

BALUCHISTAN

Biodiversity Strategy and Action Plan



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International Union for Conservation
of Nature, Pakistan



Government of Balochistan



Climate Change Division
Government of Pakistan

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Foreword

Government of Balochistan
Quetta, Pakistan

Balochistan is bestowed with a wide variety of ecosystems and habitats ranging from beautiful beaches along the coasts of the Arabian Sea through awe-inspiring desert in the west, to serene Chilghoza Forests in the Suleiman Mountains. The diverse topography and climatic conditions manifests itself in a wide range of habitats and species, many of which are of global biodiversity significance. The Marine ecosystem of the Arabian Sea is included in the Global 200 most biologically outstanding eco-regions in the world. Unfortunately, except for agricultural lands and three percent forest lands, more than 90 percent of the remaining landscape has no land use plan and no one is taking care of the ecological health of these lands. The vast majority of Balochistan's natural habitats are generally degraded and have lost much of their productivity.

The worsening health of ecosystems and diminishing ecosystem services are a cause of alarm, as it is not only a threat to the livelihoods of the poor and marginalized pastoral communities who depend on these resources for forage, fuelwood, and other natural products, but also due to growing shortages of water for drinking and agriculture due to the inability of ecosystems to recharge the aquifers. It is neither feasible nor desirable for the government to manage vast areas of natural habitats, and therefore, institutions and the capacity of local communities must be strengthened, and they must be actively involved in sustainable management of natural resources.

Pakistan is the 10th most vulnerable country to climate change, and colossal damage of life and property due to recent floods are still fresh in our memories. Balochistan is home to a large number of wild relatives of crops which together with other threatened species of flora and fauna are most at risk of extinction due to changes in habitat conditions. Therefore, we need to establish and effectively manage representative areas of all of our natural habitats covering land, water and sea. In addition to the loss of nature's bounty, there has been a lot of erosion of traditional varieties of crops and breeds of farm animals due to the introduction of high yielding crop varieties and exotic breeds.

Although high yielding varieties have helped the province feed a rapidly growing population, it has been at a high cost. We need to preserve our traditional crop varieties and breeds of farms animals both as a coping strategy against crop failures under changing climate and for breeding improved varieties and breeds. In addition, we need to develop, test and promote sustainable agricultural practices to improve water use efficiency, and minimal use of environment friendly agro-chemicals.

Balochistan has always shown strong political commitment to the cause of environment and sustainable development. Balochistan prepared its Conservation Strategy in 2000. Additionally, similar strategies were prepared in a few districts. Balochistan has been at the forefront of joining the global community in implementing environment related conventions. Unfortunately, the financial limitations far exceeded the political will of the province, and the progress to date on implementation of the Conservation Strategy and the Biodiversity Action Plan has been less than desired.

The Balochistan Biodiversity Strategy and Action Plan (BBSAP) will provide a new vision, objectives, strategies and targets to meet the conservation challenges of the 21st century, and make a significant contribution towards achieving the CBD strategic objectives and achieving the Aichi Biodiversity Targets.120. Active participation of the stakeholders who will be major players for its implementation will ensure their buy-in. The government will try its best to increase allocations for biodiversity but the bilateral and multilateral development agencies will have to come forward to meet the full financial needs of achieving the Aichi Biodiversity targets.

December, 2015

Chief Minister

Acknowledgement

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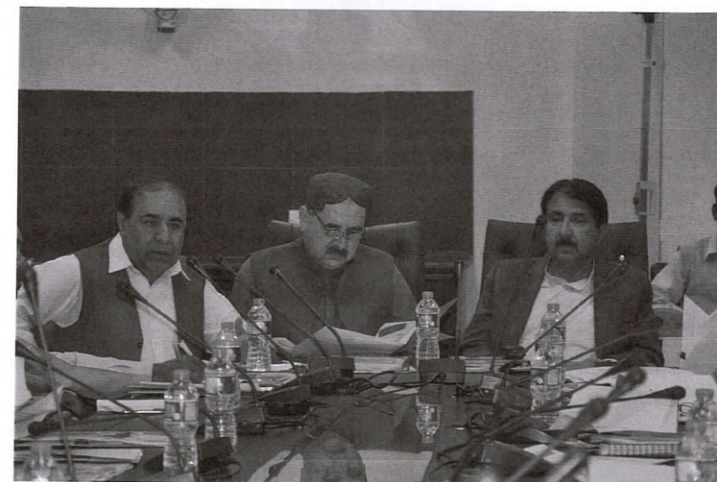
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List of Abbreviations and Acronyms

BWG	Biodiversity Working Group
CBD	Convention on Biological Diversity
CAF	Central Asian Flyway
CHM	Clearing House Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
CoP	Conference of Parties
CRI	Climate Risk Index
FAO	Food and Agriculture Organization
FSMP	Forestry Sector Master Plan
GBO	Global Biodiversity Outlook
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Global Information System
HYVs	High Yield Varieties
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for Conservation of Nature
KP	Khyber Pakhtunkhwa
MDGs	Millennium Development Goals
NBSAPs	National Biodiversity Strategies and Actions Plans
NCS	National Conservation Strategy
NIM	National Institute of Management
NRM	Natural Resource Management
NSPP	National School of Public Policy
NSDS	National Sustainable Development Strategy
NWCS	National Wetland Conservation Strategy
PARC	Pakistan Agriculture Research Council
PBS	Pakistan Bureau of Statistics
PEPA	Pakistan Environment Protection Act
PIPS	Pakistan Institute of Parliamentary Studies
PRSP	Poverty Reduction Strategy Papers
REDD*	Reducing Emissions from Deforestation and Forest Degradation
TEV	Total Economic Value
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organisation
WCS	World Conservation Strategy
WRI	World Resource Institute
WWF	Worldwide Fund for Nature

Launching Ceremony of Balochistan Biodiversity Strategy and Action Plan



Above: Minister of Environment (Mr. Ubaidullah Jan Babat), and Additional Chief Secretary Planning and Development (Mr. Naseebullah Khan Bazai) co-chairing launching of BSAP.

Below: A general view of the meeting showing stakeholders.



EXECUTIVE SUMMARY

I. INTRODUCTION

1. Context

The Conference of the Parties to the Convention on Biological Diversity (CBD), in its meeting held in Aichi-Nagoya, Japan in October 2010, adopted a Strategic Plan for Biodiversity 2011-2020 with 20 targets which came to be known as "Aichi Biodiversity Targets" (ABT). The Biodiversity Strategy and Action Plan (BSAP) is intended to implement the ABT in Balochistan. In order to create greater ownership of the BSAP, consultative meetings with stakeholders were organized with all the stakeholders including policy makers and planners. The draft NBSAP was widely shared with all the stakeholders and finally presented at a meeting of all the stakeholders in Quetta on October 28, 2015.

2. Causes and Consequences of Biodiversity Loss

Rapid growth of human population and the resulting increase in the use of fuelwood, timber, forage, non-timber forest products, and trade in wild fauna, coupled with expanding agriculture on marginal lands have caused land degradation, desertification, loss of habitat, and endangered the survival of many species in the wild. More than 70 percent area of the province is degraded due to water erosion, wind erosion, depletion of soil fertility, deforestation, and over grazing, resource degradation is further exacerbated due to increasing scarcity of water, frequent droughts and mismanagement of land. Loss of habitats and their fragmentation poses a serious threat to biodiversity in all ecosystems, and consequently many populations of species are now confined to isolated small pockets. Over harvesting of fisheries resources, use of destructive fishing gear, and use of other destructive practices are the major causes of loss of fresh water and marine biodiversity.

Crop genetic diversity is low and the principal reason is the use of high-yield varieties (HYVs). This genetic erosion is well pronounced in wheat, and fruit trees. Similarly there is an increasing trend of cross-breeding local livestock breeds. As the genetic traits of local species are lost, the ability to adapt to local environments and climates and to tolerate diseases is greatly reduced. The use of pesticides and fertilizers has increased rapidly in recent years. Unfortunately, the widespread use of pesticides has disturbed the agro-ecosystem and killed non-target and environment-friendly organisms, including many bird species. In addition, the excessive and inappropriate use of agro-chemicals has induced pest resistance and their resurgence, and ill effects on the health of people. Pollution is a growing problem and discharge of sewage and industrial effluent into aquatic and marine ecosystems is a major threat to biodiversity. The polluted water is causing numerous water-borne diseases.

3. Policy, Planning, and Institutional Failures

The value of biodiversity and ecosystem services, their contribution to the national economy, and potential to alleviate poverty have not been integrated in the national and local planning and development process. Consequently the environment sector, including climate change, biodiversity, forestry and wildlife receive a very low priority when it comes to resource allocation. The benefits from biodiversity goods and ecosystem services would far exceed the costs of protecting conserving and using them sustainably.

The Pakistan National Conservation Strategy (NCS) formulated in 1992, and then the Balochistan Conservation Strategy of 2000 provided a policy framework for biodiversity and conservation. In 2000, a comprehensive Biodiversity Action Plan (BAP) was also prepared at the national level. The National Environment Policy 2005 provides an overarching framework for addressing environmental issues like pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. The draft National Sustainable Development Strategy (NSDS) of 2012 aims 'to evolve a just and harmonious society in the country through promotion of vibrant and equitable economic growth without the overexploitation of natural resources, with fair distribution of development dividends among all stakeholders; in particular to the marginalized, poor and vulnerable parts of the society and to future generations'.

The National Climate Change Policy, approved by the government in 2012 has an overall goal, 'to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development'. One of the major objectives of the policy is conservation of natural resources and long term sustainability which was further elaborated through specific measures under forestry, biodiversity and other vulnerable ecosystems.

II. NATIONAL BIODIVERSITY STRATEGY: PRINCIPLES, PRIORITIES AND TARGETS

4. Biodiversity Awareness

People are often unaware of the loss of biodiversity and its consequences for their own well-being. Well planned and targeted efforts will be required to create awareness among the people through mobilization of media – print, audio, and video; and introduction of the values of biodiversity in the curricula of schools and colleges. In addition, schools and colleges will be encouraged to establish youth leadership clubs with focus on biodiversity and environmental issues. Inter club and intra club activities can be organized with expert lectures, seminars, and competition, where the parents are also invited. Special short term courses for the teachers, will equip them with awareness material and motivation.

Awareness also needs to focus on the junior and senior executives working in government and semi-government bodies, especially management groups, the judiciary, police, and even armed forces as their support is required for the implementation of environment and biodiversity related issues. The strategies to raise awareness would include: (1) Mobilize mass media especially the print, audio-visual, and digital social media to create public awareness of the value of biodiversity and consequences of its loss; (2) Introduce the knowledge, values, and consequences of loss of biodiversity in education at all levels - schools, colleges and universities; and (3) Sensitize policy makers, planners and administrators in development and business sectors through opinion leaders and introducing biodiversity concerns in relevant training academies.

5. Mainstreaming Biodiversity

Biodiversity needs to be mainstreamed in the national policies and plans for sustainable development. The mainstreaming will help all sectors recognize the value of biodiversity and ecosystem services and act to maximize the positive and minimize the negative impacts of human activities. The BSAP would be adopted as a policy instrument by the government. To demonstrate the value of biodiversity, valuation studies will be undertaken to demonstrate the need for inclusion of biodiversity in national accounting and reporting systems. Steps will be taken to mobilize financial resources for effective implementation of the BSAP. The following strategies will be adopted for mainstreaming biodiversity: (1) Technical and administrative capacity will be developed for valuation of biodiversity using low cost tools and methods that in addition to economic values recognize social and cultural values; (2) Biodiversity valuation studies shall be undertaken and demonstration projects initiated in ecosystems where people rely heavily on biodiversity for subsistence; and (3) The NBSAP shall be adopted as a policy document and a stakeholder Biodiversity Round Table established for mainstreaming biodiversity in policies, plans, and reporting and accounting systems.

6. Gender, Poverty and Biodiversity Nexus

Common property or open access resources are being over exploited by the landless and small landholders who rely heavily on resources for subsistence. The pastoral communities in Balochistan graze their livestock on natural pastures or rangelands. The loss of biodiversity not only increases their poverty levels but also increases their vulnerability to climate change. The men, women, and children use natural resources differently and therefore their requirements need to be factored in the conservation programmes. The women and children are mostly involved in collection of firewood, forage and NTFPS. Thus loss of biodiversity or lack of access to natural resources near their homes means an increase in their workloads and economic hardship. Because poverty results in degradation of ecosystems, conversely, there is an opportunity to alleviate poverty by restoring and maintaining the health of ecosystems. Similarly, harvesting of bio-resources is a part time activity of unemployed or under employed manpower, therefore alternative activities for the work force such as jobs or a cottage industry will help save

biodiversity. In view of the above, gender and poverty considerations cut across all thematic areas of biodiversity conservation and will be integral component of the relevant strategies and action plans.

7. Terrestrial Ecosystems, Habitats and Species

The natural ecosystems, except the managed forests and national parks, are generally not managed and consequently have become open access resources. Balochistan has a number of game reserves, wildlife sanctuaries, and national parks. A protected area review in 2000 found that many of these protected areas do not meet the globally accepted criteria. Similarly a study in 2012 found many gaps in ecological representation in the protected area system of Pakistan. The strategies to conserve the rich biological diversity of terrestrial ecosystems include: (a) The institutional and regulatory framework will be improved and implemented to address the challenges of the 21st century for conservation of biodiversity, its sustainable use and equitable sharing of benefits; (b) The natural habitats will be conserved through their expansion, including establishment of corridors, and effective management of the protected areas network integrated with the landscapes; (c) Local communities shall be empowered and capacity developed for management of the protected area landscapes; (d) An integrated pastoral management approach will be adopted to improve the health and condition of ecosystems and livelihoods of the pastoral communities; and (e) The knowledge, the science base and technologies relating to biodiversity, its value, functioning, status and trends will be improved and conservation status of known threatened species will be improved. Seventeen actions have been proposed to translate these strategies into action.

8. Forest Ecosystems

The forests not only provide valuable timber and ecosystem services like regulating water, but also produce a large quantity of medicinal and edible plants. The forest area of Pakistan is relatively small and the forest cover is shrinking due both to deforestation and degradation. There is no credible data of forest cover in Balochistan. Pakistan had committed under the UN MDGs to increase its forest cover to 6.0 % by 2015. Pakistan is also obligated to report on the status of forests in a transparent manner to various international conventions and UN agencies. The strategies proposed to conserve forest biodiversity and use it sustainably include (a) providing an enabling institutional and policy environment to integrate biodiversity concerns in the forestry sector; (b) protecting and restoring forest biodiversity including the ecosystem services by following an ecosystem approach; (c) making the plantations biodiversity friendly by increasing the floral diversity; (d) improving the knowledge, the science base and technologies relating to forest biodiversity; and reforming the rights and concessions of local people. Twenty actions are proposed to achieve these strategies.

9. Inland Water Ecosystems

Streams, rivers, natural lakes, and manmade reservoirs are a source of water, fish and important habitats of migratory species. There are over 13 wetland sites which includes 5 wetlands of international importance that have been designated as Ramsar Sites. A number of different government agencies manage and control activities in wetlands. Irrigation is managed by the Irrigation Department while fishing and hunting are regulated by the Fisheries and Wildlife Departments. These agencies have little or no coordination for managing wetlands. The strategies to conserve and make sustainable use of wetlands biodiversity include: (a) revision of the policy, laws, and regulations to ensure conservation of fish and other aquatic organisms, and equitable sharing of benefits; (b) taking appropriate measures to prevent spread of invasive species and their eradication from natural waters; and (c) building the capacity of all stakeholders to sustainably manage wetlands ensuring equitable sharing of benefits. Twenty activities will be taken to implement the strategies.

10. Coastal and Marine Ecosystems

The Arabian Sea has a rich biodiversity and is included in the Global 200 Priority Ecosystem. Over-fishing has contributed to a steep decline in catches of shrimp and many fish species. The programmes aimed at improving the economic status of the coastal communities and increasing exports will address the underlying causes of depletion of these resources. The beaches are nesting grounds of the globally endangered Green sea turtle which faces multiple threats, of which the major threats are egg predation and incidental catch in fishing crafts. Other threats include predation on green turtle hatchlings by sea gulls, crows, foxes, jackals, and stray dogs. Climate change threatens the

coastal communities in Pakistan due to lack of coastal resilience to cyclones. The Climate Risk Index (CRI) for 2012 ranked Pakistan as the 8th most affected country by climate change, and its impact could drive the already economically unstable country further into poverty.

The strategies proposed to sustain marine fisheries and adaptation to climate change include: (a) establishment of a network of protected areas and specific conservation measures taken for recovery of populations of species most in decline; (b) develop the capacity of coastal fishing communities to harvest marine organisms in a sustainable manner; and (c) improve the institutional and regulatory frameworks to address the challenges for conservation of marine biodiversity, through sustainable use and equitable sharing of benefits. Fourteen specific measures will be undertaken to implement the strategies and achieve Aichi Biodiversity targets.

11. Agrobiodiversity

Agriculture and livestock are major sources of livelihoods of rural communities. Excessive use of water, particularly for orchards, is causing shortage of water. Water shortages coupled with global warming pose a serious threat to the food security of the country and livelihoods of people employed in this sector. There is a heavy input of agrochemicals, especially in the irrigated areas and orchards. Conservation of the pollinating insects, soils microorganisms that add fertility, and predators of crop pests has received little or no attention. Substitution of organic manure with chemical fertilizers is adversely affecting soil texture, and contaminating aquifers. Balochistan has diverse agro climatic conditions and rich indigenous crop diversity. Balochistan is one of the world centers on the origin and diversity of cultivated plants. The introduction of high-yield varieties is leading to loss of local cultivars on farms.

Pakistan is the 8th most vulnerable country to climate change, and it is likely to impact the farming system, particularly in arid regions and in mountainous areas. The strategies to make agriculture sustainable and conserve agrobiodiversity include: (a) the principles and practices of sustainable and biodiverse agriculture research and development will be incorporated into national policies, laws, investment strategies, education and extension programmes; (b) all stakeholders, including farmers, the consumers, researchers, and extension specialists will be made aware of the beneficial effects of agrobiodiversity; (c) the models of sustainable agriculture for major crops shall be developed and promoted; (d) the bio diversification of agro ecosystems will be restored in time and space through crop rotations, cover crops, intercropping, crop/livestock mixtures, conservation of pollinators, soil biodiversity; and (e) the use of transgenic organisms would be considered very carefully to ensure that they pose no environmental and health risks or at least no more than the use of current crops and practices. There are 13 actions proposed to implement these strategies.

12. Sustainable Production and Consumption

The Oslo Symposium in 1994 defined sustainable consumption and production (SCP) and the concept was later recognized in the Johannesburg Plan of Implementation, adopted in 2002 at the World Summit on Sustainable Development (WSSD). Sustainable consumption and production is also the aim of goal 2 of the 2030 Agenda for Sustainable Development which requires countries to make fundamental changes in the way that they produce and consume goods and services. The change in patterns of unsustainable consumption and production requires commitment and action of the government, the business sector, non-state actors and individuals.

The productive sector indirectly impacts biodiversity through air pollution, and discharge of industrial waste in the open or in water bodies. There is no large scale use of biodiversity in the productive sector of Pakistan, however, coal mining and other industrial mining and oil exploration industries, the ship breaking industry, and hydel power projects pose direct and indirect threats to biodiversity. Poorly regulated economic development coupled with rapid demographic growth has put acute pressure on the country's natural resource base, especially land and water, and significantly increased levels of local pollution. There are serious ecological, economic, and social costs of infrastructure and a sprawling production sector.

Many species of flora and fauna are collected for trade such as *mazri* (*Nannorrhops ritchiana*) for mats and baskets, medicinal plants, and wild olives, pistachios, and pine nuts for food, etc. Extraction of economic non woody plants is highly unregulated and adversely impacts the health and condition of habitats and threatens species with extinction.

Many species or their parts are smuggled out of the country. There is a growing and unsustainable use of wood for fuel, and increased demand for fish and meat. Biodiverse green cities can play an important role in species conservation.

To conserve and enhance the environment we live in, the proposed strategies include: (a) the awareness of producers and consumers of the social cost and environmental consequences of unsustainable production and consumption will be raised to minimize the ecological foot print of pollution and degradation of natural resources; (b) sustainable consumption and production patterns for the conservation and sustainable use of biodiversity will be fostered through business and biodiversity initiatives; and (c) an active pursuit of strategic environmental impact assessment, economic incentives and enforcement of the laws to achieve the goals of sustainable production and consumption. Eleven actions have been proposed to implement the strategies.

13. Biosafety – Emerging Issues and Challenges

Biotechnology is the use of living systems and organisms to develop or make products, or "any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use" (UN Convention on Biological Diversity, Art. 2). The term Biotechnology covers a wide range of advanced genetic techniques used for changing the characteristics of plants, animals and microorganisms. It includes genetic modification, in which DNA of one or more unrelated organisms is transferred into another organism referred to as Genetically Modified Organisms (GMO).

GMO applications include agriculture, forestry, aquaculture and medicine, with agricultural being the most advanced sector using GM crops. The Cartagena Protocol on Biosafety is about protection of biodiversity from the potential risks posed by living modified organisms (LMOs) resulting from modern biotechnology. Synthetic Biology is newly emerging science that features the "de novo" synthesis of genetic material and an engineering-based approach to develop components, organisms and products. Climate Engineering, also known as geoengineering, is an array of technologies and techniques for manipulating the global climate to moderate effects of climate change. These technologies are commonly divided into two types: (a) methods to absorb and store carbon from the atmosphere; either by technological means, or by enhancing the ability of natural systems (e.g. oceans) to do so; and (b) reducing the amount of heat trapped by greenhouse gases by reflecting sunlight back into space.

The development and release of GMOs is a particularly controversial issue with arguments both for and against them. GMOs released into open fields may cross breed with native plants, which will be hard to control, raising concerns about their potential environmental impacts. To date, knowledge on the risks, benefits and uncertainties related to GMOs and biodiversity is fragmented and not well-developed, therefore prudent approaches are needed in applying GMOs. Synthetic biology applications could also have indirect negative impacts on the conservation and sustainable use of biodiversity. Biosafety rules titled "Pakistan Biosafety Rules, 2005" were made under the Pakistan Environmental Protection Act, 1997, and National Biosafety Guidelines were also issued in 2005. The strategy to safeguard human well-being from adverse effects of living modified organisms aims at building national capacity and taking actions for safe transfer including transboundary movement, handling and use of living modified organisms.

III. IMPLEMENTATION, MONITORING, AND EVALUATION

The implementation, monitoring and evaluation will be an integral component of the BSAP. Effective implementation will require working with and building the capacity of the stakeholders, communicating and reaching out to mainstream biodiversity values in the policy and planning processes, and for people to conserve and use it sustainably; and mobilizing resources for its implementation.

14. Awareness and Capacity Development

A clear understanding of the value of biodiversity is essential to prevent unintended negative consequences of policies for economic development. There is a general lack of understanding of biodiversity and its values and therefore awareness raising and capacity development will be crucial for achieving the results. This will begin with strengthening the capacity of biodiversity related sectors and other stakeholders. It will be achieved through a series of thematic workshops to increase the knowledge of stakeholders, sharing of experiences, and use of relevant tools

and mechanisms. In addition to training, mass and informal communication resources shall be necessary for raising awareness and mainstreaming biodiversity.

15. Plan for Resource Mobilization

Many actions proposed in BSAP will either neatly fit or can be easily accommodated in the on-going development plans of relevant sectors at the national, provincial and regional levels. Simultaneously additional sources of funding will be explored through innovative mechanisms available in the Ministry of Climate Change (MoCC), and other on-going donor projects, for example, the project for REDD+ Readiness, the System for Transparent Allocation of Resources (STAR) under the Global Environmental Facility, etc. In addition, bi-lateral and multilateral donor support will be solicited to meet the short fall in financial resources for achieving the ABTs in an effective and timely manner.

16. Coordination Mechanism

The Forestry Department will have the overall responsibility of coordinating implementation of the BSAP. The implementing partners will be the relevant departments, major international conservation organizations like IUCN and WWF, and other local non-governmental organizations. CBD focal points will be designated in the Planning and Development Department for liaison with the MoCC. The BSAP also proposes the establishment of Steering Committees to ensure that necessary administrative and financial support is available for BSAP implementation and monitoring.

17. Monitoring and Evaluation

The progress on the implementation of the BSAP shall be monitored on an annual basis through a flexible framework of indicators (annex 1) reflecting national circumstances and priorities. The monitoring will not only measure progress towards the achievement of ABTs and BSAP targets, but also help in identification of implementation issues, and in adaptive management for effective implementation of BSAP. An independent mid-term evaluation shall be commissioned, subject to availability of funds, to review the implementation of BSAP and make recommendations for achieving the national targets in an effective and timely manner. Final evaluation of BSAP will be combined with the preparation of the 6th National Report to the CBD.

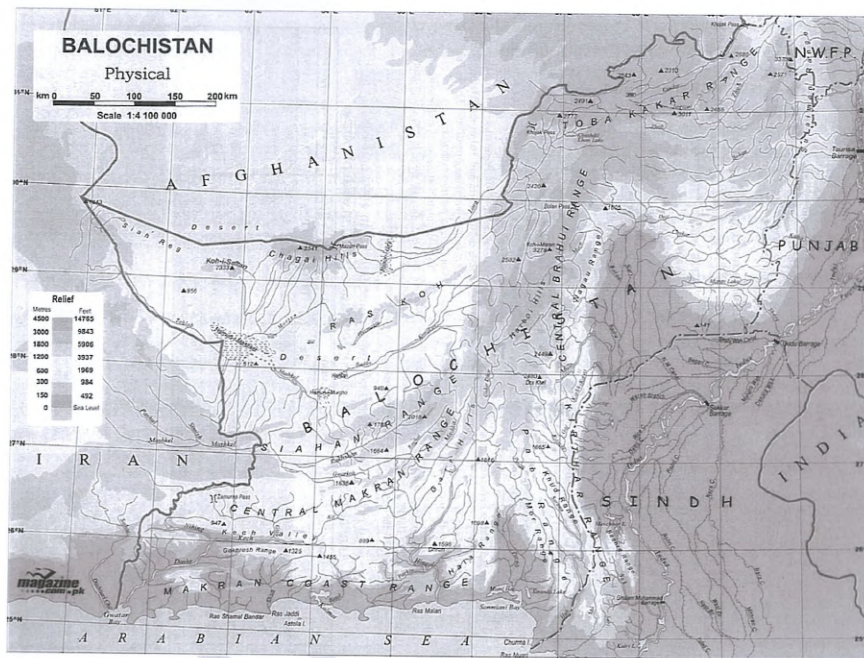


Figure 1: Map of Balochistan

(Source: <http://www.columbia.edu/itc/mealac/pritchett/00maplinks/overview/pakphysical/balochphysical.jpg>)

I. INTRODUCTION

1. Context

Pakistan was among the 150 countries that signed the Convention on Biological Diversity at the 1992 Rio Earth Summit, and ratified it in 1994. National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the Convention at the national level (Article 6). The Convention requires countries to prepare a national biodiversity strategy and action plan and ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities have an impact on biodiversity. A Biodiversity Action Plan of Pakistan was drafted in 1999 and approved by the Pakistan Environment Protection Council in the year 2000.

The Conference of the Parties (COP), the governing body of the Convention, committed themselves to achieving a significant reduction in loss of biodiversity at the global, regional and national level by 2010 as a contribution to poverty alleviation and to the benefit of all life on Earth. A Global Biodiversity Outlook prepared in 2010 reported that the Biodiversity Targets were not met and biodiversity continued to be lost, ecosystems were degraded, and the consequent decline in ecosystem services threatened to undermine human well-being. Against this background, COP-10 held in Aichi-Nagoya, Japan, in October 2010, adopted the Strategic Plan for Biodiversity 2011-2020 with five strategic objectives and 20 "Aichi Biodiversity Targets." (Annex 1) The Parties further agreed to translate this overarching international framework into revised and updated national biodiversity strategies and action plans.

The biological diversity is about more than plants, animals and microorganisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live. (*Convention on Biological Diversity*)

A review of the BAP of Pakistan and implementation of Aichi Biodiversity Targets in Pakistan carried out in 2014 found that while some progress was made, the ecosystems and habitats continue to degrade and loss of ecosystem services threatens the economic well-being and health of the people of Pakistan. Pakistan is in the process of preparing a National Biodiversity Strategy and Action Plan (NBSAP) for implementation of the ABTs. In order to ensure ownership of the provinces, it was decided that the provinces should first prepare their Biodiversity Strategies and Action Plans (BSAP) which would form the basis for the NBSAP. The purpose of a Biodiversity Strategy and Action Plan for Balochistan is to set targets in within the framework of Aichi Biodiversity and to make a positive difference in the health and condition of natural ecosystems and habitats in Balochistan, and contribute to poverty alleviation and the well-being of the people.

2. Geography of Balochistan

Balochistan (Figure 1) is situated in the southwest of Pakistan and covers an area of 347,190 square kilometers (134,050 sq mi). It is Pakistan's largest province by area, constituting 44% of the country's total land mass; but has the smallest population, being home to less than 5% of its population. Balochistan province is bordered by Afghanistan to the north and north-west, Iran to the south-west, the Arabian Sea to the south, Punjab and Sindh to the east, and Khyber Pakhtunkhwa and Federally Administered Tribal Areas to the north-east. Quetta is the capital and largest city of Balochistan.

Physically, Balochistan is an extensive plateau of rough terrain divided into basins by ranges of sufficient heights and ruggedness. Broadly, Balochistan's geographic area can be divided in to four distinct zones: Upper high lands, lower high lands, plains, and deserts. The upper highlands, known locally as Khorasan, rise as high as 3,700 meters, with valley floors about 1,500 meters above sea levels. The highlands include Makran, Kharan and Chaghi ranges in the West and Sulaiman, Pab, Kirthar in the east. The Upper High Lands fall mainly in districts Zhob, Killa Saifullah, Pishin, Quetta, Ziarat and Kalat. It comprises a number of ranges such as Sulaiman, Tobak Kakari, Murdar, Zarghoon, Takatu, and Chiltan ranges. The Lower High Lands have an altitude ranging from 1970 to 3940 ft (600 to

1200 M). They are located in south-eastern Balochistan, except the eastern part of Kachhi, and the southern end of Dera Bugti and Nasirabad districts. Some are extensions of lower high lands that exist at the boundaries of Gwadar, Turbat, Panjgur, Kharan and Chaghi districts. Balochistan has a relatively small area of plains as compared to its total land area. They include the Kachhi plain, situated to the south of Sibi and extending into Nasirabad Division, the southern part of Dera Bugti district, and narrow plain area along the Mekran coast stretching from Kachhi to the Iranian border. The plains of Kachhi, Lasbella and that of the river Dasht cover a sizable area. Mountains dominate the terrain, and valley floors, and piedmont plains make up only 15% of the landscape. The western part of the province, mostly in Kharan and Chagai districts, consists of vast plains covered with black gravel surface and broad expanses of sand dunes. The coastal-line is about 760 Kilometers long, with a number of peninsulas and promontories. The coastal area is not effectively connected with the interior; steep hills rise abruptly beyond the narrow coastal plain. Ports, such as Sonmiani, Pasni and Gwadar are unsheltered.

All rivers and streams are part of three major drainage systems. The Coastal drainage system is characterized by small, ephemeral streams and hill torrents. Rivers and streams that do not possess any significant perennial flow constitute an inland system that dominates the central and north-western area of the province. The Nari, Kaha and Gaj rivers are part of the Indus drainage system located in the north-eastern margins of the province. The flow in rivers is typified by spring runoff and occasional flash floods. The rivers beds are dry and look like small streams. Stream gradients are high and the rate of run off is very rapid. The Zhob River Basin drains towards the northeast into the Gomal River which ultimately joins the Indus River. Streams along the border of Punjab and Sindh provinces flow toward the east and southeast into the Indus River. Central and western Balochistan drains towards the south and the southwest into the Arabian Sea. Some areas located in districts Chaghi, Kharan, and Panjgur drain into playa lakes, locally called "Hamun" such as Humun-e-Lora and Hamun-e-Mashkel etc. The important rivers in Balochistan are Zhob, Nari, Bolan, Pishin, Lora, Mula, Hub, Porali, Hingol, Rakshan and Dasht.

3. Causes of biodiversity loss

The main causes for loss of biodiversity remain the same as were described in the Biodiversity Action Plan (2000). Although conservation efforts since then have created some islands of success, the vast majority of ecosystems continue to degrade, habitats continue to be lost, and many species continue to face extinction. Habitat fragmentation and loss poses a serious threat to biodiversity in all biomes and has advanced to such an extent that no corridors are left to connect the network of protected areas. Consequently many populations of species are confined to isolated small pockets. Habitat loss coupled with over exploitation of selected species for trade, food, and sport have resulted in extinction of some species from the wild and many more are threatened with extinction.

2.1. Deforestation and Forest Degradation

Total land area of Balochistan is 347,190 km² of which forest the forests cover approximately three (3) percent of the area. There has not been any assessment of forest cover in Balochistan; and therefore no data are available on the health and condition of forests. However according to assessments made by the Food and Agriculture Organization (FAO), on an average, Pakistan lost 41.3% of its cover of natural [forest] between 1990 and 2010 but the plantation area increased by 18.6% during the same period, which amounts to a net loss of 33.2% of forests and woodlands (source: FAO in mongabay.com). Communities have rights to graze, collect fuelwood and obtain timber for building huts. Natural regeneration is almost insignificant due to heavy grazing. Therefore it would be reasonable to assume that the situation in Balochistan is no different from the rest of the country. There is a general belief that over population and imprudent behavior of people towards forests are the cause of deforestation. Deforestation is a multidimensional and complex process and is the result of a number of direct and indirect causes including but not limited to conversion of forest lands for other land uses.

2.2. Grazing

Rangelands in Balochistan cover 32.3 million ha or 93% of the total area of the Province. However, these rangelands are overgrazed and deteriorated due to frequent droughts and the tragedy of the commons. Assessment of rangelands in 1983 by FAO reported that out of 21 million ha, 65% of rangelands were in good to poor condition, 30% were unproductive, and 5% were considered inaccessible. Uncontrolled grazing, and cutting and uprooting of shrubs for fuel are major causes of degradation of rangelands. Since 1983, due to anthropogenic pressures, it can be safely

assumed that the condition of rangelands has further deteriorated. In a 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). Above ground dry biomass production varies from 40 to 200 kg/ha in open areas as compared to 200 to 865 kg/ha in areas under protection (Ahmad, et al. 2012). The declining grazing resources and increasing pressure on the rangeland is creating a potential threat to the productivity of rangelands, and ultimately livestock production. Furthermore trends in land use patterns suggested that more and more rangelands are being converted into cultivated land. Furthermore, livestock population is progressively increasing.

Degradation of rangelands reduces the bio-diversity of flora and changes the vegetative composition. Increased competition for grazing affects the wild herbivore population which in turn results in reduced prey, consequently affecting the population of predators. Furthermore, prolonged droughts, transfer of nomadic to village based production systems, and the increase in density of livestock (large flock sizes) have also significantly lowered the productivity of rangelands.

2.3. Fishing

The coast line of Balochistan is approximately 750 km long which is more than 70 percent of the coastline of Pakistan, but provides only around 15 percent of Pakistan's value-added [product] in fisheries. The sector is characterized by a fishing industry where fishermen are catching more and more of limited numbers of species in already over exploited fishing grounds and selling these at low prices. Use of banned nets is not a major issue in Balochistan; however overfishing and fishing in prohibited breeding areas is one of the main causes for loss of fish biodiversity. An assessment made in 1987, by the World Wildlife Fund (WWF) recommended major *decreases* in the fish catch and a continuous degradation to marine fisheries in recent years. Other field investigations have reported mixed opinions by fishermen as to whether there was a decline in the catch. In some villages, the local fishermen reported the catch going down, while in other landing sites they reported no change. Intrusion of boats and trawlers from Sindh and fishing by foreign vessels in the Sindh EEZ are contributing to loss of fish biodiversity.

2.4. Agriculture

The climate of Balochistan is predominantly arid and except for a small area irrigated by canal water from the river Indus, is dependent on irrigation from spring water delivered through traditional subterranean channels (*Karez*), pumping of underground aquifers, and spate irrigation. Only six percent of the area of Balochistan is cultivated, of which sixty percent is cultivated under spate irrigation. The area remains fallow for almost nine months and top soil is lost through wind and water erosion. Crops often fail due to drought or heavy floods. Aquifers have been heavily utilised for horticultural crops due to heavy subsidies on tariffs on power supply, and water supply from springs has declined due to the lowering of aquifers. Vast areas of natural habitat cleared for cultivation under unpredictable rains have lost their productivity and are highly degraded. Rural livelihoods are dependent on precipitation and these were severely affected during the drought of 1998-05. Crops can fail after a seasonal drought, whereas livestock and orchards are vulnerable to persistent drought.

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 un-described crop varieties are reported to grow 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. 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 germ-plasm in Balochistan. The knowledge of wild relatives of agricultural crops found in Balochistan is limited.

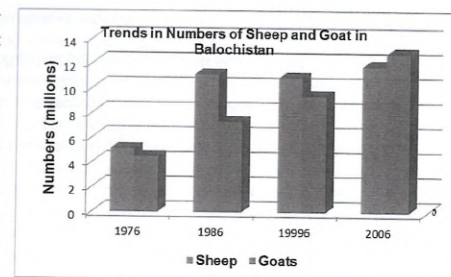


Figure 2: Trends in numbers of small ruminants in Balochistan

2.5. Pollution

Pakistan is located at the gateway of Persian Gulf and 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. There are about 11,000 ships carrying millions of tons of oil every year. 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 tons of furnace oil, was abandoned approximately 112 kilometers south of Pasni. Fortunately, the oil dispersed naturally, but under the influence of wind, waves and currents, a large slick of crude oil could end up on the coast of Balochistan. 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. The Ship breaking industry in Gaddani is a big source of heavy metal pollution in the sea. There is little in the way of sewage disposal in human settlements and industrial areas along the coast. Wastes from coastal villages and industrial estates eventually reach the sea to be redistributed by long-shore currents.

2.6. Global Climate Change

Pakistan ranks 16th on the Climate Change Vulnerability Index (CCVI) by Maple Croft. German Watch also places Pakistan as the "most affected" country for 2010 and in the top 10 for 1990-2010 by climatic changes. Droughts and unprecedented floods in the past few years are clear manifestations that climate change is costing the economy millions each year. Climate change can be expected to have a major impact on Balochistan's agriculture in the form of: (a) a shift in the boundary of crops in the hot regions because of the rise in temperature; (b) a rise in crop water requirement, again because of an increase in temperature (which will put further pressure on groundwater resources); and (c) reduced productivity in dry years, because climate change is likely to make droughts more severe and frequent (World Bank, 2013). Rise in temperatures and droughts will also adversely impact productivity of rangelands and increasing overgrazing will exacerbate the land degradation in Balochistan.

2.7. Population Growth

Pakistan has one of highest population growth rates in the world and is the sixth most populated country in the world. The estimated population of Balochistan¹ grew from 1.17 million in 1951 to about 7.91 million projected in 2010 (Figure 3). High population growth means more pressure on all other national resources, especially the natural resource capital. A Great majority of people living in the rural areas outside of the arable tract are heavily dependent on natural ecosystems for fuel, forage, and small construction timber. With the addition of new households, new ground is broken for agriculture resulting in loss of habitat and land degradation.

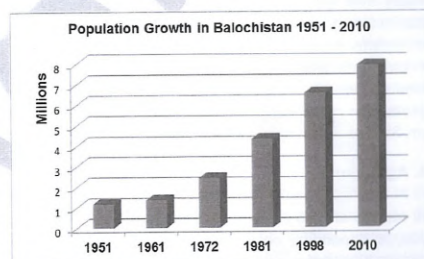


Figure 3: Population growth in Balochistan 1951-2010

2.8. Policy, Planning, and Institutional Failures

The value of biodiversity and ecosystem services, their contribution to the national economy, and potential to alleviate poverty have not been integrated in the national and local planning and development process. Consequently the forestry sector, including climate change, biodiversity, forestry and wildlife, receive a very low priority.

There is neither a national nor a provincial policy for conservation, sustainable use and equitable sharing of benefits arising from the use of biodiversity. The main economic reason behind the loss of biodiversity is the underlying

¹<http://www.pbs.gov.pk/content/population-province-region-1951>

disparity between private interests and social costs associated with the use of biodiversity. The upstream pollution, deforestation, and degradation of ecosystems has small economic gains but huge national costs in terms of quality and quantity of water, and loss of storage capacity for dams for irrigation water and hydropower generation.

A large proportion of the province's natural terrestrial habitats and wetlands are open access resources, or are ineffectively controlled under crumbling common property regimes, the centralized state or absentee landlords. The costs of protecting species and ecosystems from exploitation can be prohibitive for owners, be they government, communities or individuals, who often lack sufficient resources and capacity to enforce regulations or other restrictions. In many areas, the customary community responsibilities for the use of natural resources have weakened with the development of new economic opportunities eroding the need and concern for sustainable use of these resources. This concern has been further eroded by the disempowerment of local communities, for example, by state intervention in the management of community forests.

3. National constitutional, legal and institutional framework

3.1. Biodiversity Legal Framework

Constitution of Pakistan (1973): 'Environmental pollution and ecology' was included in the list of subjects on which both federal and provincial government could legislate, however, under the 18th amendment of 2012, it was made the exclusive domain of the Provincial Assemblies. However, the Parliament is still empowered to legislate on 'international treaties, conventions and agreements and international arbitration', 'national planning and national economic coordination including planning and coordination of scientific and technological research'. The Constitution of Islamic Republic of Pakistan predates the global emphasis on conservation of biodiversity, and thus does not include any reference to it, however, the superior courts of Pakistan have interpreted 'right to life' used in Article 9 of the Constitution and have held that the word 'life' used in said Article encompasses the environment in all its dimensions.

The Balochistan Environmental Protection Act, 2012: The Pakistan Environmental Protection Act of 1997 (PEPA) had been the key environmental legislation instrument for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, and promotion of sustainable development. However, after the 18th constitutional amendment, responsibility for environmental protection was transferred to the provinces, and Balochistan enacted its own environmental law in 2012.

CITES Law, 2012: In order to effectuate the United Nations Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973, the Pakistan Trade Control of Wild Fauna and Flora Act, 2012 (CITES Act) was promulgated which extends to the whole of Pakistan. It prohibits export, re-export and import of any specimen included in any Appendix of CITES and fixes punishment for contravention.² It provides for establishment of a Management Authority with representation from all provinces for making concessions on scientific and legal grounds. This law has significant implications for sustainable harvesting of non-timber forest products, especially medicinal and aromatic plants as it would not only help check unsustainable harvesting practices but would also encourage the beneficiary communities to make sure that such species are conserved and protected so that a sustainable use regime could be put in place to take full advantage of such species.

Access Benefit Sharing Bill, 2012 (Draft): A legislation to provide for facilitating access to genetic resources and their derivatives for environmentally sound uses, protecting traditional knowledge associated with them, equitably sharing benefits derived from them, and promoting technology transfer and building scientific knowledge and technological capacity associated with them was drafted in 2012. The bill is a legislative requirement under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) to which Pakistan is a Party. The draft bill protects community rights in respect to genetic resources, i.e., (1) the inalienable right to use their

² Government of Pakistan, 2012. Pakistan Trade Control of Wild Fauna and Flora Act, 2012.

traditional knowledge in their customary ways, (2) the right to regulate the access to their traditional knowledge, and (3) the right to share the benefits arising out of the utilization of their traditional knowledge.³

3. 2. Provincial Biodiversity and Environment Laws and Regulation

Laws and Regulation for Environment

The Balochistan Wildlife (Protection, Preservation, Conservation) Act, 2014
The Forest Act 1927
The Balochistan Forest Regulation 1890

3. 3. Biodiversity Policy Framework

Balochistan Conservation Strategy (2000): The Pakistan National Conservation Strategy (NCS) approved in 1992, was the first ever policy framework for biodiversity and conservation with three objectives: (a) conservation of natural resources, (b) sustainable development, and (c) improved efficiency in the use and management of resources. The 'biodiversity conservation' was one of the fourteen programme areas of work for priority action, with all programmes directly and indirectly supporting it. The NCS provided biodiversity conservation with renewed an important status in the national policy agenda. The NCS had a central influence in mainstreaming environmental and sustainability dimensions in other policies, plans and strategies, including Pakistan's Eighth Five-Year Plan, which borrowed heavily from the NCS in terms of greening its development objectives.

While NCS served as a good national policy document, the provinces felt the need for strategies suited to their special ecological, cultural and socioeconomic conditions. The Balochistan Conservation Strategy (BCS) was approved in 2000. The report has three parts. The first 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 contains the 'building blocks' of the strategy. The third part is concerned with how the strategy will be implemented, resources mobilized, and progress assessed.

Biodiversity Action Plan, 2000: Although biodiversity considerations started receiving attention in national planning processes after the NCS, it was not until 2000 that a comprehensive Biodiversity Action Plan (BAP) was prepared. The BAP was approved by the Pakistan Environmental Protection Council and thus adopted as the first comprehensive strategic action plan for conservation of biodiversity in Pakistan. It has 13 components, corresponding to specific Articles of the CBD:



National Environment Policy, 2005: The National Environment Policy provides an overarching framework for addressing the environmental issues facing Pakistan, particularly pollution of fresh waterbodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also gives directions for addressing the cross-sector issues as well as the underlying causes of environmental degradation and meeting international obligations. The National Environment Policy, while recognizing the goals and objectives of the National Conservation Strategy, National Environmental Action Plan and other existing environment related national policies, strategies and action plans, provides broad guidelines for addressing environmental concerns and ensuring effective management of their environmental resources at national, provincial, regional and local levels.

National Sustainable Development Strategy, 2012: The National Sustainable Development Strategy (NSDS) envisions 'to evolve a just and harmonious society in the country through promotion of a vibrant and equitable economic growth without overexploitation of natural resources with fair distribution of development dividends to all; in particular to the marginalized, poor and vulnerable in the society and to future generations'. The Strategy is aligned

³ Government of Pakistan, 2012. Pakistan Access to Genetic Resources and Benefit-sharing Act (Draft). Islamabad: Climate Change Division, GoP.

with the emerging concept of a 'green economy' as an alternate to the Framework for Economic Growth (2011), prepared by the Planning Commission of Pakistan.

Climate Change Policy: Balochistan does not have a Climate Change Policy; however, the National Climate Change Policy 2012 is applicable to the province. The National Climate Change Policy, approved by the government in 2012 has an overall goal, 'to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development'. One of the major objectives of the policy is conservation of natural resources and long term sustainability which was further elaborated through specific measures under forestry, biodiversity and other vulnerable ecosystems. The biodiversity related policy measures included setting National Biodiversity Indicators and providing the requisite financial resources for implementation of the Biodiversity Action Plan (BAP).

3. 4. Poverty Reduction Strategies

Balochistan has no separate poverty reduction strategy; however, the province follows the national strategy. Pakistan's national economic strategy cites macroeconomic stability, financial discipline and sound policy as key to broad-based growth, job creation and poverty reduction. Pakistan adopted the process of developing the Poverty Reduction Strategy Papers (PRSP) in 2000. Pakistan's first PRSP was implemented from 2004 to 2006. The PRSP-II⁴, the latest strategy paper, was implemented from 2008 till 2010. The other key policy documents outlining Pakistan's national poverty reduction strategy are Vision 2030⁵ formulated in 2007, and the Medium-Term Development Framework 2011-2014. With the change in the political government in 2013, Pakistan has a new strategic framework entitled Pakistan 2025⁶: One Nation – One Vision. All these documents underscore the importance of the agriculture and rural non-farm sectors to the country's overall poverty reduction strategy, recognizing that they represent valuable sources of employment. Within the agriculture sector, the government has outlined a number of strategic development objectives, including a focus on increasing yields, diversifying cropping patterns, producing high-value crops and investing in livestock and dairy development.

3. 5. Institutional Framework

At the national level, the Forestry Wing of the Climate Change Division is the national focal point for the CBD. The Directorate of Biodiversity in the office of the Inspector General of Forests is responsible for coordination with the CBD Secretariat, and with the national, provincial, regional and local government agencies, and other stakeholders responsible for implementation of the CBD. The downstream linkages of Directorate of Biodiversity remained very weak until recently. It was only during the process of drafting the 5th national report that meetings were held for the first time with the Balochistan government who were requested to designate focal points for the CBD and create a coordination mechanism for engaging the stakeholders in the implementation of the CBD.

In Balochistan, departments of forestry and wildlife, fisheries, environment, and agriculture and livestock are responsible for the management of these sectors. Unfortunately biodiversity considerations have not been mainstreamed in the policy and plans of these sectors and even most professionals are unaware of national obligations under the CBD. The Department of Environment is responsible for providing and enforcing environmental impact assessment guidelines for all economic development projects, regulating industrial and municipal pollution.

International conservation organizations like the International Union for Conservation of Nature (IUCN) and the World Wildlife Fund (WWF) have played a significant role in creating awareness, building capacity, policy development and jointly implementing a new generation of biodiversity conservation projects.

4. Lessons learned from the earlier NBSAP(s) and the process of developing the BSAP

4.1 Progress on Implementation of Biodiversity Action Plan 2000.

⁴ www.finance.gov.pk/poverty/PRSP-II.pdf

⁵ <http://www.pc.gov.pk/vision2030/Pak21stcentury/vision%202030-Full.pdf>

⁶ <http://pakistan2025.org/wp-content/uploads/2014/08/Pakistan-Vision-2025.pdf>

The Biodiversity Action Plan (BAP) was drafted in the year 2000 in response to Article 6 of the UN Convention on Biological Diversity. The 13 components, corresponding to articles of the CBD include: planning and policies, legislation, identification and monitoring, in-situ conservation, ex-situ conservation, sustainable use, incentive measures, research and training, public education and awareness, environmental impact assessment, access issues, exchange of information, and financial resources. The Plan elaborated 25 objectives and proposed 182 actions with 31 to be undertaken immediately within a year, 81 within five years (medium term), and 25 within ten years (long term). Although 14 years have passed since the BAP was approved, its implementation has been far from satisfactory.

The BAP did not have separate targets for provinces, and thus it is difficult to measure progress on its implementation in Balochistan. Therefore the results of a national review undertaken in 2014 are reported here, and the situation in the province is probably no different from progress at the national level. The results of the review (figure 4) show that absolutely no action was initiated on 71 or 52% of actions, and 61 or 44.5% actions were partially or fully completed, with five (5) actions still under implementation. A major reason for lack of proper implementation of the BAP is that the targets were too ambitious without taking into consideration the financial constraints and lack of human resource and institutional capacity. There was a lack of political will and insufficient financial allocation by the government.

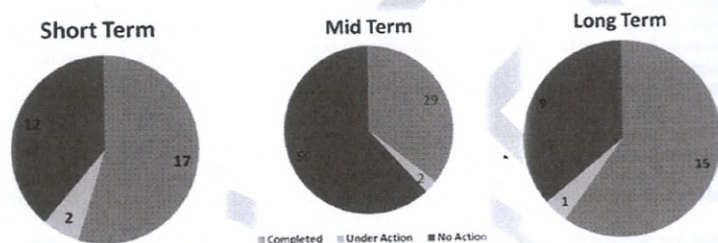


Figure 4: Progress on Implementation of Biodiversity Action Plan

The slow progress in BAP implementation is further attributed to lack of human and financial resources in the Biodiversity Directorate, which resulted in lack of coordination among the stakeholders and non-integration of BAP into development plans and policies.

4.3. Processes for development of BSAP.

A transparent and consultative process ensuring wide participation of a broad range of stakeholders from government, academia and civil society was adopted for the preparation of BSAP. Consultations were also held with a broad range of interest groups – professionals, key resource persons, civil society organizations, and academia and research institutions. The draft was circulated for review to a selected group of resource persons, and the final version was then presented in a consultative meeting of all the stakeholders.

II. NATIONAL BIODIVERSITY STRATEGY: PRINCIPLES, PRIORITIES AND TARGETS

5. Vision

The guiding vision of the Biodiversity Strategy and Action Plan is to make available the benefits of biodiversity and ecosystem services to all segments of society, in particular the marginalized, poor and vulnerable in the society and the future generations by restoring and conserving the rich natural biodiversity heritage of Balochistan, and making its sustainable use based on the principle of equitable sharing of benefits.

Biological diversity - or biodiversity - is the term given to the variety of life on Earth and the natural patterns it forms. The biodiversity we see today is the fruit of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. It forms the web of life of which we are an integral part and upon which we so fully depend (CBD).

6. Goals

1. Conserve biodiversity in priority sites, species and genetic diversity: In pursuing this goal, the focus will be on *in-situ* site specific conservation work, high priority *ex-situ* conservation, wildlife trafficking, and illegal timber trade.
2. Mainstream biodiversity as an essential element of human development: This goal will be to increase awareness of how biodiversity and ecosystem goods and services contribute to human wellbeing, sustain development outcomes; and will promote integration with key sectors such as agriculture, poverty alleviation, climate change, health, democracy and governance, economic growth, and trade.

7. Objectives

The objectives of the Biodiversity Strategy and Action Plan are based on the five strategic goals of the Aichi Biodiversity targets. These are:

1. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
2. Reduce the direct pressures on biodiversity and promote sustainable use;
3. Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;
4. Enhance the benefits to all from biodiversity and ecosystem services; and
5. Enhance implementation through participatory planning, knowledge management and capacity building

8. Strategies and Actions

The strategies and actions to achieve the objectives are organized around major CBD thematic program areas – agrobiodiversity, terrestrial ecosystems, forest biodiversity, inland and coastal wetlands, coastal lands, marine ecosystems and cross cutting issues - biodiversity awareness, mainstreaming, poverty alleviation and environment. The implementation, monitoring and evaluation arrangements are discussed in Part-III.

9. Biodiversity Awareness

There is a general lack of awareness of the importance of biodiversity and need for its conservation and sustainable use. Furthermore social and economic development generally receive a high priority for human wellbeing and often

take place at the cost of loss of biodiversity. Biodiversity is a relatively new concept and acceptance of new ideas is always a long process. Therefore awareness about the consequences of loss of biodiversity and its impact on human well-being is paramount to make people, policy makers and planners part of the solution. National and provincial level outreach and communication strategies would be launched to involve key stakeholders and other important groups to achieve the strategic objectives of the biodiversity conservation, sustainable use, and equitable sharing of benefits. Communication alone would not be sufficient to achieve the desired results and may need to be linked with economic incentives and legal frameworks as a means of achieving change, especially when there are economic or structural barriers to overcome.

Strategies

The following strategies will be adopted and actions taken to make people and policy makers aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

1. Mobilize mass media, especially the print, audio-visual, and digital social media to create public awareness of the values of biodiversity and consequences of its loss.
2. Introduce the knowledge, the values, and consequences of loss of biodiversity in the education system at all levels - schools, colleges and universities.
3. Sensitize policy makers, planners and administrators in development and business sectors through opinion leaders and introducing biodiversity concerns in relevant training academies.

The province will actively participate in the implementation of a national programme of work on awareness raising.

10. Gender, Poverty and Biodiversity Nexus

A vast majority of the poor live in rural areas, many of them are landless or small landholders and rely on goods and services derived from biodiversity and ecosystems for their subsistence. The rural poor gather firewood, forage, and non-timber forest products, and are thus impacted by the loss of biodiversity. The livelihood and sustenance needs of pastoral communities on natural resources are heavy and the loss of biodiversity not only increases their poverty levels but also increases their vulnerability to climate change.

Furthermore, women, men, and children use natural resources differently and therefore conservation programmes built on gender differences will be more socially acceptable and sustainable in the long run. The women and children are responsible for collecting firewood, forage, and other non-timber forest products (NTFPs). Loss of biodiversity or lack of access to natural resources near their homes means increase in their workloads or economic hardship. There are two recent examples of how lack of consideration for the rural poor in planning for natural resource management projects affected their livelihoods. Conservation programmes that limit the access of the poor to resources for sustenance and livelihoods will not succeed in the long term and will contribute to increased poverty, inequality, and resource degradation. Thus gender and poverty considerations cut across all thematic areas of biodiversity conservation and will be an integral component of the relevant strategies and action plans.

11. Mainstreaming Biodiversity in Planning and Policy Processes

The fate of natural ecosystems to a large extent depends on a wide range of government policies and programmes for economic development. This is particularly true for the development of roads, urbanization and industrial development in coastal areas and near inland waters, diversion of river water for agriculture and development of water storage dams. Biodiversity values are not included in the national reporting and the national accounting system of Pakistan. This is primarily due to lack of appropriate valuation of biodiversity, impact of its loss on livelihoods of the poor, and how restoration of ecosystem goods and services can contribute to poverty alleviation. Therefore demonstration of the benefits of investing in conservation and restoration, and the potential contribution for meeting a wider range of economic and policy objectives will be required before values of biodiversity get integrated into planning processes and national accounting and reporting systems. Therefore incorporation of biodiversity values into national accounting and reporting systems is necessary to limit the unintended negative consequences of policy

decisions on biodiversity. This mainstreaming is a slow process and requires a sustained effort over several years and on several fronts.

Strategies

The following strategies shall be adopted for mainstreaming biodiversity considerations in national policies and plans and poverty alleviation programmes:

1. Technical and administrative capacity will be developed for valuation of biodiversity using low cost tools and methods that in addition to economic values recognize social and cultural values.
2. Biodiversity valuation studies shall be undertaken and demonstration projects initiated in ecosystems where people rely heavily on biodiversity for subsistence.
3. The NBSAP shall be adopted as a policy document and a stakeholder Biodiversity Round Table established for mainstreaming biodiversity in policies, plans, and reporting and accounting systems.

The province will actively support the national efforts to undertake ecosystem valuation studies, and incorporation of biodiversity in national accounting and reporting processes.

12. Terrestrial Ecosystems

12. 1. Context

By virtue of its large area, sparse human population and diverse landscape, Balochistan province has the potential for a diverse flora and fauna. The diverse climatic zones have contributed to a set of ecological zones resulting in unique faunal and floral biodiversity. There has been no systematic mapping and description of the ecosystems of Balochistan. Ahmed and Ahmad (2000) prepared a vegetation map of Balochistan based on NOAA satellite data of 1992. According to this map, apart from the agricultural land and rock outcrops, thirteen different vegetation types were recognized. The people of Balochistan have historically survived on its flora and fauna over thousands of years. The excavations at Mehrgarh show that wild animals were first hunted and then domesticated. Wild plants were selected and cultivated, making settled agriculture and urban life possible.

Balochistan has some of the world's rarest animals and plants which are now endangered because of their over-utilization and loss of natural habitat. In addition, some species of flora and fauna with a restricted range are found in Balochistan. Many of the species have become either extinct or highly endangered like the Balochistan Black Bear, Leopard, Hyena, Honey Badger, Indian Wolf, etc. Consequently, conservation and sustainable use of the wild natural resources is necessary so that the people of Balochistan continue to benefit in the future from the diversity of plants and animals which characterize the province. This would not be possible without their active participation to make conservation and sustainable use happen.

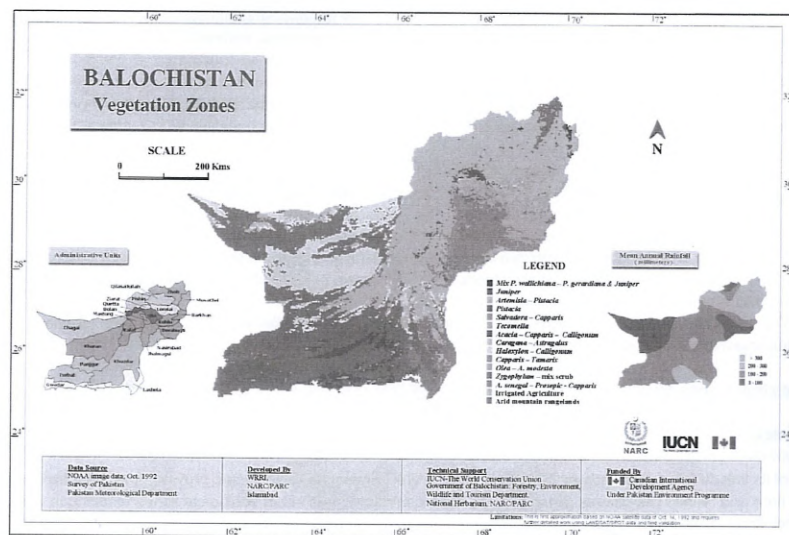


Figure 5: Map showing vegetation types of Balochistan

12. 2. Major Ecosystems & Habitats

Juniper Ecosystem: The Juniper forest type occupies high mountainous areas; these are old forests, and some of the Juniper trees are estimated to be more than 1500 years old. The forest is sparsely stocked. The characteristic Dry Temperate vegetation includes *Juniper excelsa* (obusht) as the main tree species with *Fraxinus xanthoxyloides* (wild ash) and *Pistacia khinjuk* (wild pistachio) as key associates, which occupies favorable sites.

Table 1: Numbers of different species of flora and fauna in Pakistan and Balochistan

	No of Species in Balochistan	No of Species in Pakistan	Endemic Species in Balochistan
Fauna			
Mammals	71	174	2
Birds	356	668	0
Reptiles	94	177	7
Amphibians	8	20	0
Freshwater fish	61	198	8
Flora			
Known species of higher plants	1500	5721	-

Chilghoza Pine Ecosystem: The Chilghoza pine forests consist of open to dense stands of mature and over-mature trees. Over-mature trees have dead tops and dead branches. The broad-leaved associates are *Prunus amghdalis*, *Fraxinus xanthoxyloides*, and *Pistacia khinjuk*. It occupies the Shinghar, Kaisaghar and Speraghat hills in Zhob and Sherani districts.

Olive-Pistacia-Ash Ecosystem: A typical stand of Pistacia-Ash type constitutes an open to dense growth of Pistacia and Ash trees. Most trees and useful bushes have been eliminated from the forests. Only thorny bushes such as *Caragana sp.* (makhi), *Prunus sp.* and *Berberis sp.* are found occasionally. On the slopes, scanty growth of *Haloxylon sp.* and *Artemisia sp.* is found. This is the predominant type of vegetation in Balochistan. It occupies lands above 1,220 meter (4,000 feet) and below the coniferous types. It is found all over Balochistan. The forest, owing to its location on medium slopes and usefulness, has received the maximum anthropogenic damages.

Olive-Acacia Ecosystem: The Olive-Acacia forests are generally composed of an open cover of savannah vegetation. The main trees are *Olea ferruginea* and *Acacia modesta*. The predominant shrubs are *Dodonaea sp.*, *Gymnosporia spinosa*, *Nannorrhops ritcheana* and *Zizyphus nummularia*.



This type is found in eastern parts of Sibi, Loralai, Musakhail, Zhob and Khuzdar districts, and adjoining areas of Lasbella district.

Tropical Desert Ecosystem: This type of forest is very open. The main species are *Salvadora oleoides*, *Maerua crassifolia*, *Capparis decidua* and *Acacia jacquemontii*. This type occurs in Mekran, Lasbella, Sibi and Khuzdar areas.

Plain Desert Ecosystem: The Plains Desert Forests is a part of the Indus Plains Tropical Thorn Forests. The main species are *Prosopis cineraria*, *Salvadora oleoides*, *Salvadora persica* and *Capparis decidua*. The main type occurs in alluvial plains of Porali River in Lasbella district while the Pat sub-type occurs in Kachhi plains as shown in the picture below.

Mangrove Ecosystems: Mangroves of Balochistan are unique in the sense that three important species are found in a mixed crop, which include *Avicenia marina*, *Rhizophora mucronata* and *Ceriops tagal*. The mangrove forests are located on three sites on Balochistan Coast: MianiHor Complex (Dam, Bhera, Pir Hayat, Guru Chela); Kalmat Hor Complex (Makola, Kawari, Mal, Chandi); and Gwatar Bay Complex (Jiwani, small pockets in creeks).

Of the total land area, more than 70 percent area is neither suitable for agriculture nor fit for forestry (figure 6). The predominant land use of the area is grazing and fuel wood collection. The ecological health of these ecosystems has not been assessed; however, over the years, there has been a continued deterioration of these lands, largely as a result of three factors — frequent droughts and the "tragedy of the commons" — overgrazing, cutting and uprooting of vegetation for fuel.

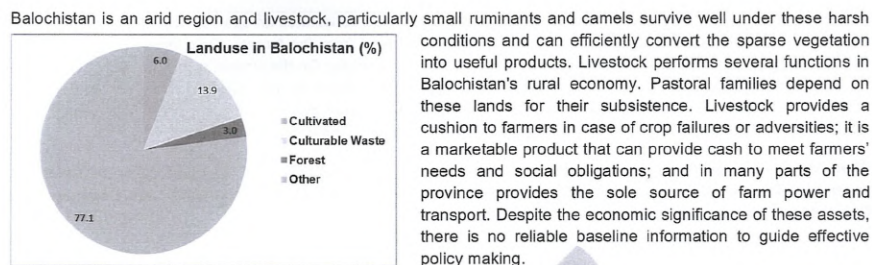


Figure 6: Land use patterns in Balochistan

A large number of research and development projects to apply North American style range management have not been successful so far. Range management has not been successful outside of North America and Australia because of wide social, cultural and land tenure differences. The pastoral systems in different parts of the country differ widely and thus would require different management approaches. Other than agricultural and forest lands which comprise less than 40% of the area, vast areas of land that are considered 'wastelands' need to be managed to control land degradation and desertification, improve ecosystem services and livelihoods, and conserve biodiversity. The existing forestry, agriculture and livestock departments are not set up to deal with integrated natural resource management, and therefore require the establishment of an independent government agency to manage these lands.

12. 3. Conservation and Sustainable Use of Biodiversity

As already mentioned, roughly more than 75% of the land of Balochistan is a common property resource and not being managed in any way. Although there are rules to protect a few plant species, there has been no serious effort to enforce the law. Among the species of fauna, primarily game species, together with some charismatic species, collectively referred to as wildlife, have historically received legal protection since the time of British rule. The wildlife act of 1974 provided for the setting aside of habitats as game reserves, wildlife sanctuaries, or national parks. Since then, the numbers of such areas have steadily increased, but only a few sites are managed effectively. A list of protected areas is given in annex 3. The initial selection of sites for notification as game reserves and wildlife sanctuaries was done to protect wildlife in areas well known for game hunting. Except for stricter enforcement of wildlife laws to control hunting, none of these sites, except a few national parks, are managed under a plan.

While conservation has historically been an agenda of the government alone, Balochistan was the first province to encourage and support conservation by local communities. The tribal leaders from Torghar Mountains made a start with the financial and technical support of US Fish and Wildlife Service for conservation of Straight Horned Markhor and Afghan Urial. The project, which has been in effect since 1985, has increased the Torghar Hills population from fewer than 200 animals in the mid-1980s to more than 3,000 animals today. This growth can be attributed to the substantial reduction in mortality when uncontrolled hunting by tribes was stopped, as well as the virtual elimination of poaching driven by the hiring of more than 80 game guards from the local population.

Table 2: Number and area of different types of Protected Areas

	Number	Area Ha	Percent of Area
National Parks	2	646,500	1.9
Wildlife Sanctuaries	14	967,608	2.8
Game Reserves	8	409,719	1.2
Community Conservation Areas	1		
Total	25	2,023,827	5.9

The number and kind of different protected areas established to achieve the long-term conservation of nature with associated ecosystem services and cultural values are given in table 2

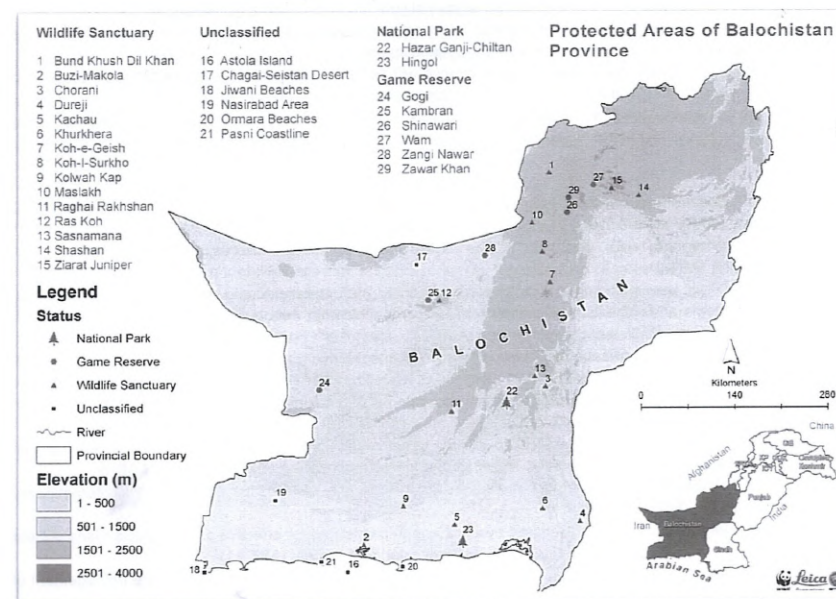


Figure 7: Map showing protected Areas of Balochistan

A large number of the sites do not meet the internationally recognized definition of protected areas. Also, there has neither been an assessment of the biodiversity of these areas, nor monitoring of the changes in their ecological health or contributions to human well-being. A protected area gap analysis undertaken in 2012 found many gaps in representation and management of the protected area system of Balochistan.

Pakistan is also a signatory to the Convention on Conservation of Migratory Species (CMS) also known as the Bonn Convention. It is an intergovernmental treaty that aims to conserve migratory animal species over the whole of their migratory range. The Siberian Crane is a critically endangered migratory species and for its conservation, the CMS Secretariat developed a Memorandum of Understanding (Siberian Crane MoU) in early 1993 proposing conservation measures, and Pakistan signed it in 1998. The population of Siberian (Central Asian flocks) that used to visit Pakistan in winters is thought to have become extinct now. A memorandum of understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia (Raptor MoU) was concluded under the auspices of the CMS in 2008. It is an inter-governmental agreement to conserve migratory birds of prey in the Africa and Eurasian region. It was signed by Pakistan in 2008.

12. 4. Strategies and Actions

The following strategies will be adopted and actions taken to fill the gaps in the protected areas and recovery of population of threatened species, implement the CBD programme of work on protected areas, and the ABTs.

Strategies:

1. The institutional and regulatory framework will be improved and implemented to address the challenges of the 21st century for conservation of biodiversity, its sustainable use and equitable sharing of benefits.
2. The natural habitats will be conserved through the expansion, including establishment of corridors, and effective management of the protected areas network integrated with the landscapes.
3. Local communities will be empowered and capacity developed for conservation of ecosystems and effective management of the protected area landscapes.
4. An integrated pastoral management approach will be adopted to improve the health and condition of ecosystems and livelihoods of the pastoral communities.
5. The knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends will be improved and the conservation status of known threatened species will be improved.

Actions:

1. Institutional effectiveness and efficiency will be enhanced by 2017 to ensure effective management and monitoring of the biodiversity resources. (ABT 17)
2. The policy and legal framework will be improved to meet the conservation challenges of the 21st century. (ABT 2)
3. A GIS will be established for assessing health (deforestation) and condition (degradation) of ecosystems and habitats, and maps prepared compatible with remote sensing technologies to identify conservation priorities and opportunities (ABT 19).
4. An ecosystem classification system using agreed international standards including broad indicators of biodiversity will be developed. (ABT 19)
5. At least 20% of the degraded pastoral ecosystems of ecological significance will be restored and managed effectively. (ABT 15)
6. A study will be conducted by 2017 to identify negative incentives and propose positive incentives that will reduce and ultimately halt the degradation and fragmentation of ecosystems. (ABT 3)
7. The lists of protected areas will be refined to include only those sites that meet the internationally recognized definition. (ABT 11)
8. Management plans will be prepared by 2017 and implemented for effective and equitable management of protected areas (annex 3) integrated into the wider landscapes. (ABT 11)
9. Local communities will be empowered and their capacity built to both collaborate in the management of PAs and to make sustainable use of common property natural resources. (ABT 11)
10. Local communities will be empowered and their capacity built by 2017 to establish community conservation areas for sustainable sport hunting. (ABT 3)
11. The protected areas network will be expanded by 2020 to cover at least 17% of terrestrial area to fill in the gaps (annex 4) in the protected area system and to establish corridors between fragmented habitats of threatened species. (ABT 11)
12. Mechanisms will be developed and put in place to ensure the financial sustainability of the protected areas. (ABT 11)
13. The gap between the scientists and conservationists will be bridged to improve the knowledge and practice of biodiversity conservation. (ABT 19)
14. Recovery plans will be prepared and implementation to improve the conservation status of major threatened species of flora (annex 2). (ABT 12).
15. Biodiversity values will be integrated in the accounting and reporting systems. (ABT 2)
16. The targets for conservation of ecosystems, habitats and species will be integrated in the annual and medium term development plans. (ABT 20)
17. Additional financial resources if needed for implementing NBSAP will be mobilized by 2016 to meet (ABT 20)

13. Forest Ecosystems**13.1. Context**

There is no credible data of actual forest cover in Balochistan. The official statistics of forest cover represent the physical area and not the true forest cover. The FAO State of Forests (2001), reported the total forest area of Pakistan (sum of natural forests plus forest plantation) decreased from 2.75 million ha in 1990 to 2.36 million ha in 2000 or a 1.5% annual rate of deforestation over a ten year period. On the other hand, a recent assessment by Pakistan Forest Institute reports a net increase of 530,000 ha in forest cover of natural forests in Balochistan (GoP, 2004). Irrespective of the variations in the assessment of forest cover, one thing is obvious: that the forestry capital of Balochistan is relatively small and the forest cover, even if not shrinking is highly degraded under growing anthropogenic pressures.

The forests of Balochistan are grouped into four physiognomic classes – Conifers, scrub, riverine, and plantations. The area of different forest types is given in table.3 (GoP, 2004). The forests are like small islands in a vast ocean of rapidly growing population and consequently faced with a number of threats. Due to short supply and growing demand, prices of timber and fuelwood are high and consequently illegal cutting of trees for fuel and timber for sale is a way of livelihood for many landless and marginalized people. The people living near forests also depend on fuelwood for cooking and heating their homes in the winter. After having run out of fuelwood on their own or communal lands, the pressure is now on the forests. The local people also let their animals loose to graze in forest areas, which hampers natural regeneration due to trampling and browsing of seedlings. Nationwide, the magnitude of various threats estimated on a scale of 1 -10 in different forest types is shown in figure 7.

Table 3: The change area of different forest types 1992-2004 (PFI, 2004)

Forest Type	Year			Annual rate % of base year 1992	
	1992	1997	2001	5 Year	10 Year
Conifer	42	39	35	1.43 (-)	1.67 (-)
Scrub	504	402	402	6.03 (+)	2.07 (-)
Riverine	20	13	13	7.00 (-)	3.50 (-)
Mangroves	2	1	2	10.00 (-)	0.00
All Forests	568	709	452	4.96 (+)	2.04 (-)
Rangelands	12,566	8,901	8,952	5.83 (-)	2.87 (-)
All Types	13,134	9,601	9,404	5.37 (-)	2.84 (-)

There is no forest policy in Balochistan, and before the 18th constitutional amendment, policy making was primarily done at national level. Now, the process for formulation of a forest policy for Balochistan has been initiated. The Balochistan Forest Regulation, 1890 and The Forest Act, 1927, were amended, from time to time, to suit the needs; but now, these acts have been merged and updated, according to present day challenges, and are in process of being enacted.

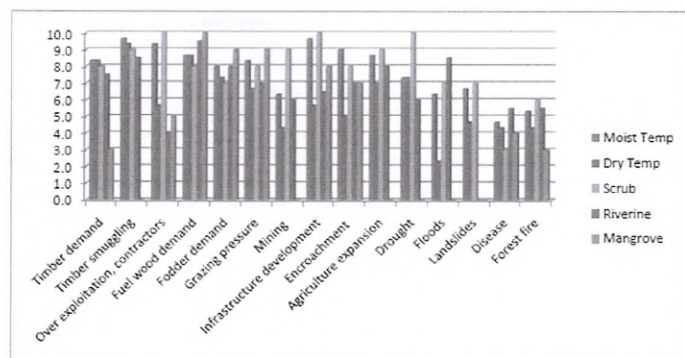


Figure 8: Magnitude of different threats on forests in Pakistan

13.2. Conservation and Sustainable Use of Forest Biodiversity

Although the stated objectives of forest management include multiple uses, for example, ecosystem services like water, clean air, non-lumber forest products, recreation, and meeting needs of local people, yet in actual reality the focus in Balochistan has primarily been on watch and ward. Efforts have been made in the past to enrich the degraded forests through natural regeneration assisted through seeding and planting saplings. However results have been mixed because of the arid climate, prolonged droughts and increasing anthropogenic pressures. Some forest areas have also been notified as protected areas under the wildlife laws.

Under the United Nations Millennium Development Goals (MDG) in 2005, Pakistan committed to increase its forest cover from 4.8 to 6.0 % by 2015. Pakistan is obligated to report on the status of forests in a transparent manner to various international conventions and UN agencies. WWF Pakistan has been entrusted with task of forest mapping to estimate the national forest cover based on district maps.

13.3. Strategies and Actions

The following strategies and actions are proposed to address the above issues, implement the CBD Programme of Work on Forest Biological Diversity and contribute to the implementation of Aichi Biodiversity Targets 2011-2020.

Strategies

1. An enabling institutional and policy environment will be created to mainstream biodiversity conservation and sustainable use considerations in the forestry sector.
2. The forest biological diversity including the ecosystem services will be protected and restored through adoption of an ecosystem approach for management of all types of forests.
3. Collaborative or joint forest management approaches will be piloted in different forest ecosystems to reduce the anthropogenic impacts by improving livelihoods of local people based on sustainable use of components of biodiversity.
4. The plantations shall be made biodiversity friendly by increasing the floral diversity.
5. The knowledge, the science base and technologies relating to forest biodiversity, its values, functioning, status and trends will be improved to prevent loss of forest biodiversity, and mitigation measures adopted including reform of the rights and concessions of local people.
6. Climate Change mitigation measures will be adopted and rights and concessions of local people will be reformed.

Actions

1. Institutional capacity will be enhanced by 2017 to ensure effective management and monitoring of forest and ecosystem biodiversity resources. (ABT 17)
2. Forest and forest related policies, laws and regulations will be reviewed by 2018 to provide a sound basis for conservation and sustainable use of forest biological diversity. (ABT 2)
3. A forest classification system using agreed international standards including broad indicators of biodiversity will be developed. (ABT 19)
4. A GIS will be established for assessing the health (deforestation) and condition (degradation) of forest ecosystems and maps prepared will be compatible with remote sensing technologies to identify conservation priorities and opportunities (ABT 19).
5. Representative forest landscapes of special importance for biodiversity will be designated as Forest Biodiversity Reserves by 2016 and effectively managed. (ABT 11)
6. Tree plantations will be made biodiversity friendly to play a significant role for conservation of the pollinators, avifauna and serving as corridors between fragmented habitats. (ABT 11)
7. Suitable ecosystem approaches will be developed by 2016 and piloted in different forest ecosystems; and training workshops held for managers for their application. (ABT 7)
8. A GIS will be established by 2017 to prepare a baseline and monitor the health (deforestation) and condition (degradation) of forests using remote sensing techniques and impact on biodiversity and ecosystem services. (ABT 19)
9. Collaborative or joint forest management approaches based on equitable sharing of benefits will be piloted by 2017 in different forest ecosystems. (ABT 3)
10. At least 25 percent of all degraded forest ecosystems will be restored by 2020 to improve their resilience and contribution to carbon stocks. (ABT 15)
11. Rights and concessions of local people in State Forests will be reformed and effectively managed. (ABT 5)
12. The Code for the preparation of management plans will be revised by 2018 to incorporate the ecosystem approaches for sustainable management of forests and biodiversity (ABT 7).
13. Management Plans based on ecosystem approaches will be prepared by 2020 and effectively implemented in all state forests. (ABT 7)
14. A programme will be launched to promote sustainable land use of common property resources. (ABT 5)
15. Recovery plans will be prepared and implemented by 2018 to improve the conservation status of important threatened species of plants (annex 2). (ABT 12)
16. Landscapes that provide essential services related to water for major dams, and contribute to health, livelihoods and well-being of local communities will be restored by 2020 and safeguarded. (ABT 14)
17. The gap between the scientists and conservationists will be bridged to improve the knowledge and practice of biodiversity conservation. (ABT 19)
18. Biodiversity values will be integrated in the accounting and reporting systems. (ABT 2)
19. Measures to achieve the targets for conservation of forest biodiversity will be integrated in the annual and medium term development plans. (ABT 20)
20. Additional financial resources if needed for implementing NBSAP will be mobilized by 2016 to meet (ABT 20)

14. Inland Water Ecosystems

14.1. Context

An Inland water 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. There are 13 perennial and ephemeral river systems in Balochistan. The flow in the rivers is characterized by spring runoff and occasional flash floods. Inland fisheries produce about 5.7%⁷ of all the fish production of Balochistan, and almost entirely from open-water capture fisheries, predominantly from small dams which are often stocked with the fry of Indian and Chinese carps provided free from government hatcheries (World Bank, 2013).

⁷WB Report Report No: ACS2258 v4

14.2. Conservation and Sustainable Use

Fishing rights in freshwater bodies are distributed under a contract system whereby the rights are auctioned off. The current system of auctioning short-term fishing rights with inland water fishing is not ideal from a conservation, sustainable use and equitable sharing of benefits point of view. Various options for co-management of inland water bodies need to be explored.

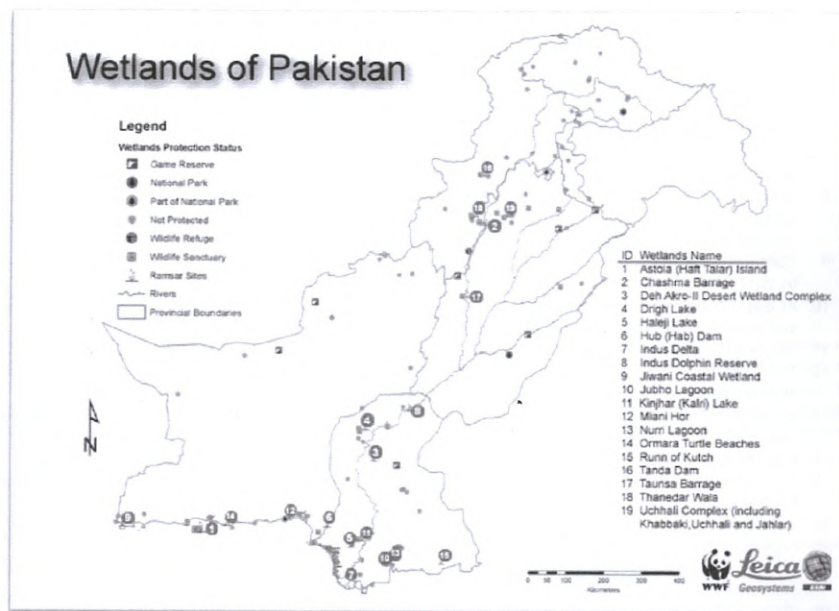


Figure 9: Map showing wetlands of Pakistan

The wetlands of Pakistan are important wintering grounds for migratory species from Europe and Central Asia. There are 22 wetlands in Balochistan (annex 5) of which only eight wetlands have some sort of protection status. Pakistan ratified the Ramsar Convention in 1975 and five wetlands of international importance in Balochistan have been designated as Ramsar Sites. Pakistan prepared an action plan for conservation of wetlands in 2000 but this was not implemented.

The conservation and sustainable use of wetlands received first comprehensive attention through a GEF project "Pakistan Wetland Programme" which started implementation in 2005 with a focus on creating an enabling environment through the establishment of sustainable institutions; enhancing planning and land-use decision-making; development, adoption and implementation of a National Wetlands Conservation Strategy (NWCS); enhancing the technical competence of government agencies and communities; raising nation-wide wetlands awareness; and securing long-term financial sustainability of wetlands conservation initiatives. In response to the need to generate practical, replicable examples of viable wetlands conservation practice in Pakistan, four demonstration sites were established by the Project in different eco-regions for development. Makran Wetland complex along the Balochistan coast was one of the four sites selected in Pakistan for demonstration of viable wetland management practices.

While the basic foundation for conservation and sustainable use of wetlands biodiversity has been laid, the efforts need to be continued to achieve fruitful results. The following strategies and actions are designed to implement the CBD programme of Work "Inland Waters Biodiversity" and Aichi Biodiversity Targets.

14.3. Strategies and Actions

While the basic foundation for conservation and sustainable use of wetlands biodiversity has been laid, the efforts need to be continued to achieve fruitful results. The following strategies and actions are designed to implement the CBD programme of Work "Inland Waters Biodiversity" and Aichi Biodiversity Targets.

Strategies:

1. The biodiversity considerations shall be included in the policy, legal, and regulatory frameworks to ensure conservation of fish and other aquatic organisms, and an equitable sharing of benefits.
2. Appropriate measures shall be taken to prevent the introduction of freshwater invasive species and control their spread to other areas, and where feasible, invasive alien species will be eradicated in habitats of significant biological diversity.
3. The capacity of all stakeholders shall be developed to sustainably manage fisheries and aquaculture, and ensure the equitable sharing of benefits.

Actions

1. An effective coordination mechanism will be established for integrated management of water, fish, and wildlife resources of wetlands. (ABT 6)
2. The institutional capacity will be strengthened by 2016 for effective enforcement of laws, and sustainable management of the wetlands. (ABT 17)
3. Biodiversity considerations will be incorporated in fisheries policies, laws and regulations by 2017 to ensure sustainable use and equitable sharing of benefits. (ABT 2)
4. A procedure for the sustainable harvest of fish stocks will be developed by 2017 and implemented to minimize impact on threatened species and vulnerable habitats. (ABT 6)
5. A baseline survey will be undertaken by 2017 to assess the biodiversity of key inland wetlands and establish a system to monitor at regular intervals the status of species most in decline. (ABT 6)
6. Wetland protected areas will be established by 2019 covering at least 15% of wetlands of biodiversity significance and effectively managed together with the surrounding landscapes. (ABT 11)
7. Management plans will be prepared by 2017 and implemented for integrated management of RAMSAR sites annex 6) including the surrounding landscapes (ABT 11).
8. The spread of alien species will be prevented by 2017 through appropriate measures to prevent their escape into natural habitats from hatcheries and aquaculture. (ABT 9).
9. The impact of alien species in wetlands of biodiversity significance will be assessed and measures taken to control and ultimately eradicate invasive alien species by 2020. (ABT 9)
10. Important wetland habitats of national biodiversity significance together with surrounding landscapes will be co-managed with custodial communities by 2017 through their empowerment and building capacity for conservation and sustainable use. (ABT 6)
11. Plans will be prepared by 2017 and implemented for recovery of depleted freshwater fish species (annex 2). (ABT 12)
12. The gap between the scientists and conservationists will be bridged to improve the knowledge and practice of biodiversity conservation. (ABT 19)
13. Biodiversity values will be integrated in the accounting and reporting systems. (ABT 2)
14. The targets for conservation of inland water ecosystems will be integrated in the annual and medium term development plans. (ABT 20).
15. Additional financial resources if needed for implementing NBSAP will be mobilized by 2016 to meet (ABT 20)

15. Coastal Areas and Marine Ecosystems

15.1. Context

The bulk of the population inhabiting the 1,129 km long coast line in Balochistan is employed in, or dependent upon marine fisheries. The estimated number of fishermen is about 43,865; out of which, 33,255 are employed on a full time basis, 13,144 on a part-time basis, and 6,413 on an occasional basis. The Balochistan coast hosts more than 30 species of shrimp, 10 species of crab, 5 species of lobster and about 70 commercial species. About, 36 species are of commercial nature and total quantity of Fish Landing on the Balochistan Coast is 143,000 M. tons; the value of Fish Landing amounts to Rs. 13.40 billion (Word Bank, 2013). More than 135,000 Tonnes (T) of fish was caught in 2011 by an estimated 52 thousand [52,000] fishermen operating 7,186 boats. This represents a third of the total Pakistan catch; Sindh, with its much wider continental shelf accounts for the remainder of the marine catch.

The major species caught were sea catfish (20,518 T), hairtail (14,661 T) and sardines (10,918 T). There have been considerable variations in catch of individual species groups over the years, though the total catch has not varied more than about 7% in the last 10 years. The catch is worth more than PKR12.698 million, contributing less than 1% to Pakistan's Gross Domestic Product (GDP). It is estimated that 300,000 people are dependent on the industry. Fishing activity is concentrated in eight larger ports/landing sites, with another 30 smaller sites. Of these, Gwadar and Pasni are the most important; both are in the Gwadar District (Word Bank, 2013). There is a serious problem of poaching in Balochistan's territorial sea (out to 22 km or 12 nautical miles) with trawlers from Sindh Province. These vessels tend to use gears such as trawls and seines, which are banned in Balochistan and are very destructive.

15.2. Conservation and Sustainable Use

A major issue for conservation of marine biodiversity is to address overfishing in marine capture fisheries. There is a need to limit new entry into the fisheries to avoid a collapse in fish catches and with it, the subsequent economic and social crises. To address the overfishing issues, a shift in fisheries management approaches are required, away from the present day free for all practices to a more structured approach of co-management with the users of the resources. This requires a revision of marine fisheries policy, legislation and supporting regulatory frameworks. Both the fisheries policy and the underlying legislation and regulations for all fisheries are out of date and urgently need revising to reflect modern fisheries management principles (including co-management) and Pakistan's international fisheries treaty obligations.

The marine environment is under stress from anthropogenic factors associated with overfishing and improper fishing practices, coastal development, sedimentation, land-based sources of pollution and marine pollution. On top of that, the biggest threat to corals is the increase in sea surface temperature as a result of climate change. Global action is required to mitigate climate change. The options for tackling these issues involve building resilience in the coral ecosystems through reduction of over-fishing and the establishment of marine protected areas (MPAs). MPAs are regarded as the best management tool for conserving coral reefs and other marine environments because their no-take zones provide a safe haven for populations to grow and to subsequently replenish the surrounding marine environment.

The various turtle conservation initiatives, reforestation of mangroves, the GEF funded wetlands project, Indus for All programme of WWF and Mangroves for Future of IUCN laid the foundation for conservation and sustainable use of wetlands biodiversity. However, the efforts need to be scaled up to prevent loss of biodiversity and make adaptations for the impending impacts of climate change, especially to protect the poor and marginalized.

The following strategies and actions are designed to implement the CBD programme of Work "Inland Waters Biodiversity" and Aichi Biodiversity Targets.

15.3. Strategies and Actions

Strategies

1. A network of protected areas shall be established and specific conservation measures taken for recovery of population of species most in decline to enhance the resilience of marine biodiversity to climate change.
2. The capacity of coastal fishing communities will be developed to harvest marine organisms in a sustainable manner.
3. The institutional and regulatory frameworks will be improved to address the challenges of the 21st century for conservation of marine biodiversity, through the sustainable use and equitable sharing of benefits.

Actions:

1. Laws, regulations, and policies shall be updated or drafted by 2016 incorporating biodiversity concerns and effective management of marine biodiversity on sound ecological principles and to prevent the threat of extinction of utilized species. (ABT 6)
2. The capacity of fisheries departments will be strengthened by 2016 to ensure compliance with laws and regulations for harvesting fish and invertebrates within sustainable harvest limits. (ABT 19)
3. An assessment of stocks and limits of sustainable harvest levels of major species will be determined by 2016 and strictly enforced. (ABT 6)
4. The population of known threatened marine species, particularly of those in most decline (annex 2) will be monitored regularly starting 2016 and remedial measures taken to improve and sustain their population (ABT 12).
5. Pilot projects will be launched by 2017 to develop and test approaches for organizing, empowering, and building capacity of coastal communities to sustainably harvest fish and invertebrate stocks. (ABT 6)
6. Marine Protected Areas covering at least 10% area of marine biodiversity significance will be established by 2017 and managed effectively as seascapes for conservation and sustainable use. (ABT 10, 11)
7. Management plans for mangrove forests will be prepared based on an ecosystem approach and effectively implemented by 2018 (ABT 5)
8. A pilot project will be launched by 2017 for restoration of at least 3,500 ha of degraded mangrove ecosystems jointly with the custodial communities on sustainable use principles and equitable sharing of benefits (ABT 15)
9. The number of operating fleets will be capped at 3,000 by 2020 to prevent over exploitation of marine fish and invertebrate resources. (ABT 6)
10. At least 1000 fishing boats will be modified by 2020 to improve the outdated fishing methods. (ABT 6)
11. The gap between the scientists and conservationists will be bridged to improve the knowledge and practice of biodiversity conservation. (ABT 19)
12. Biodiversity values will be integrated in the accounting and reporting systems. (ABT 2)
13. The targets for conservation of coastal areas and marine ecosystems will be integrated in the annual and medium term development plans. (ABT 20)
14. Additional financial resources if needed for implementing NBSAP will be mobilized by 2016 to meet (ABT 20)

16. Agro biodiversity

16.1. Context

Agropastoral system is central to economic growth and development in Balochistan and way of life for a vast majority of the population. Agriculture contributes one-third of the provincial GDP, employs more than 40 percent of the labor force, and provides a livelihood to more than half the population; it therefore forms the backbone of the economy (Word Bank, 2013). Within the agricultural sector, agricultural crops contribute about three-fifths of Balochistan's agricultural value-added. Presently about 2.1 million hectares (8% of total area) are being cultivated in the province and there are around 3.99 million hectares of cultivable wasteland that can be brought under cultivation if irrigation

water can become available. Water is the limiting factor for agriculture, and the fluctuations in crop production and the areas under cultivation are generally in line with the availability of water. The highly diverse agro-climatic zones in the province range from coastal belt, barren deserts, and fertile plains on one hand and higher plains to mountainous regions. Wheat and fruits are the two dominant crops in the uplands where favorable climate and water is available for irrigation. In eastern flatlands where canal water is available, wheat and rice are the main crops. The fruit varieties that flourish in Balochistan are: dates, apples, grapes, apricots, almonds, pomegranates etc.

Balochistan has highly subsidized electricity for tube well use, contributing to a waste of both water and electricity, and gross inequity in the distribution of public-sector support to rural communities. Inequity arises because the huge subsidy is provided to only about 2.5 percent of the crop farmers of Balochistan; the vast majority of farmers are excluded. Moreover, the farmers using electricity are generally richer than those using diesel-operated tube wells, or those relying on *Sailaba* or *Khushkaba*. The over pumping of water has seriously lowered the water table in several districts and led to the [mining] of groundwater i.e., more water is taken out than is recharged into the aquifer.

Balochistan is an arid region and the scope of intensive arable agriculture is limited. However, livestock, particularly small ruminants and camels survive well under these harsh conditions and can efficiently convert the sparse vegetation into useful products. Livestock occupies a crucial part in the agrarian economy of Balochistan; indeed, in large parts of the province it dominates rural livelihoods. More than two out of three rural households in Balochistan are engaged in livestock production and in the province as a whole, even including the urban areas, one in two households maintain goats or sheep. As a result of this widespread involvement in livestock production, 33 percent of Balochistan's agricultural value added and 8 percent of its GDP in 2010 were contributed by the livestock subsector. The livestock subsector is therefore crucial to Balochistan for providing employment and income, and for reducing poverty.

16. 2. Conservation and Sustainable Use of Agro-biodiversity

The focus of agricultural policies in Pakistan has been maximization of yields through introduction of improved varieties of crops, use of agrochemicals and exotic breeds of livestock and poultry, and artificial insemination and cross breeding are the common factors that are eroding the natural heritage of agro biodiversity. Pakistan is the 10th most vulnerable country to climate change, and its most pronounced impact is visible in terms of extreme climatic events – droughts, flooding, while its impact on changes in sowing season and maturity of crops is less pronounced. Therefore, traditional crops and varieties will help to cope with climate change and sustaining rural peoples' livelihoods.

It is believed that wheat and some breeds of farm animals were first domesticated in Balochistan, and the province had a rich diversity of crop varieties and breed of farm animals suited to different agro ecological zones. However, high yielding varieties have resulted in erosion of genetic diversity of indigenous varieties and traditional knowledge of farmers. Similarly, introduction of exotic breeds and cross-breeding of farm animals is affecting the genetic diversity of farm animals. The traditional varieties and breeds, and knowledge of farmers of farming systems would be our best insurance against crop failures under changing climate conditions and [back crossing for breeding robust varieties and breeds]. There are no policies and laws for conservation of agro biodiversity or to regulate the introduction of new varieties and breeds. Furthermore, the agriculture and livestock departments lack awareness, capacity, and financial resources to effectively manage the agro-biodiversity resources. In order address these issues and to contribute to the CBD programme of work on agro-biodiversity, and implement Aichi Biodiversity Targets 2010-2020, the following strategies and actions are proposed.

16. 3 Strategies and Actions

In order address these issues and contribute to the CBD programme of work on agrobiodiversity, and implement the Aichi Biodiversity Targets 2010-2020 [2011-2020], the following strategies are proposed.

Strategies

1. The principles and practices for sustainable and biodiverse agriculture research and development will be incorporated into national policies, laws, investment strategies, education and extension programmes.

2. Awareness of the beneficial effects of agrobiodiversity conservation of all stakeholders, including farmers, the consumers, researchers, and extension specialists will be raised.
3. The models of sustainable agriculture for major crops shall be developed and promoted particularly by managing organic matter, enhancing soil biotic activity, minimizing water losses and use of agro-chemicals.
4. The bio diversification of agro ecosystems will be restored in time and space through crop rotations, cover crops, intercropping, crop/livestock mixtures, conservation of pollinators, and soil biodiversity.
5. The use of transgenic organisms would be considered very carefully to ensure that they pose no environmental and health risks or at least no more than the use of current crops and practices.

Actions:

1. The considerations of sustainable agriculture, bio diversification of agro ecosystems, conservation of pollinators and soil biodiversity, wise use of transgenic organisms, and climate change will be incorporated in agriculture policies and plans by 2016. (ABT 2)
2. Sustainable agriculture and bio diversification of agro ecosystems shall be integrated in the educational and extension programmes of agriculture and animal sciences. (ABT 7)
3. The gaps in the *in-situ* and *ex-situ* conservation of the agro biodiversity will be assessed by 2017 and measures taken to fill the gaps (ABT13)
4. Models of sustainable production of major crops with minimum external inputs and wise use of water shall be developed, tested, and demonstrated on farms by 2020. (ABT 7)
5. The diversity of local varieties and land races of crops, fruits, and breeds of livestock and poultry and local knowledge of their management will be documented by 2017 and incentive measures tested for on-farm conservation by 2018. (ABT 18)
6. Important local varieties, land races and breeds will be improved by 2020 through selection for resistance to disease, drought tolerance, and for increased production. (ABT 13)
7. Pilot on-farm models of bio diverse agro ecosystems will be established in major agro-ecological zones. (ABT 7)
8. Models of bio diversification of agro ecosystems will be developed, tested, and demonstrated in major agro ecological zones by 2020. (ABT 7)
9. Appropriate legislative and regulatory measures will be adopted by 2018 for prevention, early detection, rapid response and control of invasive species. (ABT 9)
10. The gap between the scientists and conservationists will be bridged to improve the knowledge and practice of biodiversity conservation. (ABT 19)
11. Biodiversity values will be integrated in the accounting and reporting systems. (ABT 2)
12. The targets for conservation of agrobiodiversity will be integrated in the annual and medium term development plans. (ABT 20)
13. Additional financial resources will be mobilized by 2016 to meet any shortfall for fully achieving the targets (ABT 20)

17. Sustainable Production and Consumption

17. 1. Context

The Oslo Symposium in 1994 defined sustainable consumption and production (SCP) and the concept was later recognized in the Johannesburg Plan of Implementation, adopted in 2002 at the World Summit on Sustainable Development (WSSD). Sustainable consumption and production is also the aim of goal 2 of the 2030 Agenda for Sustainable Development which requires countries to make fundamental changes in the way that we produce and consume goods and services. The change in patterns of unsustainable consumption and production requires commitment and action from the government, the business sector, non-state actors and individuals.

The productive sector indirectly impacts the biodiversity through air pollution, and discharge of industrial waste in the open or in the water bodies. There is no large scale use of biodiversity in the productive sector of Pakistan, however, coal mining and other industrial mining and oil exploration industries, ship breaking industry, and hydel power projects pose direct and indirect threats to biodiversity. The poorly regulated economic development coupled with rapid demographic growth has put acute pressure on the country's natural resource base, especially land and water, and

significantly increased levels of local pollution. There are serious ecological, economic, and social costs of infrastructure development and a sprawling production sector.

Many species of flora and fauna are collected for trade such as *mazri* (*Nannorhops ritchiana*) for mats and baskets, medicinal plants, morels and turtles for food, etc. Extraction of economic non woody plants is highly unregulated and adversely impacts the health and condition of habitats and threatens species with extinction. Many species or their parts are smuggled out of the country. There is a growing and unsustainable use of wood for fuel, and increased demand for fish and meat.

The sprawling urban landscapes can be an important component of biodiversity conservation. This requires setting aside blocks of protected habitat, ecologically responsible development in adjacent areas, and a careful balance of the needs of nature with the needs of human populations. Urban biodiversity can improve human well-being by providing ecosystems services, connect people with nature and provide environmental education, and create corridors for natural populations. However, the rapid pace of change and high cost of land in urban environments can pose severe challenges to the long-term protection of a network of habitat patches. Often, cities do not contain large enough habitat blocks to sustain viable natural populations of most plants and animals, but small blocks can link with the surrounding habitat.

17.2. Strategies and Actions

To conserve and enhance the environment and protect biodiversity, the following strategies and actions will be taken.

Strategies:

1. The awareness of producers and consumers of the social cost and environmental consequences of unsustainable production and consumption will be raised to minimize the ecological foot print of pollution and degradation of natural resources.
2. Sustainable consumption and production patterns for the conservation and sustainable use of biodiversity, both in the public and the private sector, will be fostered through business and biodiversity initiatives, and promoting procurement policies that are in line with the objectives of the CBD.
3. Strategic environmental impact assessment, economic incentives and enforcement of the laws and regulations shall be actively pursued to achieve the goals of sustainable production and consumption.
4. The urban parks and green corridors along highways and canals shall be made biodiversity friendly.

Actions:

1. Professional capacity will be strengthened to plan sustainable development and enforce environmental laws and regulations to safeguard critical biodiversity habitats and the well-being of the people. (ABT 19)
2. A work plan for sustainable production and consumption of biodiversity will be prepared by 2016 and implemented within the 10-Year Framework of Programmes on Sustainable Consumption and Production. (ABT 4)
3. Independent third party reviews of strategic environmental impact assessment studies will be mandatory for all public and private sector economic development projects. (ABT 8)
4. Pollution of a wetland of major biodiversity significance will be brought under control by 2020 to levels that are not detrimental to ecosystem function and biodiversity. (ABT 8)
5. Dialogue will be initiated with businesses and government agencies to develop plans by 2017 for controlling pollution and provide incentives for implementing the plans. (ABT 8)
6. A demonstration project to develop and test a Biodiversity Index will be launched in Islamabad by 2017 to assess and monitor urban biodiversity. (ABT 4)
7. A 5-year work plan will be prepared and implemented to bring water pollution of the ecologically significant wetland ecosystems within safe limits by 2020. (ABT 8)
8. The gap between the scientists and conservationists will be bridged to improve the knowledge and practice of biodiversity conservation. (ABT 19)
9. Biodiversity values will be integrated in the accounting and reporting systems. (ABT 2)

10. Measures to achieve the targets for sustainable production and consumption will be integrated in the annual and medium term development plans. (ABT 20)
11. Additional financial resources if needed for implementing NBSAP will be mobilized by 2016 to meet any shortfall for fully achieving the NBSAP targets. (ABT 20)

18. Biosafety – Emerging Issues and Challenges

18.1. Context

Biotechnology is the use of living systems and organisms to develop or make products, or “any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use” (UN Convention on Biological Diversity, Art. 2). The term Biotechnology covers a wide range of advanced genetic techniques used for changing the characteristics of plants, animals and microorganisms. It includes genetic modification, in which DNA of one or more unrelated organisms is transferred into another organism referred to as Genetically Modified Organisms (GMO). According to The Cartagena Protocol on Biosafety, a component of the Convention on Biological Diversity, biosafety refers to ‘the protection of biodiversity from the potential risks posed by living modified organisms resulting from modern biotechnology’. GMO applications include agriculture, forestry, aquaculture and medicine; however, agricultural biotechnology is the most advanced sector with GM crops being widely grown.

Synthetic Biology: While there is no internationally agreed definition of “synthetic biology”, key features of synthetic biology include the “de novo” synthesis of genetic material and an engineering-based approach to develop components, organisms and products. Synthetic biology builds on modern biotechnology methodologies and techniques such as [high throughput DNA sequencing] and DNA synthesis technologies. Organisms developed through synthetic biology currently fall within the scope of biotechnology-based LMOs and GMOs as defined in the Convention on Biological Diversity.

Climate Engineering: It is also known as **geo-engineering**, is an array of technologies and techniques for manipulating the global climate to moderate the effects of climate change. These technologies are commonly divided into two types:

- i. Carbon Dioxide Removal (CDR) methods attempt to absorb and store carbon from the atmosphere; either by technological means, or by enhancing the ability of natural systems (e.g. oceans) to do so. For example; boost the growth of plankton by adding nutrients such as iron to ocean waters. If the dead plankton sink to the ocean floor and get buried, the organic carbon in their bodies will be safely locked away;
- ii. Solar Radiation Management or Sunlight Reflection Methods (SRM) aim to reduce the amount of heat trapped by greenhouse gases by reflecting sunlight back into space, either by increasing the reflectivity of the earth's surfaces, or by deploying a layer of reflective particles in the atmosphere. Examples include: pumping SO₂ into atmosphere to reflect sunlight back into space; spraying sea water into the atmosphere to increase reflectivity of the clouds; and spraying bismuth iodide high in the sky to seed large clouds to reduce the cirrus clouds that trap heat.

The development and release of GMOs is a particularly controversial issue with arguments both for and against them. GMOs have the potential to contribute positively to human livelihoods and wellbeing through increasing the productivity, adaptation to climate change and environmental sustainability of agriculture, forestry and fisheries. GM crops could contribute significantly to the need for food security, reducing costs and increasing the productivity of a range of crops and farmed animals. Conversely, they could harm the environment. GMOs released into open fields may cross breed with wild native species and the foreign genes they carry can transfer into native populations through horizontal gene transfer. Such transfer of genetic material is generally hard to control, raising concerns about their potential environmental impacts. The knowledge on the risks, benefits and uncertainties related to GMOs and biodiversity is fragmented and not well-developed, largely because of the complexity of the relationship between natural and human-modified systems. Prudent approaches are needed in applying GMOs and taking political

decisions in relation to their use and extension. Therefore more research and case by case assessment of applications is needed before deliberately releasing GMOs into the environment.

In recent years discussions of climate engineering have grown considerably amongst scientists, policy-makers, and civic environmental groups engaged in addressing climate change. These consist of desk and laboratory studies and small-scale field research. No technologies have been deployed at a scale that impacts the global climate. Yet, the intent behind climate engineering, its geographically large or even global impact, and the complexity and uncertainty of its potential effects upon climate governance – and human society raise profound questions. These technologies may have diverse environmental and societal impacts on varying scales; and create their own sets of risks, challenges, and unknowns.

In Pakistan, biosafety rules titled "Pakistan Biosafety Rules, 2005" were made under the Pakistan Environmental Protection Act, 1997, and National Biosafety Guidelines were also issued in 2005. The Biosafety Rules and Guidelines recommended setting up (a) Institutional Biosafety Committee (IBC), (b) Technical Advisory Committee (TAC), and National Biosafety Committee (NBC). All institutions, both public and private, involved in research and development in Biotechnology, are required to establish an IBC which is responsible for giving clearance for initiating research according to the Biosafety Guidelines. Up till now nearly 40 IBCs belonging to both the private and public sectors have been registered with the NBC. A National Biosafety Center was established at the federal government level.

18.2. Strategies and Actions

The following strategy and actions are proposed to adequately protect any adverse effects of living modified organisms on biodiversity and human health.

Strategy

national capacity and action and will be improved for ensuring an adequate level of protection in the field of the safe transfer, including transboundary movement, handling, and use of living modified organisms that may have adverse effects on biological diversity, also taking into account risks to human health.

Actions:

1. The government institutions, academia, business sector and other non-state actors will act individually and collectively to strictly adhere to precautionary principles for protecting biological diversity from the potential risks posed by genetically modified organisms resulting from modern biotechnology (ABT4)
2. A national regulatory, administrative and monitoring framework will be established for the implementation of the Cartagena Protocol. (ABT 17)
3. A 10 year national biosafety framework will be established for the implementation, coordination, and monitoring of the Protocol, including mechanisms to make science-based risk assessments and ensuring transparency in the development and use of LMOs. (ABT 17)
4. The gap between the scientists and conservationists will be bridged to build a more balanced and unbiased discourse around the topic. (ABT 19)

III. IMPLEMENTATION, MONITORING, AND EVALUATION

19. Introduction

A strategic plan, no matter how good it is, will not achieve the desired results if sits on the shelf, and failing to implement it is not only a waste of time in planning, but also hurts the organization, the team, and individuals. Implementation of the Convention on Biological Diversity is not only our international obligation but it also represents the need to preserve the natural heritage, and ecological integrity of the environment we live in, and the well-being of our people. Therefore the Biodiversity Strategy and Action Plan (BSAP) must be considered as part of the whole process of results, and all the efforts made in its preparation will go to waste if not implemented. Effective implementation will require working with and building the capacity of the stakeholders, communicating, reaching out to mainstream biodiversity values in the policy and planning processes, [and for people to conserve and use it sustainably; and mobilizing resources for its implementation.]

20. Communication and Outreach Strategy

The overall responsibility for raising awareness of the people and [integrating] biodiversity considerations into the national policy, planning and accounting mechanisms shall rest with the federal government. The federal government will use mass and informal communication means for raising awareness and mainstreaming of biodiversity. This will include formation of a cadre of environmental journalists who act as 'biodiversity champions' for print media and supported to contribute articles to print media, produce audio messages for radio, and video clips for TV. The informal communications will focus on organizing a focus group comprising of 'opinion leaders drawn from amongst the policy makers, planners and politicians, who will spread the message in informal settings such as in the corridors of the workplace, or at social functions.

21. Actions to Achieve the Strategy

A review of BAP implementation undertaken during the process of preparation of Pakistan's Fifth National Report to CBD in 2014 revealed that after 14 years of BAP approval, the BAP had not been fully implemented and many recommendations were either partially implemented or not implemented at all. Among other reasons, lack of political will, insufficient financial resources, and weak implementation contributed to less than satisfactory progress on BAP. Keeping in view the lessons learnt, and based on discussions with stakeholders during the planning process, the following actions will be taken for effective implementation of the Biodiversity Strategy and Action Plan in Balochistan.

1. The BSAP, prepared in consultation and with active participation of the stakeholders, shall be approved at the appropriate level of government as a policy document;
2. A Steering Committee shall be established in the Planning and Development Department to ensure mainstreaming of the BSAP in the policy and planning processes, coordination among different sectors, and its integration in the poverty reduction and climate change plans;
3. A Coordination Committee shall be established for cross-sectoral coordination, to monitor progress on the implementation of BSAP, and to provide a mechanism for sharing experiences among the stakeholders.

22. Implementation

The strategies, principles and SMART targets have been organized separately for different thematic areas of biodiversity which are managed by different sectors. The agencies responsible for different sectors will develop project proposals, get approvals and required financial allocations to start implementation by the suggested dates. The project proposals will define indicators and set milestones for achieving the targets.

The Biodiversity Strategy and Action Plan will require a concerted effort of all the stakeholders for achieving the targets in an effective and timely manner. In addition, from time to time, the stakeholders may require administrative and technical support. Therefore a Biodiversity Coordination Committee comprising of all the stakeholders shall be set up to provide technical guidance and monitor progress on the implementation of the BSAP. The Committee shall meet at least on a quarterly basis and shall be comprised of the following members:

Secretary, Forests and Wildlife Department	Chairman
Chief Conservator Forests	Member
Conservator of Wildlife	Member
Director General, Fisheries	Member
Director General, Agriculture	Member
Director General, Livestock	Member
Director General, EPA	Member
Representative, IUCN	Member
Representative of SUSG	Member

The functions of the Committee shall include but are not limited to the following:

- Review of BSAP progress of implementation including the monitoring of outputs, and outcomes
- Facilitation of inter-departmental communication and coordination
- Identification of ways and means to build the professional and financial capacities of the stakeholders for achieving BSAP targets;
- Preparation of input for the steering committee meeting
- Review of project proposals for funding the BSAP
- Ensure adequate financial and human resource allocations for implementation of the BSAP;
- Ensure adequate policy support for implementation of the BSAP.

23. Mainstreaming BSAP and Integration in Poverty Reduction and Climate Change Plans

Biodiversity is a multidisciplinary subject and effective implementation of the various articles of the CBD and decisions of the Conference of the Parties (COP) requires coordination among various stakeholders in Balochistan on one hand, and liaison with the federal government on the other hand. So far there was no designated focal point for the CBD in Balochistan and consequently there was a complete lack of information flow between the national focal point for the CBD and provincial focal point. In view of the above, the Secretary Forests and Wildlife Government of Balochistan agreed to act as the Balochistan Focal Point for all matters related to the CBD until such time as a formal decision is taken on the matter.

Effective implementation of the BSAP requires addressing the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society (CBD strategic objective 1) and integration of biodiversity values into national and local development and poverty reduction strategies and planning processes (Aichi Biodiversity target 2). Therefore in order to achieve these objectives and ensure support to the implementation of BSAP at the highest level, it is proposed to establish a BSAP Steering Committee headed by the Secretary, Planning and Development Department.

The proposed constitution of the Steering Committee shall be as follows:

Secretary, Planning and Development Department	Chair
Secretary Forests, Wildlife, and Fisheries	Member
Secretary Agriculture and Livestock	Member
Secretary Environment and Sports	Member
Director Biodiversity, Ministry of Climate Change	Member
Representative of IUCN Pakistan	Member
Representative of SUSG	Member
Chief of Section Agriculture, Forest, Livestock P&DD	Secretary

The Steering Committee shall meet at least once every year and its functions shall include but are not limited to the following:

- Suggest ways and means to ensure that biodiversity considerations are integrated in the policy and planning processes and poverty alleviation programmes of the Government of [Balochistan];

- Ensure that the needs for the conservation of biodiversity receive due consideration during the process for allocation of financial resources;
- Provide guidance to the stakeholders for effective implementation of the decisions of the CBD Conference of parties;
- Review the plans and progress of stakeholders for implementation of the BSAP within their available financial resources;
- Provide guidance and assistance in securing new sources of funds from bilateral and multilateral donors for achieving the targets of the BSAP;
- Deliberate on all emerging issues related to conservation, sustainable use of biodiversity and equitable sharing of benefits and provide appropriate advice to the government for policy decisions.

24. Plan for Resource Mobilization for NBSAP Implementation

A matrix showing the Aichi Biodiversity targets showing proposed national actions, timelines, and funds required and the agency responsible for implementation and monitoring indicators is given in annex 1. The financial constraints have been a key issue in the implementation of the BAP and are likely to be a constraint during the implementation of the BSAP. However, every effort will be made to incorporate biodiversity considerations in the ongoing projects and make the best use of available financial resources to implement the high priority actions identified in the BSAP. In addition, proposals shall be developed to seek additional funds from national and international sources for achieving the CBD strategic objectives and Aichi Biodiversity Targets.

25. Monitoring and Evaluation

The progress on the implementation of the BSAP shall be monitored on an annual basis through a flexible framework of indicators keeping in view the provincial circumstances and priorities. An indicative framework with suggested indicators for monitoring progress on Aichi Biodiversity Targets is given in annex 1. The monitoring will not only measure progress towards the achievement of the BSAP and provincial targets, but also help in identification of implementation issues, and in adaptive management for effective implementation of the BSAP. The monitoring reports will be presented to the Provincial Coordination Committee for their help in overcoming the obstacles in successful achievement of the targets. It will also form a basis for national reporting obligations as well as guide the provincial planning process. The monitoring mechanism will be established within the first year of the adoption of the BSAP.

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Annexure1: Matrix of Aichi Biodiversity Targets, Proposed Actions, Indicators, Costs, and Responsible Agency

Thematic Area	Actions	Target date & Cost Rs millions	Target	Responsible Agency	Indicators for Monitoring
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society					
Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably					
Awareness	1. 1. Awareness days will be organized to commemorate the following major environmental themes of national and international importance: biodiversity, desertification and drought, forests, tourism, wetlands, wildlife, etc.	2016 - 2020	6 awareness days	Ministry of Climate Change in collaboration with provinces	- Trends in awareness and attitudes. - Trends in public engagement with biodiversity
Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems					
Mainstreaming Biodiversity	2. 1. Sectoral policies, laws and regulations will be drafted or updated to provide a sound basis for conservation and sustainable use of biological diversity.	2018	5.0	Planning and Development Department Agriculture, Livestock, Fisheries, Forest, and Wildlife Departments.	Trends in uptake of biodiversity considerations in forest and forest related policies, laws, and regulations.
Mainstreaming Biodiversity	2. 2. Biodiversity values will be incorporated in the accounting and reporting systems.	2017	0.0	Planning and development Department Agriculture, Livestock, Fisheries, Forest, Wildlife and Environment Departments	Trends in reporting biodiversity values in accounting and reporting processes.
Total of Target 2			5.0		

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions						
Incentives	3.1. A study will be conducted to identify negative incentives and propose positive incentives that will reduce and ultimately halt degradation and fragmentation of habitats.	2017	0.5	Study	Forest and Wildlife Departments	Trends in reduction of negative incentives.
Incentives	3.2. Collaborative or joint forest management approaches based on equitable sharing of benefits will be piloted in different forest ecosystems.	2017	1.5	1 pilot sites	Forest Department	• Trends in anthropogenic impacts on forest ecosystems; • Trends in forest based livelihoods; • Trends in proportion of products derived from sustainable sources
Incentives	3.3. Local communities will be empowered and their capacity built to establish community conservation areas for sustainable sport hunting.	2017	40.00	Community Conservation Areas	Wildlife Department	Trends in effective participation of communities in conservation.
TOTAL OF TARGET 3			42			
Target 4: By 2020, at the latest, Governments, businesses and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits						
Sustainable Production and Consumption	4.1. A work plan for sustainable production and consumption of biodiversity will be prepared by 2016 and implemented within the 10-Year Framework of Programmes on Sustainable Consumption and Production.	2016	1.5	Work Plan	Environmental Protection Agency	Trends in extent to which biodiversity and ecosystem service values are incorporated 10-Year framework.

Urban Biodiversity	4. 2. A demonstration project to develop and test a Biodiversity Index will be launched in major cities to assess and monitor urban biodiversity.	2017	1.5	Quetta	Municipal Authorities	Trends in biodiversity of cities
Production and Consumption	4. 3. The government institutions, academia, business sector and other non-state actors will act individually and collectively to strictly adhere to the precautionary principle for protecting biological diversity from the potential risks posed by genetically modified organisms resulting from modern biotechnology .	2020	1.0	Government agencies; Academia;; NGOs	Environmental Protection Agency	Trends in coordination among stakeholders; Trends in information sharing
TOTAL OF TARGET 4			4.0			
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use						
Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.						
Natural Ecosystems	5. 1.A programme will be launched to promote sustainable land use for common property resources.	2017	50.0	25% of all common property resources	Forest Department	Trends in management and use of common property resources
Forests	5. 2. The rights and concessions of local people in State forests will be reformed and effectively managed.	2017	1.0	Reform of rights and concessions	Forest Department	Trends in anthropogenic impacts on forest ecosystems;

Mangrove Ecosystems	5. 3. Management plans for mangrove forests will be prepared based on an ecosystem approach and implemented	2018	12.5	Management Plan	Forest Department	Trends in condition and vulnerability of ecosystems
TOTAL OF TARGET 5			63.5			
Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.						
Inland Fisheries	6. 1. An effective coordination mechanism will be established for integrated management of water, fish, and wildlife resources of wetlands.	2016	2.5	Coordination Committees comprising of all stakeholders	Forest Department	Trends in coordination and cooperation among various agencies
Inland Fisheries	6. 2. A baseline survey will be undertaken to assess the biodiversity of key inland wetlands and establish a system to monitor at regular intervals the status of species most in decline.	2017	4.0	Survey	Fisheries and Forest Departments	Trends in extinction risk of target and bycatch aquatic species
Inland Fisheries	6. 3. A procedure for sustainable harvest of fish stocks will be developed and implemented to minimize impact on threatened species and vulnerable habitats.	2017	1.0	Standard Operating Procedure	Fisheries Department	Trends in proportion of utilized stocks outside safe biological limits

Inland Fisheries	6. 4. Important wetland habitats of national biodiversity significance together with surrounding landscapes will be co-managed with custodial communities through their empowerment and building capacity for conservation and sustainable use.	2017	40.0	4 wetland sites	Forest and Fisheries Departments	Trends in capacity and empowerment of fishing communities.
Marine Fisheries	6. 5. Pilot projects will be launched to develop and test approaches for organizing, empowering, and building the capacity of coastal communities to sustainably harvest all fish and invertebrate stocks.	2017	3.0	At least 3 pilot test sites	Fisheries Department	Trends in capacity and empowerment of fishing communities.
Coastal and Marine Fisheries	6. 6. The number of operating fleets will be capped to prevent over exploitation of marine fish and invertebrate resources.	2020	0.0	3,000 fleets	Fisheries Department	Trends in fishing effort capacity.
Coastal and Marine Fisheries	6. 7. The fishing boats will be modified to improve the outdated fishing methods.	2020	50.0	At least 1000 boats	Fisheries Department	Trends in proportion of depleted target and bycatch species with recovery plans.
Marine Fisheries	6. 8. An assessment of stocks and limits of sustainable harvest levels of major species will be determined and strictly enforced.	2016	2.5	Assessment Survey	Fisheries Department	Trends in proportion of utilized stocks outside safe biological limits.
TOTAL OF TARGET 6			103			
Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity						

Forest Biodiversity	7. 1. Suitable ecosystem approaches will be developed by 2016 and piloted in different forest ecosystems; and training workshops held for managers for their application.	2016	1.5	1 study	Forest Department	Trends in forests under ecosystem management.
Forest Biodiversity	7. 2. The Code for the preparation of management plans will be revised by 2018 to incorporate the ecosystem approaches for sustainable management of forests and biodiversity.	2018	1.5	Revised working plan code	Forest Department	Trends in use of revised code for preparation of working Plan.
Forest Biodiversity	7. 3. Management Plans based on ecosystem approaches will be prepared and effectively implemented in all state forests	2020	30.0	At least 5 management plans	Forest Department	Trends in implementation of management plans.
Agriculture	7. 4. Models of sustainable production of major crops with minimum external inputs and wise use of water shall be developed, tested, and demonstrated on farms by 2020.	2018	5.0	Wheat, and fruit orchards.	Agriculture Department	Trends in area of aquaculture ecosystems under sustainable management.
Agriculture	7. 5. Sustainable agriculture and bio diversification of agro ecosystems will be integrated in the extension programmes of agriculture.	2018	1.0	Brochures on sustainable agriculture	Agriculture and Livestock Departments	Trends in uptake of sustainable agriculture in agriculture extension.

Agriculture	7. 6. Pilot on-farm models of bio diverse agro ecosystems will be established in major agro-ecological zones	2020	12.0	At least 4 biodiverse farms in operation	Agriculture and Livestock Departments	Trends in number of farms practicing biodiverse agriculture.
TOTAL OF TARGET 7		51		Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity		
Sustainable Development	8. 1. A 5-year work plan will be prepared and implemented to bring water pollution of the ecologically significant wetland ecosystems within safe limit.	2020	2.5	Reduction in water pollution to safe limits	Environmental Protection Agency	Trends in proportion of wastewater discharged after treatment.
Sustainable development	8. 2. Independent third party reviews of strategic environmental impact assessment studies will be mandatory for all public and private sector economic development projects.	2020	0.0	All EIAs	Environmental Protection Agency	Trends in appraisal of EIA reports.
Sustainable development	8. 3. Dialogue will be initiated with businesses and government agencies to develop plans for controlling pollution and provide incentives for implementing the plans.	2017	1.5	Business groups; NGOs	Environmental Protection Agency	Trends in pollution deposition rate.

Pollution	8. 4. Pollution of a wetland of major biodiversity significance will be brought under control to levels that are not detrimental to ecosystem function and biodiversity.	2020	15.0	Control Water pollution of at least one major wetland ecosystem	Environmental Agency	Trend in recovery of health and condition of wetland
TOTAL FOR TARGET 8		19	Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment			
Fisheries	9. 1. The spread of alien species will be controlled through appropriate measures to prevent escape into natural habitats from hatcheries and aquaculture.	2017	3.0	Prevention	Fisheries Department	Trends in number of invasive alien species.
Fisheries	9. 2. The impact of alien species in wetlands of biodiversity significance will be assessed and measures taken to control and ultimately eradicate invasive alien species.	2020	3.0	Control	Fisheries Department	Trends in the impact of invasive alien species on extinction risk trends.
Agriculture	9. 3. Appropriate legislative and regulatory measures will be drafted to for prevention, early detection, rapid response and control of invasive species.	2018	1.5	Law and readiness	Fisheries Department	Trends in policy responses, legislation and management plans to control and prevent spread of invasive alien species.
TOTAL OF TARGET 9		7.5		Target 10:By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning		

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Coral Ecosystems	Marine Protected Areas covering coral ecosystems will be established by 2017 and managed effectively so as to reduce the stress posed by anthropogenic impact.	2018	5.0	MPA covering coral ecosystems	Forest and Fisheries Departments.	Trends in effective management of the MPA.
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity						
Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.						
Protected Areas	11. 1. The lists of protected areas will be refined to include only those sites that meet the internationally recognized definition.	2016	1.5	Redefined provincial and National Lists of Pas	Wildlife Department	Trends in representative coverage of protected areas of terrestrial, marine and inland water systems.
Protected Areas	11. 2. Management plans will be prepared and implemented for effective and equitable management of protected areas integrated into the wider landscapes	2017 - 2020	16.5	Management of PAs in Annex 3 under plans.	Wildlife Department	Trends in effective and equitable management of the PAs
Protected Areas	11.3. Local communities will be empowered and their capacity built to both collaborate in the management of PAs and to make sustainable use of common property natural resources.	2017	5.0	Development of capacity of Pas custodial communities	Wildlife department	Trends in development and conservation status of buffer zone

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Protected Areas	11. 4. The protected areas network will be expanded to cover at least 17% of terrestrial area to fill in the gaps in the protected area system (annex 4) and to establish corridors between fragmented habitats of threatened species.	2020	31.5	New PAs to fill gaps in PA System	Wildlife Department	Trends in ecosystem and habitats condition and management effectiveness
Protected Areas	11. 5. Mechanisms will be developed and put in place to ensure the financial sustainability of the protected areas.	2018	1.5	Private-Public partnerships	Wildlife Department	Trends in representative coverage of protected areas of terrestrial ecosystems and habitats.
Protected Areas	11. 6. Representative forest landscapes of special importance for biodiversity will be designated as Forest Biodiversity Reserves and effectively managed.	2016	2.0	At least 4 Forest Biodiversity Reserves	Wildlife Department	Trends in protected area condition and/or management effectiveness including more equitable management.
Protected Areas	11. 7. Wetland protected areas will be established covering at least 15% of the area of wetlands of biodiversity significance and effectively managed together with the surrounding landscapes.	2019	2.5	At least 5 wetland area added to the Protected Areas network	Wildlife Department	Trends in representative coverage of protected areas of forest ecosystems.
Protected Areas	11. 8. Ramsar sites (annex 6) and surrounding landscapes will be effectively managed under plans through local community organizations.	2017	3.0	At least 3 sites managed	Wildlife Department	Trends in increase in pollinators and avifauna diversity.

Protected Areas	11. 9. Marine Protected Areas covering at least 10% of the area of marine biodiversity significance will be established and managed effectively as seascapes for conservation and sustainable use.	2017	3.0	At least 1 MPA in addition to one MPA for Coral Ecosystems.	Forest, wildlife, and Fisheries Departments	Trends in effective management of MPA seascape
TOTAL OF TARGET 11			66.5			
Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained						
Species Conservation (Fauna)	12. 1 Recovery plans will be prepared and implemented to improve the conservation status of major threatened species of fauna (annex 2) in different ecosystems.	2018	20.0	Species of fauna in Annex 2	Wildlife Department	Trends in population of selected species.
Species Conservation (Flora)	12. 2. Recovery plans will be prepared and implemented to improve the conservation status of major threatened species of flora (annex 2) in different ecosystems.	2018	10.0	Species of flora in Annex 2	Forest Department	Trends in population of selected species.
Species Conservation (Fresh Water)	12. 3. Plans will be prepared and implemented for recovery of depleted freshwater fish species (annex 2)	2017	10.0	Species of fresh water fish in Annex 2	Fisheries Department	Trends in extinction risk of target and bycatch aquatic species.

Species Conservation (Marine)	12. 4. The population of known threatened marine species particularly of those in most decline (annex 2) shall be monitored regularly and remedial measures taken to improve and sustain their population.	2016 - 2020	5.0	Species of marine fauna in Annex 2	Fisheries Department	Trends in trade of species.
TOTAL OF TARGET 12			45			
Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.						
Agro biodiversity	13. 1. The gaps in the <i>in-situ</i> and <i>ex-situ</i> conservation of the agro biodiversity will be assessed and measures taken to fill the gaps.	2017	6.0	At least 2 field stations and 3 farms established for <i>in situ</i> conservation.	Pakistan Agriculture Research Council; All provinces; AJK and GB.	Trends in genetic diversity of cultivated plants, and farmed and domesticated animals and their wild.
Agro biodiversity	13. 2. Important local varieties, land races and breeds will be improved by 2020 through selection for resistance to disease, drought tolerance, and for increased production.	2020	4.0	Local varieties of cotton, rice, sugarcane, and wheat.	Pakistan Agriculture Research Council.	Trends in genetic diversity of selected species
TOTAL FOR TARGET 13			11.5			
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services						
Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contributing to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.						

Ecosystems Services	Landscapes that provide essential services related to water for major dams, and contribute to health; livelihoods and well-being of local communities will be restored and safeguarded	2020	6.0	At least 6 ecosystems	Forest Department	Trends in benefits that humans derive from selected ecosystem services
Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification						
Desertification	15. 1. At least 20% of the degraded pastoral ecosystems of ecological significance will be restored and managed effectively.	2017	40.0	At least three ecologically different pastoral ecosystems.	Forest and Livestock Departments	Trends in sustainable management of pastoral ecosystems.
Climate Change Mitigation	15. 2. At least 25 percent of all degraded forest ecosystems including mangroves will be restored to improve their resilience and contribution to carbon stocks.	2020	50.0	At least 10,000 ha restored	Forest Department	Status and trends in extent and condition of habitats that provide carbon storage.
TOTAL OF TARGET 15			90.00			
Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation						
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building						
Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.						

Policy Framework	17. 1. The revised BSAP will be approved as a policy document and implementation and monitoring mechanisms will be in place.	2015	0.5	Approval, printing and dissemination	Planning and Development Department	Trends in implementation of national biodiversity strategies and action plans.
Policy Framework	17. 2. Institutional effectiveness and efficiency will be enhanced to ensure effective management and monitoring of the biodiversity resources.	2017	5.0	Implementation of BSAP	All biodiversity sectors	Trends in integration of biodiversity policy in sectoral planning processes.
TOTAL OF TARGET 17			5.5			
Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.						
Agro Biodiversity	The diversity of local varieties and land races of crops, fruits, and breeds of livestock and poultry and local knowledge of their management will be documented by 2017 and incentive measures tested for on-farm conservation.	2018	1.0	Documentation of Agro-biodiversity	Arid Zone Research Institute, Agriculture and Livestock Departments.	Trends in farming with traditional knowledge and use of local varieties and breeds.
Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.						
Knowledge	19.1. The gaps between scientists and conservationists will be bridged to improve the knowledge and practice of biodiversity conservation.	2020	5.0	Collaborative research and sharing of knowledge	Agriculture, Livestock, Fisheries, Forest, Wildlife and Environment Departments.	Trends in collaboration and information sharing.

Knowledge	19. 2. A forest and ecosystem classification system using agreed international standards including broad indicators of biodiversity will be developed.	2016	1.5	Classification of forests, ecosystems and habitats classification	Forest and Wildlife Departments	Forest, ecosystem and habitat classification and mapping report Number of forests, habitat and species inventories.
Knowledge	19. 3. A GIS will be established for assessing health (deforestation) and condition (degradation) of forests, ecosystems and habitats and maps prepared will be compatible with remote sensing technologies.	2017	12.0	GIS System; Mapping	Forest and Wildlife Departments	Mapping and assessment of ecosystems report Number of habitat and species inventories Conservation priorities identified.
TOTAL OF TARGET 19			18.5			
Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties						
Financial Mechanism	20. 1. The targets for implementation of BSAP will be integrated in the annual and medium term development plans.	2020	\$0.0	Annual Plans	Agriculture, Livestock, Fisheries Environment, Forestry, and Wildlife departments.	Trends in integration of biodiversity in annual development plans.
Financial Mechanism	20. 2. Additional financial resources if needed for implementing BSAP will be mobilized.	2016	\$0.25	Project Portfolio	Planning and Development Department; Agriculture, Livestock, Fisheries Environment, Forestry, and Wildlife departments.	Trends in increase in mobilization of additional source of funding.

Annexure 2: List of Species for Recovery under BSAP

Fauna – Non Game Animals

Common Name	Scientific Name	Remarks
1 Common Leopard	<i>Panthera pardus</i>	
2 Balochistan Black Bear	<i>Ursus thibetensis gedrosianus</i>	
3 Striped Hyena	<i>Hyaena hyaena</i>	
4 Grey wolf	<i>Canis lupus</i>	
5 Caracal desert lynx,	<i>Caracal caracal</i>	
6 Sand Cat	<i>Felis margarita</i>	

Fauna - Game Animals

Common Name	Scientific Name	Remarks
1 Afghan Urial	<i>Ovis vignei cycloceros</i>	Already receiving attention
2 Straight horned Markhor	<i>Capra falconerimegaceros</i>	Already receiving attention
3 Sulemain Markhor	<i>Capra falconeri</i>	
4 Chiltan Markhor / Chiltan Goat	<i>Capra aegagrus</i>	Already receiving attention
5 Sindh Ibex	<i>Capra aegagrus</i>	Already receiving attention
6 Goitered gazelle	<i>Gazella subgutturosa</i>	Extinct
7 Chinkara	<i>Gazella bennettii</i>	Already receiving attention

Fauna - Birds

Common Name	Scientific Name	Remarks
1 Houbara Bustard	<i>Chlamydotis undulata macqueenii</i>	
2 Demoiselle Crane	<i>Anthropoides virgo</i>	
3 Common Crane	<i>Grus grus</i>	

Fauna - Reptiles and Amphibians

Common Name	Scientific Name	Remarks
1 Marsh Crocodile	<i>Crocodylus palustris</i>	
2 Endemic Reptiles		

Fauna - Fish

Common Name	Scientific Name	Remarks
Labeo	<i>Labeo spp.</i>	Endemic
Loach	<i>Schistura spp.</i>	Endemic
Zhob mahasheer	<i>Naziritor zhobensis</i>	Endemic

Fauna - Marine Species

Common Name	Scientific Name	Remarks
1 Green sea turtle	<i>Chelonia mydas</i>	
2 Yellowfin Tuna	<i>Thunnus albacares</i>	
3 Corals	All species	

4	Knife tooth sawfish	<i>Anoxypristis cuspidata</i>	
5	Narrow snout sawfish	<i>Pristis zijsron</i>	
6	Pondichery shark	<i>Carcharhinus hemiodon</i>	
7	Ganges shark	<i>Glyphis gangeticus</i>	
8	Scalloped hammerhead Shark	<i>Sphyrna lewini</i>	
9	Squat-headed Hammerhead Shark	<i>Sphyrna mokarran</i>	
10	Broad fin shark	<i>Lamiopsis temminckii</i>	
11	Longheaded eagle ray	<i>Aetobatus flagellum</i>	

Flora

Common Name	Scientific Name	Remarks
1 Juniper	<i>Juniperus excelsa</i>	
2 Chilghoza	<i>Pinus gerardiana</i>	
3 Gugul	<i>Commiphora wightii</i>	
4 Mazri	<i>Nannorrhops ritchiana</i>	
5 Bakau	<i>Rhizophora mucronata</i>	

Annexure 3: List of Protected Areas of Balochistan

National Parks					
Name	District	Area (ha)	Land Tenure	Management Plan	Key Species
1. Hazarganji Chiltan	Quetta, Mastung	27,400	Notified Government Land	Yes	Chiltan Wild Goat
2. Hingol	Lasbella, Awaran, Gwadar	619,100	Notified Government Land	Yes	Ibex, Urial, Chinkara, Marsh crocodile,
Total Area		646,500			
Wildlife Sanctuaries					
1. Maslakh	Pishin	46575	Notified Government Land	No	Migratory & Resident Birds
2. Sasana Mana	Ziarat	6607	Notified Government Land	No	
3. Gishk	Kalat	24356	Notified Government Land	No	Ibex
4. RasKoh	Kharan	99498	Notified Government Land	No	Ibex
5. Ziarat	Ziarat	37247	Notified Government Land	No	Suleiman Markhor
6. Kurkhera	Lasbella	18345	Notified Government Land	No	Migratory & Resident Birds
7. Buzi Makola	Gwadar	145101	Notified Government Land	No	Ibex
8. Chorani	Khuzdar	19433	Notified Government Land	No	
9. Kachau	Khuzdar	21660	Notified Government Land	No	Ibex, Chinkara
10. Shaahan	Khuzdar	29555	Notified Government Land	No	
11. Ragha-e-Rakhshan	Kharan	125425	Notified Government Land	No	Migratory & Resident Birds, Reptiles
12. Kolwakap	Kech/Awaran	33198	Notified Government Land	No	
13. Gut	Chagai	165992	Notified Government Land	No	
14. Chapar Kohan	Khuzdar	194616	Notified	No	

Game Reserves					
Total Area		967,608	Government Land		
1. Dureji	Lasbella	178259	Notified Government Land	No	Sind Ibex, Blandford Urial
2. Bund Khushdil Khan	Pishin	1296	Notified Government Land	No	Dried up wetland
3. ZangiNawar	Nushki	1069	Notified Government Land	No	Migratory Birds, Reptiles, Dried up wetland
4. Gogi	Ziarat	10364	Notified Government Land	No	
5. Wam	Ziarat	3887	Notified Government Land	No	
6. ZawarKan	Pishin	1060	Notified Government Land	No	Suleiman Markhor, Partridges
7. Kambran	Chagai	211433	Notified Government Land	No	
8. Duz-Dara and Koh-e-Surkho	Mastung	2351	Notified Government Land	No	Buffer zone for HazarganjiChiltan National Park
Total Area		409,719			
Community Conservation Areas					
1. Torghar	QilaSaif Ullah		Communal land	Yes	Staright horned Markhor, Afghan Urial
2. Hapursi, Darnelli /Kook Area Harboi	Kalat		Communal land		
3. Dher	Kachhi		Communal land		
4. Lohindo, GajKolachi, Shah Noorani Area Bahran Lak Phab Range	Khuzdar		Communal land		
5. Nag	Washuk		Communal land		Houbara bustard
6. Naseer Aghbargai	QilaSaif Ullah		Communal land		
7. Syed Abad, Talo Bund, Ormara	Gwadar		Communal land		
8. Shah Sar and Sur Ghar	Musakhail		Communal land		

Annexure 4: Sites Identified for Filling Gaps in the Protected Area System

Vegetation Type	Ecosystem	Representation	Proposed Sites	Priority
Marine and Island	Astola Island, Arabian Sea	Gap	Arabian Sea including Astola	High
Littoral and Mangrove	<i>Avicenna – Ceriops</i>	Inadequate	Ganjabad, Cheer Koh, Sonmiani, Gwathar Bay, Jiwani, Kalamat	Medium
Wetlands, swamps and seasonal wetlands	<i>Tamarix dioica-Typha angustata,</i>	Gap	Wasta Lake, and Zarri Daggar Zhob,	High
Sand Dune Desert	<i>Prosopis cineraria – Salvadora oleoides</i>	Gap	Sibi	Medium
Balochistan Dry Coniferous Forest	<i>Juniperus excelsa – Fraxinus xanthoxyloides</i>	Inadequate	Khalifat, Zargoan, and Ziarat	High
	<i>Cedrus deodara– Pinus wallichiana</i>	Gap	Takhat –i-Suleiman	High

Annexure 5: List of Major wetlands of Balochistan

	Wetland	Area (ha)	Location	Ramsar Site	Conservation Status
1	Akara Dam		Gwadar		Not Protected
2	Astola (Haft Talar) Island	5,000	Gwadar	Yes	Not Protected
3	Astola Sea Mount		Gwadar		Not Protected
4	Band Khushdil Khan		Pishin		Game Reserve
5	Boji Point		Lasbela		National Park (part of)
6	Chakhon		Zhob		Not Protected
7	Dasht Khor		Gwadar		Not Protected
8	Hamun-i-Lora		Chagai		Not Protected
9	Hamun-i-Mushkel		Chagai		Not Protected
10	Hanna Lake		Quetta		Not Known
11	Hub Dam	27,000		Yes	
12	Jiwani Estuary	4,600	Gwadar	Yes	Not Protected
13	KalamatKhor		Gwadar		Not Protected
14	Marav Lake		Dera Bugti		Not Protected
15	MianiHor	55,000	Lasbela	Yes	Not Protected
16	Ormara	2,400	Gwadar	Yes	Not Protected
17	Pasni Bay		Gwadar		Not Protected
18	Qamardin Karez		Qila Saifullah		Not Known
19	Ras Malan		Lasbela		Not Protected
20	Siranda Lake		Lasbela		Not Protected
21	Spin Karez		Quetta		Not Known
22	Wasta Dam		Zhob		Not Protected
23	ZangiNawar		Chagai		Game Reserve
24	Zhob River		Zhob		Not Protected

Annexure 6: List of Ramsar Sites of Balochistan

	RAMSAR Site	Remarks
1	Astola (Haft Talar) Island	No management plan
2	Hub Dam	No management plan
3	Jiwani Coastal Wetland	No management plan
4	Miani Hor	No management plan
5	Ormara Turtle Beaches	No management plan