BIODIVERSITY IN PAKISTAN: STATUS CHALLENGES AND STRATEGIES FOR ITS CONSERVATION

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ABSTRACT

Pakistan possesses a variety of world's ecological regions due to its immense latitudinal and altitudinal variations. These regions include the coastal mangrove forests of the Arabian Sea as well as some of the highest mountains of the world, where the western Himalayas, Hindu-Kush and Karakoram ranges meet. This diversity contains diversified habitats and landscapes that support a rich biodiversity of both fauna and flora. Arid and semi-arid regions covering almost 80% of the total land area of the country possess significant portion of country's biodiversity.

During the last two-three decades, a number of animal and plant species have become threatened or endangered mainly due to over-exploitation and loss of natural habitat. Rapid human population growth is increasing pressure on the country's natural resource base. Increased poverty has forced rural people to exploit biodiversity at unsustainable rates. Factors like deforestation, overgrazing, soil erosion, salinity and water logging are posing major threats to the remaining biodiversity of the country. The continuing loss of forest habitat, with its associated fauna and flora, will have serious implications for the nation's other natural and agricultural ecosystems. Protected Areas System has been established for in-situ conservation of biodiversity in the country.

Pakistan Environmental Protection Act 1997, provides legal protection to the overall environment in Pakistan. A number of other laws do exist relating to conservation of various components of biodiversity. All efforts to reverse losses and promote diversity would be in vain without local participation. The key to protecting the biological diversity is involving local communities and obtaining support from relevant institutions in sustainable use initiatives.

The Government of Pakistan recognized the value and importance of the country's valuable treasure and prepared the National Conservation Strategy (NCS) in 1992. Biodiversity conservation has been treated as an essential component in the NCS. Pakistan also became a party to the Convention on Biological Diversity (CBD) in 1994. Under the obligation of CBD, a Biodiversity Action Plan (BAP) has also been prepared and approved by the Government of Pakistan in 1999. The plan deals with the conservation and sustainable use of biodiversity in all ecological regions of Pakistan including arid and semi-arid regions. It is proposed to all the government agencies, local communities and NGOs to work together as partners in the noble task of biodiversity conservation.

Key-words: Biodiversity, status, challenges, conservation, environment, Pakistan.

INTRODUCTION

Pakistan spans over 882,000 km^2, lying between 24° and 37° north and 61° and 75° east. Pakistan extends some 1,700 km north from the Arabian Sea coast and the mouths of the Indus River to its headwaters among the mountains of the Himalaya, Hindu Kush and Karakorum ranges, where a number of peaks exceed 8,000 meters, Pakistan has a coastline of about 1,046 km with 22,820 km^2 of territorial waters and an Exclusive Economic Zone of about 196,600 km^2.

Pakistan contains three of the world's six biogeography realms with their distinct biota, and spans four of Earth's ten biomes (desert, temperate grassland, tropical seasonal forest and mountain) (Cox and Moore, 1993). Roughly two-thirds of the country is mountainous; changes in altitude generate many changes in climate and species within short distances. Pakistan encompasses a wide array of terrestrial ecosystems within 12 major vegetative zones (Ahmed *et al* 2006). These range from the permanent snowfields and cold deserts of the north to the arid subtropical zones of Sindh and Balochistan; from the dry temperate coniferous forests of inner Himalayas to the tropical deciduous forests of the Himalayan foot hills; from the steppe forests of Sulaiman range to thorn forests of Indus plains; and from the swamps and riverine communities of the Indus and its tributaries to the mangrove forests of the Indus delta and Arabian Sea coast (Roberts, 1997). In addition, a number of distinct agro-ecosystems have been created through the conversion of natural habitats to agricultural use. Nine main agro- ecological zones have been identified in the country (GOP, 1992).

About 80% of country is arid and semi-arid, along with 12% sub-humid and *8%* humid, with two distinct seasons (i.e. summer and winter) (GOP, 2001). The monsoon brings major portion of rainfall in most part of the country. There are also winter rains, which are limited in quantity. Because of its distribution, precipitation is generally inadequate for productive rain fed agriculture. There are vast areas under arid and semi-arid habitat, which host important biodiversity resources of the country. The area around Pakistan is the richest in phytoplankton and zooplankton in the Arabian Sea region (Parnetta, 1993).

Table 1. Species richness and endemics for major plant and animal groups.

Group	Total Species reported in Pakistan	Endemic	Threatened
Mammals	174	6	20
Birds	668	N/a	25
Reptiles	177	13	6
Amphibians	22	9	1
Fish (freshwater)	198	29	1
Fish (marine)	788	-	5
Echinoderms	25	-	2
Molluscs (marine)	769	-	8
Crustaceans (marine)	287	-	6
Annelids (Marine)	101	-	1
Insects	>5000	--	-
Angiosperms	5700	380	N/a
Gymnosperms	21	-	N/a
Pteridophytes	189	-	N/a
Algae	775	20	N/a
Fungi	>4500	2	N/a

Adopted after the Government of Pakistan (GOP), 1999

STATUS OF BIODIVERSITY IN PAKISTAN

Pakistan is rich in biodiversity due to its diversified landscapes and ecology. It has relatively low national rates of endemism for some species (about 7 per cent for flowering plants and reptiles and 3 per cent for mammals) and higher rates for others (15 per cent for freshwater fish) (GOP, 1999). The proportion of "restricted range" species is much higher, however; for many of them, Pakistan contains majority of the global population. The number of endemic species and those considered as threatened with extinction has been presented Table-1. However, no consistent analysis has yet been done on threatened species in Pakistan.

Among nomads there are at least three endemic species and a number of endemic and non-endemic subspecies. A high percentage of Pakistan's bird fauna is migratory, over 30% of recorded species are Palaeartic winter visitors (Roberts, 1991). The Sulaiman Range, the Hindu-Kush and the Himalayas in NWFP and AJK comprise part of the Western Himalayan Endemic Bird Area. This is a global center of bird endemism with 10 restricted range species in Pakistan (GOP, 1999).

Among reptiles 13 species are endemic. Chagai desert is important for reptiles with six endemic species. A number of marine turtle species nest Pakistan's beaches. Out of 29 endemic fish species, nine are snow trout occurring in northern snow fed rivers (GOP, 1999). Eighty species of butterflies have been recorded in northern mountains, many of which are endemic (Hasan, 1997). Almost 80% of Pakistan's endemic flowering plants are confined to the northern and western mountains (Ali and Qaiser, 1986).

There are around 500 wild relatives of cultivated crops, most of which are found in northern areas of Pakistan (A.Qutab, Pess.com.). In fact northern and western Pakistan comprises one of the world centers on the origin and diversity of cultivated plants. However, with the introduction of high yield varieties, agriculture expansion, dam construction and deforestation, severe threats to wild landraces of cultivated crops have been posed.

Pakistan is rich in indigenous crop diversity, with an estimated 3,000 taxa of cultivated plants. The principal crops are wheat, rice, maize, barley, pulses, oil seeds, cotton, sugar cane, tobacco, vegetables and fruits (both tropical and temperate) (GOP, 1999). The Plant Genetic Resources Institute at Islamabad maintains over 16,899 accessions of more than 40 different crops (Anwar and Chris, 2000).

Pakistan has 2 breeds of buffalo, 8 of cattle, one of yak, 25 of goat, 28 of sheep, Three of horse, 6 of camel, and 3 of indigenous poultry (Usmani and Jasra, 1993). Almost 80 per cent of Pakistan's domestic livestock breeds are derivatives of established breeds and the proportion of non-descript livestock to pure is on the increase (GOP, 1999).

THREATS TO BIODIVERSITY

Pakistan's biodiversity, although rich, faces severe threats. Over-grazing, over-harvesting, water-logging and salinization, deforestation, land conversion, soil erosion, desertification, alien invasive species and pollution contribute to the degradation of biodiversity resources. Loss of fragmentation and degradation of natural habitat is the main cause of present high rate of extinction, and is a critical problem in all biomes (UNEP, 1995). Pakistan's woody biomass is declining at a rate of 4.6% per year (GOP 1992, Hosier, 1993). Mangrove forest cover has been halved from 2600 Km^2 in 1970s to 1300 Km^2 in mid 1990s. This natural wealth is quickly disappearing (Saifullah, 1997). Mangroves play an economically significant role in providing breeding grounds for shrimp and fish larvae, protecting from excessive siltation and acting as sanctuaries for migratory birds.

Similar trend has been observed in rangelands where 90% of non-alpine rangelands have been degraded (GOP, 1992). Degradation of rangelands reduces the diversity of flora and changes the vegetation composition. With the water diversion, fresh water habitats have also been degraded and fragmented. Blockage of Indus through dams and barrages is considered to be the most important human threat to biodiversity in the aquatic ecosystems of Pakistan (Ahmad, 1997). Changes in habitat quality, while less extreme than habitat loss, also affect plant and animal populations. Habitat fragmentation, for example, increases the risk of extinction by isolating small pockets of previously connected populations. As an example, four mammal species have disappeared from Pakistan including; tiger, lion, swamp dear and one horned rhinoceros (Ahmad, 1997).

Many bird and animal species are experiencing population decline because of illegal hunting for sport, meat, and trade. There is a strong tradition of hunting in Pakistan, and the impact of hunters has increased with the spread of modern weapons and greater mobility. Virtually all large mammals have declined in number and in distribution. Currently, 37 species and 14 subspecies of mammals, 25 species of birds and ten species of reptiles in Pakistan are internationally threatened (IUCN, 1996).

Recently, increasing demand for plant based drugs and products have resulted in the scarcity of a number of valuable medicinal plant species. Irrigation for agriculture has caused degradation of agro-ecosystems through increasing salinity, sodicity and water-logging in the Indus basin. Excessive use of pesticides and fertilizers has caused the disturbance of natural biotic balance in agriculture soils. It has direct impact on terrestrial and aquatic fauna. Excessive use of nitrogenous fertilizers leads to eutropication of water channels and wetlands, spread of aquatic vegetation and reduced aquatic diversity, as in Halezi, Drigh and Patisar lakes (Khursheed, 1991).

Pollution and particularly the industrial pollution may have direct negative impacts on ecosystems and may reduce or eliminate or heavy metal contamination of sensitive species. Fishing in coastal waters has steadily increased and the valuable shrimp fishery has begun to show signs of over-exploitation and there is an increased proportion of young shrimp in the catch (Amjad, 1996).

Weak governance systems, low literacy (i.e. 35 per cent), lack of scientific research, poor law and order situation and poor infrastructure all contribute to *a* lack of effective control over biodiversity use and conservation measures. The root causes of Pakistan's biodiversity crisis are its rapid population growth (i.e. 2.6 per cent per annum) and the poverty of its citizens, which minimizes the alternatives to unsustainable natural resource exploitation for meeting basic needs (GOP, 1999).

Pakistan recognizes the importance of maintaining its biodiversity. It adopted a Biodiversity Action Plan (BAP) in 1999 and is currently in the initial stages of implementing the prescribed actions. A due recognition has been given to all ecological regions of the country, especially arid and semi-arid regions where there is relatively more pressure on natural resources by the native communities.

PRIME ISSUES IN CONSERVING BIODIVERSITY

Presented below are the most critical issues for biodiversity conservation in Pakistan, identified by Anwar and Shank, 2000.

- the need for associated policy and institutional reforms and institutional strengthening;
- integration of biodiversity conservation measures into sectoral initiatives;
- better understanding of all aspects of biodiversity and effective means for ensuring their sustainable use;
- developing community-based biodiversity management systems;
- developing and institutionalizing systems to monitor key elements of biodiversity; and
- better implementation of existing plans.

CRITICALLY THREATENED ECOSYSTEMS

There has been a widespread historic conversion of natural ecosystems consisting of tropical thorn forest in the Indus plains to agriculture. This has caused rapidly accelerating depletion of habitats and the continuing depletion of species and populations. Most of the remaining natural or modified ecosystems in Pakistan are now critically threatened. At least ten ecosystems of special value for their species-richness and/or unique communities of flora and fauna are threatened with habitat loss and degradation (Table 2).
Juniper forests of north-central Balochistan are the most extensive remnants of the kind in the world. Some trees are over 1000 years old. Chagai desert in Balochistan has many endemic species adapted to living in the sand. Himalayan moist temperate forests hosts endangered westernTragopon pheasant and musk dear and a number of bird species (Anwar, 1996).

STRATEGIES FOR PROMOTING BIODIVERSITY CONSERVATION

The Government of Pakistan prepared and adopted National Conservation Strategy (NCS) in 1992 which was accepted by the World Bank as a National Environmental Action Plan. There are 14 core programs in the NCS, many of which touch upon biodiversity issues. However, as a whole the document does not provide comprehensive actions specifically related to biodiversity loss and conservation. The main planning instruments in Pakistan are the Perspective Plan, the Five-Year Plan, and Annual Development Plans.

Traditionally, these instruments have not paid required attention to environmental concerns, the Eighth Five-Year Plan (1993-1998) identifies the need to develop provincial conservation strategies to carry through with NCS recommendations. The Sarhad and Balochistan Provincial Conservation Strategies have been completed and strategy for Northern Areas is under preparation. At least two district-level conservation strategies are also being initiated. These strategies deal with biodiversity much more explicitly at local level (GOP, 1999).

It is good to note that the Sarhad Provincial Conservation Strategy (SPCS) is more specifically presents a chapter on biological diversity, parks and protected areas. However, it also does not comprehensively address the requirements of the CBD. This approach to hierarchically nested conservation plans is also found at the local level with the preparation of district conservation strategies in Chitral and Abbottabad. These strategies postdate development of the BAP, and will explicitly address its recommendations relevant to the local context (GOP, 1999). Presently existing sectoral policies and plans most pertinent to the conservation and sustainable use of biodiversity relate to wildlife, forestry, fisheries and agriculture. Pakistan's existing wildlife policies and plans are concerned almost exclusively with the establishment of protected areas, and tend to place a great emphasis on fauna, specifically game animals. They relate to taking and trade controls for listed species, and therefore do not address many of the more comprehensive requirements of the CBD.

INSTITUTIONAL NEEDS FOR BIODIVERSITY CONSERVATION

The federal Ministry of Environment is the focal point for national concerns related to biodiversity conservation. Within the Ministry, the Director General (DG), Environment, assisted by a Deputy Secretary and a Section Officer, deal with biodiversity issues. D.G. Environment is also focal point of most of the environmentally related conventions. The provinces have control over most aspects of biodiversity conservation; provincial forest and wildlife departments are primarily responsible for biodiversity conservation. The office of Inspector General of Forests (within the Ministry of Environment) oversees all policy coordination, research and education, as well as liaison matters related to forestry, rangelands, and wildlife management.

The National Council for the Conservation of Wildlife (NCCW), an attached department of Ministry of Environment, formulates and coordinates wildlife policy and plans at the federal level in addition to dealing with international conventions dealing with wildlife species and liaison in other relevant matters. Existing wildlife policies relate mainly to fauna, and not flora, and to game animals rather than non-game species. The Zoological Survey Department is responsible for conducting surveys of fauna in different eco-regions and also maintains records of specimens. Pakistan Forest Institute is playing a pivotal role for forestry education and research at national as well as regional level. The provincial Forestry, Wildlife and Fisheries departments are responsible for the management of wild lands both within and outside protected areas. These wild lands include areas not under cultivation and managed for natural resources.

The Pakistan Environmental Protection Agency (PEPA) is an attached agency of Ministry of Environment established under the *Pakistan Environmental Protection Act* of 1997. PEPA has the responsibility for executing, enforcing and regulating protection of the environment in the country. PEPA is also the focal point and approving

authority for Initial Environmental Examinations (IEEs) and Environmental Impact Assessments (ElAs). The agency is supported by provincial EPAs.

Table 2. Critically threatened ecosystems in Pakistan.

Ecosystem	Characteristics	Significance	Threats
Indus delta and coastal wetlands	Extensive mangroves and mudflats-Inadequate protected area coverage	Rich avian and marine fauna-Diverse mangrove habitat Marine turtle habitat. Coastal resources	Reduced freshwater flow from diversions upstream-Cutting Mangroves for fuelwood and Development Drainage of coastal wetlands-Pollution
Indus River and wetlands	Extensive wetlands	Migratory flyway of global importance- Habitat for Indus River dolphin	Water diversion/ drainage Agricultural -intensification Toxic pollutants-Hunting
Chagai desert	A desert of great antiquity	Many endemic and unique species	Proposed mining Hunting parties from the Gulf
Balochistan juniper forest	Huge and ancient junipers	World's largest extant juniper forest-Unique flora and fauna-Watershed	Fuelwood cutting and overgrazing-Habitat fragmentation-Disease-Soil Erosion
Chilghoza forest (Suleiman Range)	Rock outcrops with shallow mountain soils-Pine nuts	Important wildlife habitat for several species at risk-Watershed	Fuelwood cutting and overgrazing Illegal hunting-Soil Erosion
Balochistan subtropical forests	Mid-altitude forests with sparse canopy but rich associated flora	Very few areas remain Important wildlife habitat-Watershed area	Fuelwood, Soil erosion-Cutting and overgrazing-Watershed destruction
Balochistan rivers	Not connected with Indus River System	Unique aquatic fauna and flora with high levels of endemism	Water diversion/ drainage Over fishing
Tropical deciduous forests (Hima-layan foothills)	Extend from the Margalla Hills NP east to Azad Kashmir	Perhaps the most floristically rich ecosystems of Pakistan	Fuelwood cutting and overgrazing-Erosion-Watershed destruction
Moist and dry temperate Himalayan forests	Important forest tracts now becoming increasingly fragmented	Global hot spot for avian diversity watershed important wildlife habitat	Commercial logging- Fuelwood cutting and overgrazing, Soil Erosion
Trans-Himalayan alps and plateaus	Spectacular mountain scenery-Watershed areas	Unique flora and fauna; center of endemism-Watershed Freshwater storage	Fuelwood cutting and overgrazing Illegal hunting-Unregulated tourism Habitat fragmentation
Snow Cover peak and Glaciers	Mountain scenery	Unique wildlife Tourism-Main source of water.	Shrinking glaciers due to global warming.

Adopted and modified after the Government of Pakistan (GOP), 1999

ROLE OF RESEARCH INSTITUTIONS

A number of federal and provincial institutions are engaged in conducting research in various components of biodiversity. These include Zoological Survey Department, Pakistan Museum of Natural History, Pakistan Agricultural Research Council, Pakistan Forest Institute, Punjab Forestry Research Institute, Provincial Agriculture, Fisheries and Livestock Research institutes and universities. New research programs in priority areas related to the conservation, management and sustainable use of biodiversity are required to be started. There is also need to develop biodiversity monitoring programs and establish database centers at federal provincial and university level.

ROLE OF NGOs

The most notable international NGOs working in the field of biodiversity conservation are WWF and IUCN. A number of local NGOs are also working in various fields of environmental protection and biodiversity conservation. Most of them work in close collaboration with local community-based organizations in the conservation of biodiversity. NGOs are particularly prominent in the mountainous areas of northern Pakistan, where the Aga Khan Rural Support Program (AKRSP) introduced community mobilization and organization. Basic social infrastructure to develop community-based conservation programs is provided through several conservation NGOs. The Mountain Areas Conservancy Project, a large-scale biodiversity conservation initiative funded by GEF/UNDP, has mainly been developed based on the work done by AKRSP in the northern mountain region (Anwar and Shank, 2000).

PROTECTED AREAS

Government of Pakistan has taken a number of steps for the protection and conservation of biodiversity in the country. The national protected areas system has been established throughout the country (Table 3). This includes national parks, wildlife sanctuaries and game reserves, and covers an area of 9.17 million hectares (10.4 per cent of total land area) (GOP, 1999). However, most of these protected areas were designated in the 1960s and 1970s through legislation. Most of these areas are too small in size and isolated to be effective. Also, not all the country's biodiversity is currently represented and protected in existing system of protected areas. This is partly explained by the fact that the dominant selection criteria for many of the PAs was based upon species, as opposed to habitat or biodiversity (IUCN, 2000).Further, most of the ecological zones, including many of the critically threatened ecosystems, are not adequately represented within the protected area system. Wildlife sanctuaries provide greater protection than national parks, while game reserves afford no protection to habitat but merely regulate hunting. The three categories of protected areas are inadequate for contemporary needs. Most of the remaining' unprotected areas of biodiversity significance are currently used and managed by local communities in one-way or the other (GOP, 1999).

There are a number of gaps relating to management of PAs in Pakistan (GOP, 1999):

Existing wildlife laws do not provide adequate framework for management, providing no provision for wildlife departments to manage adjacent areas.

Most of the PAs in Pakistan lack comprehensive management plans and where exist are not fully implemented.

Provincial wildlife departments are not will equipped with trained staff to effectively manage the PAs. A very little progress has been made in collaborative management regimes and local communities have rarely any role in their management.

POOR LEGISLATION AND WEAK IMPLEMENTATION OF LAWS

There are a wide range of laws which govern conservation of different components of biodiversity, including forest, fisheries and wildlife. These laws are implemented by the provinces in their relevant areas and by the Capital Development Authority (CDA) in federal capital area. Relevant legislation is divided between the federal and provincial governments. Wildlife, parks, forestry, and freshwater and near-shore fisheries are under provincial jurisdiction and are covered by various acts and ordinances. Provincial Wildlife Boards have been set up in some provinces to provide policy for supervision of wildlife conservation and management. A serious weakness in the law regarding conservation of species is that it deals with animal species with no provision for protection of plant species or habitat. The laws need to be amended in this regard and also to include provisions of international conventions dealing with wildlife and biodiversity to which Pakistan is signatory.

Pakistan Environmental Protection Ordinance of 1983 was the first relevant comprehensive federal legislation targeting environmental protection and conservation as a whole. This was replaced by the Pakistan Environmental Protection Act in 1997. The Act addresses the biodiversity conservation in the country primarily through its environmental assessment screening process for proposed development projects. These processes include Initial Environment Examination (IEE) and Environment Impact Assessment (EIA) and have been put into place and do address some biodiversity considerations. However, there is little expertise available at federal and provincial level including lack of resources and qualified staff to effectively undertake lEEs or ElAs. Therefore, normally department ask their client to consult private enterprises or government organizations like PCSIR or SUPARCO to do the job.

NEED FOR COMPREHENSIVE PLANS AND STRONG POLICIES

A Forestry Sector Master Plan, developed in 1992 focuses on the programs like: soil conservation, watershed development, wood production, biodiversity conservation and institutional strengthening.
Similarly a Forest Sector Policy for Pakistan has also been prepared by the Forestry Wing, Ministry of Environment. It takes a comprehensive approach to the forest sector and integrates forests, rangelands, watersheds and wildlife.
Pakistan's Agricultural Policy addresses a number of issues relevant to the CBD, including increasing primary production, reducing land degradation, improving irrigation and drainage, improving soil management, and expanding integrated pest management. It does not, however, adequately address the issue of agro-biodiversity per se.
Fisheries policy focuses on aquaculture and makes no reference to conserving indigenous aquatic biodiversity (GOP, 1999).
Eighth five-year plan, which was formulated after the approval of NCS in 1992, identifies the environment as a critical issue. Conservation of natural resources and protection of environment are included in plan objectives. It also mentions the expansion and management of protected areas, ex-situ measures for plant conservation and conservation of endangered species. However, it does not fully addresses the conservation and sustainable use of biodiversity and scope of CBD (Anwar *et al*., 2005).
All the stakeholders must ensure that provisions of Biodiversity Action Plan are integrated into next forthcoming five-year plan and into both the federal and provincial annual development plans as well (GOP, 1999).

NATIONAL ACTION PLAN TO COMBAT DESERTIFICATION

Pakistan is also Party to UN Convention to Combat Desertification (CCD) since 1997 and has prepared National Action Plan to Combat Desertification (NAP). NAP addresses the biodiversity conservation indirectly as secondary issue. Habitat loss and degradation is one of the main issues and threats to conservation of biodiversity in Pakistan. NAP will be specifically addressing land degradation and desertification problems which would be of great significance in rehabilitation of the natural vegetation, especially in arid and semi-arid regions (GOP, 2001).

Table 2: Protected Areas in Pakistan

Region/ Province	National Parks	Wildlife Sanctuaries	Game Reserves	Unclassified	Total PAs	Area Protected (hectares)	(%)
Azad Jammu & Kashmir	**1**	**0**	**8**	**0**	**9**	**51,998**	**3.91**
Balochistan	**2**	**14**	**8**	**7**	**31**	**1 ,837,704**	**5.29**
Punjab	**3**	**37**	**19**	**0**	**58**	**3,315,803**	**16.14**
NWFP	**3**	**6**	**38**	**5**	**52**	**470,675**	**6.30**
Sindh	**1**	**35**	**14**	**4**	**52**	**1 ,307,575**	**9.27**
Federal Territory	**1**	**1**	**1**	**0**	**3**	**94,186**	**100**
Northern Areas	**4**	**5**	**9**	**0**	**18**	**2,092,180**	**2.97**
Total	15	98	97	16	225	9,170,121	10.4

Adopted after the Government of Pakistan (GOP), 1999
Total area of National Park= 37,67518ha

ACTIONS SPEAK LOUDER THAN WORDS MUST BE THE SOUL OF BIODIVERSITY ACTION PLAN

Pakistan was among the first nations to sign the CBD in 1992, ratified by the Cabinet in 1994. Article 6 of the Convention calls for parties to develop national strategies, plans or programs for the conservation and sustainable use of biological diversity; and integrate as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programs and policies (CBD, 1992).
To fulfill its obligation under CBD, Pakistan started the process of developing Biodiversity Action Plan in 1993. Initial discussions about a national response to the CBD were held between government and the World Bank in

1993. A proposal was developed by an adhoc Biodiversity Conservation Coordination Group formed under the Ministry of Environment. In July 1996, funds were provided by the Global Environmental Facility (GEF) through the World Bank to develop the Bio-diversity. Action Plan along with a proposal for a protected areas initiative. BAP preparation was therefore linked with planning for the Protected Areas Management Project (PAMP).

The BAP integrated three processes called for by the CBD: country study, national strategy and action plan. The BAP provides a brief assessment of the status and trends of biodiversity, outlines strategic goals and objectives, and identifies a plan of action with the following objectives.

The objectives:
•   to create a policy framework that fosters the sustainable use of biological resources and the maintenance of biodiversity;
•   to strengthen and promote national biodiversity conservation programs and develop international and regional cooperation;
•   to create conditions and incentives for biodiversity conservation at the local community level;
•   to strengthen and apply more broadly the tools and technologies for conserving biodiversity; and
•   to increase people's knowledge of biodiversity and their willingness and capacity to conserve it.

PRIME ROLE OF MINISTRY OF ENVIRONMENT

Ministry of Environment is the national focal point for the CBD, with the overall responsibility for implementing the BAP to oversee the implementation process. The BAP proposes a Biodiversity Steering Committee at the federal level, chaired by the Minister for Environment and including representatives from relevant federal ministries and departments, provinces and NGOs. Since most implementation measures will take place at the provincial level, the BAP also allows for Provincial Steering Committees. The respective provincial ministers for forest, fisheries and wildlife will chair these committees, which will include representatives of relevant departments, NGOs and community organizations. These forums will provide a strong coordination among all stakeholders to work for the conservation of biodiversity in the country (GOP, 1999).

IMPLEMENTATION PROBLEMS

Anwar and Shank (2000) identified the following primary challenges in implementing the biodiversity related policy and plans such as BAP include:
•   lack of funding,
•   weak capacity of government departments (lack of individual capacity and incentives for performance),
•   lack of awareness of environmental issues on the part of decision-makers and civil society, and
•   weak governance (slow decision-making processes, inability to conceptualize policy, and lack of distinction between public and private interests)
There is need to address some of these problems on priority basis by the Ministry of Environment through the creation of biodiversity secretariat that may be able to take up the priority issues through coordination with concerned government and other organizations.

DEVELOPMENT OF LINKAGES AMONG ALL ENVIRONMENTAL RELATED CONVENTIONS

Dire need exists to establish strong linkages among the CBD, CCD, Convention on Climate Change (CCC) and other relevant Conventions. National focal points for these conventions are to be strongly linked with each other through modern communication tools. Biodiversity has been addressed by all' the three conventions directly or indirectly. Synergies about biodiversity conservation among these conventions may clearly be understood and documented to establish strong linkages between these conventions. Frequent exchange of information between secretariats of these conventions will further strengthen the linkages and will be useful in a number of action areas including biodiversity conservation.

TAILORING STRATEGIES TO THE BIODIVERSITY SCENARIO OF PAKISTAN

Keeping in view the Biodiversity scenario of the country, Anwar et al., (2005) suggest the following actions and the authors believe that they may be replicable under similar circumstances elsewhere;
1)   Pakistan has undertaken considerable spade work to generate biodiversity specific documents like NCS, BAP

etc., however, implementation phase, unfortunately met with a little or no success.

Findings of these documents need to be disseminated appropriately at various levels (i.e. decision, policy, implementation and grass root). For this purpose, appropriate presentation of these documents is required e.g. Executive Summaries/briefings for the President/Prime Minister, technical sessions for mid level policy makers/planners/implementers and NGO's approach for local communities. Eventually biodiversity must be reshaped as economic subject at all levels rather than an incentive package.

2) Once biodiversity issues are being successfully identified and addressed appropriately, the opinions of decision and policymakers through vigorous efforts as mentioned above may be formed to engage all public service departments in this respect. For this purpose, all public departments dealing with biodiversity in one or the other way may be enlisted. Biodiversity concerns/issues relative to each department be segregated, hence suggesting individually solutions. Finally each department should prepare its annual action plan duly incorporated in annual development plan to combat its biodiversity concerns, and it may become an annual scheduled activity.

3) For achieving as mentioned in 'b' the top level decision makers (i.e. President/Prime Minister of the country) has to be sensitized greatly. It could possibly be achieved by linking cleverly the biodiversity with food security, social security or country security and would require' appropriate sensitization packages.

4) All groundwork concerning biodiversity conservation in Pakistan has almost been completed. For example, NCS, BAP, NAP to combat desertification etc. have been prepared. However, everything is sitting on shelves and there is unfortunately no implementation so far.

5) There are very few biodiversity trained professionals in Pakistan. Hence in real terms, there is always a communication gap between national and international forums like CBD, CCD, CCC Universities etc. Capacity building of concerned departments is urgently needed.

6) Under the on-going circumstances, a National Biodiversity Council (NBC) with objectively defined national and international mandate is proposed as under:

Creation of an organization on biodiversity at the national level

Keeping in view the importance of the subject and the threatening situation, it seems logical to create an organization on biodiversity at the national level, having an international and national mandate. That will maintain liaison with all international commitments regarding biodiversity conservation focusing on technical, financial, human resource development (HRD) and communication aspects.

At the National level, the organization should be able to serve the all aspects of biodiversity like: development of human resources; policy reforms and legislation; Sensitization especially at policy and mid level; and assist all concerned public departments/ agencies in assisting, educating and segregating biodiversity issues.

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(*Accepted for publication October 2007*)