Power Department/BIDA ■ Industries, Trade, Minerals, Labour & Manpower Department ■ Health Department ■ Education, Culture, Sports & Youth Affairs Department ■ Population Planning & Social Welfare Department ■ EPA Balochistan ■ Development Authorities (BDA, QDA, BWASA) ■ Quetta Municipal Corporation, municipal & town committees ■ District administration ■ Traffic police ■ Town planners & architects ■ NGOs & multi/bilaterally funded projects in the sector ■ Transport companies, rickshaw owners & drivers associations ■ Hospitals, schools/colleges, markets, hotels & mosques ■ Garbage pickers' groups ■ Judiciary	■ **Environment/Information & all other relevant sections, in P&DD** ■ **All organizations & institutions listed in column 3** ■ **Interest Group/Roundtable on Urban Environment**	■ **Information Wing of Services, General Administration & Information Department** ■ **Media (electronic & print)** ■ **Press clubs** ■ **Traditional communicators such as ulema, tribal elders & TBAs** ■ **Drama & theatre groups** ■ **IUCN Pakistan/SDNP** ■ **Select NGOs & civil society institutions** ■ **Development Financial Institutions (DFIs)** ■ **Academia** ■ **UNICEF, WHO**
Creating & sustaining environment-friendly development	■ Planning & Development Department ■ Industries, Trade, Minerals, Labour & Manpower Department including Directorates, Technical Training Centres, Inspectorate of Mines & LIEDA ■ Agriculture, Cooperatives, Food & Fisheries Department ■ Irrigation & Power Department/BIDA ■ Population Planning & Social Welfare Department ■ Local Government & Rural Development Department ■ Health Department ■ Environment, Wildlife, Livestock, Forest & Tourism Department including EPA, Balochistan ■ BWASA, BDA, QDA ■ WAPDA ■ NGOs & multi/bilaterally funded projects in the sector ■ BCC&I/LCC&I ■ Mine Owners Association ■ Corporate Sector	■ **Environment/Information/ Industries/Local Government & other relevant sections in P&DD** ■ **All institutions listed in column 3** ■ **Relevant interest groups/ roundtables (industry, minerals & energy)**	■ **Information Wing of Services, General Administration & Information Department** ■ **District administration & line agencies** ■ **Education, Culture, Sports & Youth Affairs Department** ■ **World Health Organisation** ■ **ILO** ■ **DFIs** ■ **Media & Press clubs** ■ **Traditional communicators e.g. ulema, tribal elders** ■ **IUCN Pakistan/SDNP** ■ **Select NGOs** ■ **Academia**
Conserving, rehabilitating, developing & using forests sustainably	■ Planning & Development Department ■ Environment, Wildlife, Livestock, Forest & Tourism Department including its field agencies Forest Department, Livestock Department & EPA Balochistan. ■ Ziarat Development Authority, Ziarat District Forest Committee ■ Agriculture, Co-operatives, Food & Fisheries Department ■ Irrigation & Power Department/BIDA ■ Local Government & Rural Development Department ■ Services, General Administration & Information Department ■ Board of Revenue	■ **Environment/Information Agriculture Sections, in P&DD** ■ **All agencies listed in column 3** ■ **Interest Group/Roundtable on Forests & Biodiversity**	■ **Media (electronic & print)** ■ **Press clubs** ■ **Academia** ■ **Traditional communicators such as ulema, tribal elders, TBAs & theatre groups** ■ **DFIs** ■ **IUCN Pakistan/ SUSG-Central Asia/ SDNP**

BCS Programme Area	Agencies Responsible for Action	Responsibility for Communicating the BCS & Required Actions to the Implementing Agencies	
		Primary	Assisted By
	■ District administration ■ Judiciary ■ Armed forces ■ Balochistan Chamber of Agriculture ■ Farmers associations ■ Balochistan Chamber of Commerce & Industries ■ NGOs & multi/bilaterally funded projects in the sector		■ Select NGOs
Conserving & using biodiversity & wetlands wisely	■ Planning & Development Department ■ Environment, Wildlife, Livestock, Forest & Tourism Department & its field agencies - Forest & Livestock Departments ■ Agriculture, Co-operatives, Food & Fisheries Department ■ Irrigation & Power Department/BIDA ■ Education, Culture, Sports & Youth Affairs Department ■ Population Planning & Social Welfare Department ■ Balochistan Coastal Development Authority ■ Ziarat Development Authority, Ziarat District Forest Committee ■ District administration ■ Judiciary ■ Armed forces ■ NGOs & multi/bilaterally funded projects in the sector	■ **Environment/Information/ Agriculture Sections, P&DD** ■ **Interest Group/Roundtable on Forests & Biodiversity** ■ **All agencies listed in column 3**	■ **Information Wing of Services, General Administration & Information Department** ■ **Media (electronic & print)** ■ **Press clubs** ■ **IUCN Pakistan/SUSG-Central Asia/SDNP** ■ **Select NGOs** ■ **Traditional communicators such as ulema, tribal elders, TBAs & theatre groups** ■ **Academia** ■ **DFIs**
Conserving cultural heritage & developing tourism	■ Planning & Development Department ■ Education, Sports, Culture & Youth Affairs Department including the Directorate of Archaeology ■ Environment, Wildlife, Livestock, Forest & Tourism Department including the Tourism Cell, Forest Department & EPA Balochistan ■ Federal Directorate of Archaeology ■ Federal Folk Heritage Institute (Lok Virsa) ■ Pakistan Tourism Development Corporation ■ Balochistan Society for Arts & Crafts ■ Agriculture, Co-operatives, Food & Fisheries Department ■ Home & Tribal Affairs Department ■ Idara-e-Saqafat Balochistan ■ Pashto, Balochi & Brahvi academies ■ University of Balochistan (Arts & Culture Department) ■ Hotel industry & guides' groups ■ Travel agencies/tour operators ■ Cultural & literary societies ■ Armed forces ■ NGOs & multi/bilateral projects working in the sector e.g. adventure clubs ■ Mela organising committees	■ **Environment/Information/ Culture Sections, in P&DD** ■ **All organizations listed in column 3** ■ **Interest Group/Roundtable on Cultural Heritage & Tourism**	■ **Media (electronic & print)** ■ **Press clubs** ■ **IUCN Pakistan/SDNP** ■ **DFIs** ■ **International museums & arts & crafts institutions** ■ **Select NGOs**

BCS Programme Area	Agencies Responsible for Action	Responsibility for Communicating the BCS & Required Actions to the Implementing Agencies	
		Primary	Assisted By
Collecting authentic data & managing information	■ Public Information Directorate ■ Directorate of Public Relations ■ Bureau of Statistics & Programming Section, P&DD ■ Planning & Development Department ■ BEMIS in Education, Culture, Sports & Youth Affairs Department ■ HMIS in Health Department ■ Irrigation & Power Department/BIDA including its Water Resources Bureau ■ Arid Zone Research Centre, Quetta ■ Federal Meteorology Department ■ EPA Balochistan ■ IUCN Pakistan's Balochistan Office Information Centre ■ SDNP ■ All line departments, field agencies & projects/programmes e.g. ADP/TDMP involved in data collection & information management ■ All departments of University of Balochistan	■ **Environment/Information & all relevant sections, P&DD** ■ **All organisations listed in column 3** ■ **Interest Group/Roundtable on Information Technology**	■ **Industries, Trade, Minerals, Labour & Manpower Department** ■ **Electronic communication networks e.g. internet, SDNP** ■ **Media (electronic & print)** ■ **Informal media (for traditional knowledge)** ■ **NGOs & multi/ bilaterally funded projects working in areas related to environment** ■ **Academia** ■ **Literary societies** ■ **Press clubs** ■ **DFIs** ■ **BCC&I, LCC&I, industrial associations** ■ **Balochistan Chamber of Agriculture**
Alleviating poverty	■ Political parties & leaders (for ensuring equity & focus on poverty alleviation) ■ Planning & Development Department ■ Population Planning & Social Welfare Department ■ Local Government & Rural Development Department ■ All line departments ■ EPA Balochistan (for pollution control) ■ District administration ■ Judiciary ■ Social Action Programme ■ Poverty Alleviation Programme ■ Micro credit institutions ■ Vocational training/skill development programme ■ UN agencies/other donors ■ NGOs & multi/bilaterally funded projects working for poverty alleviation ■ Community organisations & women organisations	■ **Environment/Information/ Poverty Alleviation sections in P&DD** ■ **Interest Group/Roundtable on Poverty Alleviation** ■ **All organisations listed in column 3**	■ **Information Wing of Services, General Administration & Information Department** ■ **Media (electronic & print)** ■ **Traditional communicators such as ulema, tribal elders, TBAs & theatre groups** ■ **IUCN Pakistan/SDNP** ■ **Select activists' groups/ NGOs** ■ **Development-oriented credit institutions** ■ **Press clubs** ■ **Academia**

Chapter 22

Res
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Resource Mobilization for the BCS

The BCS is a strategic plan for arresting and reversing the current trend of rapid degradation of the environment in Balochistan. By covering all key social, economic and natural resource sectors, it provides a foundation for formulating a comprehensive sustainable development strategy for the province, besides promoting the conservation and sustainable use of natural resources and protection of the environment.

The BCS identifies the complex and multi-dimensional issues facing Balochistan as they relate to natural resources, the environment and institutional capacities, and it articulates strategies to address these issues. Many of the suggested actions require a change in thought about the way problems and opportunities are perceived and addressed.

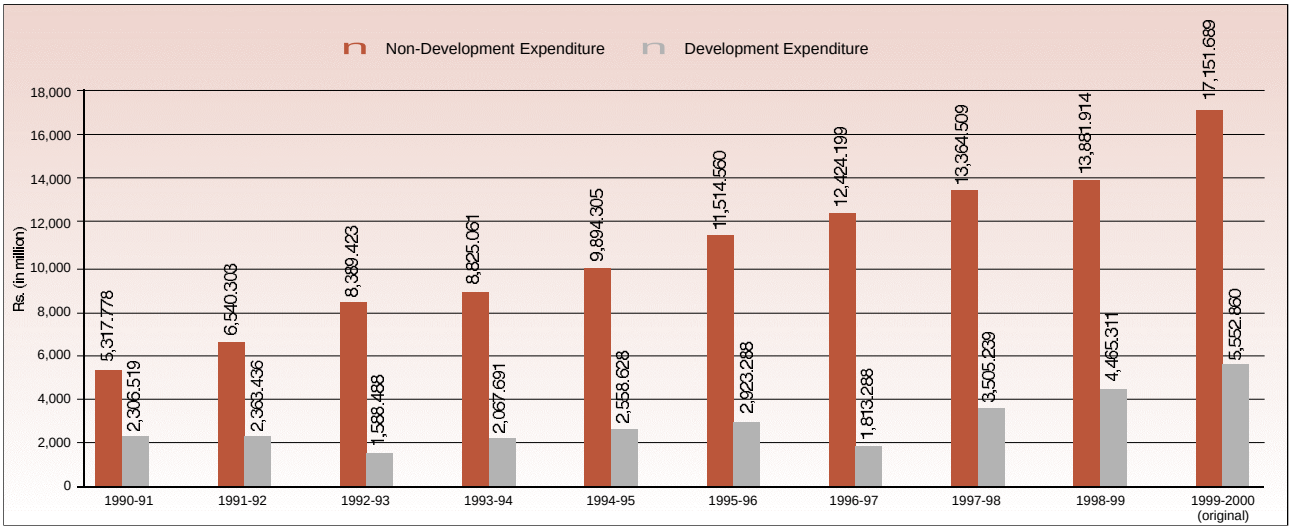
Resource requirements are of three types – institutional, human and financial. The BCS calls for effective development of institutional and human capacities, especially for changing the modus operandi in the field of development planning and implementation. Essentially, the BCS is not about fund-raising or developing a portfolio of projects to be funded. It is about integrating and improving policies based on the vision for the future, involving stakeholders and developing public-private partnerships for rationalizing, prioritizing and achieving development objectives. Institutional strengthening and human resource development and mobilization have been dealt with in detail in Chapter 14.

Regarding the financial resources, the strategy does not advocate a huge additional investment of funds to achieve its goals. Rather, the emphasis is placed on more efficient, participatory and transparent institutions that adopt context-specific approaches to deal with problems of environmental degradation and human deprivation.

In light of the overall budgetary constraints facing the country and province however, and the low priority generally accorded to issues of environment, additional funds must be raised for specific programmes and projects. Some resources could become available as a result of the proper use of existing funds and reorientation of existing investments.

It is therefore essential that resource needs are identified and met for BCS implementation. This Chapter deals with mobilizing financial resources.

Figure 20 Development and Non-Development Expenditure in Balochistan



Source: P&DD 1993b; Ibid 1994; Ibid 1995; Ibid 1996; Ibid 1997c; Ibid 1998b; Ibid 1999b; Ibid 1999c.

Note: Figures 20–25 have numbers for 1992/93-1998/99 of the revised budget whereas the figures of the original estimates are used for 1999-2000. Original means initial allocation made at the beginning of the fiscal year. Revised means actual allocation that is determined at the end of the fiscal year.

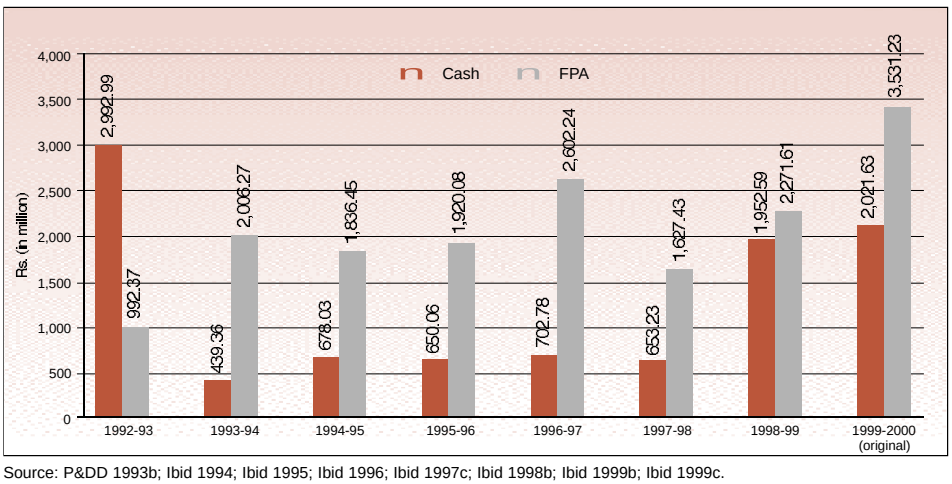
FISCAL POSITION

In the previous 10 years, there has been a consistent increase in the total expenditure of the provincial government, but little increase in the development budget. The average annual rate of increase has been about 11.5%. The development expenditure throughout this period constituted about one-fifth of the total budget (Figure 20). Until 1992–93, the Special Development Programme remained the major component of the provincial development budget, after which a major proportion of the development budget became dependent upon the provision of funds through the Social Action Programme (SAP) window.

Foreign Project Assistance (FPA) has contributed very significantly in the allocations for development expenditures. On average, FPA constituted about 70% of the total Public Sector Development Programme (PSDP) in the period 1993–99 (Figures 21 and 22), a trend that began when SAP was initiated in 1993–94.

In the natural resource sectors, water has been a priority for the government, followed by agriculture and then environment (Figure 23). There has been a consistent increase in allocation for the water sector. However, allocations for agriculture and environment sectors have been fluctuating, mainly because of fluctuations in the availability of FPA.

Figure 21 Cash and FPA Allocations in the Public-Sector Development Programme



Source: P&DD 1993b; Ibid 1994; Ibid 1995; Ibid 1996; Ibid 1997c; Ibid 1998b; Ibid 1999b; Ibid 1999c.

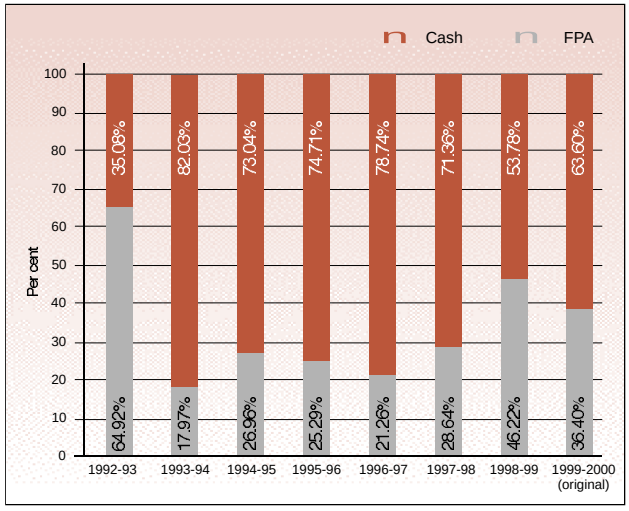
Note: In Figure 21–25, cash means amount contributed by the government to the PSDP.
In Figure 21–22, the cash component for 1999–2000 also includes a federal soft loan of Rs. 698.03 million and a Japanese grant of Rs. 11.5 million.

In the social sector, education has received the highest development budget. Public health, local government and rural development and health have been the other important sectors; these allocations mostly utilized for arranging drinking water and sanitation facilities as well as for promoting public health concepts. In the budget for 1999–2000, education was given top priority, allocating about a quarter of the PSDP budget to this sector (Figure 24).

In the economic and infrastructure sectors, roads have been given top priority, followed by housing and urban services (Figure 25). High allocation to roads is important for improving access to remote areas in vast and rugged terrain in Balochistan. This will also help in case of disasters such as drought and in increasing trade with other regions and countries. For these reasons, there has been a consistent increase in allocations for roads over the years. The housing and urban services sector caters for government offices and residences and amenities to urban areas in the province.

Although the upward trend in total allocations in the PSDP (Figure 26) indicates increasing availability of resources, the fact remains that high inflation rates over the years have diluted the impact of increases.

Figure 22 Cash and FPA Allocations as a Proportion of PSDP

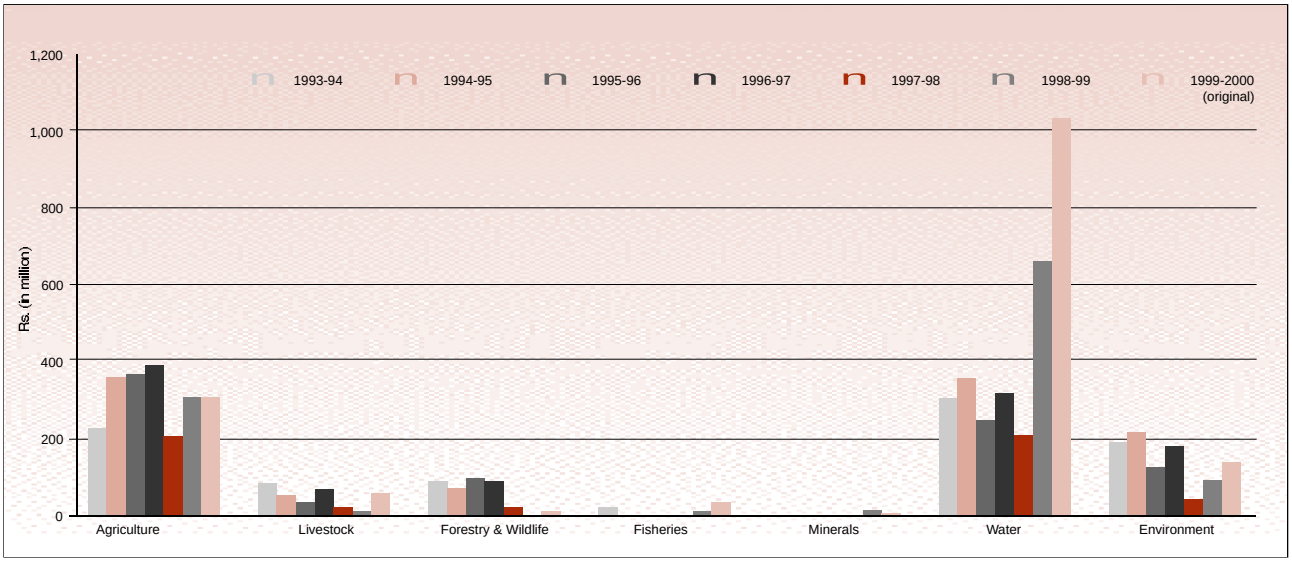


Source:P&DD 1993b; Ibid 1994; Ibid 1995; Ibid 1996; Ibid 1997c; Ibid 1998b; Ibid 1999b; Ibid 1999c.

Ninth Five-Year Plan

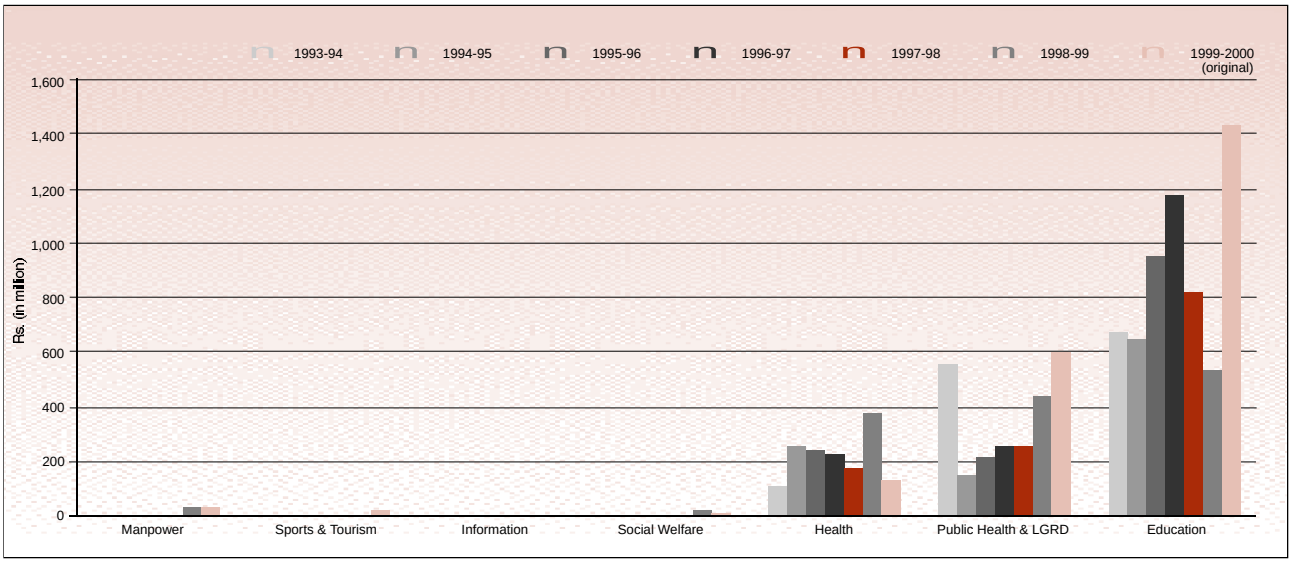
The total outlay of the Ninth Five-Year Plan for Balochistan is a little over Rs. 41 billion. In the sectoral allocations (Table 41), the priorities of the government are reflected: all commitments under the SAP would be fully honoured, and the infrastructure and productive sectors will also receive priority. The livestock and the mineral sectors will get relatively higher allocations. This is in line with the importance these sectors have for current and future development of Balochistan (P&DD 1998a).

Figure 23 Allocations for Natural Resource Sectors in the PSDP



Source: P&DD 1994; Ibid 1995; Ibid 1996; Ibid 1997c; Ibid 1998b; Ibid 1999b; Ibid 1999c.

Figure 24 Allocations for Social Sectors in the Public Sector Development Programme

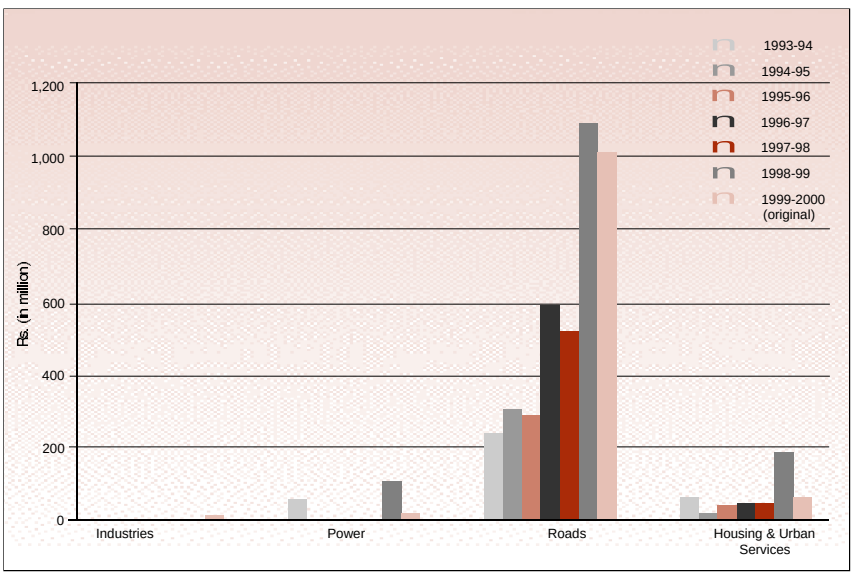


Source: P&DD 1994; Ibid 1995; Ibid 1996; Ibid 1997c; Ibid 1998b; Ibid 1999b; Ibid 1999c.

Annual Development Plans

The revised budget for 1998–99 was Rs. 19,714.5 million, of which only Rs. 4,224 million was for the PSDP. The FPA constituted 53.78% of the PSDP. Originally 289 development projects were identified for funding but only 54 could be completed due to severe financial constraints and intermittent bans on spending. 235 projects were thrown forward for inclusion in subsequent PSDPs.

Figure 25 Allocations for Economic and Infrastructure Sectors in the PSDP



Source: P&DD 1994; Ibid 1995; Ibid 1996; Ibid 1997c; Ibid 1998b; Ibid 1999b; Ibid 1999c.

The original budget for 1999–2000 is Rs. 22,847.5 million, out of which Rs. 5,552.86 million (24.3%) was allocated for the development programme; this includes an FPA of Rs. 3,531.23 million (63.6% of PSDP). The major amount of Rs. 17,294.64 million) is meant for non-development expenditure. Out of 235 projects accommodated for funding during the year only 76 were new. Amongst these, 31 projects costing Rs. 1,861.29 million, including a FPA of 1,471.74 million, are included. About 29.4% of the PSDP was allocated to the water sector. Allocation for education is about 25.8%, followed by roads at 18.3%. The remaining priority sectors for PSDPinclude public health; local government and rural development; agriculture; health, environment, housing and urban services; livestock; fisheries; and forest and wildlife. Major block allocations of Rs.

215 million, Rs. 265.2 million and Rs. 30 million were made for the Public Representatives Programme, Other Schemes and Special Programme respectively.

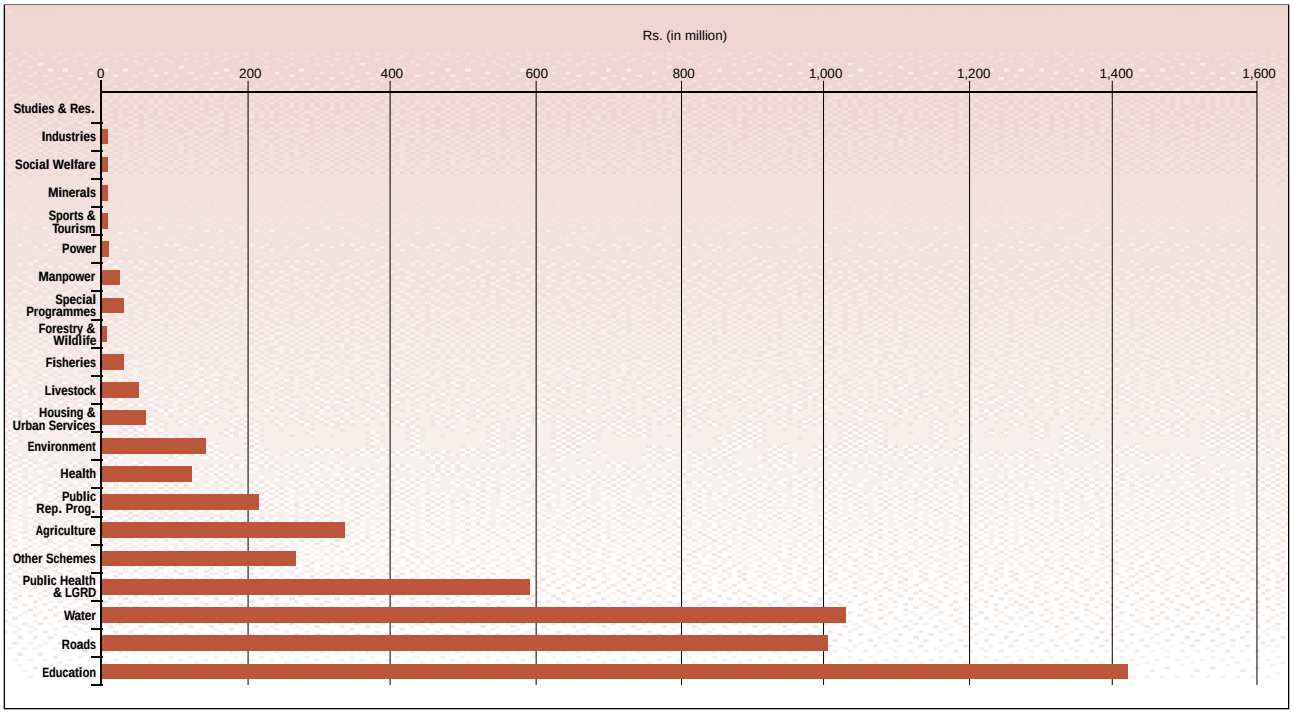
A list of projects in the various sectors that will help implement BCS recommendations is given in Appendix 5. It is an indicative list, and many other projects may be

Table 39 Sectoral Allocations in the Ninth Five-Year Plan

Sector	Allocation	On-going Schemes (in million rupees)	New Schemes
NON-SAP			
Agriculture	2,500	719	1,781
Livestock	1,000	142	858
Forestry	264	90	174
Fisheries	700	280	420
Food	22	0	22
Industries	226	20	206
Minerals	500	4	496
Manpower	100	33	67
Sports and tourism	100	1	99
Physical planning and housing	1,000	82	918
Roads	6,000	3,439	2,561
Water	4,500	3,137	1,363
Education	2,000	904	1,096
Health	1,000	521	479
Social welfare	50	2	48
Rural development	500	1	499
BDA	100	10	90
QDA	300	90	210
Environment	500	236	264
BWASA	500	103	397
Power	700	700	0
Special programme	201	0	201
Public feedback programme	1,343	0	1,343
Studies and research	80	0	80
Other schemes	2,000	0	2,000
Women specific	50	0	50
Total Non-SAP	26,236	10,514	15,722
SAP			
SAP (PHE)	4,128	1,505	2,623
SAP (education)	8,340	2,067	6,273
SAP (health)	2,700	626	2,074
SAP (miscellaneous)	23	0	23
Total SAP	15,191	4,198	10,993
Grand Total	41,427	14,712	26,715

Source: P&DD 1998a.

Figure 26 Sectoral Allocation in Public Sector Development Programme, 1999–2000



Source: P&DD 1999b.

added to it. The government will try to accommodate these and other BCS related projects in PSDP in the future years.

The major issues regarding PSDP include:

- donor-driven prioritization of investment portfolios;
- political motives behind regional and sectoral allocation of resources;
- over-dependence upon FPA and federal grants;
- limited provincial resources for development; and
- lack of a sustainable development vision.

Donor Funding

The BCS is a strategic plan for the conservation and sustainable management of natural resources and protection of the environment. Achieving these objectives will also help in sustainable development and poverty alleviation. The BCS is an agenda developed locally through the widest participatory planning process. It is expected that bilateral and multilateral donors will accept this as the basis for future investment.

The understanding of donor aid priorities, including their thematic, sectoral and geographical focus, their criteria and their procedures is always helpful in attracting donor funds. There is also a need to improve capacity both within and outside the government in designing appropriate projects for donor funding.

In order to learn about funding priorities, a questionnaire was sent to leading donor agencies. The feedback received from seven of them has been compiled in Table 40 and 41. It is easy to conclude from the answers that most bilateral donors have sectoral and thematic, as well as geographical focuses, but the level of funding, project objectives and implementation arrangements are decided on a project-to-project basis. A list of donor-funded projects are in Appendix 6.

Regarding the beneficiaries of assistance, all donors with the exception of the European Union (EU) and the Australian Assistance for International Development (AusAID) plan to assist poor and vulnerable groups (especially women and children). The EU focuses on rural population and AusAID intends to assist primary-school-age girls who are out of school.

The World Bank, Royal Netherlands Embassy (RNE) and United Nations Development Programme (UNDP) plan to work through a combination of government line departments and non-governmental organizations

(NGOs) or community-based organizations (CBOs), and in some cases, exclusively through NGOs/CBOs. The EU, DFID and AusAID would determine the funding channels and implementation arrangements on a project-by-project basis.

Development aid is shrinking, and access to donor funding is now firmly entrenched in the showing of impacts on target beneficiaries, using processes and ensuring accountability. The donors are becoming more and more stringent, rightly so, due to the accountability exercised by the taxpayers in their countries. Moreover, donors have improved their coordination and are adopting similar approaches and strategies for planning, implementation and monitoring. Now they not only wish to assess the priority of a project in the context of a programme, but are also concerned with capacities, sustainability after a project is completed, impact on beneficiaries, gender integration, proper use of funds and facilities, transparency, accountability, improved systems and procedures, and fulfilling government's commitments regarding counterpart funds, land and staff.

State-controlled and service-delivery-oriented development is no longer a candidate for donor funding.

Table 40 | Donors

	WB*	RNE	UNDP	DFID	EU	ADB	AusAID
FUNDING BY SECTOR							
Education	√	√		√	√	√	√
Health	√	√		√	√	√	
Environment/NRM	√	√	√		√		
Infrastructure	√					√	
Credit	√						
Institution building	√	√	√			√	
Poverty reduction	√			√		√	
Water	√			√		√	
Energy			√				
Governance	√		√				
Livestock					√		
Others							
TYPE OF DONOR SUPPORT							
Financial assistance/ project support	√	√	√	√	√	√	√
Training/ skill development	√	√	√	√	√	√	√
Equipment			√	√	√		
Networking			√	√			
Information	√		√				
Operational/ running costs				√		√	
URBAN/RURAL FOCUS							
Mainly rural		√	√				√
Mainly urban							
Rural/urban	√			√	√	√	

*WB: The World Bank
RNE: Royal Netherlands Embassy
UNDP: United Nations Development Programme
DFID: Department for International Development, UK
EU: European Union
ADB: Asian Development Bank
AusAID: Australian Assistance for International Development

Table 41 Funding Level in 1999–2000

Sector	WB	RNE	UNDP*	DFID**	EU***	ADB	AusAID
Infrastructure	5†					1.5	
Education	60-70						Aus$ 2.0 million
Rural development		3.25				0.12	
Inst. development		1.75					
Urban sanitation		1.20					
Reproductive health		2.25					
Biodiversity			1.50				
Climate change			0.33				
Environment			0.15			0.8	
Governance			0.30				

* Under GEF Small Grant Programme.
** Breakdown for planned allocation for Balochistan not available, but total annual funding by DFID is to the tune of £25–30 million.
*** Not specified.
† All figures in US$ million unless stated otherwise.

The public-sector organizations and NGOs that are taking concrete steps to ensure a wider participation of civil society institutions in development are likely to succeed in raising funds from donors for their programmes and projects. In addition, donors prefer to provide resources to initiatives that demonstrate a partnership between government and NGOs.

Good governance, human rights, nuclear non-proliferation, absence of state terrorism and control on abuse and trafficking of drugs are increasingly among the foremost criteria for development aid. Good governance includes civil services reform, decentralization, information sharing, transparency and accountability.

FOUR-PRONGED APPROACH

Releasing Resources Through Improvement in Efficiency and Effectiveness

Resource mobilization and use are closely related to the issues of governance and capacities that have been dealt with extensively in the previous chapters. However, this approach calls for developing a consensus on the reasons for the consistent failure of development projects in Balochistan to achieve their objectives. It should be followed by remedial planning, institutional measures, development of project-specific indicators of desired impacts, and institutionalizaton of an effective mechanism to monitor and evaluate impacts. Similarly, there is a need to reduce wastage of non-development funds by improving governance and efficiency and controlling the misuse of facilities.

Re-assessing and Re-orienting Existing Programmes and Projects

This is to ensure that programmes and projects are aligned to the goals and principles of the BCS. It will require an analysis of all current initiatives that are being implemented or have been approved for implementation. A committee with representatives of government organizations, NGOs and the private sector will be set up to evaluate the potential for impact, technical aspects, monitoring design, implementation methodology, institutional arrangements, status, linkages and monitoring the results of these initiatives.

If heavy investments are being made in additional infrastructure when the real issues are ineffective delivery, a re-profiling of the project is necessary to focus more on raising awareness and capacity-building. Similarly, heavy investments must not be made without assessing the efficiency of interventions. Transparency and the participation of stakeholders in planning, imple-

Jalal-ud-din Qureshi

Public-sector development plans such as those for delay action dams need to go through a public consultative process.

mentation and monitoring are the other elements that must be addressed.

Reviewing the Public-Sector Development Planning Process

This is to integrate the BCS goals, approaches, guidelines, programmes, interventions and recommendations into all Five-Year Plans, Annual Development Plans and Three-Year Rolling Plans. A three-year planning cycle will be instituted so that there is time to implement and evaluate before starting the next phase of projects.

Fortunately, the federal government is firming up its plan, through a wide consultative process, for devolution of power and decentralization of planning to district, tehsil, union council and village levels by devolving financial autonomy to district and local government institutions. The proposal regarding establishment and management of a District Development Fund (DDF) will also be considered as an integral part of the broader plan of devolution. The Fund will receive a share of development funds directly, to fund the projects identified, prioritized, planned, developed and approved for the district through a participatory and transparent process. The establishment of a joint government–non-governmental group to approve and oversee the implementation of projects to be funded by the DDF could further enhance the effectiveness of this mechanism.

Raising and Allocating Additional Funds

This relates to local resources and donor funding. The former will include funds to be made available by the federal, provincial and local governments, and investment to be made by the private sector and communities. The provincial government can raise additional funds by improving efficiency in the collection of revenues and consumer charges, minimizing pilferage and extending the taxation net to the non-formal economy in the province as well as to include agricultural property or income. Multilateral and bilateral donors have funded programmes and projects in the areas relevant to the BCS in the past, and the expectation is that they will be interested in funding in the future.

Fazal Dad Kakar

Potential funding windows such as the National Heritage Fund should be accessed.

Some of the existing and potential windows are discussed below.

Establishing and/or Using Funds

Accessing the NGO Fund

The NCS Unit in the Ministry of Environment, Local Government and Rural Development is managing the NGO Fund to support NGO actions in the 14 core programme areas of the National Conservation Strategy. NGOs can apply for funds on a prescribed proforma through the Environmental Protection Agency, Balochistan. Unfortunately, groups in Balochistan have not used this opportunity to its potential.

Accessing the National Heritage Fund

The Ministry of Culture, Sports and Tourism has established this fund, which can be accessed by relevant government organizations and NGOs. Again, this fund has not been accessed for Balochistan so far.

The Fund for Sustainable Development

The Fund for Sustainable Development (FSD) will be designed and set up as provided under the Pakistan Environmental Protection Act, to raise and provide resources to environmental and sustainable development projects by collecting pollution charges and levies for the use of natural resources, such as wildlife hunting. Sustainable hunting of economic wildlife species, especially prized species of markhor, urial, ibex and chinkara (only of populations that can withstand sustained hunting) can generate substantial revenues from foreign and local hunters. The government of Balochistan will put its share into the FSD. The fund could be partially ploughed back for development of the area in which the hunting is being carried out, and partially used for the management of wildlife resources elsewhere in the province. It needs to be appropriately designed and managed for conserving and sustainably using natural resources, generating employment opportunities for the local poor and

building awareness and ownership of common resources.

The project and activities relating to all BCS programmes would be eligible for receiving funds from the FSD. The key considerations in managing the fund should be objectivity, transparency and accountability.

A part of the pollution charge to be received from polluting industries for non-compliance with National Environmental Quality Standards will go into the FSD. It might preferably be used for raising awareness and building capacity of industrial management for cleaner technologies and the regeneration and rehabilitation of natural resources that are affected adversely by industries.

Communities would be motivated and mobilized through dialogue, partnership arrangements and incentives to pool their contributions for local initiatives and to develop, implement and monitor such initiatives.

The private sector in general and industry in particular are very important actors in development. Although industrial development is still in its nascent stages in Balochistan, and the potential for establishing big industries is limited, new small, medium-sized and cottage industries are likely to be established. The proactive planning is important to maximize the benefits and minimize the adverse impacts of such growth. The following measures will be taken to mobilize resources for improving the protection of the environment:

- An incentive-oriented tax base will be designed so that tax rebates and concessions are available to industries that are clean and/or are voluntarily contributing to the FSD for other sustainable development initiatives, irrespective of, or in addition to pollution charges. The credibility of the fund and level of contributions would increase if it is managed transparently and objectively. A local Steering Group that includes representatives of EPA, Industries, Trade, Minerals and Labour and Manpower Department, local industries, NGOs and other contributors will manage the fund. Another option is to give tax concessions to industries that will be using a certain percentage of their annual income towards sustainable development initiatives, as agreed upon between them and the representatives of local government and local communities in a joint forum.
- The partnership between the private sector and NGOs will be useful for specific initiatives that are agreed to between them. These initiatives could range from a mix of income generation schemes to the regeneration and sustainable use of natural resources, such as the propagation and marketing of medicinal plants, breeding and marketing of fish products and production and marketing of local arts and crafts.
- Balochistan's informal economy is larger than its formal economy, and all of it is outside the tax net. The process of bringing it into the tax net will start through a documentation survey for increasing federal, provincial and district revenues. Here again, an incentive-based taxation system needs to be designed.

A. L. Rao, IUCN

Documenting the informal economy is an economic necessity.

Broadening the Tax Base

This is an economic necessity. For too long, Pakistan and Balochistan have deferred a difficult decision that has had the single most negative impact on development. A documentation survey will start soon to come to a fair and transparent system of levying taxes on the province's rich people.

The long-term vision of Balochistan should be self-reliance, especially in an environment of donor funds drying up. Investing in creating an enabling environment for the private sector and civil society institutions is like-

Children at play.

ly to be more beneficial. The impacts of projects could be enhanced by decentralizing development planning and implementation and by creating transparent systems of monitoring and evaluation.

The government will allocate a specific amount of annual funds for BCS implementation, as is done for some of the other programmes ,such as SAP and the Poverty Alleviation Programme.

Donor Funding

Important donor funding windows that may be accessed for implementation of the BCS are discussed in this section.

The Global Environment Facility (GEF) funds initiatives relating to conserving biodiversity, combating climate change, protecting international waters and controlling depletion of the ozone layer. GEF has the following mechanisms:

- Small Grant Programme for NGOs. This is for small and short-term initiatives to be implemented by NGOs, generally in rural areas. The approval process is simple. The LIFE programme focuses on urban-related projects of NGOs. These grants are managed by UNDP through two separate Selection Committees of experts, which approve the NGO projects. The maximum size of a grant for a project is US$50,000. Currently, three initiatives are being funded in Balochistan: Biodiversity Conservation and Sustainable Use in Torghar (Qila Saifullah District); Conservation of the Black Bear; and Strengthening of an NGO (TARAQEE), for low-cost sanitation in the suburbs of Quetta.
- Medium-Size Grant (MSG). A 'fast track' approval procedure was introduced in 1998 for access to grants larger than US$50,000 and up to US$1 million. There is a simpler procedure for applying for grants up to US$750,000. The mechanism also assists in developing project proposals through PDF Block A up to US$25,000 and PDF Block B up to US$300,000. The criteria for approval of the grant include the global significance of intervention and relevance of the project to one or more of GEF's programme priority areas. NGOs, private-sector institutions and government organizations are eligible to apply for the grant. However, the GEF focal point in the Ministry of Environment, Local Government, and Rural Development must endorse the application. The government will help NGOs and others in identifying and developing proposals for an MSG and in the expeditious processing of requests by the GEF focal point for the submission to the implementation agency. The implementing agencies for this grant as well as large grant are UNDP, the World Bank and the UNEnvironment Programme.
- GEF Large Grant. This is generally meant for government organizations, but NGOs can also have access if the federal government's Economic Affairs Division endorses an application on the recommendation of the relevant provincial government and GEF focal point in the Ministry of Environment, Local Government and Rural Development.The procedure for accessing the grant is quite cumbersome.

The European Union is an important multilateral donor and its priorities increasingly are initiatives that are jointly implemented by the government and independent institutions in education, health and natural resource sectors, including the coastal zone and livestock. The government will seek EU assistance to develop an Integrated Coastal Zone Management Plan and for development interventions in livestock and rangelands sectors.

The Royal Netherlands Embassy has been a long-term partner in the development of Balochistan. Dutch-funded projects include Improving the Systems for Development Planning in Balochistan, the BCS, the Balochistan Community Irrigation and Agriculture Project, Primary Education Quality Improvement Project, Balochistan Rural Water and Sanitation, Quetta Water and Sanitation, the Water Research Bureau, Quetta Kachi Abadis Environmental Management Project, the Reproductive Health Project and Support to Strengthening Participatory Organization. The Dutch funding is also available to SAP and to the Quetta Healthy City Project through the World Bank and the World Health Organization respectively. The criteria for Dutch funding to Pakistan is linked to the state of poverty, governance and human rights. Pakistan is last on the list of 19 Dutch aid-recipient countries, but has been dropped recently. The RNE, having supported the formulation of the BCS, should have a major stake in its implementation.

UNDP has been actively supporting Balochistan's development needs. Currently, UNDP is supporting the Area Development Programme, Balochistan in eight upland districts, the Trial District Management Project in Loralai and Jhal Magsi Districts, and the Sustainable Development Networking Programme. UNDP is very active in sustainable development initiatives and should be interested in initiatives in the core programmes of the BCS.

The main interest of the Canadian International Development Agency (CIDA) in Pakistan is in environment, water and energy sectors. In Balochistan, CIDA's support has catalyzed action on controlling air pollution in Quetta. Currently, CIDA is supporting the installation of a compressed natural gas (CNG) supply station and the conversion of rickshaws to CNG in Quetta city. After focussing on the national level in the environment sector, CIDA now has as opportunity to assist at provincial level through supporting BCS implementation.

The German development agency, Deutsche Gesselschaft für Technische Zusammenarbeit (GTZ), which has helped in organizing and mobilizing local communities in the past, is no longer supporting the Balochistan Rural Support Programme. GTZ is, however, providing assistance for technical training in Balochistan.

Japan International Cooperation Agency (JICA) has been assisting the fishermen in coastal areas and has provided vehicles and equipment to the Quetta Municipal Corporation for solid waste disposal. JICA is also interested in supporting the construction of delay action dams to augment the supply of water to Quetta.

Asian Development Bank (ADB) has recently provided assistance in studying the various aspects of water supply and sanitation in Quetta and for developing an investment proposal. ADB has also assisted in the Pat Feeder Command Area Development Project and National Drainage Programme.

The BCS: benefitting the people.

The World Bank has funded the Balochistan Natural Resource Management Project, which has components relating to the institutional strengthening of the Planning and Development Department of the EPA, Balochistan, and of the Forest Department, as well as natural resource management. The Hingol National Park Project is to be funded by GEF through the Bank. National Drainage Programme and the Rural Water Supply Project are also being funded by the Bank.

All major bilateral donors, including CIDA, NORAD, RNE, JICA, DFID, GTZ and AusAID have windows for funding NGO projects.

Chapter 23

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Monitoring Implementation and Assessing Sustainability

Realizing the BCS goal will require continuous monitoring of the implementation progress of the strategy, as well as periodic assessment of the progress that Balochistan is making towards sustainable development.

Effective monitoring and assessment systems will need to be in place so that the province is able to gauge its own performance and progress regularly and make necessary adjustments to maximize benefits from the use of its scarce resources for the well-being of the people and ecosystems. It would require an overall monitoring and assessment framework, an institutional set-up and strengthened institutional capacities.

A MONITORING AND ASSESSMENT FRAMEWORK

As the government, private sector, local communities, non-governmental organizations (NGOs), academia and the media will be active partners in implementing the BCS, a flexible, participatory and simple monitoring and assessment framework will be adopted that will monitor, assess and provide feedback at various levels to enable the implementing agencies to take action, or correct their course. The salient features of the monitoring framework are:

- As a legal obligation, the province will monitor annually the implementation of the BCS, including making appropriate institutional arrangements, and will assess its progress towards sustainability every three to five years.
- The BCS monitoring reports and sustainability assessment reports will be widely circulated and used for course correction.
- A pre-tested assessment model will be used to assess progress towards sustainability.
- The objectives of the BCS will be reviewed and refined if need be, by following the procedural steps suggested by the model.
- An information management system will be developed, keeping in view the requirements of information to verify indicators for assessing progress towards BCS implementation, as well as human and ecosystem well-being.
- Decentralization of decision-making to district and local levels and increased participation of civil society, including local communities, civil society institutions and the media, will be an important component for monitoring and assessment.

Jalal-ud-din Qureshi

Monitoring and evaluation at all level is important.

- Progress to address gender concerns, especially the role of women in realizing the goal of sustainable development in Balochistan, will be monitored and assessed carefully.
- Timely feedback at each level will be ensured so that corrective measures and actions are taken by those responsible.
- Interest groups and roundtables set up under the BCS will be encouraged and supported to assist in monitoring BCS implementation in the relevant sectors and thematic areas.
- Participation of all stakeholders in monitoring and assessment will be encouraged.

MONITORING BCS IMPLEMENTATION

The Balochistan Conservation Strategy, when implemented, will be the main instrument for the province to attain sustainability, and there will be a need to effectively monitor and review progress and performance in implementing the BCS. This will require, among other items, a regular monitoring and review of implementation mechanisms and processes, including institutional arrangements, reform and strengthening; policy and legal changes; use of economic tools; environmental communication and education; and resource allocation and use. Therefore, in view of the BCS objectives, the implementation framework will include an overall monitoring, as well as regular monitoring of sector-specific results (outputs, outcomes and impacts) and indicators.

Defining Results and Indicators

Alongside the Five-Year Plans, the results and indicators for BCS implementation will be defined and monitored annually and during the five-year plan exercise at the provincial level. It will also be useful if this exercise is undertaken at district and local levels, as well as for each stakeholder institution.

A participatory approach will be used to define the BCS results and indicators. All stakeholders will be involved to the extent possible. The mechanism of interest groups and roundtables will be used in order to do this exercise in an organized way. Each institution at the provincial level, and if possible, at district and local levels, will define its own results and indicators.

Operationalizing the BCS Monitoring System

The Government

The provincial Planning and Development (P&D) Department will have overall responsibility for monitoring implementing the BCS, and setting up and operationalizing monitoring and evaluation (M&E) systems at the provincial level and in key relevant government agencies and other stakeholders. The P&D Department will provide guidance and render support to stakeholders in defining results, milestones and indicators, and in building capacity in monitoring and assessment. The structure in the P&D Department that deals with M&E and the environment, as well as the Bureau of Statistics (BoS), will have a key role in monitoring BCS implementation and assessing sustainability. This structure will have adequate resources and its capacities will be enhanced to enable it to play its role effectively.

Each government institution playing an active role in BCS implementation, monitoring and assessment of sustainability will have in-house capacity built in gradually to monitor its performance and progress, and to provide feedback to its senior management, the P&D Department, respective interest groups or roundtables and other stakeholders.

The Private Sector and Civil Society Institutions

As in the public sector, private-sector institutions and entities and active NGOs will define results, milestones and indicators that they want to achieve in specific timeframes. Each of them will create an internal M&E capacity, will monitor performance and progress regularly and provide feedback to its senior management, the P&D Department, interest groups or roundtables and other stakeholders.

Nomination of one NGO, such as IUCN, for overall coordination of and support to civil society institutions will be very useful. Its mandate may also include the capacity-building of NGOs, community-based organizations and so on, in order to coordinate monitoring and assessment. The lead NGO and the P&D Department will work closely and support each other regularly.

Review of the BCS

A periodic review of BCS implementation will be important to assess the extent to which:

- the objectives, results, milestones and indicators of the BCS have been achieved;
- the financial and human resources, and policy and legal support required to implement the BCS have been provided;
- the desired institutional arrangements have been made, and institutional reform and strengthening have been undertaken;
- appropriate economic tools have been used;
- environmental awareness and commitment have increased and environmental education has improved; and
- the learning and experiences of BCS implementation have been used to retrofit BCS implementation.

The objectives and priorities set out in the BCS document need to be reviewed every three to five years, especially in connection with the five-year planning exercise. The changes in the political, social, economic and environmental scenario in Balochistan and external factors will be kept in view. The BCS review will help the province to revalidate or adapt the BCS direction, priorities and implementation. It will be useful if the first review of the BCS is linked with the review of the Ninth Five-Year Plan of Balochistan, and if an external independent assessment is supported by a donor agency.

MEASURING PROGRESS

In order to assess whether by implementing the BCS, the province is making progress toward the goal of sustainable development, it will be important to periodically assess the status of people and ecosystems and how they are affecting each other. A regular assessment will enable the stakeholders, including the government of Balochistan, to know whether efforts are being channelled in the right direction and if the desired results are being achieved.

Approach to Sustainability

IUCN, in collaboration with the International Development Research Centre of Canada, has developed a user-friendly, participatory, systematic approach to assess and measure sustainability. The method, based on IUCN's work in Colombia, India and Zimbabwe, has evolved over the years and has been tested in the field by teams working in Asia, Africa and Latin America.

The Well-being Assessment Method is based on measuring the sustainable well-being of people and ecosystems, giving equal importance to both (Appendix 7). If either of the two is unsatisfactory or getting worse, then both the system's and the society's well-being will be unsustainable. Sustainable development therefore, entails improving and maintaining the well-being of both.

If people continue to live in poverty, facing malnutrition, oppression, powerlessness or violence, the good health of ecosystems, if it exists at all, is no compensation, and well-being will be unsustainable. Similarly, ecosystems support life and are vital to attain desirable standards of life. In the final analysis, the usefulness of trade-offs between the needs of people and of ecosystems would only be short-lived. A sustainable society needs to achieve both simultaneously.

Setting Up an Assessment System

Balochistan will use the Well-being Assessment Method to look at its people and ecosystems periodically. This will be a six-stage process.

1. Setting up an institutional home for assessing Balochistan's progress towards sustainable development.
2. Establishing a system of information gathering and reporting. The following cycles of assessment will require validation of information and data to be collected, to gauge the changes in human and ecosystem well-being. Keeping in view information gaps and quality issues, partners and institutions will be identified, who will provide quality information and data regularly.
3. Capacity-building of key stakeholders using the Well-being Assessment Method. IUCN's International System Assessment Team can help in capacity-building and setting up an assessment system for the province.
4. Undertaking an assessment of the well- being of people and ecosystems of the province at the start of BCS implementation to define the benchmark, and subsequently every three to five years in connection with the exercise of five-year plans. All important stakeholders, including government agencies, private sector, communities, civil society institutions, academia and the media will be involved. The assessment will require:
   - identification of specific stakeholders to be involved in the assessment process;
   - collection of necessary information and data required for the assessment;
   - organization of an assessment exercise;
   - collection of additional information and data relating to the results (outputs, outcomes and impacts) and indicators to be identified in the assessment exercise; and
   - completion of the assessment exercise and communication of the results to all stakeholders, including the BCS Steering Committee, policy-makers, decision-makers, NGOs, line departments, the private sector, academia and the media, as well as publication of the report for wider circulation.
5. Exploring the possibility of using the method at the district and local levels, so that the issues affecting sustainable development could be identified and addressed at those levels as a priority.
6. Interacting regularly with the government of NWFP, which is pioneering in setting up the system of assessing progress towards sustainability, in order to take advantage of the learning and experiences of that province.

GOVERNANCE

The Steering Committee overseeing the implementation of the BCS will oversee BCS monitoring and assessment of sustainability and will provide high-level guidance and advice. The Steering Committee will decide on the specific time-frame of the BCS review, as well as assessment of Balochistan's progress towards sustainable development. The Steering Committee will consist of opinion leaders from civil society, including the representatives of political parties, interest groups or roundtables and NGOs, senior bureaucracy, the private sector, academia and the media. It will be chaired by the Chief Secretary. The Steering Committee will meet at least twice a year to assess progress and provide guidance, advice and support. The group will establish a Sub-committee in the P&D Department to take responsibility of these functions. The Sub-committee will have representation from and will be supported by the institutional structure dealing with M&E, environment and BoS.

The Steering Committee and its sub-committee will have the legal cover and mandate to assess Balochistan's progress towards sustainable development and to monitor and review BCS implementation. Every six months, at the least, the sub-committee will bring to the notice of the Steering Committee the main findings, observations and suggestions regarding BCS monitoring, to enable the

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The future of Balochistan lies in its people.

latter to catalyze action and provide support and direction as needed.

Similarly, the findings and recommendations of BCS reviews and sustainability assessment exercises will be presented to the Committee for consideration and further action.

The Sub-committee will be mandated to:

- interact with the relevant interest groups and round-tables and involve them in the BCS monitoring and sustainability assessment;
- identify stakeholders interested in BCS implementation and in monitoring and assessing progress towards sustainability, and encourage their participation;
- build the monitoring and assessment capacities of key stakeholder institutions;
- set up a system, and procedures to collect and analyze information and data required at various levels for monitoring and assessment systems;
- monitor BCS implementation annually and assess Balochistan's progress towards sustainability every three to five years, and publish reports for presentation to the Provincial Assembly and BCS Steering Committee, as well as for wider circulation to policy-makers, decision-makers, public representatives, donors, government departments, NGOs, academia and the media;
- define BCS results, milestones and indicators for specific time-frames at the provincial level and provide guidance and support to BCS implementing and monitoring agencies at the institutional, district and local levels;
- develop and institutionalize monitoring and assessment systems for its own need and for the use of all other stakeholders;
- enhance partners' capacity in self-monitoring and assessment, to enable them to monitor their own progress and performance, and share the same with their constituencies;
- coordinate and interact with the relevant BCS stakeholders for mutual learning, experience sharing, catalyzing, supporting and monitoring;
- seek regular feedback/monitoring report from the P&D Department's sections, line departments and all other BCS implementing agencies;
- provide feedback to the BCS Steering Committee for course correction, advice and action;
- publish yearly BCS monitoring reports for wide circulation;
- organize mid-term review of the BCS, submit its findings and recommendations to the Steering Committee and share these with all other stakeholders;
- use the report to refine the objectives and action plans of the BCS and to develop policies, five-year plans, perspective plans, three-year rolling and annual development plans and sectoral programmes; and
- explore possibility of monitoring BCS implementation and assessing progress toward sustainability at district and local levels.

Appendices

Appendix 1 Premises, Objectives and Operating Principles of the NCS

Premises

- **Unsustainable use and growth is a function of increases in population and per capita consumption.**
- **Cross-sectoral analysis, consisting of ecosystem evaluation and demand assessment, can find a place for every economic need and an economic use for every place.**
- **Abody of multi-sectoral policies and programmes can steer a country towards sustainability more effectively than the current collection of single-sector policies do.**

Aims

- To introduce fundamental changes in work and in lifestyles and habits in order to protect the interests of present as well as future Pakistanis.
- To facilitate the integration of environmental considerations into the millions of daily economic, social and physical decisions of individuals, households, communities, corporations and government.
- To facilitate the incorporation of environmental policy considerations into government's economic, social, and physical development processes.
- To facilitate the environmental early warning and awareness building roles of NGOs and to obtain early proclamations in favour of environmental objectives, and for NGOs to promote the formulation of, and adherence to, environmental standards.
- To harness the energy of the private corporate sector in support of environmentally sensitive processes and products.
- To revitalize community-based management for the sustainable use of common resources and infrastructure.

Objectives

- **Conservation of natural resources:**
  - **to maintain essential ecological processes;**
  - **to preserve the diversity of natural resources; and**
  - **to restore degraded natural resources cost-effectively.**
- **Sustainable development:**
  - **to ensure the sustainable use of natural resources;**
  - **to extract exhaustible resources at rates that do not exceed the creation of substitute capital resources; and**
  - **to ensure balanced and diversified development that maintains, if it does not increase, the sum of options available to future generations.**
- **Improved efficiency in the use and management of resources:**
  - **to improve the efficiencies with which natural resources are used and managed, raising their yields towards their sustainable potential;**
  - **to improve the efficiencies with which associated resources and human-derived capital (e.g., community infrastructure) are used and managed;**
  - **to give priority to the conservation and improvement of best soils and sweet water; and**
  - **to give priority to preventing deterioration of fragile ecosystems with large downstream effects.**

Operating Principles

- Greater public participation in development and environmental management:
  - achieve better public awareness of environmental concerns;
  - encourage public participation and commitment to the amelioration of environmental problems;
  - create channels for communication of NGO concerns to government and systems for adequate response; and
  - promote permanence in public participation by enabling, facilitating, and strengthening grassroots institutions and participatory mechanisms.
- Amerger of environment and economics in decision-making:
  - allocate environmental responsibility to economic decision-makers; and
  - install environmental monitoring systems.
- Durable improvements in the quality of life:
  - balance natural resources and population numbers;
  - support durable improvement in the quality of human settlements;
  - control and prevent pollution; and
  - give preference to biological solutions.

Appendix 2 Background Paper Authors

1. Water	Dr. Abdul Majeed Mr. Jalal-ud-Din Qureshi
2. Agriculture	Mr. Arif Masood Ansari Dr. Muhammad Ismail Mr. Mushtaq Ahmed Dr. Muhammad Saeed
3. Livestock and Rangelands	Dr. Atiq-ur-Rehman Dr. Faqir Muhammad
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6. Industry	Dr. Mirza Arshad Ali Beg
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13. Cultural Heritage	Dr. Fazal Dad Kakar
14. Environmental Health	Dr. A. Q. Sikander Riaz
15. Governance	Mr. Iqbal A. Kidwai

Land

- The Land Acquisition Act, 1894.
- Government Grants Act (No. XV), 1895.
- Soil Reclamation Act, (No. XXI), 1952. (Amended by Ordinance, 1964, 1965, and amended and extended by Ordinance (No. V), 1964).
- West Pakistan Land Reform Regulation, 1959, M.L.R. No. 64.
- West Pakistan Land Reform Rules, 1959.
- Consolidation of Holdings Ordinance (No. VI), 1960.
- West Pakistan Land Reforms (Ejectment of Tenants and to Provide for Buildings) Rules, 1961.
- West Pakistan Hill Tract Improvement Ordinance, 1961.
- Pat Feeder Canal (Control and Prevention of Alienation of Land) Ordinance (No. IX), 1967.
- Land Revenue Act, 1967.
- West Pakistan Land Revenue (Conferment of Rights of Ownership) Rules, 1969.
- Land Reforms (Amendment) Acts (1973, 1974, 1975).

Forest and Vegetation

- Cattle Tress Pass Act, 1871.
- Balochistan Forest Regulation, 1890.
- Forest Act, (No. XVI) 1927. (Several Notifications regarding protection, regulation of exploitation and designation of protected forests).
- Forest Act, 1927 (Application to districts of Kalat, Mekran and Kharan).
- The West Pakistan Goats (Restriction) Ordinance (XLII), 1959 and Rules, 1961.
- Balochistan Forest Regulation (Amendment) Act, 1974.
- The Firewood and Charcoal (Restriction) Act, 1974.
- Cutting of Trees (Prohibition Act), 1992.

Wildlife and Protected Areas

- Prevention of Cruelty to Animals Act, 1890.
- Balochistan Wildlife Protection Act (No. XIX), 1974 and Rules.
- Balochistan Wildlife Protection Ordinance, 1977.
- Pakistan Animal Quarantine Ordinance, 1979.
- Balochistan Wildlife Protection (Amendment) Ordinance, 1980.

Water

- The Canal and Drainage Act (No. VIII) 1873 and (Amendment) Acts (1952, 1965, 1968, 1970).
- The Inter-State Water Dispute Act, (No. 33) 1956.
- The West Pakistan Water and Power Development Authority Act, 1958. (Similar Ordinance and Amendment Ordinances, 1958, 1964, 1967).
- Determination of Land Revenue and Water Rate Ordinance, (No. IV), 1959 (amended in 1961).
- Notification (No. 5174-68/155-CRI) National Calamities (Prevention and Relief) Rules, 1969. Extensive provisions especially in respect of flood control.
- Balochistan Canal and Drainage Ordinance, 1980.
- Balochistan Water Users Association Ordinance, 1981.
- Pakistan Environmental Protection Act, 1997.
- The Balochistan Irrigation and Drainage Authority Act, 1997.

Fisheries and Coastal

- West Pakistan Fisheries Ordinance, 1961 and Rules 1964.
- Pakistan Coast Guard Ordinance, 1973.
- Exclusive Fishery Zone (Regulation of Fishing) Act, 1975 (amended in 1983).
- Territorial Waters and Maritime Zones Act, 1976.
- Maritime Security Act, 1984.
- Balochistan Sea Fisheries (Amendment) Act, 1994.
- Pakistan Environmental Protection Act, 1997.
- The Balochistan Coastal Development Authority Act, 1998.

Pollution Control

- Pakistan Penal Code, 1860 (Section 268 on 'public nuisance').
- Criminal Procedure Code, 1898 (Section 133).
- Factories Act, 1934 (as amended up to Dec. 1975).
- Motor Vehicle Act, 1939 and Rules, 1940.
- West Pakistan Hazardous Occupations Rules, 1963.
- West Pakistan Motor Vehicle Ordinance, 1966.
- Agricultural Pesticide Ordinance, 1971.
- The West Pakistan Regulation and Control of Loudspeakers and Sound Amplifiers Ordinance (III), 1985.
- Pakistan Environmental Protection Act, 1997.

Agriculture

- West Pakistan Agriculture Pest Control Ordinance, 1959.
- The Agriculture Pesticides Ordinance, 1971.
- The Balochistan Agricultural Produce Market Act, 1991.
- The Balochistan Agricultural Produce Market Rules, 1995.
- The Balochistan Agriculture Income Tax Act, 1996.
- Seed Act, 1976.

Livestock

- Cattle Tress Pass Act, 1871.
- West Pakistan Animal Slaughter Act, 1953.
- The West Pakistan Goats (Restriction) Ordinance, 1959 and Rules 1961.

Industry

- Boiler Act, 1923.
- Factories Act, 1934.
- Development of Industries (Federal Control Act), 1949, 1972, 1979.
- Pakistan Public Safety Ordinance, 1952.
- Balochistan Safety Act.
- West Pakistan Standing Order, 1968.
- Industrial Relations Ordinance, 1969.
- Pakistan Environmental Protection Act, 1997.

Mining

- West Pakistan Regulation of Mines and Mineral Development Act, 1958.
- West Pakistan Regulation of Mines and Mineral Development Act, (Repeal) Ordinance, 1969.
- Balochistan Mining Concession Rules, 1970.
- Balochistan Wildlife Protection Act, 1974.
- Balochistan Marble and Coal Minerals Ordinance, 1978.
- Pakistan Environmental Protection Act, 1997.

Energy

- The Electricity Act (IX), 1910.
- Marketing of Petroleum Products (Federal Control Act), 1974.
- Pakistan Atomic Energy Ordinance, 1975.
- Pakistan Environmental Protection Act, 1997

Urban Environment

- Balochistan Water and Sanitation Authority Ordinance, 1988, 1989.
- Pakistan Environmental Protection Act, 1997.

Cultural Heritage

- Pakistan Antiquities Act, 1975 and Rules.

Local Government

- Local Government Ordinance, 1980.

Health

- Epidemic Disease Act, 1879, 1958.
- Vaccination Act, 1880.
- Essential Commodities Act, 1957.
- West Pakistan Pure Food Ordinance, 1960.

Information

- Telecommunication Ordinance, 1995.

Development

- Ziarat Valley Development Ordinance, 1991.

Federal Institutions

- Legislature – Parliament (National Assembly and Senate) and its committees e.g. Public Accounts Committee, Members Privileges Committee, and the various subject committees.
- Federal Cabinet, ministries, divisions within ministries, attached departments, and subordinate offices.
- Commissions e.g. Public Service Commission, Agriculture Commission (defunct), Agricultural Prices Commission, Privatisation Commission, and Land Reform Commission.
- Supreme Court, Shariat Court, tribunals, special courts.
- Planning Commission, Economic Co-ordination Committee, Executive Committee of the National Economic Council, Central Development Working Party, and Project Development Working Party in each of the ministries.
- Council of Common Interests, National Financial Award, Inter-Provincial Co-ordination Committee, Pakistan Environmental Protection Council, Social Welfare Council, Central Zakat Council, and Council of Islamic Ideology.
- Auditor General of Pakistan, Accountant General of Pakistan, Military Comptroller of Audit and Accounts.
- Autonomous and semi-autonomous corporations, e.g., Pakistan Mineral Development Corporation, Pakistan Industrial Development Corporation; Pakistan Tourism Development Corporation, Pakistan Television Corporation, Pakistan International Airlines Corporation, Utility Stores Corporation.
- Authorities, e.g., National Highway Authority, Corporate Law Authority, Capital Development Authority.
- Military (Army, Navy, Air Force), Para-Military Forces, e.g., Frontier Constabulary, Coast Guards, Defence College, and military colleges and schools.
- National Administrative Staff College and National Institute of Public Administration.
- Pakistan Meteorological Department, Geological Survey of Pakistan, Pakistan Agricultural Research Council, Arid Zone Research Centre, Pakistan Council of Research in Water Resources, Pakistan Council of Scientific and Industrial Research.
- Ehtesab Bureau, Prime Minister's Inspection Team, Federal Investigation Agency.
- 2010 Programme (including Good Governance Programme, Poverty Alleviation Programme, and Champions of Reform Programme) – defunct.
- Federal Bureau of Statistics and Export Promotion Bureau.
- Central Board of Revenue and its departments for taxation and collection of central revenues.
- State Bank of Pakistan and development financial institutions, e.g., scheduled banks, Agricultural Development Bank of Pakistan, Industrial Development Bank of Pakistan, Federal Bank of Co-operatives, Pakistan Industrial Credit and Investment Corporation (PICIC), Small and Medium Enterprise Development Authority (SMEDA), and Regional Development Finance Corporation (RDFC).
- Commercial organizations, e.g., Water and Power Development Authority, Sui Southern Gas Company, Sui Northern Gas Company, Pakistan Telecommunication Corporation Limited, Pakistan Railways, Pakistan Post Office.

Provincial Institutions

- Planning and Development Department, Divisional Development Officers, its sections, field agencies (e.g. Balochistan Development Authority), programmes (e.g. Area Development Programme Balochistan, Social Action Programme and Poverty Alleviation Programme), and projects (e.g. Balochistan Trial District Management Project).

- Some of the line departments and their field agencies have planning cells or directorates, e.g., Agriculture Planning Directorate.
- Irrigation and Power Department, its field agencies (including Irrigation Department and Water Research Bureau) and programmes or projects, e.g., National Drainage Programme, and Balochistan Community Irrigation and Agriculture Project.
- Environment, Wildlife, Livestock, Forests and Tourism Department, its field agencies including Forest Department, Environmental Protection Agency and the Livestock Department.
- Agriculture, Cooperative, Food and Fisheries Department and field agencies (e.g., in agriculture sector there are wings for extension, research, education, engineering, and horticulture), Agriculture Research Institute, Deciduous Fruit Development Centre, Agriculture College. Others include Coastal Development Authority (dormant), Agriculture and Fisheries Directorates.
- Public Health Engineering Department and its field agency.
- Health Department, its Directorate General, Bolan Medical College, Institute of Public Health, hospitals, rural health centres, civil dispensaries, and Basic Health Units.
- Education, Culture, Sports and Youth Affairs Department, Curriculum Bureau, directorates (e.g. Directorate of Archaeological Museum) and projects including the education component of the Social Action Programme.
- Industry, Trade, Minerals and Labour and Manpower Department and its Directorates of Industries, Mineral Development, technical training, and Lasbela Industrial Estate Development Authority.
- Population Planning and Social Welfare Department, its directorates and committees. The department is responsible for supporting civil society organizations, managing gender and child labour issues besides population planning, social security and other social issues.
- Services and General Administration and Information Department, its Directorate of Public Relations.
- Law Department.
- Finance Department.
- Home and Tribal Affairs Department with responsibilities of maintaining and overseeing peace, human rights, and travel of foreigners in Balochistan.
- Rural Development Academy.
- Board of Revenue – custodian of state-owned land and of land rights.
- Commissions e.g., Public Service Commission.
- Provincial Chief Executive's Inspection Team.
- Haj and Auqaf, Zakat, Library and Archives Department.
- University of Balochistan, Balochistan University of Engineering & Technology, professional colleges, e.g. Bolan Medical Collage, Balochistan Agriculture College, other colleges, technical training centres and schools.

Planning and Development

- BCS Implementation Support Project.
- Developing provincial sectoral policies and improving environmental legislation.
- Continuous review of all policies, programmes and projects for incorporating poverty alleviation, equity, gender and environment.
- Setting up a Land Use Planning Directorate in P&D Department, land use planning and development planning control in Balochistan.
- Strengthening applied research (improving focus of and co-ordination in research , and funding of priority research).
- Capacity building and institutional development of P&D Department and some key organisations.
- Supporting institutional reform and strengthening in select natural resource sectors (Forests and Biodiversity; Livestock and Rangelands; Agriculture; Coastal Fisheries and Development; and Water).
- Planning preventive mechanisms for avoiding disasters and emergencies, and developing protocols for managing them in case of occurrence: such as drought, earthquake; bomb blast; industrial accident or accident in transporting, storing, and using toxic substances and inflammable materials; poisoning of water source; shortage of food; strikes of sweeping and cleaning personnel; oil slick in coastal waters; forest fire; choking of sewer and storm water drains; and nuclear radiation.
- Developing electronic atlas of Balochistan.

Poverty Alleviation

- Medium and long-term planning and implementation for drought management.
- Poverty alleviation through good governance, sustainable development and primary environmental care in three pilot districts of Balochistan.
- Pilot projects for organisation and empowerment of poor and marginalized groups, supporting them in income generation and equitable use of natural resources.
- Water development, irrigation efficiency, watershed management, livestock and range management, health and education as listed under the relevant sectors.

Forests and Biodiversity

- Implementation of the management plan of Hazarganji Chiltan National Park.
- Planning and management of Dureji Game Reserve.
- Recovery and conservation of threatened species of wild animals including Balochistan black bear, straight-horned markhor, Sindh ibex, chinkara, marsh crocodile, houbara bustard, falcons, goitored gazelle.
- Designation, planning and management of Zangi Nawar as a 'Wetland of International Importance'.
- Conservation of chilghoza and blue pine forests in Zhob District.
- Planning, management and nomination of juniper forests as a 'World Heritage Site'.
- Setting up and managing Protected Areas in Balochistan.
- Creating models of collaborative management of state-owned forests and protected areas and replicating Torghar model of community-based management of wildlife.
- Management of watersheds and active water recharge zones.
- Management of watershed of all existing and potential dams (delay action, storage).
- Management of watersheds of all settlements.
- Non timber forest products project.
- Restoration of mangroves in Miani Hor, Kalmat Bay and Gawatar Bay.

- Designation, planning and management of Hab Dam, Miani Hor, Astola Island, and marine turtle nesting beaches at Ormara, Pishukan and Jiwani as Ramsar sites.
- Planning and management of other key protected areas in Balochistan including Hingol National Park, Raskoh and Takatu.
- Sand dune stabilisation to safeguard settlements and other infrastructure in Gwadar and Kharan districts.
- Social and farm forestry in uplands, Lasbela District and Nasirabad Division.
- Supporting farmers in raising forest nurseries.
- External management and programme review of Forest Department.
- Promoting sericulture in upland and canal irrigated districts for poverty alleviation.

Environmental Protection

- Enhancing capacity of EPA Balochistan.
- Raising environmental awareness of government agencies, media, educational institutions, civil society organisations and the private sector.
- Building capacity of the private and public sectors in NEQS, EIA, ISO 14000.
- Controlling air and noise pollution in Quetta and other urban areas.
- Monitoring and controlling air emissions, effluents and solid wastes of industries in Hab, Windar, Gadani and Quetta.
- Institutionalising environmental audit of industries.
- Compliance of NEQS by industries and local government institutions.
- Technical support to EPA Balochistan in setting up and using the laboratory.
- Safe incineration of hospital waste.
- Use of CNG and lead-free fuel and tuning of vehicles.

Local Government and Rural Development

- Raising environmental awareness.
- Pro-active planning and up-gradation of existing and new urban areas in Balochistan.
- Treatment and re-use of sewerage water in Quetta and other towns.
- Solid waste disposal and landfill sites for Quetta and other towns.
- Updating and implementing Master Plan of Quetta for making it a healthy and sustainable city.
- Empowering and strengthening local government institutions.
- Improving co-ordination, information and resources sharing and revenue generation for managing Quetta.
- Village development planning and implementation.
- Rural water supply and sanitation.
- Rural roads; basic health units; primary and technical education; veterinary and breed improvement services; one window comprehensive extension and supply services; micro credit; skill development.

Water

- Raising awareness of water issues.
- A study on efficacy of existing delay action dams aiming at developing an appropriate site criteria, design options, essentials and monitoring mechanism.
- Encouraging harvesting of runoff for sailaba and water conservation for khushkaba cultivation.
- Treating and recycling sewage and drain water, especially in Quetta valley.

- Integrated groundwater recharge and sustainable use demonstration projects.
- Setting up a sovereign Water Board (initially for Pishin Lora Basin) for planning, promoting, supporting, and enforcing efficient use of water in Balochistan.
- Building capacity for environmental impact assessment of water related projects.
- Increasing irrigation efficiency of ground and canal water.
- Rural water supply projects.
- Arranging additional water supplies for Quetta from outside the valley.
- Installing small to medium size desalination plants in coastal towns.

Health

- Environmental health education in Balochistan.
- Safe disposal of hospital waste.
- Preventive health-care.
- Establishing/strengthening Environment Health Section in the Institute of Public Health.

Water and Sanitation

- Proper disposal and treatment of domestic sewerage and hospital and industrial effluents of Quetta and controlling pollution of groundwater in Quetta.
- Planning and managing water supply and sanitation for Quetta.
- Rural water supply and sanitation.

Social Welfare

- Strengthening the Social Welfare Wing of the Population Planning and Social Welfare Department for promoting the role of civil society institutions by supporting consultative mechanisms such as roundtables, citizens' fora, and the proposed district environment and development committees.
- Community environmental awareness programme.
- Strengthening and networking non-governmental and community-based organisations.

Population Planning

- Female literacy and empowerment.
- Raising awareness through ulema, tribal elders and TBAs and improving family planning services.
- Containing Quetta through development planning control and proactively planning and developing another Quetta-like city as well as upgrading existing towns in Balochistan.

Education

- Training of trainers in environmental education.
- Orientation of teachers on environment.
- Infusing and instituting environment in elementary, higher, technical and professional education.
- Improving quality of education and making it needs-based.

- Seasonal (during winter) educational facilities for nomadic/transhumant population in Kachhi plains.
- Improving and expanding technical training and professional education.

Fisheries and Coastal Development

Short Term

- Preparation of an Integrated Coastal Zone Management Plan. This should consider comprehensive/environment-friendly development.
- Feasibility studies for all potential developments along the coast including initial environmental examination/ environmental impact assessment (EIA).
- Establishing and managing protected areas along the coast through community participation.
  - Mangroves along the coast – Miani Hor, Kalmat Bay Gawatar Bay.
  - Marine turtle nesting beaches – Astola Island, Ormara, Pishukan, Jiwani; and
  - Estuaries – Shadi Kaur, Dasht river.
- Promoting environment-friendly ecotourism.
- Environmental awareness and education targeting government organisations, the private sector, and communities.
- Developing and implementing environment-friendly master plans of coastal towns (Gadani, Damb, Ormara, Pasni, Gwadar, and Jiwani).
- Training of technicians and fisherfolk in the various aspects of sustainable fisheries.
- Direct export of fish from Pasni and Gwadar.
- Improving water and sanitation, education, and health coverage.
- Income generation opportunities for coastal communities through alternative sources of income.
- Coastal ferry service.
- Construction of coastal highway, preceded by appropriate EIA and incorporation of the recommendations in project design and implementation.

Long Term

- Establishing sustainable towns along the coastal highway, avoiding ribbon growth.
- Desalination plants for supply of drinking water.
- Establishing industrial estates along the coast for small to medium size industries.
- Construction of a motorway to link the coastal areas with other parts of Pakistan, and Iran, Afghanistan and Central Asian Republics.

Agriculture

- Developing and promoting cost-effective and feasible practices for efficiency in irrigation by groundwater and canal water.
- Promoting rational and safe use of agricultural chemicals and arranging safe disposal of old pesticides.
- Rehabilitating waterlogged and saline soils.
- Strengthening of agricultural extension services and organising these through multi-disciplinary teams.
- Sailaba agriculture development.
- Strengthening of Balochistan Agricultural College for needs-based and quality education.
- Strengthening of women-in-development support component in the agriculture sector.
- Strengthening of agricultural research and information management.
- Improving marketing of agricultural produces.

Industry, Mining and Energy

- Enhancing capacity of relevant government organisations and the private sector in PEPA, 1997, NEQS, EIA, workers' safety, occupational health, ISO 14000 and environmental audit.
- Promoting and monitoring workers' safety, occupational heath, and other environmental considerations in industrial, mining, and energy sectors.
- Environmental audit.
- Public hearings of IEE/EIAs.

Culture and Tourism

- Inventory and maps of cultural and natural resources of Balochistan.
- Conservation of cultural resources (architectural, rock carvings/shelters, archaeological, arts, crafts, folklore, music, dance, indigenous knowledge and resource management traditions).
- Promotion of tourism in Balochistan, especially in coastal areas.
- Improvement of Quetta and Sibi museums.
- Developing guided trails and training local guides
- Strengthening of institutions related to culture and tourism.
- Participation in 2001 Pakistan's Year of Tourism.

Justice and Accountability

- Setting up provincial ombudsman's office.
- Improvement in compliance/enforcement of law.
- Improving performance of civil administrators and law enforcing agencies.
- Enhancing capacity in statutory and customary law.
- Review and updation of environmental legislation.

Services and General Administration/Finance

- External management and programme review of key departments for restructuring, strengthening and improving performance.
- Reviewing and updating the rules of business, secretariat instructions, and delegation of financial and administrative powers keeping in view the present socio-political conditions and requirements of information sharing, transparency, and accountability.
- Improving working conditions in government organisations through improving co-ordination: creating objectivity; inducting responsibility, transparency and accountability; introducing information technology; improving information collection and management; and bringing behavioural change regarding public service.

Information

- Promoting information technology and access to information, and raising environmental awareness.

Appendix 6 Donor-Funded Projects and Programmes in Balochistan, 1998-99 to 2000-2001

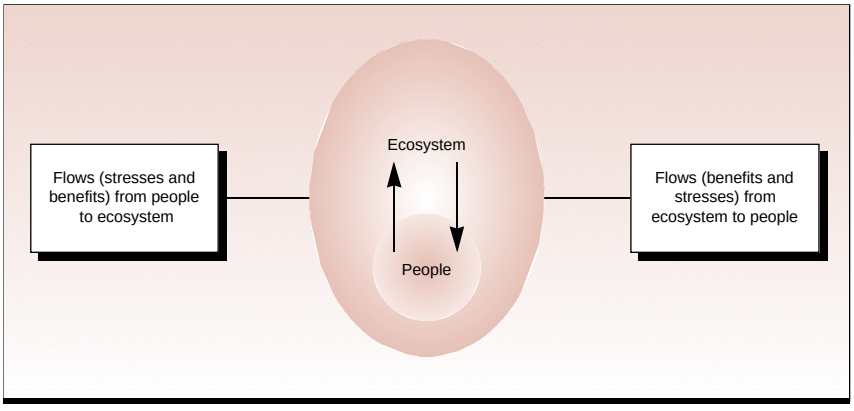
Project / Programme	Donor
NON–SAP	
RECENTLY COMPLETED	
First Provincial Highways (90 km)	ADB
Technical Assistance for Water and Sanitation for Quetta	ADB
On-Farm Water Management Project	Japan
Quetta Water Supply	Kuwait
Quetta Water Supply and Sanitation Project	RNE
Primary Education Quality Improvement Project (PEQUIP)	RNE
Balochistan Conservation Strategy (Development Phase)	RNE
Improving the Systems for Development Planning in Balochistan: IMPLAN	RNE
Conservation and Management of Juniper Forest (under BNRMP)	WB
Implementation of Hazarganji Chiltan National Park (under BNRMP)	WB
Mekran Coast Sand Dune Stabilisation (under BNRMP)	WB
Rangeland/Watershed Rehabilitation Pilot Programme (under BNRMP)	WB
Strengthening of Balochistan EPA/Environment Section (under BNRMP)	WB
Second Family Health Project	WB
ON-GOING	
Farm to Market Road (phase II) 202 km	ADB
Farm to Market Road (phase III) Rural Access Road	ADB
Second Provincial Highways	ADB
Second Science Education for Secondary Schools	ADB
Technical Education Project	ADB
Flood Protection Sector (phase II)	ADB
Children's Hospital, Quetta	Germany
Advisory Assistance in Instructor Development Basic (Training and Examination)	Germany
Pat Feeder Command Area Development Project (Nasirabad and Jaffarabad)	IFAD
Basima Nag Road, Kharan	Japan
Water Resources Development with Construction of Delay Action Dams (Phase I – Quetta, Mastung, Pishin)	Japan
Support to Strengthening Participatory Organisation (SPO)	RNE
Balochistan Hydrometric Network Project	RNE
Quetta Kachi Abadies and Environmental Management Project (QKAEMP)	RNE
Reproductive Health Programme Balochistan	RNE
Sibi Rakhni Road (District Sibi, Kohlu, Barkhan)	Saudi Arabia & Kuwait
Trial District Management Project (Loralai & Jhal Magsi)	UNDP
Area Development Programme (ADP) Balochistan	UNDP & WFP
National Drainage Programme	WB
Balochistan Community Irrigation and Agriculture Project (Phase II)	WB & RNE
Hingol National Park - Planning and Management	WB/GEF

Project / Programme	Donor
Agriculture Research Project, BARB Building, Quetta	
Construction of Coastal Highway (by Federal Government)	
IN PIPELINE	
Provision of Equipment for Bolan Medical College Complex, Quetta	Japan
Establishment of Fish Processing Unit at Gwadar / Pasni	
Extension of Olive Plantation/Afforestation at Zhob, Loralai, and Khuzdar	
Reinvigoration of Inspectorate of Mines, Balochistan Quetta	
Strengthening of Coal Dust and Gas Testing Laboratory	
Construction of Kachhi Canal	
SOCIAL ACTION PROGRAMME	
RECENTLY COMPLETED	
Balochistan Primary Education Development Programme	WB/RNE
ON-GOING	
Girls Primary Education (Phase II)	ADB
Middle School Project	ADB
Teachers Training Project	ADB
Women Health Project in Balochistan	ADB
Consolidation and Improvement of Middle Level Education (OECF)	Japan
Promotion of Primary Education: Provision of Mobile Teacher Training Units and Teaching Kits	Japan
Programme Assistance to Social Action Programme	RNE
Low-cost Water Supply, Sanitation and Hygiene Education Project	UNICEF
Balochistan Rural Water Supply and Sanitation	WB/IDA/RNE
Promotion of Girls Primary Project II	WFP
IN PIPELINE	
Improvement of RHCs, BHUs, by Providing Equipment	Japan
Water and Sanitation (phase II)	UNICEF

This method argues that sustainable well-being is a combination of human and ecosystem well-being and places equal importance on people and ecosystems. "People are an integral part of the ecosystem. The well-being of one is bound up by the well-being of the other" (Alvi 1997). If either is unsatisfactory or worsening, the society is unsustainable. Sustainable development therefore entails improving and maintaining the well-being of both.

Human well-being is defined as "a condition in which all members of society are able to determine and meet their needs and have a large range of choices to meet their potential" (Alvi 1999). Similarly, ecosystem well-being is taken as "a condition in which the ecosystem maintains its diversity and quality, and thus its capacity to support people and the rest of life, and its potential to adapt to change and provide a wide range of choices and opportunities for the future" (Alvi 1999). The egg of sustainability (Figure 1) can be good and sustainable only if both the yolk (people's well-being) and the white (ecosystem well-being) are good. If people continue to live under the clutches of poverty, malnutrition, oppression, powerlessness, or violence, a healthy ecosystem—even if it exists—is no compensation and will be unsustainable in the long run. Similarly, ecosystems support life and are vital to attain any standards of life. In the final analysis, trade-offs between the needs of people and those of ecosystems would only be short-lived, and ultimately a sustainable society needs to achieve both together.

Figure 1 Egg of Sustainability



Well-being Assessment Method

The WAM proposes a common framework of five dimensions or sets of issues for both human and ecosystem well-being. Within this framework, users select their own issues and indicators.

Human Well-being Dimensions

- Health and population: physical and mental health, disease, mortality, fertility, and population growth trends.
- Wealth: the economy, income, poverty, material goods, infrastructure, basic needs for food, water, clothing, and shelter.
- Knowledge and culture: education, state of knowledge about people and the ecosystem, communication, and systems of beliefs and expression.
- Community: rights and freedom, governance, participation, peace, crime, civil order, and institutions.
- Equity: distribution of benefits and burdens between males and females and among households, ethnic groups, and other social divisions.

Ecosystem Well-being Dimensions

- Land: the diversity and quality of land ecosystems, including their modifications and conversion and degradation.
- Water: the diversity and quality of inland water and marine ecosystems, modifications by dams, embankments, and pollution and water withdrawal.
- Air: local air quality and global atmosphere.
- Species and populations: status of wild species and wild and domesticated (crop and livestock) populations.

- Resource use: energy and materials, waste generation and disposal, recycling, resource sectors such as agriculture, fisheries, timber, and mining and hunting.

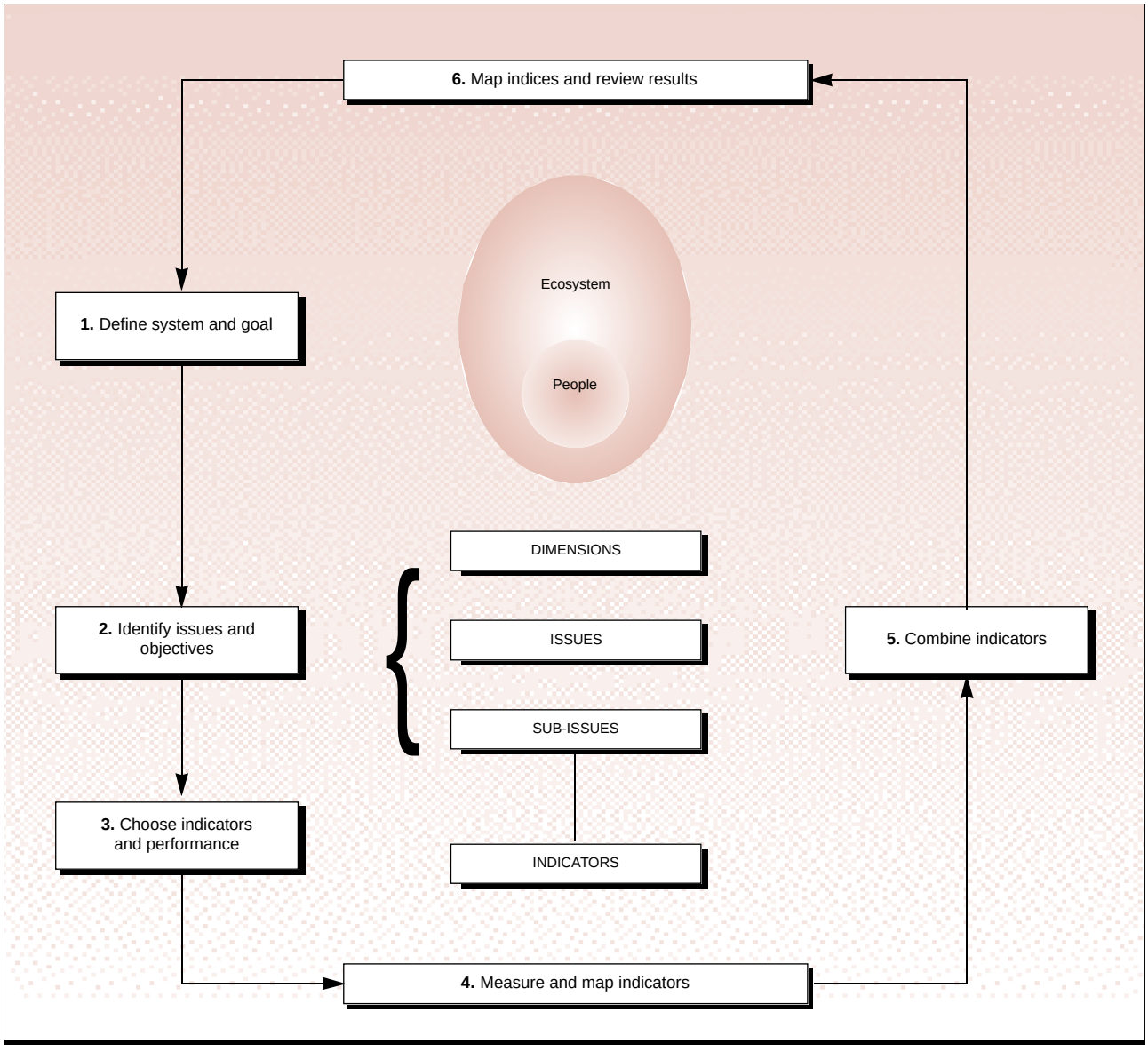
Six-Stage Assessment Cycle

A six-stage cycle is used to assess the system (Figure 2)

1. Define system and goals

The system includes the people and ecosystem of the area to be assessed. The goal manifests the vision of sustainable development and serves as the foundation for determining what the assessment will measure.

Figure 2 Assessment Cycle



2. Identify issues and objectives

Issues are the key subjects and concerns of human society and ecosystem that must be analysed to draw a comprehensive picture of the current situation. Objectives further clarify the goal and the improved conditions that should be achieved.

3. Choose indicators and performance criteria

Indicators are reliable, feasible, measurable, and representative dimensions of an issue/sub-issue. The key indicators are selected for each identified issue. Performance criteria translate the goal and objectives into measurable performance and act as standards of achievement for each indicator. They serve the basis for putting indicator results on a performance scale, so they can be combined. The performance criteria will decide the band (Bad, Poor, Medium, OK, and Good) a given indicator will go into.

4. Measure and map indicators

Indicator results are recorded in their original measurements and given scores on the basis of the performance criteria. The exact position of an indicator is determined in one of the two ways:

- best performance is the maximum value and worst performance is the minimum value, such as life expectancy at birth; or
- best performance is the minimum value and the worst performance is the maximum value, such as a threatened animal species as a percentage of total animal species.

  Indicator scores are entered in a database and linked to mapping software, so that maps showing the condition of people and ecosystem can be drawn.

5. Combine indicators

The scored indicators are combined up the hierarchy. Indicators are combined into a sub-issue / issue index, issues into a dimension index, and dimensions into a subsystem (people and ecosystem) index. Elements (indicators, sub-issues, issues, or dimensions) are combined in one of the three ways:

- Unweighted average: the elements considered to be roughly equal in importance are weighted and averaged.
- Weighted average: Based on their relative importance, the elements are given different weights, and then added and averaged.
- Veto: A lower score overrides a higher score

6. Map indices and review results

Indices are mapped to give a visual reading of results and to reveal the big picture and patterns of performance.

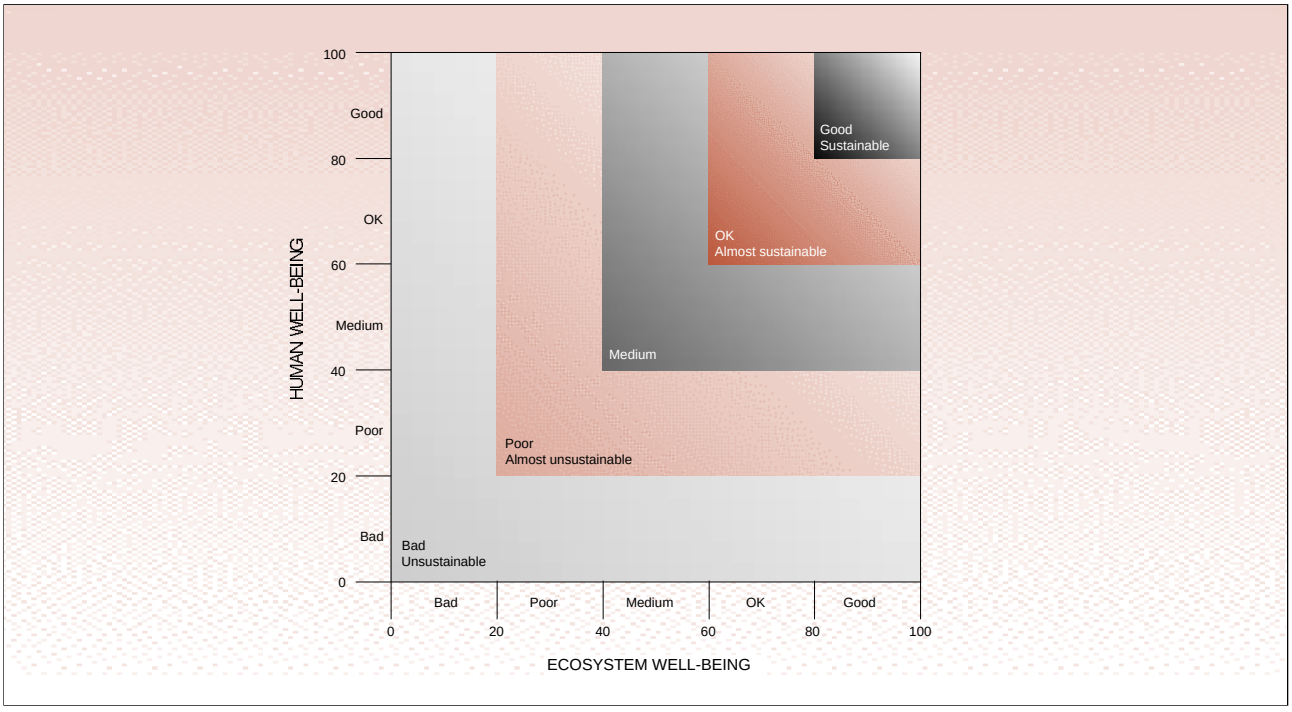
The review links the assessment to action by analysing the indicators and indices; reviewing the pattern of performance and the data behind them; determining the issues and areas where improvements are most needed; proposing policies and actions to make the improvements; planning the priority actions; and reviewing and revising policy, programme, and project objectives and targets.

Barometer of Sustainability

The barometer of sustainability is a tool used to display the combined indicators and results. It is specially designed to show human and ecosystem well-being together without submerging one in the other (Figure 3). Its key components are:

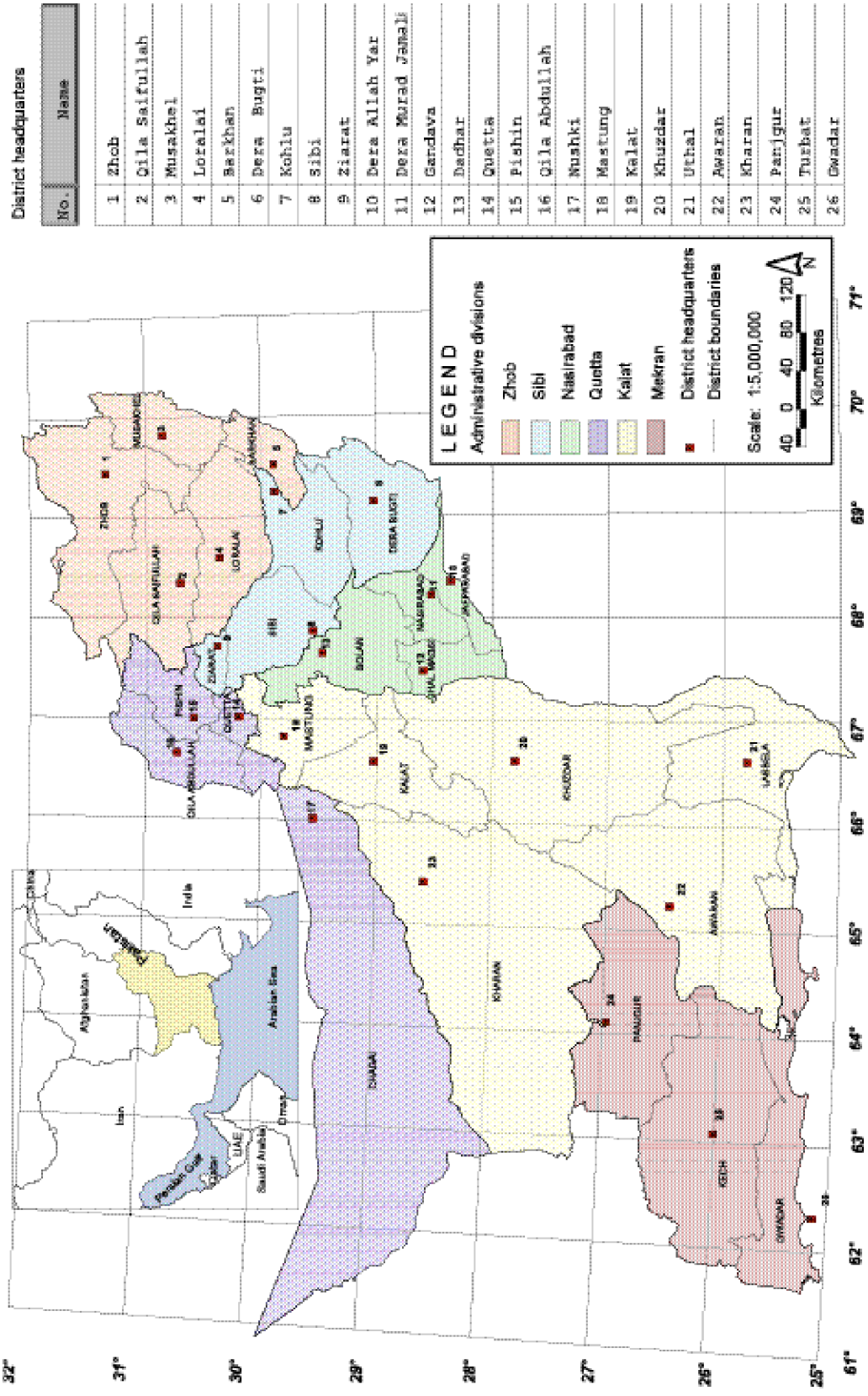
- Two axes are used: the x-axis for ecosystem well-being and the y-axis for human well-being. This enables each set of indicators to be rolled up separately and allows analysis of people-ecosystem interactions.
- The axis with the lower score overrides the other axis. For example, a high score for ecosystem well-being cannot offset a low score for human well-being.
- A five-band scale – Bad, Poor, Medium, OK, and Good – is used to define the health of people and ecosystem. Each sector offers enough flexibility for users to place the combined scores precisely.

Figure 3 Barometer of Sustainability



Maps

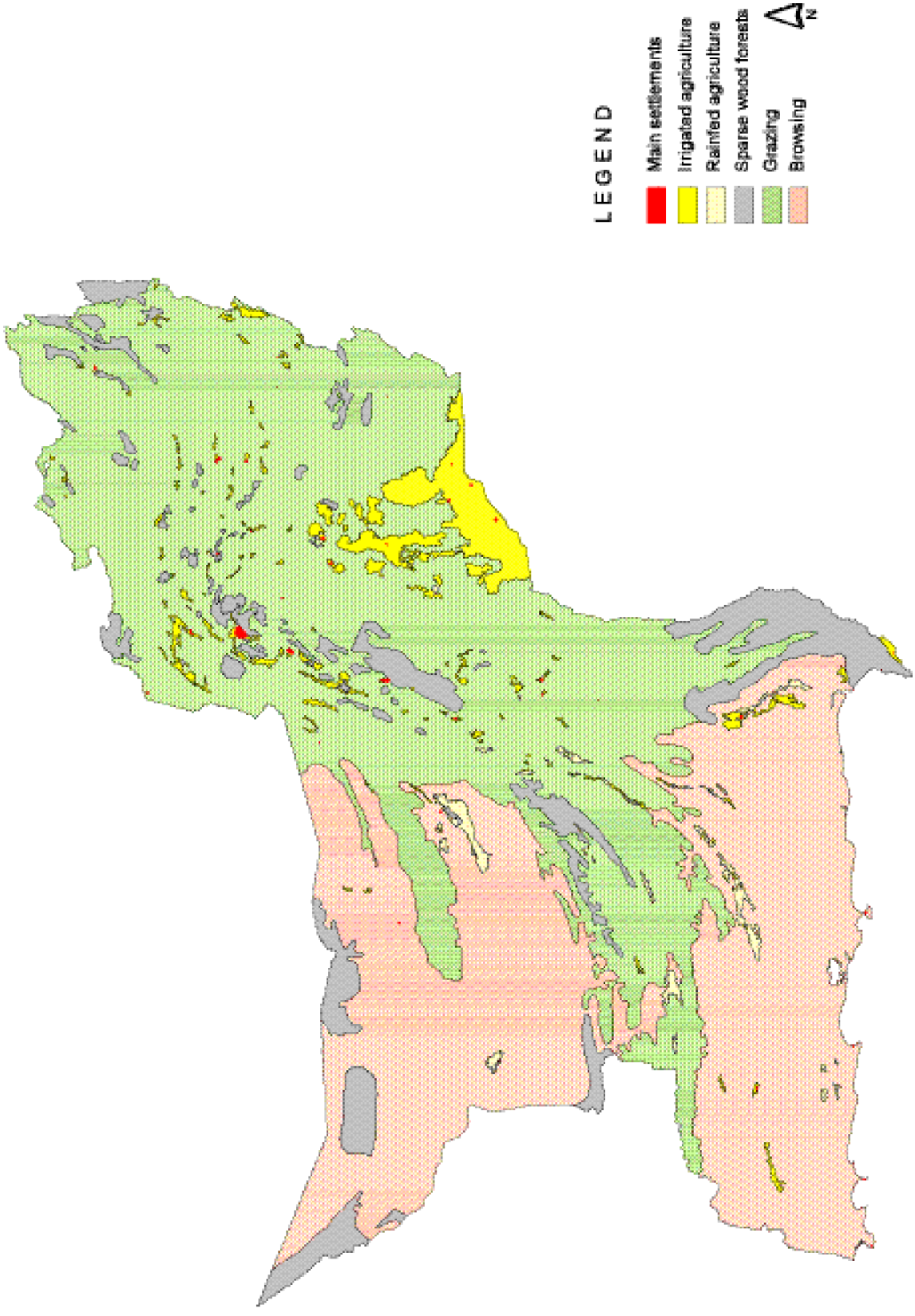
Map 1 Districts of Balochistan



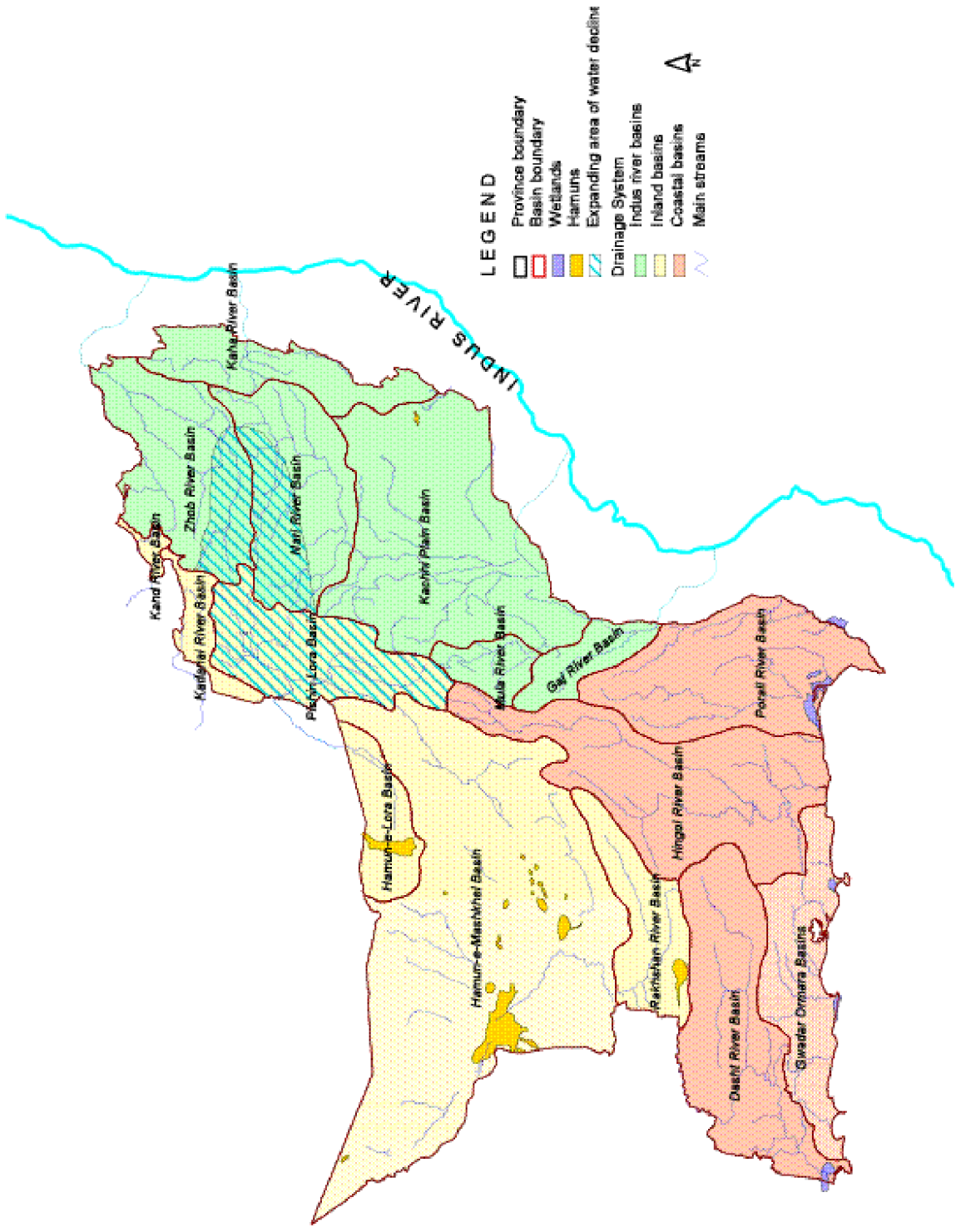
District headquarters

No.	Name
1	Zhob
2	Qila Saifullah
3	Musakhel
4	Loralai
5	Barkhan
6	Dera Bugti
7	Kohlu
8	Sibi
9	Ziarat
10	Dera Allah Yar
11	Dera Murad Jamali
12	Gandava
13	Dadhar
14	Quetta
15	Pishin
16	Qila Abdullah
17	Nushki
18	Mastung
19	Kalat
20	Khuzdar
21	Uthal
22	Awaran
23	Kharan
24	Panjgur
25	Turbat
26	Gwadar

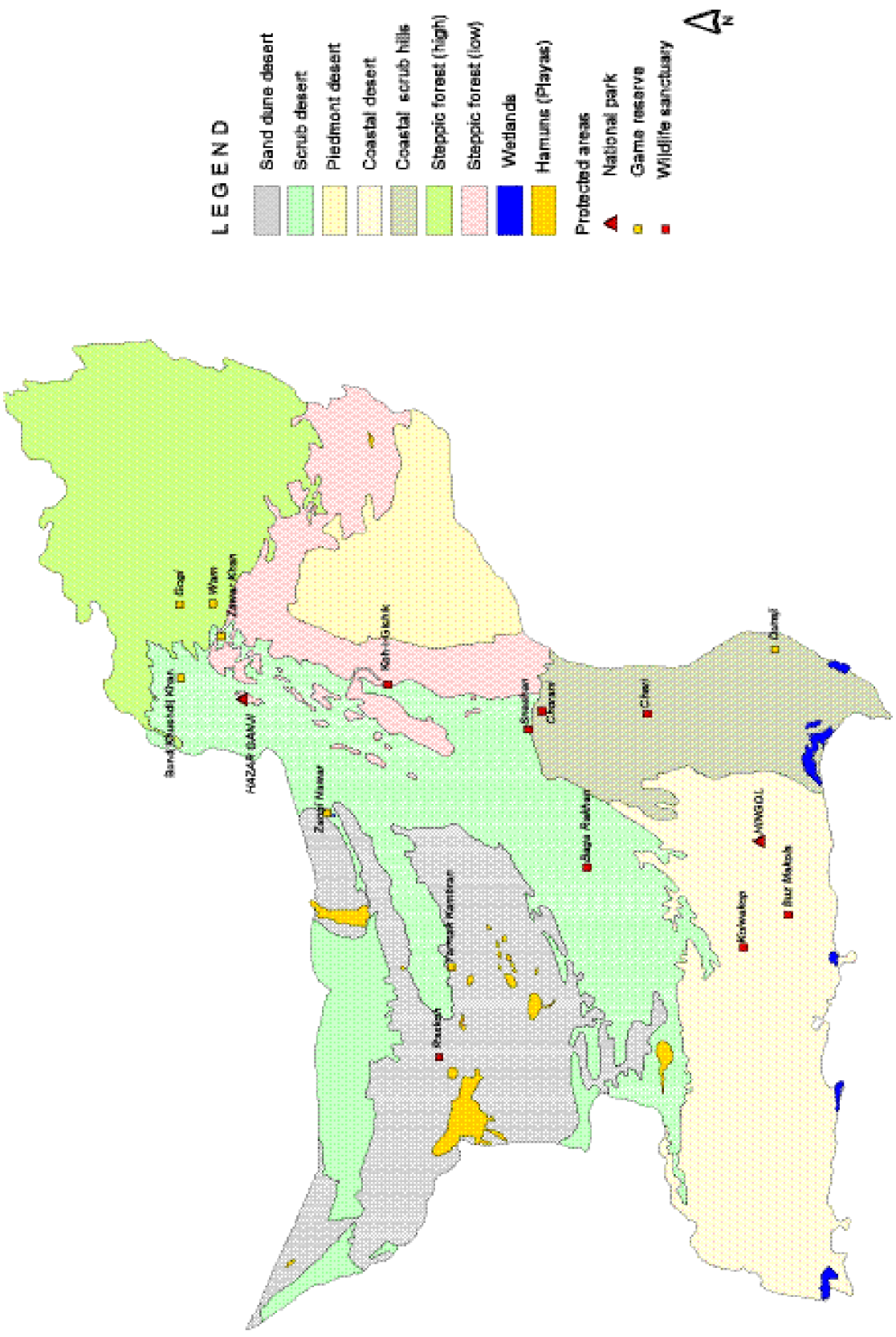
Map 2 Land Use



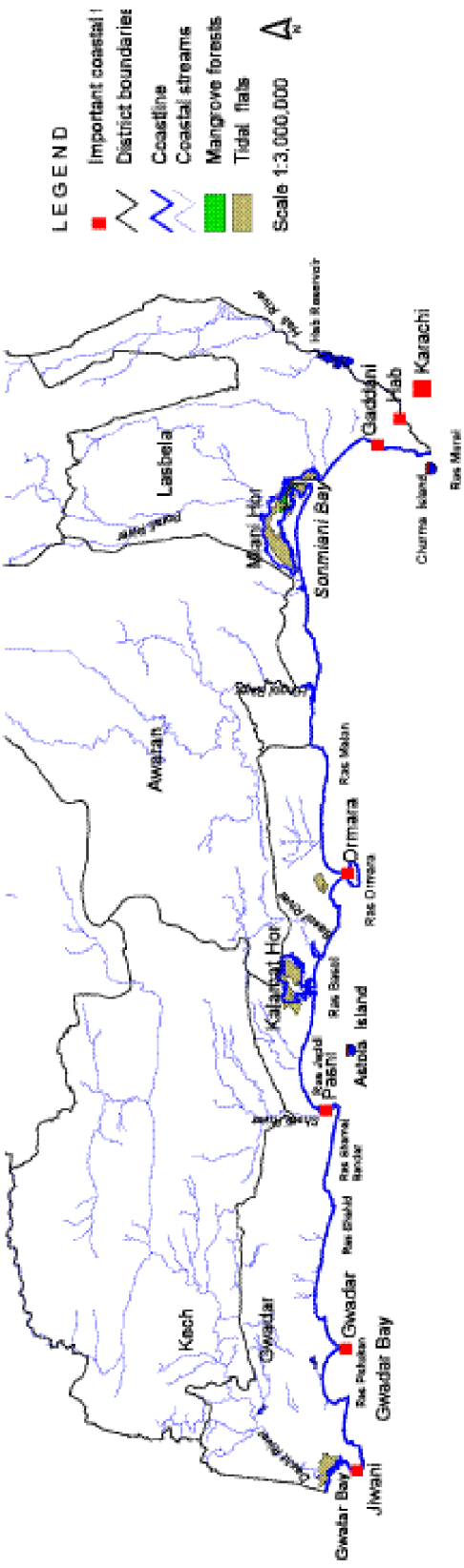
Map 3 Water Basins



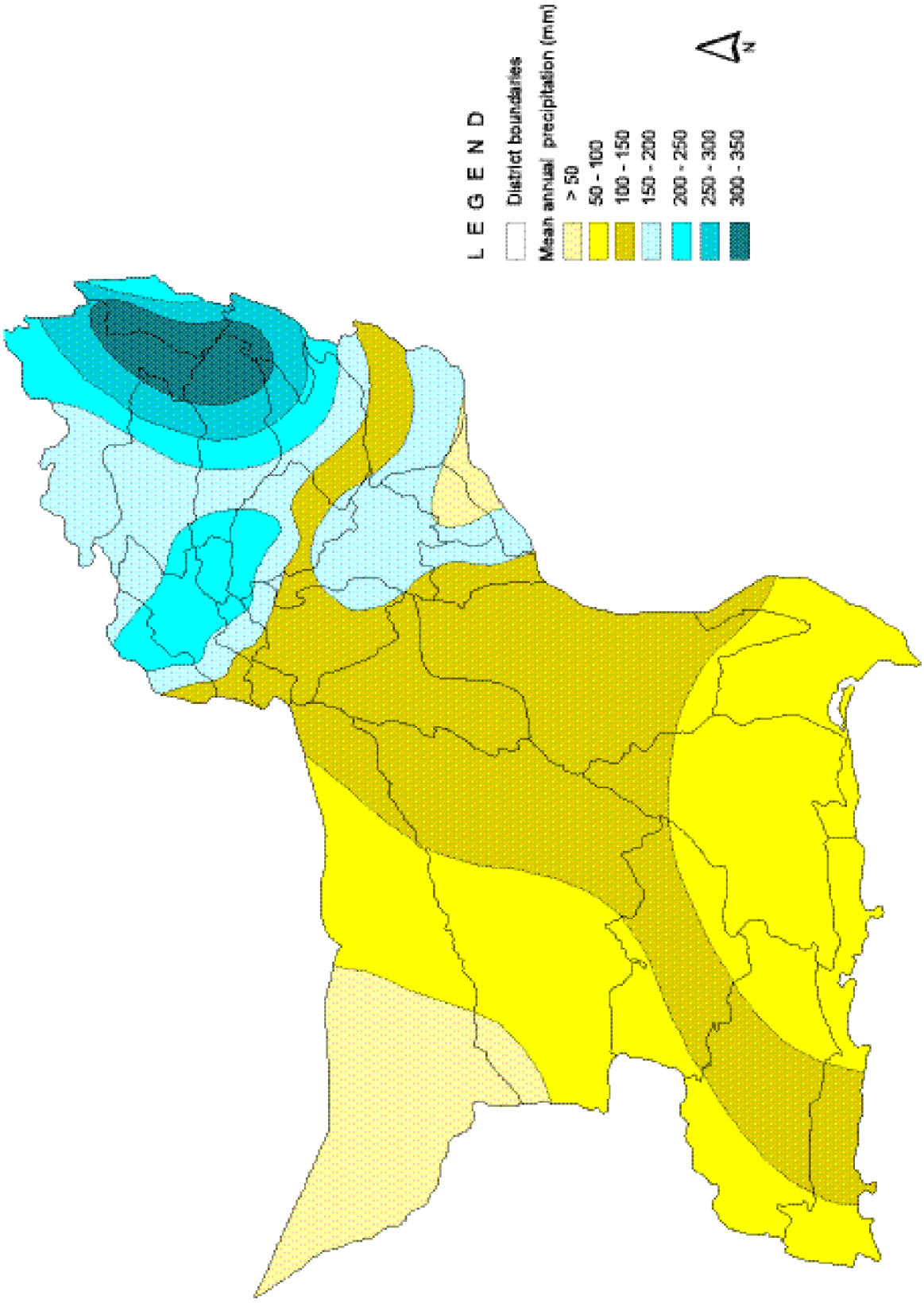
Map 4 Protected Areas and Habitat Types



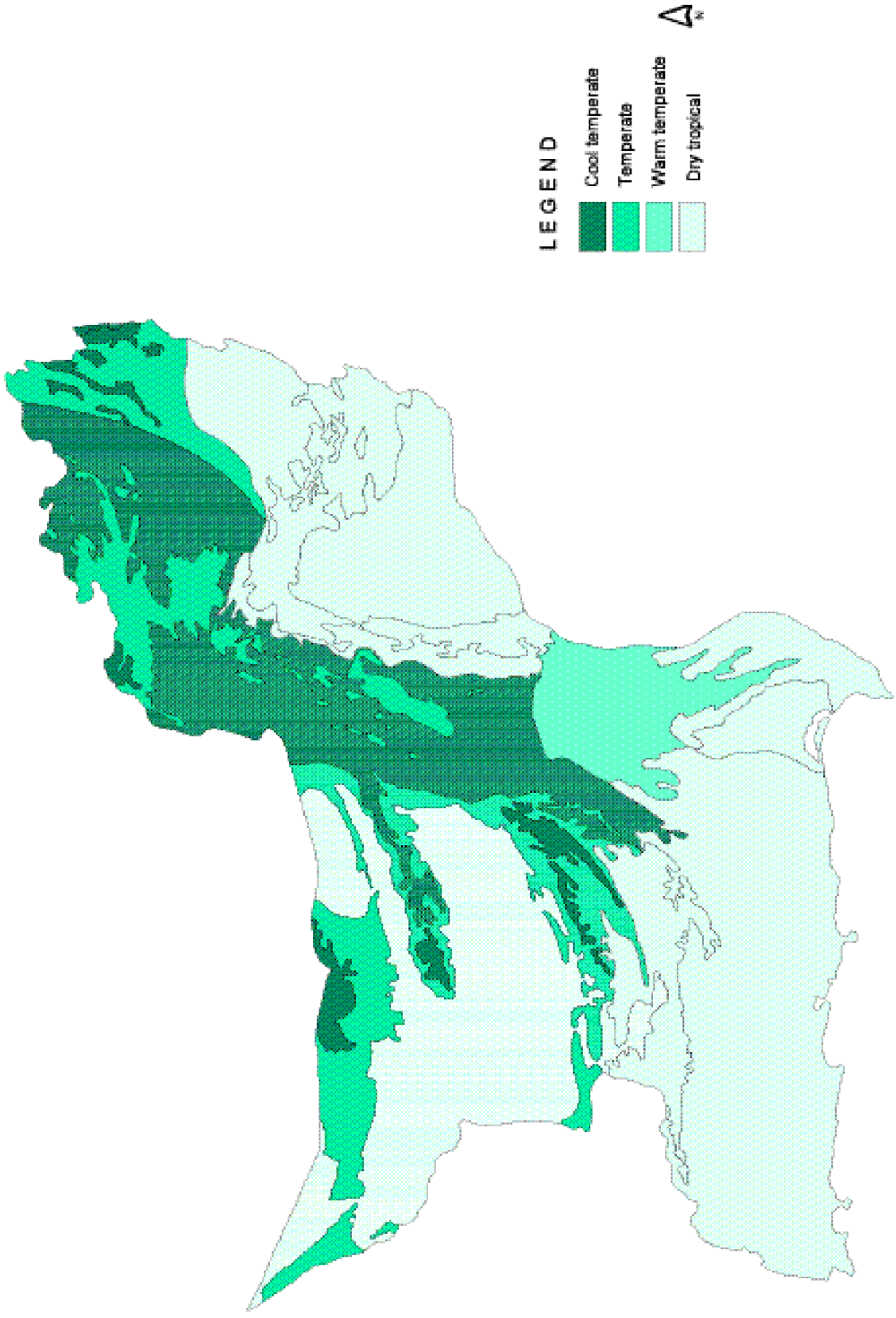
Map 5 Coastal Zone



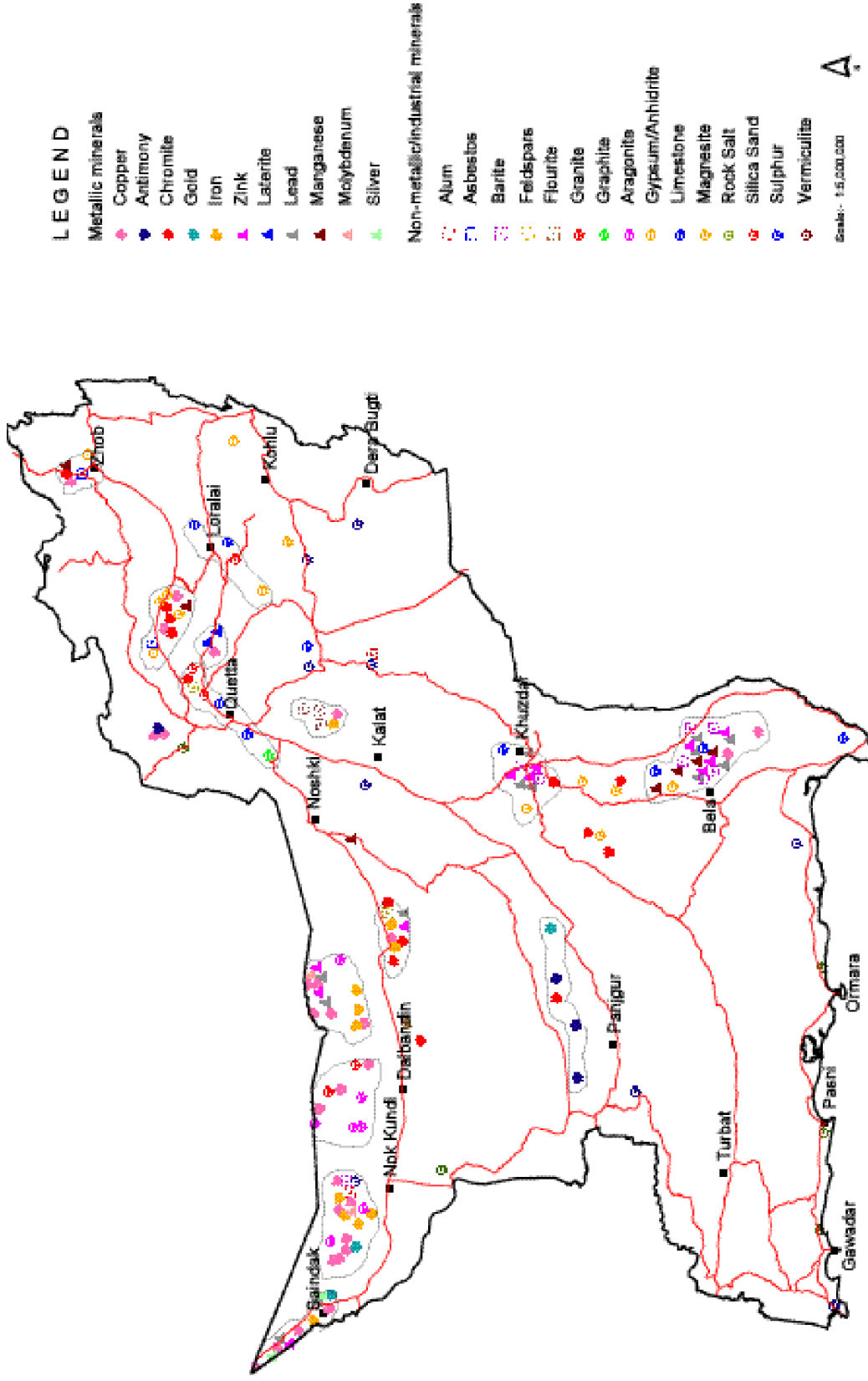
Map 6 Precipitation



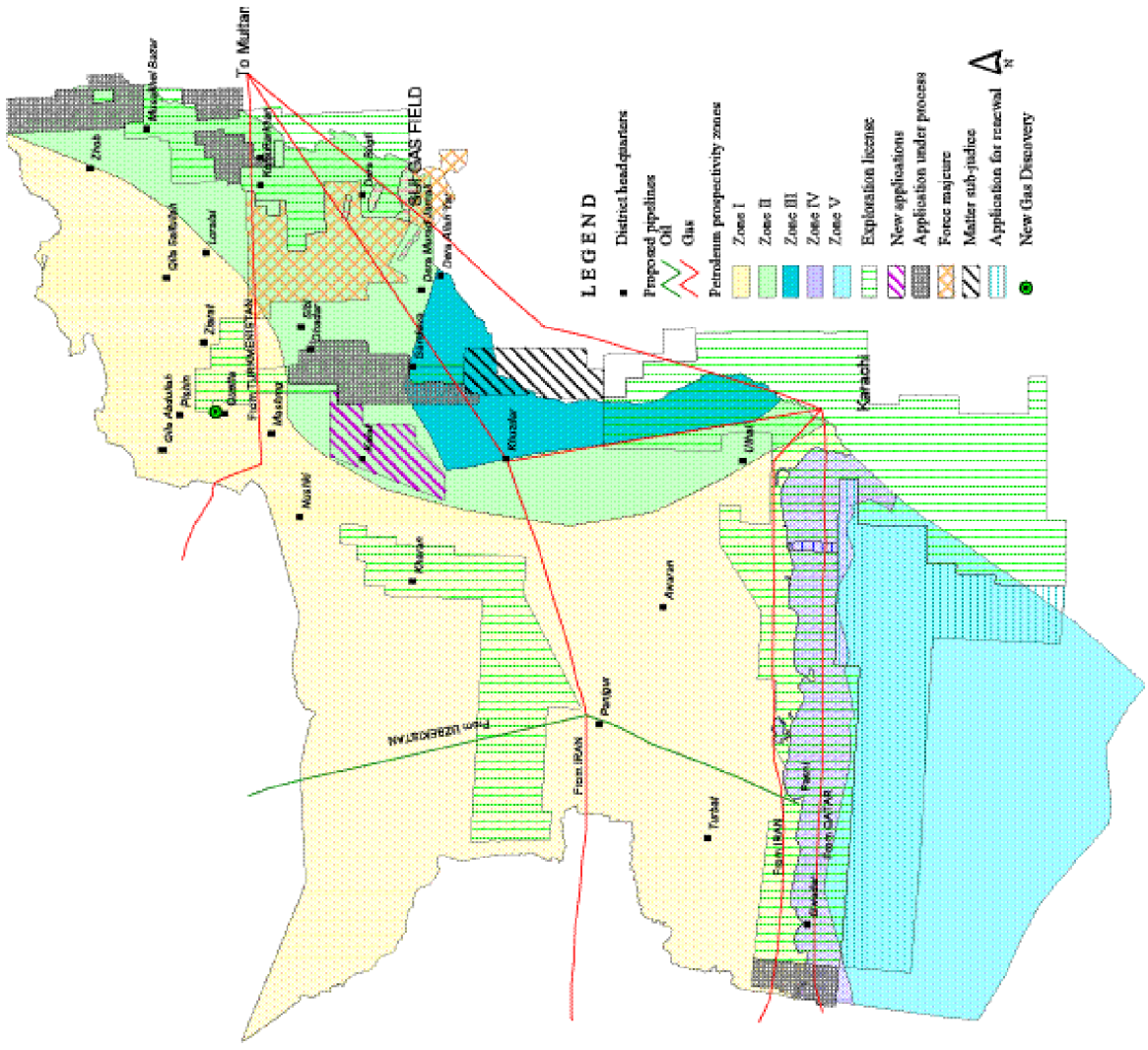
Map 7 Ecological Zones



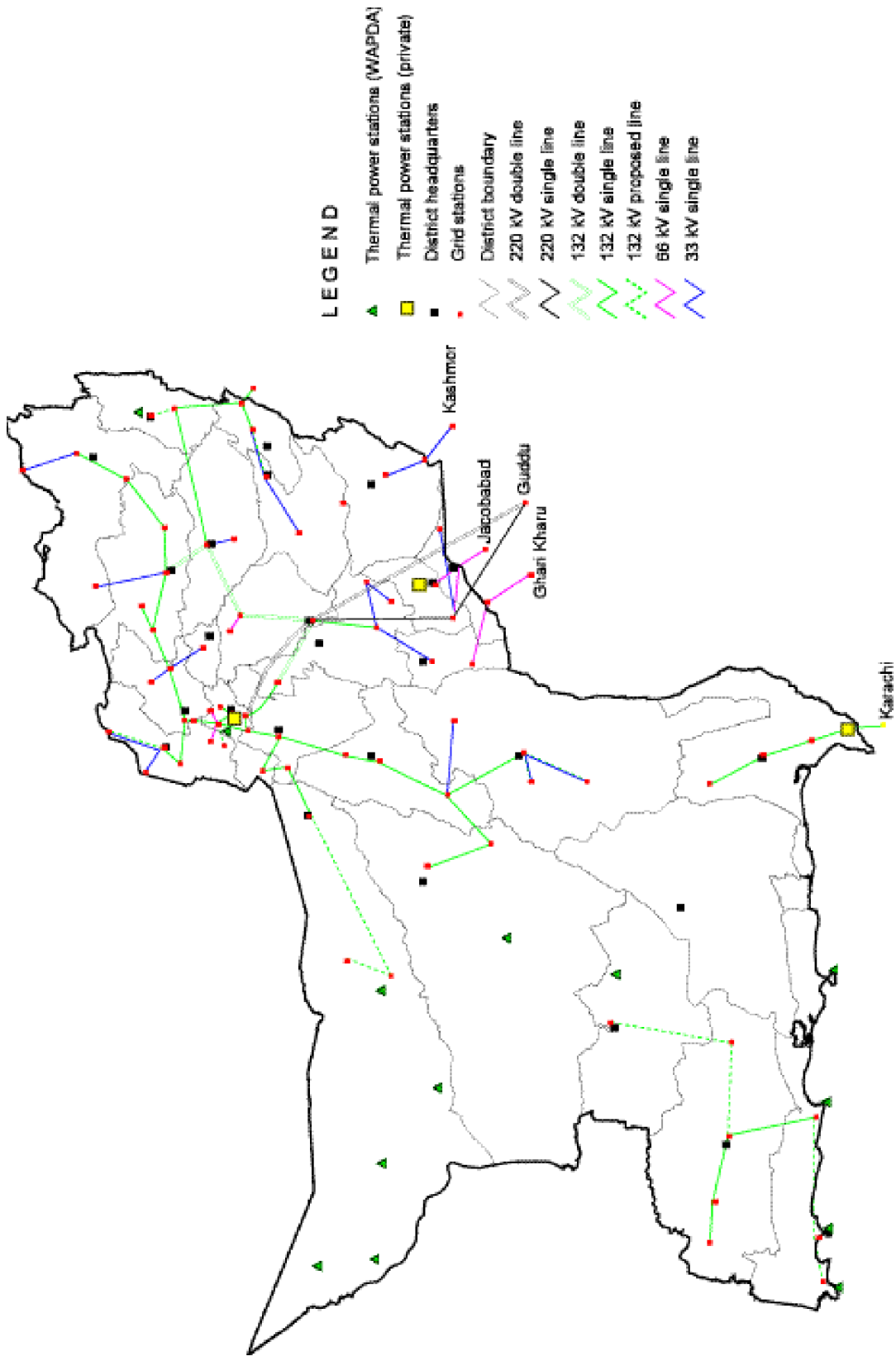
Map 8 Minerals



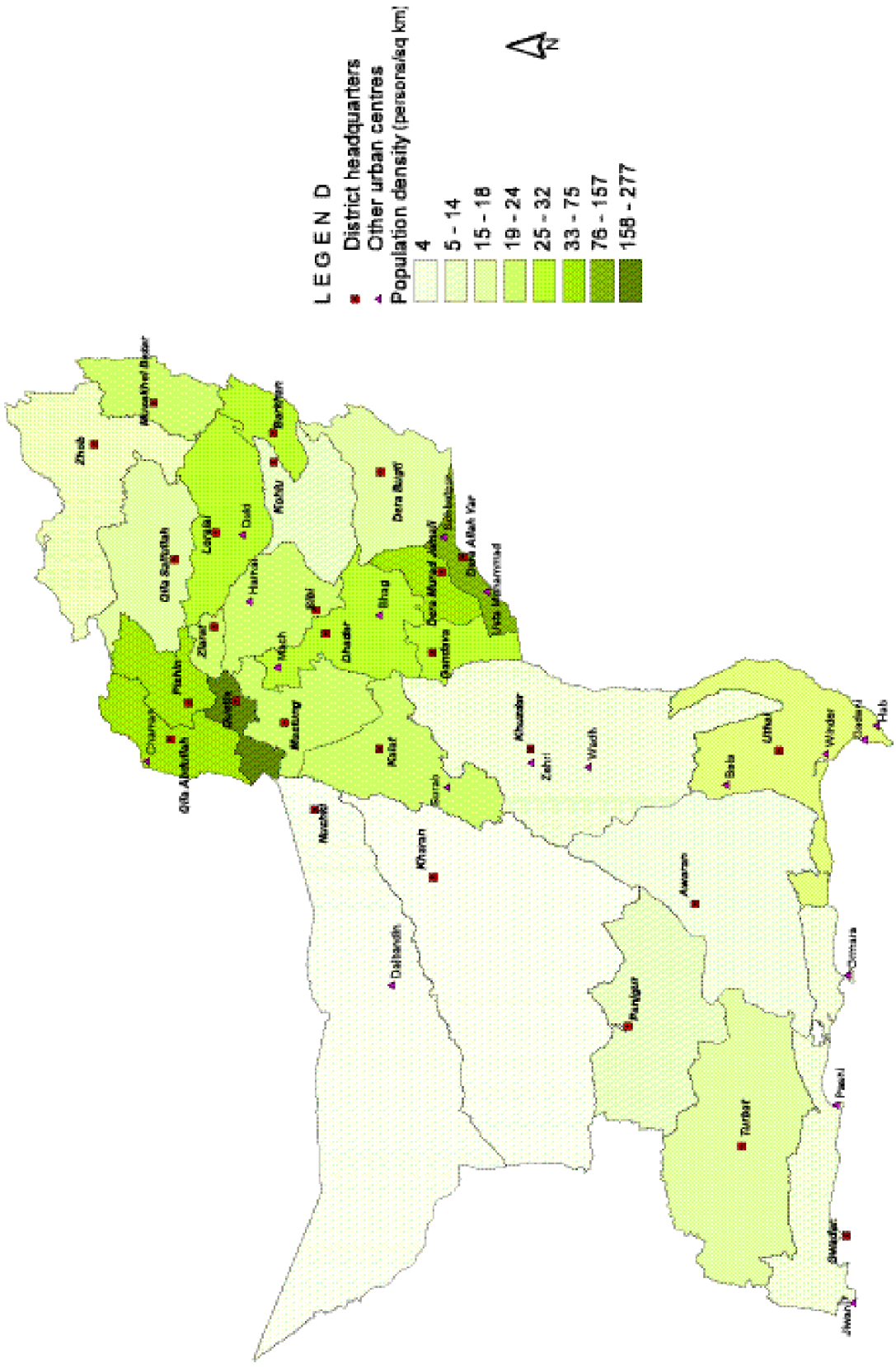
Map 9 Oil and Gas Resources



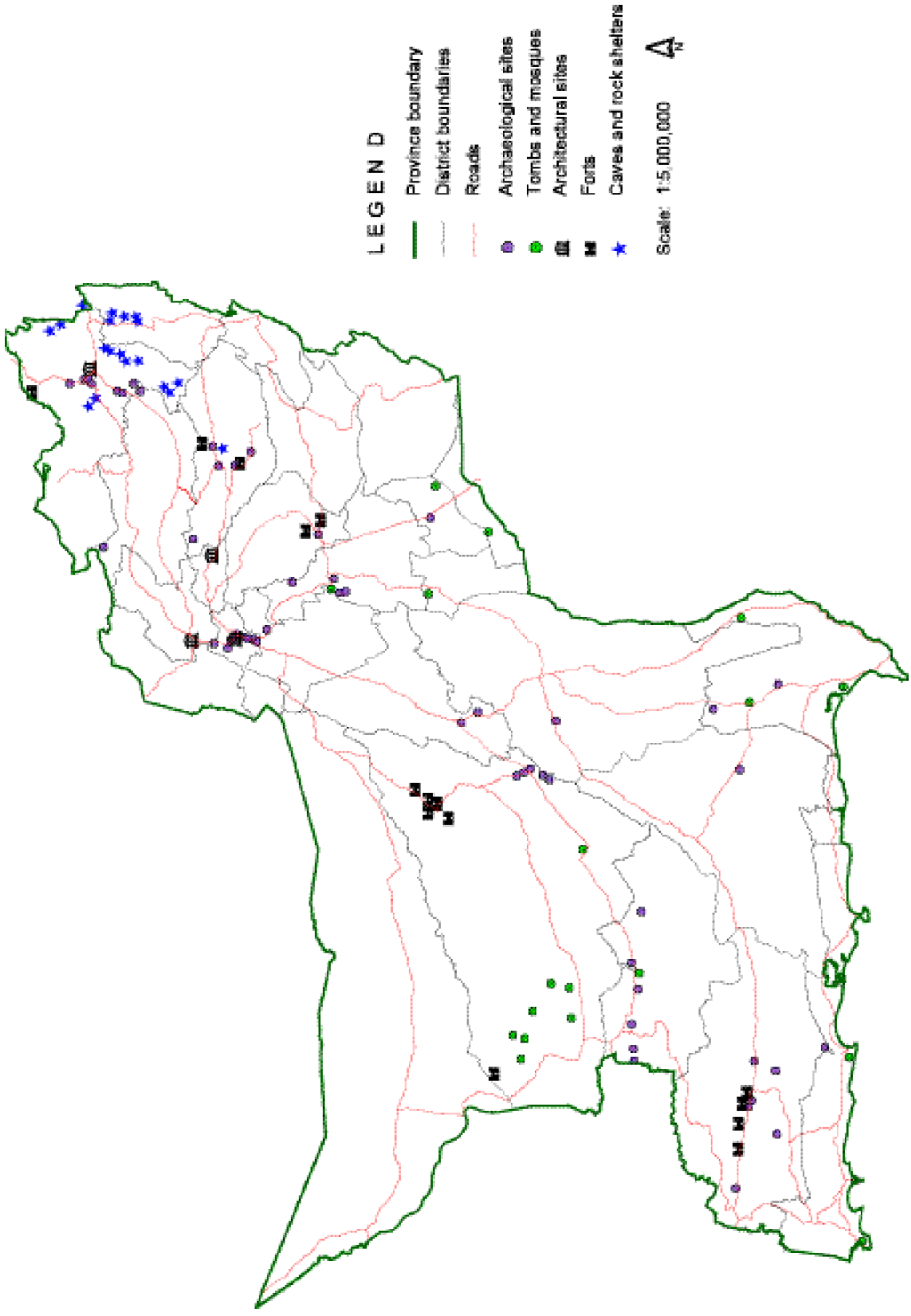
Map 10 Electricity Generation and Supply



Map 11 Population Density



Map 12 Archaeological and Architectural Heritage



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