

ENVIRONMENT

Pakistan recognizes the importance of incorporating environmental concerns as a cross-cutting theme in its sustainable development strategy. In Pakistan, environmental degradation is intrinsically linked to poverty because of the overwhelming dependence of the poor on natural resources for their livelihoods—whether agriculture, forestry, fisheries, hunting etc. Poverty combined with a burgeoning population and rapid urbanization, is leading to intense pressures on the environment. To arrive at sustainable solutions to environmental problems, this ‘environment-poverty nexus’ needs to be addressed.

Pakistani cities are facing problems of urban congestion, deteriorating air and water quality and waste management while the rural areas are witnessing rapid deforestation, biodiversity and habitat loss, crop failure, desertification and land degradation. There is increasing realization that many of these issues are compounded by climate change. The Government recognizes that women in Pakistan are directly involved in and responsible for many aspects of environmental management. Therefore, gender analysis and incorporating women’s concerns into all environmental initiatives are being given increased importance.

The Government has initiated the National Environment Action Plan (NEAP) in 2001 as an umbrella programme to address these environmental concerns in a holistic manner. The development objective of NEAP is environmental sustainability and poverty reduction in the context of economic growth. The United Nations Development Programme has been supporting the implementation of this initiative through the NEAP Support Programme (NEAP-SP). In March 2007, NEAP-SP programme entered its second phase. The NEAP-SP Phase-II will be guided from the experiences gained in Phase-I and help translate

the NEAP into action, while enhancing the poverty-environment nexus aspects in operational terms.

Some of the major achievements of NEAP Phase-I included development of policies and strategies like National Environmental Policy, Sanitation Policy, Clean Development Mechanism Strategy, Draft National Forest Policy and Energy Conservation Policy etc. During Phase-I, the Programme appraised more than 300 project proposals submitted by various stakeholders, while the core team of NEAP-SP prepared more than 60 project concepts. This also included preparation of projects for Public Sector Development Programme e.g. Clean Drinking Water Initiatives, Clean Drinking Water for All, Activity-based Capacity Development, National Bio-Safety Center and Rehabilitation of Rangelands of Potohar Tract of Punjab through participation of local communities.

NEAP-SP Phase II proposes a wide range of technical, institutional, regulatory, social and economic interventions in terms of different projects grouped under the following four thematic programmes: Pollution Prevention and Control; Climate Change; Ecosystem and Natural Resources Management; and Environmental Governance, Advocacy, and Partnership. These programmes, in addition to pursuing their technical objectives, will strengthen the institutional and technical capacities of relevant Government institutions. Moreover, the proposed programme will promote equal participation of women in project level activities and promote sustainable grassroots projects through its Grassroots Initiatives Programme for Local Environmental Management (GRIP).

At the international level, Pakistan is not only a signatory to numerous Multilateral Environmental

Agreements (MEAs), but has also shown its commitment to non-legally binding instruments such as Agenda-21 Rio Principles and Johannesburg Plan of Implementation aiming for sustainable development of natural resources. Pakistan adheres to the United Nations Convention on Biological Diversity (CBD), Convention on International Trade in Endangered Species of wild flora and fauna (CITES), United Nations Convention to Combat Desertification (UNCCD), United Nations Framework Convention on Climate Change (UNFCCC), Convention on Migratory Species (CMS), Ramsar Convention on Wetlands, Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal, Rotterdam Convention on the

Prior Informed Consent for Certain Hazardous Chemicals and Pesticides in International Trade and the Montreal Protocol. Pakistan has also prepared the National Implementation Plan for Persistent Organic Pollutants (POPs) to ratify the Stockholm Convention.

The Government has also committed itself to achieving the Millennium Development Goals (MDGs) as adopted by the UN member states in the year 2000. Among the MDGs, Goal number 7 aims at ensuring environmental sustainability. Each of the goals has a number of targets. Each MDG target is measured by several indicators. The indicators chosen by the Government to report progress on Target 9 are given in the Table 16-1.

Table 16.1: MDG Target 9- Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

Indicators	Definitions	1990-91	2001-02	2004-05	2005-06*	PRSP Target 2005-06	MTDF Target 2009-10	MDG Target 2015
Forest cover including state owned and private forest and farmlands	Forest cover including state owned and private forest and farmlands, as percentage of the total land area	4.8	4.8	4.92	5.02	5	5.2	6
Land area protected for the conservation of wildlife	Land area protected as as percentage of total land area	9.1	11.25	11.3	11.3	11.3	11.6	12
GDP (at constant factor cost) per unit of energy use as proxy for energy efficiency	Value added (in 1980/81 Rs) per ton of oil equivalent	26,471	27,047	27,000	Not Available	27,300	27,600	28,000
No. of vehicles using CNG	No. of petrol and diesel vehicles using CNG fuel	500	280,000	700,000	1,400,000	n/a	800,000	920,000
Sulphur content in high speed diesel (as a proxy for ambient air quality)	Percentage of sulphur (by weight) in high speed diesel	1	1	1	Not Available	n/a	0.5	0.5-0.25

Source: Pakistan Millennium Development Goals Report 2006, CRPRID, Planning Commission

N/a = Not available

* : Estimates for 2005-2006

One of the targets of the MDGs, as shown in the table above, is 6 percent forest cover including trees on agricultural lands, by 2015. In 2005-2006, 5.02 percent of Pakistan's land area was covered with trees which was an improvement from the previous year's 4.92 percent. The MDG target for "land area to be protected for the conservation of wildlife" is 12 percent by 2015. Pakistan already has 11.3 percent of its area under protection for conservation of wildlife. Thus, it is very likely that this target can be met by 2015. The Government's MDG target for number of vehicles using CNG (which previously used diesel and petrol) is 920,000 whereas the current estimate for 2005-2006 is 1.4 million. Therefore, Pakistan has already met its MDG target well in advance. This achievement has been made possible because of the tremendous growth in the number of vehicles that are converting to CNG due to the Government's resolve regarding the development of the CNG sector as a cleaner and economical energy alternative. On the other hand, the indicator for ambient air quality, 'sulphur content in high speed diesel', shows that there has been no improvement in recent years. Although the target for 2015 is 0.5-0.25 percent (by weight), the current percentage of 1 has remained unchanged in years.

Target 10 of the Millennium Development Goal of environmental sustainability aims to "halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation," whereas target 11 is concerned with improvement of the lives of slum dwellers. In Pakistan, this target has been adapted to mean proportion of katchi abadis that have been regularized. Target 11 poses a challenge to the Government, as the current proportion of regularized slum settlements is 60 percent, which has to be increased to 95 percent by 2015 set by the government.

STATE OF THE ENVIRONMENT

a) Air

The major cities of Pakistan have been suffering from deteriorating air quality due to a relatively higher population growth; absence of public transport services and tremendous increases in the

number of privately owned vehicles. A particular concern is very high concentrations of pollutants such as nitrous oxides and sulphur. In rural areas of the country, indoor air pollution, due to burning of fuel-wood and biomass to meet energy needs for cooking and heating, is an issue of concern. The primary sufferers of the health risks posed by indoor air pollution are women, who do most of the cooking, and young children who are primarily looked after by their mothers.

Suspended Particulate Matter: Another issue of air quality in Pakistan is the presence of excessive Suspended Particulate Matter (SPM) in the ambient air. The major sources of SPM are vehicles, industry, burning of solid waste, brick kilns and natural dust. The origin of Suspended Particulate Matter (SPM) may be a natural phenomenon, such as unpaved roads and places uncovered by green grass or trees.

The average SPM concentration in Pakistan exceeded 3.8 times from the Japanese standards (200 ug/m³) and 6.4 times from WHO guidelines (120 ug/m³) as reported by Pak-EPA in 2001 during the investigation of Air and Water Quality in the cities of Lahore, Rawalpindi and Islamabad.

Vehicular Pollution: Pakistan's steady economic growth has been accompanied by rising urbanization, higher income and affluence, and an increase in the private ownership of motor vehicles. In the absence of any urban transport policies and sustained investments in public transport, most urban citizens rely either on their private motor vehicles or the informal transport sector for urban transport. The resulting urban congestion is straining the capacity of the Government to resolve the urban transport issues and fund sustainable solutions. As a consequence, urban areas of Pakistan are experiencing a deterioration in air quality.

In recent years, Pakistan has witnessed a sharp increase in private vehicle ownership. New passenger car registrations, which have soared since 2001, are expected to continue to rise. The number of motor vehicles in Pakistan has jumped

many fold over the last years. The surge in he demand for cars originated from the increasing affordability of cars on the one hand and availability of car financing from the banking system on he other. Amongst these vehicles, those of serious concern are diesel vehicles using crude diesel oil and motorcycles and rickshaws. Due to

overloading, faulty injection nozzles and weak engines, diesel vehicles emit excessive graphitic carbon (visible smoke). On the other hand, motorcycles and rickshaws, due to their two-stroke engines, are the most inefficient in burning fuel and thus, contribute most to emissions.

Table 16-2: Growth in CNG Sector

As on	CNG Station	Converted Vehicles*
December, 1999.	62	60,000
December, 2000,	150	120,000
December, 2001.	218	210,000
December, 2002.	360	330,000
December, 2003.	475	450,000
December, 2004.	633	660,000
December, 2005.	835	1,050,000
December, 2006.	1190	1,300,000
16 th May, 2007	1450	1,400,000

* Estimated figures Source: HDIP

The government's response to vehicular pollution and to improve ambient air quality has been to promote CNG as a cleaner alternative. Currently, 1,450 CNG stations are operational throughout the country (see Table 16-2) while another 1,000 are under construction. To date, Oil and Gas Regulatory Authority (OGRA) has issued more than 5700 provisional licenses for the establishment of CNG Stations in the country. Pakistan's CNG fleet is the largest in Asia and the third largest in the world after Argentina and Brazil. The sector has already attracted the investment of Rs. 60 billion and more is expected. The tremendous growth in this sector has led to job creation and till date approximately 60,000 new jobs have been created. In line with a Cabinet directive, the Federal Government is providing incentives in the form of payment of the markup (either complete or partial) of the loans required to purchase new CNG vehicles. In this regard, the cities of Karachi, Hyderabad, Lahore, Rawalpindi, Islamabad, Peshawar and Quetta are phasing out diesel vehicles in favour of CNG buses for intra-city transportation. All new buses, mini buses and wagons will be dedicated CNG – or dual fuel vehicles. Provincial governments are also taking

initiatives to promote CNG conversions. For example, the Punjab Government is giving 20 percent of the capital cost for purchasing new CNG vehicles.

b) Water and Sanitation

Pakistan is an agrarian economy that is heavily dependent on the water from its rivers for various purposes ranging from agriculture to power generation. According to an estimate, the Indus River irrigates 80 percent of the 21.5 million ha of agricultural land. Over the years, various pressures on the River Indus, the most important being water extraction for irrigation purposes, has led to substantial pressures on Pakistan's water resources. Pakistan's current supply of water is just a little over 1000 m³ per person and that puts Pakistan in the category of 'high stress' countries. In light of growing population pressures, rapid urbanization and increased industrialization and extended periods of drought, it has been estimated that an additional 48 Billion m³ water would be required to meet the growing demands of agriculture and the country's economy by the year 2011. This would depend largely on the judicious use and management of the available water resources.

The increased groundwater utilization for domestic and agricultural use has adversely affected groundwater quality particularly in the irrigated areas with almost 70 percent tube wells now pumping hazardous sodic water. Due to greater dependence on this resource for meeting the ever-growing agricultural requirements, water table decline has also been observed in many areas.

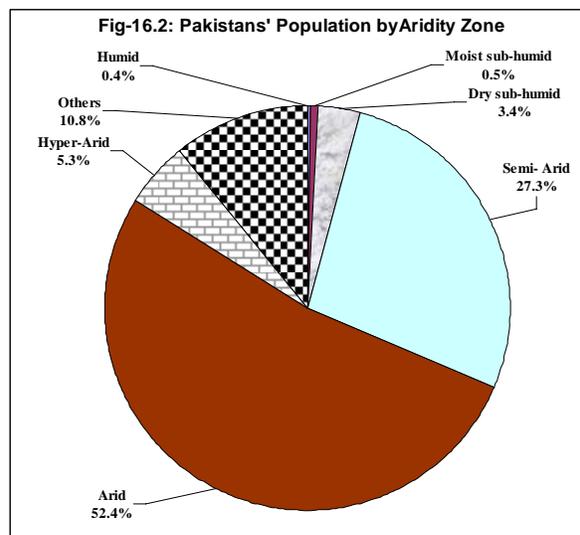
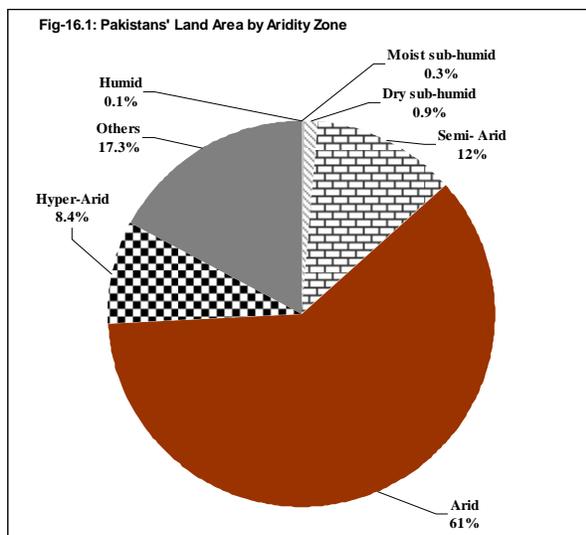
Despite the generally arid nature of Pakistan's climate, 10 percent (780,000 ha) of the total surface area of the country is covered by wetlands which are of global importance. There are about 225 significant wetlands in Pakistan identified to date, out of which 19 have been recognized as being of international importance by the Ramsar Convention. The diverse assortment of natural freshwater and marine wetlands that occur within Pakistan support many unique combinations of biodiversity. In addition, almost all of Pakistan's wetlands are inhabited by people. Due to growing population pressures and habitat loss induced by climate change, the wetlands are facing increasing pressures. It is feared that these wetlands may not be able to take on much additional pressure and

their productivity needs to be preserved, enhanced and sustained.

The Human Development Report 2006 points out, "the scarcity at the heart of the global water crisis is rooted in power, poverty and inequality". Target 10 of MDG 7 deals with sustainable access to safe drinking water and basic sanitation. Currently, only 54 percent of the population of Pakistan has access to safe sanitation and 66 percent to safe drinking water, whereas the targets for 2015 are 90 percent and 93 percent respectively. Even though there has been an improvement in water supply coverage from 53 percent in 1990 to 66 percent in 2005, however, the MDG target of 93 percent poses a considerable challenge.

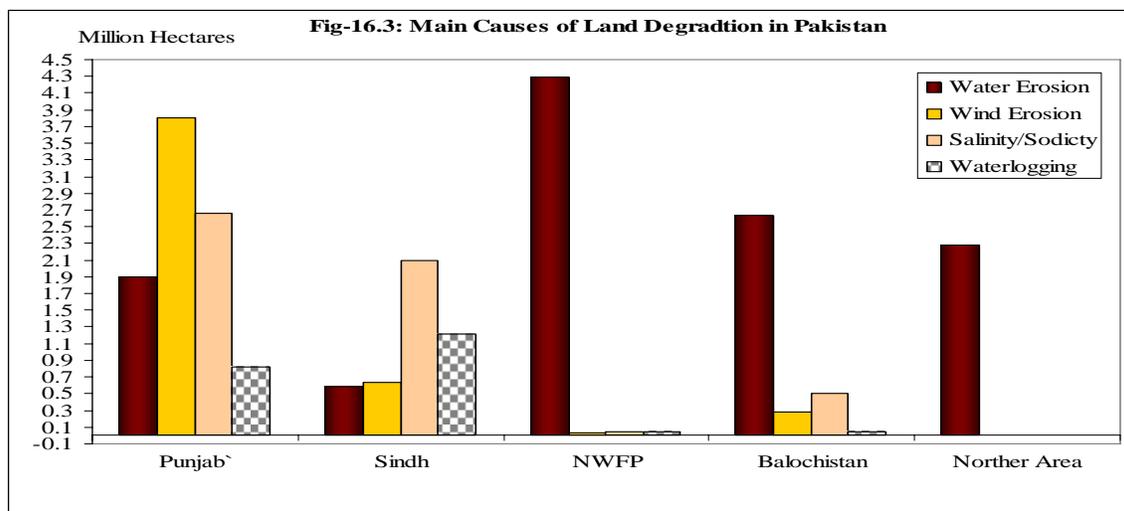
c) Land

Out of a total land area of 79.6 million hectares, only 16 million hectares are suitable for irrigated farming in Pakistan. Hence, a majority of the people depend on arid and semi-arid areas to support their livelihoods through agro-pastoral activities. Pakistan's land area by aridity and population by aridity zones is given in the Fig-16.1 and Fig-16.2.



Like many other developing countries, Pakistan is faced with the challenges of being affected by land degradation and desertification, which are causing environmental problems, including soil erosion, loss of soil fertility, flash floods, salinity,

deforestation and associated loss of biodiversity and carbon sequestration. Land degradation is mainly due to four major causes: water erosion, wind erosion, salinity/sodicity and water logging as shown in Fig-16.3:



About 5.2 percent of Pakistan's land area is covered by forests, whereas both environmental and economic standards necessitate that the country should have at least 20-25 percent area under forests. However, the MDGs are not so ambitious and suggest forest cover of 6 percent (as mentioned earlier). About 11.2 million hectares, mostly northern mountain regions, are affected by water erosion. According to an estimate, about 2 million hectares are affected by water logging and around 6 million hectares by salinity and sodicity. Wind erosion is another issue concerning land degradation in Pakistan. About 3-5 million hectares of land is affected by wind erosion in arid regions of Punjab (Cholistan), Sindh (Tharparkar), and Balochistan (Chagai Desert and sand areas along the coast). Some of the areas have 0.5 to 4 meter high moving sand dunes, posing danger to cultivation land and local infrastructure.

d) Forestry

In 2001, out of a total of 86.7 m.ha land area of Pakistan including AJK, 3.317 m.ha was under contiguous forest cover and 0.781 m. ha farmland area was under tree cover which was taken as a baseline for fixing the Millennium Development Goals. As earlier shown in table 1, Pakistan has committed to increasing forest cover to 5.7 percent by 2011 and to 6 percent by the year 2015. An increase of 1.2 percent implies that an additional 1.051 m.ha area has to be brought under forest cover within the next ten years. This will include

all state lands, communal lands, farmlands, private lands and municipal lands.

In terms of the MDG target with respect to protected areas established to conserve rapidly declining wildlife species in their natural environment, Pakistan has committed to improve and enhance its existing network of protected areas in terms of quality and quantity from 11.25 percent in 2001 to 12 percent by 2015.

e) Climate Change

Climate change is an area that has become increasingly important in recent years. For the last two decades, the world's scientists have debated if climate change was taking place and whether its causes were anthropogenic (human-made) or natural. However, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) released in 2007, bringing together over 2500 of the world's leading scientists from more than 130 countries, has now conclusively proven that climate change is taking place. In this report, the IPCC announced that "most of the observed increase in globally averaged temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations". This was a more forceful statement than in 2001 when the Third Assessment Report had used the word 'likely' to describe GHG emissions as a cause for climate change. Furthermore, the "Stern Review on the Economics

of Climate Change”, released in October 2006 by Nicholas Stern for the British Government, for the first time made a strong case for taking action regarding climate change from an economic point of view. One of the key statements of the Stern Review was that the costs of not doing anything and carrying on ‘business as usual’ would be *greater* than taking action to mitigate climate change. Thus, it is absolutely crucial for the global community to work together to implement emissions reductions to mitigate climate change.

Climate change also raises issues of global justice and equity. Whereas the richer industrialized countries are primarily responsible for GHG emissions, it is the poorer developing countries who would most heavily bear the costs of climate change due to their increased ‘adaptation vulnerability’. In the Pakistani context, this vulnerability is particularly high because of its large population and economic dependence on primary natural resources. As stated earlier, Pakistan’s agrarian economy is heavily dependent on river water provided by melting glaciers. Unfortunately, the glaciers are melting at a faster pace in Pakistan and river Indus faces serious threats due to climate change.

Climate Change will also have severe consequences for biodiversity in the country. For example, one of the world’s rarest mammals, the blind Indus River Dolphin, is indigenous to the Indus River. The Indus dolphin has seen the loss of its habitat due to the construction of Pakistan’s extensive irrigation system and its population has shrunk in size to the extent that it is now considered one of the world’s most endangered mammals. Further changes in water levels due to climate change could wreak havoc to this species’ habitat.

POLICIES AND PROGRAMMES

To address the various challenges mentioned above, the Government is implementing various policies and programmes; many of which have come out of the National Environment Action Programme of the Ministry of Environment. In this

regard, the National Environment Policy prepared under NEAP serves as an overarching framework for various interventions in the environment sector. Some of the key policies and programmes that have stemmed from NEAP are mentioned below divided into various areas of environmental concern.

a) Air and Water Quality Monitoring

In recent years, the Government has taken various concrete steps to attain control over industrial pollution in the country. The most significant measure was the enactment of the Pakistan Environmental Protection Act 1997, which makes it incumbent upon industrial facilities to restrict their air emissions and effluents to the limits specified in the National Environmental Quality Standards (NEQS). The Act also outlines institutional framework for administering its laws: it institutes one federal and four provincial Environmental Protection Agencies (EPAs) to formulate NEQS and devise systems and procedures required to determine whether industries comply with them. Unless the EPAs elicit the industrial sector’s participation, the second task isn’t small or easy.

Perceiving the need for a more feasible approach for the enforcement of the NEQS in the country, the Expert Advisory Committee constituted by the Pakistan Environmental Protection Council in the year 1998 recommended the Self-Monitoring and Reporting System for Industry. Under the NEAP-SP, **Green Industry Programme** was launched in the year 2006 by the Pakistan Environmental Protection Agency for the promotion of Self Monitoring & Reporting, with the support of the UNDP, to make the industries responsible for systematic monitoring and reporting of their environmental performance. The key attribute of this programme is the “nation wide reductions in the pollution levels” by providing the flexibility to the industries to choose cost-effective environmental solutions and by promoting pollution control measures and assisting in the identification of regulatory and non regulatory impediments.

Strengthening industries’ environmental monitoring and reporting will contribute to several objectives of the Environmental Protection and

Sustainability. It will improve monitoring of industries compliance with environmental regulations. It will also help to improve data collection in order to produce national state-of-the-environment reports and other assessments for decision-making. Furthermore, it will facilitate environmental reporting to the international community. Last but not least, increasing the quantity of environmental information produced by industries, improving the quality of this information and enhancing access to it by the general public will help to exert significant pressure on polluters to reduce their adverse environmental impacts in due course of time.

b) Water and Sanitation

i) Clean Drinking Water for All: Pakistan's adaptation of MDG indicator for drinking water coverage defines it as the proportion of population (urban and rural) with sustainable access to improved water source i.e. pipe and hand pump. The initiation of the Government's multi-billion rupee programme "Clean Drinking Water for All by 2008" aims to achieve this target by providing improved drinking water source especially to the poorest of the poor. This programme is one of the biggest initiatives related to water to come out of the NEAP. The Clean Drinking Water Programme was initiated by the Ministry of Environment on the directive of the President and the Prime Minister of Pakistan initiated in two parallel phases. The first is the "Clean Drinking Water Initiative" (CDWI) project whereby 544 plants are being installed one in each district and tehsil; and ii) Clean Drinking Water for All (CDWA) project whereby filtration plants shall be installed one in each union council and villages.

The programme was approved by the Central Development Working Party (CDWP) at a cost of Rs. 115.09 Million in July 2004 and was included in the Medium Term Development Framework 2005-10. The Clean Drinking Water for All is now a Sub-Programme of Khushal Pakistan Programme and a high level task force has been notified for overall supervision and monitoring of the programme. An

amount of Rs.10 billion has been earmarked for the programme.

ii) Pakistan Wetlands Programme (PWP): This Programme is an initiative of the Federal Ministry of Environment and is being implemented by the World Wide Fund for Nature, Pakistan since July, 2005 for seven years. This much-needed initiative is designed to arrest and reverse environmental damage to the country's wetland resources. The general objective is to conserve the globally important wetlands biodiversity in Pakistan while alleviating poverty. It is a US\$11.792 million programme funded by a consortium of national and international donors.

Pakistan's wetlands are inhabited by an estimated 130 million people permanently living, and another three to four million temporarily living on the wetlands. Thus, right at the outset of the Programme it had been stressed that any conservation efforts must also incorporate poverty alleviation and income generation for the communities whose entire livelihoods are primarily dependent on wetlands resources.

A key component of the PWP is to create awareness on all issues related to wetlands conservation. In this regard, the Programme has reached out to all sections of the Pakistani community through trainings, educational activities, conferences, carnivals, school-events and other conscious raising activities. The traveling wetlands carnival toured four of the country's major cities. It is a means of reaching out to the public to raise their understanding for the need to conserve, protect and manage Pakistan's wetlands resources. It stressed the valuable scientific and social roles they occupy within the country and region.

The PWP seeks to cover the country with in depth scientific studies on all facets of wetlands in addition to highlighting all aspects relating to wetlands education, conservation and management and to provide the most current and scientifically sound information not just to

conservationists and biologists but most importantly to policy-makers as a tool to promote conservation efforts. In this regard, the Programme has conducted a number of surveys. In the Salt Range Wetlands Complex (SRWC) a Baseline Ornithological Survey of the Salt Range took place in December 2006. The assessments of five lakes yielded significant populations of terrestrial and wetland birds and it was estimated that more than 40,000 birds were present. Along the Indus Rivers a Flood Season investigation was carried out to establish that, in the majority of cases, the Indus Dolphin could only pass downstream during periods of flooding. This observation has provided useful insight into the realities underlying the current distribution of dolphin in the mainstream of the Indus River and will aid in understanding genetic distributions within the species. Recently, under the PWP, an environmentally significant coral reef thought not to exist in Pakistani marine waters has been discovered. The coral reef is situated on the northern side of Astola Island along the Makran coastline. Coral reefs among other precious assets are degrading under a broad spectrum of anthropogenic threats, most of which are a direct product of poverty, but many of which are exacerbated by human ignorance and mismanagement.

iii) National Sanitation Policy: The Second South Asia Conference on Sanitation (SACOSAN-II) was held in September 2006. One of the key achievements of this Conference for Pakistan was the approval of the National Sanitation Policy which had been developed by the Federal Ministry of Environment in consultation with the provinces and other stakeholders.

As mentioned earlier, meeting Pakistan's MDG sanitation target is a challenge for the country; however, the approval of the policy shows Pakistan's commitment on this front. This document provides a consensual framework for provinces to develop strategies, plans and programmes for the implementation of this Policy. Within this framework, a clear goal of eradicating 'open defecation' has been identified with the proper disposal of solid wastes. The primary objectives of the policy are "the safe disposal of

excreta away from the dwelling units and work places" and "the promotion of health and hygiene practices in the country".

A key challenge remains for provinces to put this policy into practice. Under the Local Government Ordinance (LGO) 2001, the responsibility for sanitation service provision has been devolved to the Tehsil tier of Local Government. In addition, the responsibility for strengthening collective action has been devolved to the Union tier of local government. Under the devolution plan, it is these tiers of local government that are primarily responsible for sanitation service provision. The Provincial Government, in exercising its responsibility for legislation and financing shall seek to provide the requisite support to these local governments to deliver improved sanitation services. It will also be the responsibility of the provincial governments to ensure that city governments and Tehsil Management Administrations (TMAs) follow the Hospital Waste Management Rules 2005 of the Ministry of Environment and the provisions of the Basel Convention on Management of Hazardous Wastes and their disposal.

c) Land

Keeping in view the magnitude of the problem and possible measures to address land degradation issues in the country, the Ministry of Environment with the financial support of the GEF-UNDP has launched a full-scale project on **Sustainable Land Management to Combat Desertification in Pakistan**. The project aims at combating desertification and improving land management practices to eradicate poverty in arid and semi-arid regions of Pakistan. This multi-sectoral project will be implemented in two phases. Phase-I will focus on creating enabling environment, institutional strengthening, mainstreaming Sustainable Land Management (SLM), principles in land use planning and implementation of pilot projects for promoting SLM practices for improving livelihoods, while Phase-II will focus on demonstration of SLM practices at a larger landscape building on the lessons learnt and best practices tested under Phase-I. In addition, the Federal and the Provincial

Governments, as well as some bilateral donors, have started a number of projects that will contribute to combat land degradation.

d) Forestry

In light of the broader vision of MDGs and the formulation of strategies by Provincial Forest Departments to achieve the MDG targets, the Ministry of Environment's Forestry Wing has devised a strategy for the next 10 years starting from 2005. The Forestry Wing is responsible for coordination and monitoring of forestry sector developments in the country through the office of the Inspector general Forests. It deals with the formulation of forest policy, planning, international coordination, education, training and research in the field of forestry. On the other hand, the implementation of forestry projects comes under the purview of the provincial governments. Under the Forestry Strategy, which is in line with the Forestry objectives of the National Environment Policy, the provincial departments will be requested to develop long-term umbrella plans to achieve their committed targets; nationwide forestry awareness, education and training programmes will be implemented; tree farmers will be given incentives to raise nurseries and trees and provisions will be made for alternative fuels (such as natural gas, liquefied petroleum gas, solar and hydropower etc) to reduce pressures on forest resources.

At the institutional level, the linkages of the Federal Forestry Wing and Provincial Forest Departments will be strengthened with Highway Departments, Irrigation Departments and Pakistan Railways for establishing linear plantations. Further, District Governments and Municipal Administrations will be encouraged with incentives to bring maximum lands under forest cover.

i) Environmental Rehabilitation and Poverty Reduction through Participatory Watershed

Management in Tarbela Reservoir: This 5-year project is being undertaken by the Ministry of Environment and being implemented by the Forest

Department, Government of NWFP at a cost of Rs. 532.457 million. The project aims to contribute to sustainable resource management in the Tarbela reservoir catchment through consolidating and expanding the social forestry activities in the programme area. Besides replanting over 10,000 acres, the project envisages afforestation over an additional area of 70,000 acres of privately and community owned denuded marginal lands.

ii) Programme for Mountain Areas Conservation:

The programme is in line with the overall objectives of biodiversity conservation as envisaged in the Medium Term Development Framework 2005-2010 for addressing the green environment issues in Pakistan. The programme is a successor of the earlier 7-year project titled "Mountain Areas Conservancy Project (MACP)" and would build on its achievements. Its primary objective is the conservation of the unique and rare biodiversity species of global significance and would cater for the conversion of MACP into a programme by furthering its successful interventions. This will be crucial in reaching the MDG target of 12 percent protected land areas.

iii) Forestry Sector Research and Development

Project: The Pakistan Forestry Institute (PFI) is responsible for the implementation of this 7-year project with a total cost of Rs. 193.5 million. The main objectives of the project include assessment of existing forest type cover by using Geographic Information System and Remote Sensing techniques and to monitor the changes for subsequent management plans; determination of optimum water requirements of important tree species to enhance wood production; identification, testing and preservation of forest insects, pathogens and their natural enemies for optimum pest management; human resource development and dissemination of research findings to field foresters and communities through electronic and print media, publications, brochures and pamphlets etc.

e) Climate Change Initiatives

Although Pakistan is a low greenhouse gas (GHG) emitting country, the Government has shown its commitment at the international level to address

climate change. In this regard, the Government has ratified the UN Framework Convention on Climate Change (UNFCCC) on June 1, 1994 and then ratified the Kyoto Protocol in February 2006. Pakistan undertook a comprehensive inventory of greenhouse gas (GHG) emission sources and sinks, as well as prioritized feasible mitigation options and formulated a GHG abatement strategy under the GEF/UNDP Asia Least Cost Greenhouse Gas Abatement Strategy (ALGAS) completed in 1997. Pakistan has since updated the national GHG inventory and defined its strategy for addressing climate change concerns through the development of an Initial National Communication to the UNFCCC. Following the INC, Pakistan initiated the process of formulation of the Second National Communication on Climate Change and has requested Global Environment Facility (GEF) for the provision of necessary resources.

Building on these preliminary studies for ALGAS and Pakistan's Initial Communication on Climate Change, the Ministry of Environment approved the National Operational Strategy for Clean Development Mechanism (CDM) in 2006. Pakistan is the current chair of the "Group of 77" developing countries and China is making efforts to bring up the issue of the poorest countries being the most affected by climate change at the United Nations and especially by garnering support for the Adaptation Fund.

f) Energy Efficiency and Renewable Energy

Pakistan has a large potential for development of renewable energy. However, despite the recognition of renewable energy as a vital source to tap into, the share of renewable energy in the energy mix has been quite negligible. During 2005-2006, the share of various primary energy sources in energy supply mix was: gas 50.4 percent, oil:

28.4 percent, LPG: 0.4 percent, coal: 7.0 percent, hydroelectricity: 12.7 percent and nuclear energy: 1.0 percent. However, in addition to government institutions that are focusing specifically on alternative or renewable energy sources such Alternative Energy Development Board (AEDB), National Energy Conservation Center (ENERCON) and Pakistan Council for Research in Renewable Energy Technologies (PCRET), the importance of renewable energy is also recognized by the Ministry of Petroleum and Natural Resources. This is evident from their annual publication, Pakistan Energy Yearbook, which has a separate section dedicated to Renewable Energy outlining all development efforts in the field.

The Government of Pakistan's 2002 Policy for Power Generation Projects states the safeguarding of the environment and ensuring exploitation of indigenous resources, which include renewable energy resources, as one of its main objectives, along with encouraging greater private sector participation in power generation. The National Energy Conservation Center (ENERCON), Ministry of Environment approved the **National Energy Conservation Policy** in 2005. Most significantly, in 2006, the Ministry for Water and Power showed its commitment to promotion of renewable energy by approving the **Policy for Development of Renewable Energy for Power Generation**. The policy consists of three phases: short, medium and long term. In the short term (period up to June 2008), the Policy focuses on providing very liberal and attractive incentives to attract investments in renewable energy in Pakistan. The later phases of the Policy will be consolidated incorporating the lessons learnt from the first phase.

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