THE CRITICAL ANALYSIS OF IMPLEMENTATION OF RAMSAR CONVENTION IN PAKISTAN

Researcher:

NazimaKiran

Reg # 5-FBAS/MSES/F07

Supervisor:

Dr. Muhammad Irfan Khan

Department of Environmental Sciences

Faculty of Basic and Applied Sciences

International Islamic university, Islamabad

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Nazima Kiran

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Submitted in partial fulfilment of the requirements for the MS in Environmental Science at the Faculty of Basic and Applied Sciences, Department of Environmental Sciences International Islamic University Islamabad.

Supervisor: Professor Dr. Irfan Khan 4 October, 2009

DEDICATION

Dedicated to my parents whose efforts, encouragement and prayers enabled me to complete this work.

Critical Analysis of Implementation of Ramsar Convention in Pakistan

Name of Student: **Nazima Kiran**

Registration No.: **05-FBAS/MSES/F07**

Accepted by the Department of Environmental Sciences International Islamic University Islamabad, in partial fulfillment of the requirements for the MS in Environmental Science.

Viva Voce Committee

Chairman/Head

External Examiner

Supervisor

Member

(30th October, 2009)

ABSTRACT

The government of Pakistan signed the Ramsar convention in 1971 and ratified by the Parliament in January 1976. The mission statement of the convention is conservation and wise use of all wetlands through local, regional and national actions and international cooperation as a contribution towards achieving sustainable development. Even though Thirty-seven years have passed, no fundamental achievements have been made by the government for the conservation of wetlands. As observed, the mission statement of Ramsar symbolizes two principles in it. Some initiatives may have taken towards the first objective but the second aim (i.e., the wise use of wetlands) has been ignored largely. The following study was conducted to review activities and plans developed for the implementation of the Ramsar Convention in Pakistan. The methodology adopted was based on secondary information and feed back by interviews and questionnaires. Analysis of the existing literature was also carried out to improve general validity and reliability of the findings.

Wetlands provide a number of ecological, socio-economic benefits to the human beings as well as life support system to other organisms. These ecosystems perform variety of functions as are effective in flood control, recharging of aquifers, reducing sediment, waste water treatment, buffer against the hurricanes and cyclones and also winter resort, shelter and breeding ground for number of migratory birds. However, the rapid change in demography and abrupt developmental activities leads to the unsustainable utilization and depletion of these resources.

Few initiatives have been taken by the government in cooperation with other organizations to tackle the issues relating to the conservational and management activities of regional wetlands. For the success and full-range benefits, there is a need of appropriate legal, institutional and political support to these plans. Further a comprehensive strategy is required to conserve wetland resources and manage them for maximum sustainable benefits.

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LIST OF ABBREVIATIONS

Biodiversity Action Plan	BAP
Central Indus Wetland Complex	CIWC
Communication Education and Public Awareness	CEPA
Community Based Organizations	CBOs
Environmental Impact Assessment	EIA
Geographic Information System	GIS
Global Environmental Facility	GEF
Government of Pakistan	GoP
Government of Sindh	GOS
Himalayan Wetlands Initiative Strategy	HWIS
Indus River System Authority	IRSA
Inspector General of Forestry	IGF
International Centre for Integrated Mountain Development	ICIMOD
International Union for Conservation of Nature	IUCN
International Water Management Institute	IWMI
Makran Coastal Wetland Complex	MCWC
Ministry of Environment	MoE
Multilateral Environmental Agreements	MEAs
National Conservation Strategy	NCS
National Council for Conservation of Wild Life	NCCW
National Energy Conservation Centre	ENERCON
National Environmental Quality Standards	NEQS
National Project Steering Committee	PSC
National Wetlands Conservation Strategy	NWCS

National Wetlands Management Committee	NWMC
Non Governmental Organizations	NGOs
Northwest Alpine Wetland Complex	NAWC
Pakistan Environmental Protection Agency	Pak EPA
Pakistan Forest Institute	PFI
Pakistan Poverty Alleviation Fund	PPAF
Pakistan Wetlands Program	PWP
Project Management Unit	PMU
Provincial Irrigation Department	PID
Royal Netherlands Embassy	RNE
Salt Range Wetland Complex	SRWC
Self Monitoring And Reporting Tools	SMART
South-Asian Water Analysis Network	SAWAN
Target Driven Programmes	TDS
United Nations Development Programme	UNDP
Water and Power Development Authority	WAPDA
Wetlands Action Plan	WAP
World Wide Fund	WWF
Zoological Survey Department	ZSD

FORWARDING SHEET

The thesis entitled Critical Analysis of Implementation of Ramsar Convention in Pakistan

Submitted by Nazima Kiran in partial fulfilment of MS degree in Environmental Science has been completed under my supervision .I am satisfied with the quality of student's research work and allow her to submit this thesis for further process as per IIU rules and regulations.

Date: _____ Signature: _____

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CHAPTER: 1

INTRODUCTION

Pakistan is blessed with abundant and important resources of natural inland water bodies and purpose-built reservoirs despite arid and semi arid climate in most parts of the country. Pakistan's wetlands are globally significant in two ways: first, in terms of the intrinsic value of their indigenous biodiversity and secondly, as an acute example of the poverty/subsistence-use nexus that constitutes one of the most fundamental threats to biodiversity worldwide. The high global significance of Pakistan's wetlands is attributable to the diversity of species that they support (Rao, 2008).

The Government of Pakistan has signed the Ramsar convention in 1971 and ratified by the Parliament in January 1976. In compliance with the provisions of Ramsar Convention on wetlands, Pakistan had initially designated nine Ramsar sites and the number has now been increased to nineteen. Pakistan is regularly attending Ramsar Conference of Parties meetings and takes interest in follow up actions. Khursheed (2006) describes that implementing agencies in Pakistan are facing problems due to lack of coordination among the line agencies, awareness and knowledge about the importance of wetlands.

In this work an attempt has been made to analyze the progress of Government and other institutions in implementing the commitments regarding Ramsar Convention, from 1971 till 2008 in order to explore the nature, extent and impact (negative or positive) of various initiatives and efforts taken for the protection, conservation and rehabilitation of various wetlands in Pakistan and the problems faced by the Government in terms of gaps in the institutional mechanisms of coordination for management of wetlands. It also reviews the

role of different governing bodies and local communities in utilization of wetland ecosystems.

1.1 Significance of the Study

As a signatory to the Ramsar Convention, Pakistan is obliged to fulfill its obligations and take appropriate measures at the policy and implementation levels. The Ramsar Convention and the work by the Wetland International have boosted research on wetlands. During 1985-1995 was a period of peak activity, some 170 sites were surveyed in Pakistan for bird count. Many of these surveys lasted 2-3 years and some for as long as 10 years. International environmental and conservation organizations notably WWF and IUCN as well as national organizations like Pakistan Forest Institute, Peshawar, the Zoological Survey of Pakistan and the Provincial Wildlife Departments made particular contributions especiallly to bird surveys (GoP, 2005). Although the useful work has been done regarding wetlands using different perspectives, different approaches and analysis but most of them are species oriented conservation projects. The formulation of the Pakistan's Wetland Action Plan 2000 and Pakistan Wetlands Programme 2006 appeared to provide some momentum but still there is a lack of detailed baseline data and there is no comprehensive, large scale monitoring of wetland sites based on ecosystem approach.

1.2 Aim and Objectives

The aim of this study was not merely to add information to the subject. Instead, all efforts have been made to evaluate the current status of the scenario in order to provide guideline for future initiatives. The specific objectives of the study were:

1. to assess the success of initiatives taken by the governmental and non-governmental organizations towards conservation of wetlands;

2. to analyze the impact of perceptions of local communities regarding wetland use and their response to different projects and conservational efforts taken by different organizations.
3. to assess the effectiveness of the existing legal and institutional framework, the level of coordination among institutions, the adequacy of budget and funds in this context.

It is hoped that this study will initiate more studies on economic valuations of the full range of the services, benefits and functions of each Ramsar site in Pakistan. Further the results of this study would be helpful for strategic environmental assessment of any future government plans, programmes and policies about wetlands; identification of wetland management interventions and measures required to maintain the ecological character of Ramsar sites. It is further hoped that this would also help in designing, implementing and evaluating interventions regarding CEPA Action Plan (Communication Education and Public Awareness) etc.

1.3 Literature Review

As a result of rapid development in various walks of life especially telecommunication, science and technology, there has been a greater need for framing legal institutional instruments to regulate environmental impacts associated with these developments. Therefore there is an accelerated pace of development of international law in general and international environmental law in particular. International environmental instruments primarily include "hard laws" such as conventions, protocols and "soft laws" such as guidelines or codes of conduct. In addition, agreements, resolutions and declarations are also adopted to facilitate the implementation of treaties and conventions (Khursheed, 2006).

1.3.1 The Ramsar Convention on wetlands:

The official name of the treaty, *The Convention on Wetlands of International Importance especially as Waterfowl Habitat,* was the first modern inter-governmental treaty between nations aiming to conserve natural resources. The signing of the Convention on Wetlands took place during 1971 in the small Iranian town of Ramsar. Since then, the Convention on Wetlands has taken the common name of the Ramsar Convention. The convention entered into force in 1975 and now there are 158 contracting Parties designated for inclusion in the ramsar list of wetlands of international importance. In order to commensurate, the date of its adoption, every year, 2nd February is celebrated as the World Wetland Day (The Convention on Wetlands, 2009).

The mission of the Ramsar convention on wetlands is:

"The conservation and wise use of wetlands by national action and international cooperation as a means to achieving sustainable development throughout the world" (Ramsar Convention, 1997).

Under the Ramsar Convention a wide variety of natural and human-made habitat types, ranging from rivers to coral reefs, can be classified as wetlands. Under the text of the Convention (Article 1.1), wetlands are defined as:

"areas of marsh, fens, peatland or water, whether natural or artificial, permanent or temporary with water that is static or flowing; fresh, brackish or saline; including areas of marine water the depth of which low tide does not exceed six meters".

In addition, the Convention (Article 2.1) provides that wetlands

"may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six meters at low tide lying within the wetlands" (Ramsar Convention, 1982).

Wetlands constitute the world's most productive environment. They are cradles of biological diversity, providing the water and primary productivity upon which countless

species of plants and animals depend for survival. They support high concentrations of birds, mammals, reptiles, amphibians, fish and invertibrate species.of the 20,000 species of fish in the world, more than 40% live in fresh water (Khursheed, 2006). The interaction of physical, biological and chemical components enable the wetland to perform many vital functions (e.g. water storage, storm protection, shoreline stabilization and erosion control, ground water recharge).Wetlands also provide tremendous economis benefits like water supply, fisheries, agriculture by maintaining the water tables and nutrient retention in floodplains, energy resources such as peatand plant matter, wildlife resources , transport and recreation and tourism opportunities. In addition, wetlands have special attributes as part of the cultural heritage of humanity. These functions, values and attributes could only be maintained if the ecological processes of wetlands are allowed to continue functioning.

1.3.2 Significance of wetlands of Pakistan:

Despite the generally arid nature of Pakistan's climate, the region supports a diverse array of wetlands and in excess of 225 significant wetland resources are on record. 19 of these sites have been internationally recognized by the *Ramsar Convention Bureau* as being of global importance. The diverse assortment of marine and fresh water wetlands that occur within Pakistan supports unique assemblages of biodiversity. The same resource, however, also sustains an estimated 130 million permanent human residents and 3 - 4 million of displaced persons from adjacent countries. The wetlands of the region are, therefore, generally 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.

In all, eighteen threatened species of wetlands dependent mammals are found in the country including the Indus River Dolphin (Plantanista minor). Further, twenty threatened bird species are supported by Pakistan's wetlands in addition to twelve reptiles and two endemic species of amphibians. Pakistan's wetlands also support between 191-198 indigenous freshwater fish species, including fifteen endemics and a total of 788 marine and estuarine fish species. The high altitude wetlands, characterized by sites such as Karumbar Lake, situated at an elevation of 4, 150m, and Saucher Lake, at 4,250m on the Deosai Plains, represent a relatively unique category of alpine wetlands that is confined to the Himalaya, Hindukush and Korakoram mountain cordilleras (GoP, 2009).

1.3.3 Current status of implementation of Ramsar Convention in Pakistan:

The work on wildlife and wetland conservation in Pakistan began in 1967 with the first expedition organized by WWF under the supervision of Guy Mountfort. The expedition recommended that many important wetlands all over the country be declared protected. As a further step towards wetland conservation, Pakistan joined the Ramsar Convention in 1976 and declared nine wetlands to be 'wetlands of international importance' at the time of ratification. Data for the waterfowl census was collected by Christopher Savage during 1967-70. Data in the following years, 1970-76 and 1987-89 was collected by F.J. Koning (GoP, 2000). In later years some studies were done by Provincial Wildlife Department, the Zoological Survey Department and the Pakistan Forest Institute in 1992, Pakistan formulated National Conservation Strategy with fourteen core areas for priority implementation. Moreover a national wetland committee had been constituted in February 1996 for effective coordination of wetland related activities.

The Ministry of Environment and WWF-Pakistan also developed a Wetland Action Plan that was officially adopted by the Government of Pakistan in 2000. In the recent years Pakistan implemented a GEF funded project for the convention of wetlands in collaboration with WWF-Pakistan and Provincial governments. Recently, in 2008 a National Report by the GoP on the implementation of the Ramsar Convention is submitted to the 10^{th} meeting of the Conference of the Contracting parties.

1.4 Methodology

The methodology adopted was based on secondary information and feedback by interviews based on semi-structured questionnaires with the relevant officials of the government and non-governmental organizations. In this research both primary and secondary sources were used. The primary sources included the information obtained through interviews based on semi-structured questionnaires and the secondary information obtained from national reports, books and articles in journals as well as independent evaluation reports developed by different departments, groups or NGOs.

CHAPTER 2
LEGAL AND INSTITUTIONAL FRAMEWORK

2. INTRODUCTION

The presence of comprehensive legal framework and proficient institutions are essential to maintain the sustainable use of wetlands. For the conservation and good management of wetlands there is a need of enhanced wetland inventory that can provide the basic information on various aspects of wetlands. An appropriate planning before taking step towards implementation and an effective institutional and administrative framework is obligatory for the successful management. Further more, an effective coordination among different sectors like fisheries, industry, agriculture, WAPDA and irrigation, energy, local communities is vital for the protection of these ecosystems. Pakistan has signed the Ramsar Convention thirty-seven years back and up till now what major steps have been taken by the Government of Pakistan is being discussed in this chapter.

2.1 Policy

The Government of Pakistan formally declares 2009 as "The National Year of Environment". Besides the other commitments, the government determined to develop the National Wetland Policy by the end of this year.

As wetlands have shown great number of ecological and social values so there is an amplified appreciation and concern to take good care with sustainable management of these resources. In the current scenario, there is a prior need of formulating a policy that helps to ensure sustainable use of wetland resources with equitable sharing and restrain the rampant loss of these resources. The country has no national umbrella policy to address the biodiversity, wildlife and wetlands. The entire biodiversity and wetland issues are considered and treated under the forest policies. The existing sectoral policies contain elements that can only relate to some extent or contravene wetland conservation and

sustainable use. While working in isolation these policies lack any coordination or common objective. Here is an overview of strategies and policies that cover explicitly or implicitly the wetlands and their resources.

2.1.1 National Conservation Strategy (NCS):

The National Conservation Strategy (NCS) had developed in 1992 and the three main objectives of the NCS were

- Conservation of natural resources
- Sustainable development
- Improved efficiency in the use and management of resources

It comprehensively discussed the issues and showed concern to the protection of water bodies, wildlife, fisheries and marine and coastal resource management. However, it had not proposed any independent approach and strategy for the conservation of wetlands. During the mid-term review it had analyzed that because of broad horizon regarding the implementation programs the effective change could not possible so more focused approach needed.

2.1.2 National Forests Policy, 2008 (Draft):

In the previous forests policies the wetlands were implicitly considered because the forestry, wildlife, watershed, range areas and related issues were taken in the domain of the Ministry of Food, Agriculture & Livestock until the middle of 1990s. These policies included some provisions regarding the hunting of wetland species and establishing protected areas. Later these areas and subjects were transferred to the Ministry of Environment. The draft National Forests policy correlates the forests conservation with environmental services including water, biodiversity, carbon sequestration, countryside recreation and ecotourism. It will help in management of watersheds to improve flows and reduce sedimentation of mega and small reservoirs, which results in less change in the ecology of wetlands (Rao, 2008).

2.1.3 National Fisheries Policy, 2006:

The National Fisheries Policy, 2006 focused on revenue generation and exploitation. However, it provides a great opportunity to strengthen the institutions and enhancing their capacities.

2.1.4 National Water Policy, 2006 (Draft):

The Draft National Water Policy, 2006 still not approved has recognized the requirement of water for nature. After the approval and by transferring it into action plan its convenience could be revealed.

2.1.5 National Environmental Policy, 2005:

The National Environmental Policy adopted in 2005. It included the specific provisions to control coastal and freshwater pollution; conservation and sustainable use of biodiversity; and establishment and management of protected areas.

2.1.6 National Tourism Policy:

The National Tourism Policy was formulated in 1999 and reviewed in December 2007. However, there is no provision regarding the protection and wise use of wetlands.

2.1.7 Balochistan Water policy, 2005:

The Balochistan Water Policy (approved in 2005) addressed explicitly the concerns and significance of water resources and enabled the management of the existing issues. The most relevant issues discussed in this policy are the inadequacy and unreliability of existing data for the effective planning; ineffective and insufficient monitoring and evaluation; over extraction of groundwater and wastage of floodwater; indiscriminate provision of subsidy for installation of tube wells and on power tariff which overburden the financial resources of the province; lack of coordination between water and agriculture sectors; social and cultural variations among tribes enhances the inability of government sector to manage the water resources.

2.1.8 Development of Draft Wetlands Policy:

While developing a wetland policy, the priority has to be given to identify the basic requirements for the conservation and wise use of wetlands. There is also a need to identify considerable values of wetlands and the potential impacts of proposed activities on those values. As the significant values may vary according to the type of wetlands for example, the most significant value of protected wetland may be the protection and conservation of endangered specie and wildlife habitat. While a wetland in agricultural surroundings may have significance of water-allocation for crop growth. An upstream wetland may act as sponge for holding excess water thus regulates water flows downstream and lessening the flood hazards.

During the second Project Steering Committee meeting of PWP, in February 2007, the IUCN-Pakistan was assigned to implement Output 3.2 (that is NWCS policy development phase). The contract was signed among the parties on November 13, 2007. At present the IUCN Pakistan has the competency and possible resources to accomplish this task as the organization has suitable intra-governmental acquaintance and expertise in the formulation of national and provincial policies. Besides considering the Ramsar guidelines for policy development the field visits are oriented to understand the perspectives of different stakeholders and the challenges faced by the wetlands towards the sustainable utilization.

A multidisciplinary team was structured to formulate the regulatory framework for wetlands. The team had conducted visits at the following PWP demonstration sites:

Salt Range Wetland Complex
Indus Dolphin Wetland Complex
Alpine Wetland Complex
Makran Coastal Wetland Complex

The purpose of these visits was to get the first hand knowledge regarding the wetlands status and related issues. Further, identifying and understanding the varied nature of stakeholders.

In order to progress in a successive and systematic way the background paper and reports for all the complexes were developed. Set of consultative meetings by multi disciplinary expert group at both regional and national levels were arranged to coordinate and resolve the conflicts. By getting inputs from various experts, draft wetlands policy is to be concluded. After the approval, it is hoped to provide a legally enforceable regulatory mechanism and potential action to wetland managing authorities.

2.2 Legislation

Currently no specific and comprehensive wetland legislation exists in the country. The laws that are most relevant to wetlands conservation and sustainable use are the provincial wildlife laws. Besides that fisheries laws and Environment Protection Act, 1997 also considered wetlands protection under some provisions. However, the lack of compliance and regulation of these laws hinder the effective management of wetlands.

There is no specific provision of Ramsar Convention in these laws. However, the Draft Balochistan Biodiversity Act has included extensively the requirements of Ramsar and other relevant Multilateral Environmental Agreements (MEAs) to which Pakistan is a Party. There is no regulation to address the land use planning and development planning activities in rural areas having wetlands. Similarly, in cities industrial development is restricted to certain areas through zoning but there is no provision to control the recreational development which may affect the water bodies. Furthermore, there is no legislation regarding allocation of water flows based on wetland production, functions and environmental services besides those related to dams and barrages based on irrigation demands and drinking water demands (Rao, 2008).

2.2.1 Wildlife Acts:

All the four provinces of Pakistan have their own wildlife legislation. In addition, there is a Federal Territory Islamabad Wildlife Ordinance (1979) and Azad Jammu & Kashmir Wildlife Act (1975).

It is reviewed that the wildlife legislation addresses the species distinctly but not the habitat of those species. Legislation although provides the protection to particular endangered threatened species especially water fowl in the context of wetlands but the enforcement is weak. The hunting/shooting are generally permitted from October to March to those people who have permits. Out of nineteen Ramsar sites in Pakistan, few have been declared as game reserves or wildlife sanctuaries. The legislation sets out the responsibilities of the Provincial Wildlife Departments for the protection, rehabilitation and preservation of national parks, game reserves and wildlife sanctuaries. These also put the liability on the departments for the enforcement of laws and regulations concerning them. However, the limited institutional capacities and lack of enforcement hardly stopped the deterioration of these ecosystems.

2.2.2 Environment Protection Act, 1997:

The Environment Protection Act, 1997 prohibits polluting water bodies and hence the NEQS were developed to be followed for both industrial effluents and municipal waste before entering the water bodies. In 1990s the polluter pays principle was adopted with the consent of the industrial sector but later the Self Monitoring and Reporting (SMART) program was introduced by the Pak. EPA. However, there is lack of enforcement concerning these laws.

The legislation further disallows the developments, which overstress the environmental conditions. The environmental impact assessment (EIA), which is a basic tool for sound development, is limited to the critical areas listed in the Guidelines for Sensitive and Critical Areas of Pakistan (October 1997). Any external activity that has the potential affect on the water body and if it is not included in the list of critical and

sensitive areas given in the 1997 Guideline then there is no regulation to address this potential threat. However, it does not exempt any type of activities that adversely affect wetlands and water systems. The EIA provides all the specific tools for effective monitoring of execution of mitigation measures during development and operational phases of projects but fake or unsatisfactory EIA reports raise the extent of non-compliance.

2.2.3 Fisheries Laws:

Over fishing is a major threat to the indigenous population of fish but the conservation of native species or habitats is not considered under fisheries laws. Further more there is no provision regarding the Indus Dolphin which is an internationally threatened aquatic mammal.

2.3 National Wetlands Action Plan, 2000 (WAP)

Draft Wetlands Action Plan (WAP) had formulated in 2000. Besides highlighting the significance and major threats to wetlands of Pakistan, it also discussed the deficiencies in the existing framework of legislation and institutional capacities. This plan also presented the possible solutions to the wetland issues but only few provisions being implemented in default manner.

2.4 Biodiversity Action Plan, 2000 (BAP)

Pakistan developed BAP in 2000, which provided a possible framework for biodiversity conservation. The plan emphasized the integration of sectoral policies, development of appropriate regulations for both in-situ and ex-situ conservation, promotion of research and improving socio-economic valuation of biodiversity. It showed an emerging concern towards the wetlands as gene pools of biodiversity. However, it scarcely addressed the water bodies issues based on water demands for irrigation and agriculture (in terms of both quality and quantity) and alteration in flow patterns due to climatic changes.

2.5 Wetlands Inventory

In 1985, Karpowicz prepared the preliminary inventory of wetlands in East Asia. Derek Scott in 1989 developed a comprehensive report on the important wetlands of Pakistan that was published in the Directory of Asian Wetlands. Same year Scott and Poole compiled an overview of the important wetlands. During the year of 1987, Wetland International-Asia Pacific initiated a mid-winter waterfowl census programme in the region. However, the data had not been fully analyzed and little information is available on population trends. It is reported that the Provincial Wildlife Departments, the Zoological Survey Department and the Pakistan Forest institute undertake this census every year (GoP, 2000).

In 1987, the total numbers of wetlands in Pakistan listed were 119 (Ghalib et al., 1988). In 1976, at the time of ratification nine wetlands of international importance were listed (Scott, 1989). In 2001 four new wetlands and during 2002-2004 six new wetlandshad been designated as Ramsar sites. However, the existing inventory provides insufficient information in terms of hydrogical, geographical and ecological characteristics of wetlands. Most of the data regarding wetlands presented in the form of unpublished departmental and project reports that hinder the conservation of wetlands. An effort is made by PWP to up date all the existing data through Wetland GIS Database and make it accessible to all the conservation agencies (output 2.3) but the implementation of this provision is not satisfactory due to the lack of technical expertise and unavailability of technical resources for the site offices of four complexes.

2.6 Institutions

"Only effective institutions can promote the conservation and wise use of wetlands. Pakistan is a federation comprising of federal government, provincial governments and local governments. Water, fisheries, nature conservation, recreation and environment protection are the most important components of wetlands in Pakistan for institutional and administration framework. Both the federal government and its federating units have jurisdiction over water in terms of policy, legislation and management. Inland and coastal fisheries are in the domain of the provinces or the

respective regions. Environment and ecology are on the Concurrent List and thus both the federal and the provincial governments can legislate. Because of a large number of agencies with various jurisdictions in river basins and coastal areas, some with conflicting or duplicating mandates, constraining ecosystem management at that time" (Rao, 2008).

2.6.1 Ministry of Environment:

Besides policy making and planning; conservation and protection of ecosystems; pollution control and promotion of sustainable development MoE has the administrative control over National Council for Conservation of Wildlife (NCCW), Zoological Survey Department (ZSD), Pakistan Forest Institute (PFI), National Energy Conservation Centre (ENERCON), and Pakistan Environmental Protection Agency (Pak EPA).

2.6.2 National Council for Conservation of Wildlife (NCCW):

The NCCW is working under the mandate of MoE. It is the focal point for the Pakistan Wetland Project. It is the administrative authority responsible for implementing the convention. It presents the country reports at international forum of Ramsar Convention and liaises with other conventions and international agencies. It also coordinates with the provincial governments for wildlife policy formulation, its implementation; planning and management of Protected Areas and habitats of migratory species; control of illegal hunting and trade of wild animals; and in some other matters.

2.6.3 Zoological Survey Department (ZSD):

ZSD is a federal department and works under the provision of MoE. It is directed to research and conduct surveys regarding both the terrestrial and marine wildlife. Due to the change in leadership, as main office was shifted from Karachi to Islamabad, it was expected that the Department will take off to perform its mandated and potential role but it has not happened so far (Rao, 2008).

2.6.4 Pakistan Forest Institute (PFI):

Pakistan Forest Institute is an attached department of MoE. The department is responsible for the forest, watershed, wildlife and soil conservation activities. It also directs the research, education and training programmes concerning these subjects. It is believed that during 1980's PFI was very vigorous and effectual in all aspects but performance has declined over the years due to the lack of expertise, non replacement of professionals, financial constraints and leadership crisis.

2.6.5 Council of Common Interests & Indus River System Authority (IRSA):

Both are constitutional bodies. Council of Common Interests is responsible for the resolution of disputes among provinces on water issues where as IRSA ensure equitable distribution of water between the provinces in accordance with the Inter-Provincial Water Apportionment Accord of 1991, and recommends providing minimum flow downstream Kotri to protect biodiversity. It is revealed that due to high stakes and political sensitivity in water for irrigation and power IRSA has declined efficacy and power to get recognition and implementation of its decisions. Consequently, the environmental flow downstream Kotri Barrage is not regulated substantially except in the monsoon season and in the wet years. This further affects the productivity of natural resources (Rao, 2008).

2.6.6 Water and Power Development Authority (WAPDA):

WAPDA is responsible for development, maintenance and operation of mega hydraulic infrastructures, supply of irrigation water and flood control operations, prevention and reclamation of water logged and saline lands. An environmental cell was developed in WAPDA in order to identify and tackle the detrimental impacts of developmental activities taken by WAPDA. The environmental cell has been upgraded recently to the level of directorate general. There is hope of better understanding towards the environmental considerations and EIAs for the long term sustainability of water resources.

2.6.7 National Wetland Management Committee (NWMC):

In 1996, NCCW established National Wetland Management Committee which comprised the members of relevant government departments, provincial wildlife departments and NGOs. The purpose behind the establishment of this committee was to provide a single platform to federal departments, provincial departments and NGOs; and to develop a National Wetland Strategy. The main task of this committee was to give advice on appropriate policies, research and training, identification of wetlands and formation of Provincial Wetland Management Committees. IGF is the main focal person of NWMC and up till now only one meeting was conducted by NWMC. The agenda of that meeting was to overview the Wetlands Action Plan for the approval.

2.6.8 PWP Head office:

The PWP established its headquarters in the form of a National Project Steering Committee (PSC) and Project Management Unit (PMU) located in Islamabad, with the support of MoE's NCCW. The PMU is the focal point of the project and the main functions of this unit are:

- assessment of wetland conservation measures taken at demonstration sites,
- compilation of case studies and activate techniques for replication,
- Integration of information gathered from demonstration sites into wetlands management policy, project training courses and public awareness programmes.

It is staffed with governmental personnel supported from relevant departments. Specialists are also appointed who have the competency to transfer skills and build the capacity of governmental and partner agencies.

The PSC mainly provides overall guidance and monitor the implementation of the project. Besides PWP head office a Technical and Equipment Resource Centre located in Lahore, GIS lab in Islamabad, and four regional site offices with PWP regional teams are established (Further progress will be discussed in chapter 5).

2.7 Other Organizations

A considerable number of international and national NGOs are working in wetland conservation programmes especially with the help of community participation. These organizations take initiatives and cooperate with government in their efforts to improve wetland management and conservation. Although they have the capacity to carry out research, assemble information on wetlands, and provide guidance and training on wetland management, but there is no clear mandate at the national level which present an approved or preferred mode of operation. Due to which on one hand NGOs are sometimes in doubt about the extent of their job while on the other hand local government officials are not confident about their influence to deal with NGOs.

NGOs have a very effective and crucial role in raising public support for conservation activities, developing management plans for the protection of wetland sites in cooperation with the significant government departments and local communities, propagating knowledge through public awareness campaigns, and strengthening local communities by establishing village organizations for sustainable conservation efforts. Some of the NGOs are discussed below

2.7.1 Wetlands International:

Wetlands International is an independent, non-profit global NGO that works globally, regionally and nationally. Its directives are to achieve the conservation and wise use of wetlands, to benefit biodiversity and human well-being. Its head office is in Wageningen, the Netherlands and currently it has 15-country offices. Number of governments from all continents of the world, extensive specialist networks and volunteers support this international organization.

For the future initiatives and work plan Wetlands International has adopted the following four long-term, strategic global goals:

- "Stakeholders and decision makers are well informed about the status and trends of wetlands, their biodiversity and priorities for action;

- The functions and values of wetlands are recognized and integrated into sustainable development;
- Conservation and sustainable use of wetlands is achieved through integrated water resource management and coastal zone management;
- Large scale, strategic initiatives result in improved conservation status of species, habitats and ecological networks" (Wetlands International, 2007).

2.7.2 World Wide Fund for Nature (WWF):

WWF-Pakistan that is the largest conservation NGO established in 1970. Its aim is to conserve nature and its diversity, for present and future generations in Pakistan and the main objectives are:

- To maintain the key environmental factors for conservation of biodiversity and reduce negative human impacts on nature in Pakistan;
- To conserve ecologically representative samples of forests, freshwater and marine ecosystems and species of special concern;
- To promote the best practices in reducing pollution and wasteful consumption through Target Driven Programmes (TDPs);
- To increase the capacity for effective conservation work, within WWF and in other Governmental and non-governmental partners.

The WWF-Pakistan head office is in Lahore and is in contact with International Secretariat of WWF located in Gland, Switzerland. There is a network of 6 regional offices in Islamabad, Karachi, Peshawar, Gilgit, Muzaffarabad and Quetta and 5 project offices in Chitral, Ayubia, Sonmiani, Jhangar, and Zhob (WWF-Pakistan, 2009).

In the past many regional programmes and management plans, which showed efficient work and sufficient achievements, were conducted with the relevant government institutes and departments for conservation of nature. The major initiative taken by WWF was the wetland conservation programme started in 1989. Since that time, a dynamic and constructive work has done in coordination with provincial and federal government

agencies. In 2000, a Wetland Action Plan was formulated that outlines the history, status and possible solutions to country's wetland issues.

In 2006, another initiative taken by the Federal Ministry of Environment as the Pakistan Wetlands Programme (PWP), is implemented by the WWF-P and funded by a consortium of national and international donors including the Global Environment Facility (GEF), United Nations Development Programme (UNDP), the Royal Netherlands Embassy (RNE), WWF-Global Network and the Pakistan Poverty Alleviation Fund (PPAF) (GoP, 2007). Besides this Programme many ongoing conservation projects and small grant programmes are established by the organization in country (discussed in chapter 5).

2.7.3 The World Conservation Union (IUCN):

"The World Conservation Union is the world's largest and most important conservation network. It was established in October 1948 as the International Union for the Protection of Nature (or IUPN) following an international conference in Fontainebleau, France. The organization changed its name to the International Union for Conservation of Nature and Natural Resources in 1956. Its headquarters are in Gland, Switzerland" (IUCN, 2009).

"In 1982, an exploratory mission from the IUCN Headquarters laid the foundation for the IUCN Programme in Pakistan. In 1985, a one person IUCN Country Office was established in Karachi to initiate the implementation of the NCS. Since then IUCN Pakistan has grown into the largest country programme with five programme offices and a number of offices in the field. To ensure sustainable development of Pakistan's natural and local resources, IUCN Pakistan aims:

- integration of environment and development;
- support to institutional and human resource development for environment;
- facilitation for the creation of a supportive policy and legal framework; and
- increasing popular support for the environment.

IUCN works closely with the government at the national and provincial levels as well as with civil society. IUCN-Pakistan advocates and technically assists the development of the conservation strategies; and, supports strategy implementation by providing assistance in policy and legislative reforms, capacity development, environmental assessment, awareness and education, and selected field projects" (IUCN-Pakistan, 2008).

2.7.4 Birdlife International:

BirdLife International is a global Partnership of conservation organizations which is intended for conservation of birds, their habitats and global biodiversity also working towards the sustainable use of natural resources.

"BirdLife Partners collaborate on regional work programmes in every continent. BirdLife's aims are to:

- prevent the extinction of any bird species
- maintain and where possible improve the conservation status of all bird species
- conserve and where appropriate improve and enlarge sites and habitats important for birds
- help, through birds, to conserve biodiversity and to improve the quality of people's lives
- integrate bird conservation into sustaining people's livelihoods" (Birdlife International, 2009).

Although the organization is working through the region of Asia for conservation and protection of birds but Pakistan is not a partner of it regarding any challenge. However, it has developed an inventory of globally threatened species of birds in Pakistan in collaboration with IUCN (mentioned in Red Data Book).

2.7.5 International Water Management Institute (IWMI):

IWMI is an international research center that is supported by the number governments, private foundations and international organizations collectively known as the Consultative Group on International Agricultural Research (CGIAR). IWMI has offices in 12 countries across Asia and Africa. IWMI is effectively supporting Pakistan's agriculture and water sector through number of ways:

- Helping water planners to make more effective decisions about water resources availability and allocation by using low-cost satellite imaging technique,
- Supporting Pakistan's irrigation sector reform to improve service and control the costs.
- Assists in establishing Area Water Boards and Farmer Organizations,
- Projects in Pakistan and Vietnam are being developed to quantify the benefits and risks of wastewater irrigation including rapid assessment techniques and the creation of decision-making tools (IWMI, 2009).

2.7.6 International Centre for Integrated Mountain Development (ICIMOD):

"The International Centre for Integrated Mountain Development, ICIMOD, is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush-Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and based in Kathmandu, Nepal. ICIMOD is working to develop an economically and environmentally sound mountain ecosystem to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream. The Himalayan Wetlands Initiative has a draft Strategy (September 2008) that member country representatives have agreed to develop further towards regional endorsement. The Himalayan Wetlands Initiative Strategy (HWIS) emphasized 'Inventory and assessment of high altitude wetlands services and values' as a priority issue, and 'Promote joint needs-based research, particularly for high altitude wetlands and related river basins' is defined as a specific objective. ICIMOD continues to be the coordinating body of the Himalayan Initiative" (ICIMOD, 2009).

2.7.7 Shehri:

"Shehri was formed in 1988 by a group of concerned individuals to provide citizens of Karachi with a platform to effectively voice their concerns and take action in arresting the deterioration taking place in their living environment, and to properly reform and improve it. It operates as a pressure group and a consciousness raising organization interfacing with citizens, civic and metropolitan bodies and higher tiers of government. It acts as a catalyst for generating debates and searching for solutions to urban problems.

Focusing on environmental and wildlife conservation, Shehri, launched 'Helping the Turtles Survive' campaign funded by the Global Environment Facility, United Nations Development Programme (GEF,UNDP), Pakistan. Similarly, on the 14th of August 1998, coinciding with the nation-wide Independence Day celebration, Shehri members and residents of the locality formally inaugurated the SHEHRI-Park, which they adopted in the Clifton area of Karachi"(Shehri, 2008).

2.8 DISCUSSION:

In the current scenario, there are two distinctive behavior exist in our society regarding the wetland resources. The first one is the persistence of those non-sustainable activities and practices of primary sector (agriculture, farming, fishing), secondary sector (industry, manufacture) and tertiary sector (tourism, transport, provision of services), which leads to continuing degradation of wetland resources for short-term economic benefits. The second is increasing number of initiatives purposely for protection and conservation of these resources. These efforts are in terms of research, educational, training and awareness projects, institutional development and fiscal support for the implementation of sustainable practices. Generally, the first group has being prevailed the second but from the last few years the positive efforts supported by the government and other organizations through number of actions and programmes are developed for the wetlands.

As discussed earlier that national wetland policy does not exist in our country but the draft national policy is in pipeline. In the absence of appropriate policy framework and due to the nature and importance of these fragile ecosystems, other policies such as forest, agriculture, water, fishing, tourism etc. have an impact of them. There is also a lack of coordination among various sectoral policies. It is a fact that most of the policies as to fisheries, agriculture etc. do not exist any provisions for conservation and management of wetlands while have a great impact on the ecology and economy of wetlands.

It is assessed that contradictory or incomplete sectoral policies and practices had inhibited activities that halted the degradation of wetlands. For example, fisheries departments promoted the introduction of exotic fish in natural waters including the protected areas, even though opposed by the wildlife organizations. These policies do not provide for compensation for lost wetland habitats or functions. However, Pakistan was the first Ramsar Party to get the principle of compensating for the delisted Ramsar Sites with other wetlands recognized by the Ramsar Bureau (Rao, 2008).

Uncontrolled land use planning has negative impact on the wetland ecosystem. Like wetland drainage, forest clearing for agriculture, tube well pumping exceeds the rate of ground water recharge, changing erosion and silt flow patterns dumping of untreated agricultural, industrial and urban waste in water bodies. An economic incentive for development and urban sprawl is another main cause of wetlands loss. As stated that the subsidy on power tariff, for installation of tube wells and for provision of agrochemicals degraded the ground water quality, which further directly or indirectly deteriorate the wetlands.

According to a national focal person, there is no need of separate law and more emphasis should be given on preventive measures than the curative ones. According to him a comprehensive and appropriate strategy would help to address the issues related to ecological and social aspects as well as the wise use and rehabilitation of these resources.

As mentioned above, the wetlands are not governed by a single specific legal statute but fall within the domain of Wildlife, Environmental and Fisheries legislation. The wetland conservation and wise use could only be promoted to some extent through regulatory measures taken under the jurisdiction of wildlife departments. The wildlife laws designated some of the wetlands as wildlife sanctuaries and game reserves. Abdul Latif Rao, in one of his reports said, "It is possible legally and institutionally to designate and manage coastal protected wetlands, even though they may include terrestrial and marine areas as is the case of Hingol NP, turtle nesting beaches and mangroves along Balochistan and Sindh coast. It is only in the game reserves that sustainable use is possible and the communities may have usufruct rights or could be authorized to such uses under the wildlife legislation. The other two categories of the protected areas i.e. national parks and wildlife sanctuaries are non-exploitation areas under the law but in practice, the communities continue to use the resources unabatedly through hide and seek game. Both the staff and the communities are not comfortable due to this inconsistency. This issue has been addressed in the Draft Balochistan Biodiversity Act by adding suitable categories of protected areas".

Environmental law considered wetland conservation and management indirectly and at different levels. The law has specific clauses to address municipal and industrial waste disposal into inland water bodies, however, appropriate measures should be needed to monitor effluent discharges by the regulatory authorities.

It was assessed that even in the presence of integral legal support and extensive guidelines the EIA system is not much constructive and effective in Pakistan. The inadequacy of the EIA system is due to insufficient capacity of EIA approval authorities, deficiencies in screening and scoping, poor EIA quality, ineffective public participation and weak monitoring. Instead of using EIA as a project-planning tool, it is used presently as a project justification tool. However, the government has recently shown a high level of responsibility to the environmental protection by making EIA compulsory for all the public sector projects likely to have adverse environmental impacts (Nadeem and Hameed, 2008).

The fisheries laws and policies concentrated on issues related to fish production, aquaculture and exploitation. There is a lack of provision regarding the conservation of indigenous fish specie or habitat. No specification exists regarding acceptable water quality conditions in aquaculture farms or for the effluents discharged from farms. Furthermore, there should be a provision to place exotic species in quarantine in order to reduce risk to native species.

Thus, lack of enforcement and inadequate legislation further stimulate illegal interventions. As discussed earlier, the wetlands are continuously being affected by illegal release of pollutants, negligence by uncontrolled access of visitors to these fragile ecosystems, illegal hunting, illegal cutting of mangrove forests, encroachment of public land and irrational change in land use in order to serve the interests of social groups. The reasons behind the low level of law enforcement are:

- shortage of manpower,
- the staff of management agency or military and police are reluctant to enforce laws,
- offer of bribes to law-enforcers,
- insufficient logistic support,
- very low or severe fines/charges and penalties for law breakers, and
- lack of confidence among field staff on taking law enforcement action that higher authorities on such actions might fire them.

There is a prior need to take effective measures in terms of evolution of specific law and policy and further modification of previous concerned laws and policies. For the sustainable management and wise use of wetlands, it is important to coordinate in the formulation and implementation of relevant sectoral policies, which requires close cooperation of significant sectors (like water, environment and other related sectors).

The development of specific policy framework is on the way. After its approval, the major step would be its implementation (in terms of translating its provisions into feasible action plans in order to get the quality output) through governing bodies.

Another constraint that hinders the conservation and wise use of wetlands is the absence of appropriate wetland inventory. Almost all wetlands play a vital role in providing food security, protection against floods and storms, housing materials, recreational and educational sources etc. Up till now, number of surveys being conducted by Wildlife Departments with the help of other organizations (WWF, IUCN, Birdlife International e.t.c) sometimes on regularly basis. These surveys were specified usually to assess the population status of particular specie. For example, the survey of Indus Dolphin and the mid-winter waterfowl counts being mostly done at regular basis. Also, the analysis of Pakistan's mangrove ecosystems by aerial photography and Landsat imagery was conducted during the period of 1990 to 1998. Pakistan Wetlands Programme is now making an effort to develop a comprehensive wetland inventory based on GIS; however, the team facing number of limitation while conducting surveys like political instability, unfavorable weathering conditions, and financial instability etc. Additional surveys are required at different time intervals to check the status of resident species of other aquatic fauna and flora as well as habitats.

In order to develop a valuable and dynamic inventory there is a need of a comprehensive study including the assessment of ecological, economic and socio-cultural significance of different wetlands in the country. This could be achieved through rapid surveys and assessments using remote sensing and GIS tools where needed. So that up-to-date information composed in inventory could be used by the concerned wetland conservation agencies and developmental planners for formulation of management action plans in future.

As mentioned earlier, there are a number of institutions in the country having the jurisdictions over river basins and coastal areas. However, there is confusion among different organizations regarding their responsibilities. Like, the ownership authority and

management authority may not be the same in the wetland areas. So due to overlapping or conflicting mandates the management of these ecosystems is restricted at larger extent.

At the federal level, the agencies usually concerned with the conservation and wise use of wetlands included NCCW, IRSA, Pak EPA, Water Section & Environment sections of Planning and Development Division, WAPDA and Marine Fisheries Department. At the provincial level the wildlife and fisheries departments, Environmental Cells in PIDAs, provincial EPAs, water and sanitation agencies are dealing wetland related issues and concerns.

It is revealed that the jurisdictional overlaps and inconsistencies hampered the possible solutions to the wetlands issues and problems in Pakistan. Almost three to four agencies (WAPDA/ irrigation or small dams/ fisheries/ wildlife) are involved in managing the respective resources of a wetland. Water and power agencies, fisheries departments and tourism organizations have their mandates magnifying the prospect of development and revenue generation, whereas the wildlife agencies respond fiercely to avoid adverse impacts. The inadequacy of cooperation and understanding, mutually developed management plans and strategies among these institutes and the lack of powers and human, technical and financial resources delayed the implementation of wetland conservation and wise use programs. Therefore, there is a need to coordinate their activities to achieve integrated management of wetlands. According to the background paper for national wetland policy, the three major stakeholder and institution groups associated with the wetlands are:

- Natural Resource Sector included fisheries, water, wildlife, forestry and agriculture, generally focused on utilization and management of the respective natural resources.
- Development Sector included water, housing and settlements, industry, communications, energy, tourism and agriculture. The activities have adverse impacts on wetland resources, for example, discharge of untreated sewage and industrial effluents, land use change for agriculture and infrastructure, agricultural runoff and

oil spills, construction and over extraction for irrigation and power negatively affect environmental flows and directly or indirectly deteriorate the natural resources.

- Wetland Supporting group/organizations such as EPAs, research and development, information and communication, security agencies, education and training, gender and women development, health, water and sanitation (Rao, 2008).

Another serious issue in our country included disorganized reports, insufficient information, incomplete and obsolete data relevant to the management of wetlands. According to the Ramsar Bureau, all the contracting parties have to submit their country reports after every three years. The main purpose of these reports is to get:

- a valuable overview of national experiences;
- continuous monitoring of the implementation of the Convention;
- a means of sharing information relating to wetland conservation measures that have been taken, any problems that may have arisen, and appropriate solutions to such problems

As mentioned in the chapter, NCCW is responsible for the submission of reports to Ramsar Convention. Almost all the reports submitted to the Bureau missing the fundamental supportive information or filled with general approach not satisfactorily. The basic deficiency found in reporting included:

- lack of coordination among implementing agencies and the reporting agency,
- technical, institutional and financial constraints to update the record,
- uncertainty to disseminate the experiences and knowledge among other competent personal of the department,
- may be unaware of the technicalities of the report (have not fully understood the question)
- may not wish to present the exact situation of those wetlands facing ecological problems (as because of economical benefits)
- or lack the capabilities and capacity to proceed with related issues.

While developing report the government has to avoid the fake statements in order to assure the validity of that report. In most of the cases like provision of EIA; strategies and policies to address the invasive species and their threats, management of transboundary/shared wetlands; wetlands inventory and their ecological, social and economical assessment are some of the issues not addressed properly in the reports.

Education at all levels, professional training in conservation concepts and practices are crucial to ongoing success in protecting the wetland resources. Such initiatives and opportunities has to be taken by conservation agencies, educational institutes and universities, and other non-governmental organizations in order to share experiences and knowledge, develop expertise and promoting cooperation. According to the WAP, the development of major documents such as CEPA action plan, modules for education and training courses, manuals based on wetland management techniques, catalogue of mitigation measures could enhance the wetlands management and conservational activities but still not exist.

2.9 CONCLUSION AND RECOMMENDATIONS:

It is concluded that the development and implementation of specific law and strategy/policy be a most significant step towards strengthening the activities for conservation and sustainable use of wetlands. There is a need to review sectoral policies (which have impact on wetlands) and solve issues caused by duplication and conflicts regarding administrative jurisdiction. National, regional and international cooperation is necessary in order to facilitate the activities with respect to inventory development, education, training, planning and management. Here are few suggestions that can help to enhance the conservational activities.

- There is a need to harmonize those legal and institutional measures, which contribute to the loss of wetlands, with conservation and wise use objectives. This can be achieved by revising, upgrading and modifying the relevant sectotal laws and policies.

- Identify the ways in which existing legal and institutional measures can be implemented more effectively and productively.
- To upgrade law enforcement in relation to violation of laws related to wetland conservation and sustainable use, training on the provisions of the law and in law enforcement techniques has to be conducted for the concerned staff.
- Application of a broad based EIA methodology including impacts of the developmental activities within river basin. The construction of hydraulic structures on river flows is the key area to ensure conservation and sustainable use of its resources.
- In order to promote sustainable management, Planning Commission has to integrate various sectors such as environment, agriculture, water, wildlife and industries in decision-making process.
- There is a need to evaluate the full range of environment, social and economic values of wetlands to develop a comprehensive wetland inventory.
- Organizing training programmes with concept of wetlands conservation for senior managers and staff, research organizations, policy makers, and other stakeholders in different parts of the country.
- A comprehensive training program, which covers both theoretical and practical matters, is to be designed to strengthen the capacity of the key agencies responsible for the protection and sustainable use of wetlands.
- There is a need to provide basic training in GIS and remote sensing data interpretation for specific staff assigned in mapping section. This training should be extended to the staff of central office, regional offices, and other agencies' staff.
- To develop learning materials (like CEPA Action Plan, training modules, catalogue of mitigation measures etc.) that focused on cross-sectoral nature of wetland benefits and impacts. These could support the sensitization/awareness programs, integrated training, sustainable development planning, and wetlands management and conservation projects.
- To launch a versatile, professionally designed public awareness campaign of groups concerned in wetlands such as the PWP offices, Other GOs, LGOs and NGOs a joint effort should be initiated.

- There should be a regulation to provide minimum allocation of water flow which helps to sustain the different ecological and functional aspects of water bodies. It should be adopted with consent of WAPDA, PIDs, owners and users of the wetland.
- Enhance the reporting and monitoring system of concerned agencies by taking effective measures at all levels.
- Build up regional cooperation for management planning in transboundary wetlands with countries sharing the river basins.

CHAPTER 3

SOCIAL AND ECONOMICAL FRAMEWORK

3. INTRODUCTION

Human reliance on wetlands is high as high proportion of human settlements are located near sea coasts, the shores of lakes or alongside rivers to get advantage of the series of benefits that wetlands provide. The dependence of a large number of populations living along coastline is on fishing for their livelihood, and is therefore directly related to the productivity of the mangroves, estuaries, sea grass beds, coral reefs and algal flats to maintain fish, shrimp and mollusk populations. Inland, the communities especially the poor farmers totally depends on the flow-regulation function of wetlands that maintain river flows during the dry season. While others dependent on the lake fisheries for the revenue generation. The pace of urbanization further heightens the dependence on wetlands for a reliable water supply to cities. Thus, the sprawling population and continuous developmental activities intended towards the constant degradation of wetland resources irreversibly. The demographic changes also altered the old traditional method of resource extraction to the more extensive, unsustainable means of resource exploitation. The increased pressure from development has strained their capacity to sustain themselves and to provide the services necessary for the survival of local community specifically and the whole society generally. As the wetlands are one of the reliable sources of our flourished economy, so their conservation definitely is achieved through the "Wise Use" according to the Article 3.1 of the Ramsar Convention. The Wise Use means "sustainable utilization for the benefit of mankind in a way compatible with the maintenance of natural properties of the ecosystem (The Convention on Wetlands, 2009)". Pakistan, being a party to the Ramsar Convention, is obliged to implement the wise-use principle. However, till to date, this important guideline of Ramsar Convention has not been implemented in Pakistan due to various reasons.

3.1 Wetland Resource Utilization by the People

The country's wetlands are the substantial source of livelihood to the local people through irrigation of agricultural land, fisheries, mangrove plant products, domestic water supply as well as are supporting a great variety of wild flora and fauna.

The arid and semi-arid areas, the rapidly growing coastal regions and the mega cities of the developing world are among the most vulnerable regions experiencing the increasing global water scarcity. Among other ecosystems, wetlands are the most fragile ecosystems that bear detrimental effects of water scarcity. These effects (usually in terms of loss of wetland areas, changes to water regime and water quality) are generally heightened by the anthropogenically driven fundamental changes that are categorized as:

3.1.1 Drainage and In-fill:

Wetlands have been drained and in-filled for agriculture, industry and urban development. Many fresh water wetlands either have dried away or reduced in size due to massive extraction of ground water, drainage of rivers and lakes to irrigate the land and to supply water to metropolitan areas. Water diversions and dam construction have reduced the inflow of water to wetlands, which in turn affects the ecological character of such water bodies. Although the origin of new wetlands because of canal irrigation system had supported many migratory birds such as cranes and ducks. However, from last few years the continuous increase in water logging and salinity of such areas has made them susceptible to sustain any bird or plant life.

3.1.2 Over-grazing and Over-harvesting of mangroves:

Increasing inhabitants near the water bodies also increased the size of local herd resulted in over-grazing around these ecosystems. The vegetative areas that were intermittently allowed to recover in the past but from last few years are continually grazed or cultivated. Another serious threat to mangrove forests (that provide many useful resources to local communities like fodder livestock and timber) is the over-harvesting. The deterioration of mangrove ecosystems directly affects those fauna specie,

which used these wetlands as breeding grounds. As mentioned earlier, several species associated with these forests have been vanished from Pakistani coast.

3.1.3 Usage as Dumping Site:

"Effluents from industries, uncontrolled use of fertilizers in the surrounding agricultural lands, discharge of domestic wastes and sewerage from human settlements contribute to the water quality deterioration of these systems. Such decrease in the quality and quantity has contributed to decline in the diversity of flora and fauna, migratory birds and the productivity of the system. Several thousand species have now become extinct and many other sustainable species, products like fish, timber, medicinal plants, water transport and water supply are over exploited "(Mirabzadeh, 1999).

3.1.4 Export/ Foreign Exchange:

Wetlands operate, as breeding and nursery grounds for commercially important fish and invertebrates, so are a large generator of foreign exchange for the Government. Fishing is the most common profession of the people living along the coastal belts of the Sindh and Balochistan province. A considerable amount of fish, shrimps, and their products, (which worth over a billion rupees) had been exported in the past. But from the last few decades, the continual degradation of mangrove and riverine forests resulted in decline in fish and crop production. Which in turn have a negative effect on livelihoods just because of increased salinity, pollution (industrial effluent and untreated sewage) and reduced water flows.

It was recorded by the Marine Fisheries Department that during the period of 1971 to 1998 catches of large "jaira" shrimps had reduced by about 50%. The Palla fish that would account for 70% or more of the total fish catch in the 80's had reduced to 15% of the total fish catch in 1995. In 2007, the European Union (EU) banned on fish/fish products from Pakistan (essentially Sindh) had badly affected the fisheries sector (GOS, 2007).

3.1.5 Extensive Tourism:

In Pakistan as compared to the other industries, tourism is not recognized as well flourished industry. This is because of two reasons: firstly due to political instability in the region and secondly due to the insignificant concept of recreation and tourism as uses of wetlands. The unsustainable and intense recreational activities, apart from generating small revenue, also contribute to degradation of wetlands e.g. highly stressed and polluted Kallar Kahar Lake (in Punjab).

3.2 Economic Under-Valuation of Wetlands

Economic valuation is defined as the attempt to assign quantitative and monetary values to goods and services provided by environmental resources or systems, whether or not market prices are available to assist us. When market prices are not available (e.g., for flood control services, for disaster mitigation services, for erosion avoidance...), the value is established by *the willingness to pay* for the good or service, whether or not we actually make any payment. Economic valuation is not an easy and non-conflictive exercise. It often depends on human preferences. In other words, it depends on what people perceive as the (positive or negative) impact wetlands have on their wellbeing. In developing countries, where life is not always easy for most people, the economic value tends to overstate the others (Lambert, 2003).

In Pakistan like other developing countries, the value placed on wetland resources by government and local people is based upon the immediate benefit in terms of revenue and livelihood. Thus, considerable efforts are needed to evaluate the socio-economic implications of wetlands and then to develop and adopt measures required to maintain the ecological character of wetlands. Some site-specific work has done by IUCN and WWF regarding this issue (i.e., Economic valuation in Indus delta). A comprehensive mechanism to enhance replication and propagation of these interventions could broaden the ecologically aware activities through out the country. These activities in outlook could change the human preferences concerning wetland resources.

3.3 Lack of Alternatives for Local People

Besides the lack of information and knowledge regarding sustainable resource utilization, the provision of alternatives is another main obstruction in conservational activities of wetlands. It is obvious that local people might be aware of the value and functions of wetlands and the negative impacts of over-exploitation of these resources but unemployment and poverty unable them to adopt sustainable patterns of resource utilization. Moreover, under provision of social services and human resource development compel them to continue the existing patterns of earnings primarily based on unsustainable utilization of these resources.

3.4 Resource Rights, Cultural and Gender Differences

"The management authority in wetland areas is not necessarily the same as the resource user and the conflicts may arise between the interest of wetland owners and users. It is necessary to distinguish between private, communal and state ownership. Further, a clear distinction needs to be made between the owner authority, management authority and resource users .in some cases the ownership authority is not the same as the management authority. In some government owned areas, for example, wildlife is managed by the Wildlife Department while water is managed by WAPDA or PID. Clear water allocations related to ecological and wildlife needs are not defined. WAPDA and PID merely use criteria for the diversion of water related to agricultural production. This puts the Wildlife Department in its role as wildlife manager in a vulnerable position. Some areas on the boarders of water works are auctioned/ leased by the PIDs to farmers for use in dry seasons after the usual fall in water level. The way farmers use their land can have a negative impact upon migratory birds. As discussed earlier the country wetlands are institutionally vulnerable due to weak management authority with ineffective mandate. Private owners and users may have priorities that do not necessarily coincide with those of the Wildlife Department and the objectives of the Ramsar Convention. Private owners have the most extensive mandate and as such are able to over-exploit and destroy the resources. Probably the only way to sustain a wetland in such conditions is to purchase the land and the water sources. Such a strategy is heavily dependent on political and economic support (GoP, 2005)".

From old civilization till modern world the rivers, lakes and wetlands are part of their cultural history existing as a main segment of art, religion and mythology. Most of the people have lived for centuries near the bank of rivers, lakes, mudflats and coastal line. Besides, the direct use of wetland products for food, fodder, boats building and houses construction their lives have also been spiritually associated with the wetlands. With the passage of time, the distraction of water upstream has led to desiccation of these wetlands. Which have seriously threatened the people who depend directly on these wetlands for their livelihood and their ritual and cultural practices too.

Pakistan is a multiethnic, multicultural society comprising a population that is diverse in terms of ethnicity/race, language and religion. The people of Pakistan are generally considered a mixture of Indo-Iranian lineage (Renfrew, 1987). These ethnic and cultural differences emerging with varying patterns of employment may affect the way to inter-relate with wetlands. The varying resource utilization and uneven employment patterns are likely to interpret into different usufruct rights and possibly the domination of one group for resource use at the expense of others.

The patterns of wetland utilization (either sustainable or unsustainable) may also diversify between the male and female users depending upon their status, knowledge and education. Women are one the main stakeholders and usually from communities settled near water bodies utilize these wetland resources as water collection for daily use (like washing clothes, cooking and cleaning), fodder, reeds and wood collection for their different economic activities such as weaving baskets, mats and brooms and making other items and handicrafts. The varying economic and educational status of this group also affect the ways these resource being utilized and hence contribute negatively or positively to conservational and management activities of such resources. These areas usually have limited education resources particularly for females, which further exacerbate the conservational issues.

3.5 Financial Resources

3.5.1 Financial Assistance (by Government):

Besides many other limiting factors, two of the factors that also intensify the wetland management issues in Pakistan are finance and manpower. In Pakistan where provision of basic necessities to general people is the chief priority of the government the environmental concerns are considered to be insignificant. Although from the last few years, appropriate amount of budget announced for environment sector but not available due to many reasons (incapability of recipient/beneficiary agencies and departments, insufficient project proposals, weak allocation of funds by governing agencies due to political interests etc.). There is no specific budget allocated by the Government for management or conservation of water resources. Inadequate financial assistance for sustainable practices, and consequently the lack of real encouragement for local communities to adopt these practices resulted in great hardship to these populations and further depleted the resources at high pace.

3.5.2 Financial Assistance (by other organizations):

As the GoP lacks the resources to invest in wetlands conservation and without financial support from private sector and international organizations, the resource utilization by the people will remain unregulated. And the prevailing conditions would further lead to the depletion of water bodies and reduction of their resources. The involvement of international institutions and private sector could enhance the capacity of government organizations for conservation and management of wetland areas. They could help in research and development of techniques and plans for regeneration of important wetlands species.

From last many years, non-governmental organizations such as IUCN and WWF are playing crucial rule in supporting and directing the conservational activities of wetlands in our country (included small-scale site specific or specie specific projects). In 2006, the Ministry of Environment has started seven years programme named "Pakistan Wetlands Programme" and is implemented by WWF Pakistan. The programme required

substantial financial support, which is provided by four sources: the GEF Programme ($3.33 million), UNDP – Pakistan ($1.5 million), WWF- Network ($1.2 million) and the Royal Netherlands Embassy, Islamabad ($4.03 million). In addition to this, the Pakistan Poverty Alleviation Fund has committed to parallel financing amounting to $2.06 million (GoP, 2009).

3.6 DISCUSSION

"Wetlands are under increasing stress due to urbanization, technology development, economic growth and various other anthropogenic activities, which have accounted for their over exploitation and degradation. They are threatened by excessive loading of silt and nutrients from various sources (point and non-point sources) due to the removal of vegetation cover in the catchment areas. Vast areas of wetlands have been encroached for various purposes such as agriculture, settlements, etc., leading to shrinkage of wetland area. Weed infestation and colonization by water hyacinth causes further degradation of much of the wetland ecosystem. Wetland waters are diverted for farming, public water supply, hydroelectricity and navigation, which can change its water regime. The involvement of local people in wetland management is of prime importance since they are an active part of the ecosystem (Mirabzadeh, 1999)".

The rapidly growing population and unstable economic growth increased the pressure and forced the unsustainable utilization of these resources that results in irretrievable losses. The major threat to these resources is ignorance and lack of knowledge about sustainable utilization of these valuable resources and absence of alternatives for local communities.

The Pakistan Wetland's Action Plan, 2000 provided a comprehensive list of possible solutions, which could help to minimize the risks of wetland degradation by taking actions through government, private sector, other international organizations and especially the local communities' cooperation.

"Our new approach must meet two fundamental requirements. One is to secure a widespread and deeply-held commitment to a new ethic, the ethic for sustainable living, and to translate its principles into practice. The other is to integrate conservation and development: conservation to keep our actions within the Earth's capacity, and development to enable people everywhere to enjoy long, healthy and fulfilling lives (IUCN/WWF/UNEP, 1991)". Thus we have to adopt those lifestyles and developmental paths that respect and work within the nature's limits. Moreover, five main challenges i.e., integrating conservation and development; satisfying basic human needs; achieving equity and social justice; providing for social self determination and cultural diversity, and maintaining ecological integrity are to be addressed in order to acquire the pathway of sustainable development. There is a need to understand these goals and establish comprehensive strategies and tools for the achievements.

3.6.1 Keep within the Earth's Carrying Capacity:

"The carrying capacity is defined as the maximum number of individuals that can be sustained by an environment without decreasing the capacity of the environment to sustain that same amount in the future" (Botkin and Keller, 1995).

This carrying capacity varies from region to region, and depends upon how many people there are and how much food, water, energy and raw materials each uses and wastes. It may be possible that few people consuming a lot in an area can cause as much damage as many people consuming a little. Therefore, there is a need to develop and adopt those policies and technologies that bring human numbers and life-styles into balance with nature's capacity. "Caring for the Earth: A Strategy for Sustainable Living" (IUCN/UNEP/WWF, 1991) defines broad lines of advance towards a world that lives sustainably within the natural limits of the planet. The principles for sustainable living include: respect and care for the community of life; improving the quality of human life; conserving the earth's vitality and diversity; minimizing the depletion of non-renewable

resources; living within the earth's carrying capacity; changing personal attitudes and practices; and enabling communities to care for their own environments".

3.6.2 Socio-economic valuation of Wetlands:

As discussed previously that one of the major root cause behind wetland resource depletion in our country is the lack of understanding of wetland values. From last many years, wetlands had been undervalued because many of the ecological services, biological resources, and amenity values they provide us are not evaluated economically, and hence are difficult to value.

As far as the socio-economic status of wetlands and their resources is concerned, they are providing unlimited services to societies in terms of revenue generation. Birds, fish and shellfish are harvested for local consumption as well as for foreign exchange. Many reptiles especially crocodiles and turtles are hunted for sale especially for their pelts/skin. Many wetland species of flora and fauna are harvested for food and for economic gain. The area around wetlands is extensively used for agriculture and grazing purpose. For example, the entire length of the Indus river is particularly important for traditional agriculture such as rice, cotton and wheat that not only fulfill the food requirements of country but also are the major source of foreign exchange.

In 1997, the Ramsar Convention Bureau published a functional book as Economic Valuation of Wetlands*: A Guide for Policy Makers and Planner*, basically provided the guidance to policy makers and planners on the prospective of economic valuation of wetlands. It also enlightened various techniques and examples of wetland valuation studies and provided a framework for planning a study and outlining the terms of reference for technical consultants.

It is a combine responsibility of government, scientists and local people to recognize the biological importance of wetlands and to promote awareness of their social, economic and cultural functions.

3.6.3 Community Participation:

"Most of the creative and productive activities of individuals or groups take place in communities. Communities and citizens' groups provide the most readily accessible means for people to take socially valuable action as well as to express their concerns. Properly mandated, empowered and informed, communities can contribute to decisions that affect them and play an indispensable part in creating a securely based sustainable society (IUCN/UNEP/WWF, 1991)".

"Through community participation, people can be encouraged and taught to use natural resources wisely, and provided assistance in identifying possible alternatives that can be adopted. This can only be made possible if the value of these resources is more widely understood and appreciated. To ensure their participation, it is important to involve them in the entire process, from the design and planning to the implementation stages of any conservational or management programme. The common approaches to achieve such goals are the Participatory Rural Appraisals and community mobilization that helps in identification of priority needs with the community's participation, establishment of a self-sustaining system to solve issues at the local level, and participation of local people in conservation of natural resources on self help basis (GoP, 2000)."

The process of public participation may raise local conflicts in communities such as conflicts on sharing of resources, limits on resource use and on access to alternative income generation activities. To overcome these risks, again the government and NGOs will have to take initiatives to propagate knowledge and develop the community education centers, which will enable them to decide on resource sharing arrangements. Furthermore, in order to motivate people to use these resources sustain ably, and to benefiting them and nature there is a need to provide them some incentives.

One of the main steps initiated by the Pakistan Wetlands Programme is the establishment of community-based organizations in order to focus and channel the

community responses. But the pace of work is too slow and process of CBOs registration is in progress.

3.6.4 Sustainable Resource Use:

"Around the world, people are recognizing that economic growth and environmental protection must go hand in hand. One of the implications of the concept of sustainable development in wetland management is the sustainable utilization of wetlands for human benefit. This development should be compatible with maintaining the natural properties of the ecosystem. The need for integrating conservation and development is enshrined in the Ramsar Convention's concept of wise use. The book "Towards the Wise Use of Wetlands", published by the Ramsar Convention Bureau, was the first attempt to promote the wise use of wetlands by providing case studies of important initiatives and guidelines based on these for applying the concept (Mirabzadeh,1999)".

In order to promote the practice of sustainable wetland resources utilization, it is needed to identify the specific problems and issues concerning wetlands, to carry the socio-economic study of local communities and to ensure the community participation in all the activities planned for wetland management.

3.6.5 Conservation Education:

"Conservation education is any type of education that brings about improved natural resource management and reduces environmental damage. It is essential to buil this approach into both formal and non-formal education in order to reach the maximum number of people. The power of non-formal education must be harnessed, especially in a country like Pakistan, where over 70% of the population remains illiterate. Both children and adults must be schooled in the knowledge and values that will allow them to live in a sustainable harmony with the environment. The formal and non-formal education sectors can be utilized by integrating conservation and environment issues into the general curriculum and training teachers to include information on the environment in subjects like English, Urdu, science, geography, history and art. In addition, using mass media for

campaigns, which target both rural and urban populations and provide alternatives to unsustainable resource use (GoP, 2000)".

3.6.6 Women Participation:

The female population in our country, especially in rural areas, is discriminated by an extremely low level of education and participation. While they are directly involved in natural resource utilization. The women from communities in and around wetland areas utilize these resources in every aspect of their lives.

"When seeking to cooperate with local communities, special attention should be given to ensuring the participation of women. Women often play a major role in resource use. However, their status generally does not allow them to benefit from the necessary legal and financial means, nor participate fully in household and community decision making. If the participation of women is to become a reality, it is necessary to plan actions that address them specifically. While developing wetland management and conservation plans, a specific strategy should be added to target women not only for conservation education purposes, but also for activities that entail the sustainable use of wetland resources (GoP, 2000)".

3.6.7 Changing Personal Attitudes:

To adopt the ethic for living sustainably, people should re-examine their values and later their behavior. Society should promote values that support the new ethnic and discourage those that are incompatible with a sustainable way of life. Influential personalities in the communities like religious leaders, political leaders, teachers and other educated persons should realize their significant role in sensitizing the public about wise use of natural resources.

3.6.8 Integrating Development and Conservation:

The Wise Use Principle necessitates the conservational activities to protect the natural properties of the wetland ecosystems. Wetland conservation is a long-term effort that has rarely allowed local communities to increase their revenue or meet their needs in

the short term. Sometimes the conservational measures may prohibit or restrict some of the activities of local people. On the other hand, the developmental activities aim to improve the quality of human life and to fulfill their needs but sometimes on the extent of natural system disruption. Development can be real only if it makes our lives better in all respects keeping harmony with natural processes. Therefore, there is a need to integrate the conservation initiatives and developmental projects in order to achieve the sustainability. Conservation-based development needs to include deliberate action to protect the structure, functions and diversity of the world's natural systems, on which our species utterly depends. The Dublin Statement (International Conference on Water and Environment, 1992), which preceded the UNCED Conference in Rio, states that since water sustains all life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. It is suggested to develop a broad-based approach to water management, with greater emphasis on integrated regional planning and conservation of critical habitats. For example, the term integrated river basin management has developed as a broad concept based on holistic approach, which aims to make the sustainable use of resources within a river basin. Once the scientific basis for management options have been defined by professional staff, the participation of local communities, farmers, industry and conservation organizations is needed to satisfy the needs of different interest groups.

3.6.9 Work as Multidisciplinary Teams:

"Most river basins contain a variety of landscapes, land uses, habitats, industry, communities, laws and traditions. Thus, implementation of a truly integrated ecosystem approach, requires the establishment of interdisciplinary teams including hydrologists, water engineers, biologists, physicists, soil scientists, planners, human and animal health experts, ecologists, sociologists, demographers, legal experts, and agro-foresters. These teams need to address a wide range of sectoral topics including population dynamics, water quality modeling, irrigation, health problems, water weeds, fish, herding, legislation, training, and participatory rural appraisal. In addition there will be many cross-sectoral issues, such as development of a geographical information system to

overlay various spatial data sets, equitable allocation of resources, development of community participation in resource management, establishment and running of authorities to coordinate planning and management. Conventionally, different disciplines tend to be specialize in separate sectors, for example, hydrologists and fisheries experts often belong to different ministries between which there is little formal contact. Each sector often has its own agencies and authorities responsible for development, many of which relate to water issues. Given the interconnection of the ecosystem, it is critical that inter-sector, interagency collaboration is established to develop the multidisciplinary team. Indeed, ecosystem management accepts that no individual or agency can cover all the different aspects involved. The various agencies should collaborate on all aspects of planning and implementation of projects, including problem analysis, project design, data collection, analysis and modeling, policy development, management and enforcement, monitoring and evaluation (Acreman, 1996)".

3.6.10 Create a Global alliance:

"Generally, wetland conservation receives little monetary support from the government because it is viewed as a low priority area. In the underdeveloped world, where basics such as health and education also receive less than necessary funding, it is difficult for governments to justify spending on the environment. This is why there is a crucial need for governments and NGOs to explore the possibilities of diverse funding mechanisms, such as fees, special taxes and returning profits from the exploitation of the environment, to make up the funding base for conservation (Dugan, 1990)".

It is narrated in the book Carrying for Earth that "no nation today is self-sufficient. If we are to achieve global sustainability, a firm alliance must be established among all countries. The levels of development in the world are unequal, and the lower-income countries must be helped to develop sustainably and protect their environments. Global and shared resources, especially the atmosphere, oceans and shared ecosystems, can be managed only on the basis of common purpose and resolve. The ethic of care applies at the international as well as the national and individual levels. All nations stand to gain from worldwide sustainability and are threatened if we fail to attain it".

During COP 10, a resolution (COP10 DR 12 Rev.2) was passed based on principles for partnerships between the Ramsar Convention and the business sector. It recognized the role of business sector in managing water resources and reducing the risk of unsustainable environmental management. The main purpose of this resolution was to support efforts between the Ramsar structures and partners and the business sector in building alliances with scientific and research organizations. It also encouraged private and public companies to develop alliances with relevant stakeholders to implement collective agreements and economic incentives, such as payment for those environmental services that contribute to the conservation of wetlands and resources (Ramsar COP 10, 2008).

According to one of the resource person, foreign funding mechanism in our country is very weak because of some critical issues. The weak allocation of funds in our country by international organizations may be due to their own political interests in polarized world or may be due to incompetency and incapability of our government institutions and other local NGOs.

3.7 CONCLUSION AND RECOMMENDATIONS

Most of the people are unaware of the full range of services provided by wetlands and about the changes occurred in these natural systems by their activities. It is obvious that people would only accept the sustainable way of living ethically only if they are provided by adequate incentives to acquire fundamental knowledge and skills and hence are persuaded to do what is right. It is evaluated that for conservation and sustainable use of wetland resources wetlands must be valued; assessed through economic, social and cultural perspective; equitably shared by all; developed through the use of suitable technology; managed through an ecosystem approach and by multidisciplinary teams which assemble, intermingle and disseminate useful information among all stakeholders to produce sound decision making. Here are few suggestions to be noticed:

- Promote environmental education and awareness about stewardship of natural resources among communities particularly in the area of wetland conservation and sustainable resource utilization.
- Enhance the conservation oriented research activities to increase the ecological knowledge of these ecosystems. Develop and implement species recovery plans for threatened wetland species
- Initiate assessments based on socio-economic values of wetlands and their potential for utilization.
- Initiate projects related to low cost sanitation facilities and indigenous methods of income generating avenues to solve the livelihood issues of communities without pressurizing the wetlands.
- Credits or incentives should be given to poor communities (dependent upon wetland resources) in order to reduce the pressure on these resources.
- Establish community based organizations, and initiate training and capacity building programmes for them. So that in future, CBOs can assist the community development work, disseminate the knowledge regarding sustainable resource utilization and helps in sound planning and decision-making regarding conservational and management plans.
- Identify other income generating sources like ecotourism in these areas to reduce the pressure on them. Further, develop a policy on tourism in wetlands and employ the local residents after training them.
- Promote the integrating approach among both conversationalists and developmentalists for environmentally sound development in these areas.
- Develop disaster action plan especially for coastal areas in order to secure the poor communities and their livelihoods.
- Develop plans for rehabilitation of degraded wetlands.
- Develop the green belts along the coastline (mangroves and coastal forests) and riverbanks. And involve the local communities in the reforestation of mangrove areas.
- The government should allocate specific budge for the conservation and sustainable management of important wetland areas.

- Seek international aids and funding for the implementation of wetland conservational projects.

CHAPTER 4

INITIATIVES AND PROGRAMMES TAKEN FOR THE CONSERVATION OF WETLANDS

4. INTRODUCTION

Wetlands the most productive ecosystems occur within all biomes and take many forms. They are among the world's most important but most susceptible environmental resources. In order to achieve the goal of sustainable or wise use of these resources, first the society must consider and recognize the high value goods and services these ecosystems provide. In order to maintain and replenish these ecosystems integrated planning and management approaches are needed to be taken by the societies independently as well as jointly. The 'integrated development and wetland conservation plans' not only help the society to actively manage the flooding and drying of its wetland areas but also take it towards prosperity. Thus for a successful sustainable utilization of wetlands affirmative action plans should be developed especially for already degraded and vulnerable wetlands. In this chapter, some of the already completed, on going and few future projects regarding the conservation and protection of wetlands or their resources are discussed.

4.1 Projects Related to Wetland Resources

4.1.1 Indus Dolphin Project (on-going):

In 1974, Giorgio Pilleri conducted a survey and he observed the Indus Dolphin population in the River Indus. His Scientific study revealed that there were only 150 dolphins in the stretch of 170 km of the River Indus. After this discovery in 1977 the Indus Dolphin Project was started. Indus Dolphin was declared as endangered species and the area between the Sukkur and Guddu barrages as Dolphin Reserve.

From 1979-81 the research project was conducted by Giorgio Pilleri with the cooperation of WWF-International and Volkert Foundation.

In 1986, the Sindh Wildlife Management Board was reorganized and started the annual surveys to observe the population of Indus Dolphin. These surveys were conducted from 1987 to 1999.

During that period, WWF submitted a report based on surveys conducted by WWF and Sindh Wildlife Department. The report highlighted the major threats leading to decline of this specie. These major threats included habitat destruction due to the construction of barrages, fishing/accidental netting, industrial and urban pollution, lack of conservation awareness. The report also provided some useful recommendations to stop this population decline (GOS & WWF, 1996).

In 2006, a survey was conducted to observe the population pattern from Guddu to Sukkur and it was reported that the population of Indus Dolphin was increased by three times than observed in 2001. Hussain Bux Bhaagat , Deputy Conservator of Sindh Wildlife Department, also discussed in his report that the two main reasons behind the specie recovery were conducive natural environment and artificial enhancement of population.

It is stated that the Indus Dolphin Project is still on going to control the decline of this endemic mammal (GOS, 2007).

4.1.2 Asia-Pacific Migratory Water Bird Conservation Strategy, 1996-2000:

Wetlands International Asia-Pacific and International Waterfowl & Wetlands Research Bureau-Japan Committee developed the strategy. The strategy broadly covered the breeding, staging and non-breeding areas of migratory birds using its flyways. It also discussed the major migratory water bird conservation issues and priority actions to over come these issues (Wetlands International Asia-Pacific and International Waterfowl & Research Bureau-Japan Committee, 1996-2000).

4.1.3 Crane Migration through NWFP, Conservation problems & Prospects, 1998:

The study was conducted to estimate population of cranes over major migratory routes in NWFP and to asses the after effects of crane hunting. Mian Muhammad Shafiq (Assistant Secretary Wildlife) created the report for Oriental Bird Club. At the end of report, few recommendations were given to conserve the crane species found in Pakistan (Shafiq, 1998).

4.1.4 Conservation of Migratory Birds in Chitral, NWFP, 1992:

"Chitral lies on the migratory route of several globally important bird species. These birds face enormous hunting pressure as it is estimated that about 200,000 of the one million migratory birds passing through Chitral are killed during migration. WWF-Pakistan initiated efforts to reduce the hunting pressure in 1992. The awareness and education efforts proved quite successful when, in addition to reduced local hunting, communities also started establishing private bird refuges. In addition, establishing nature clubs in high-pressure hunting areas and formation of conservation associations comprised of few known hunters has a great impact on the project (GoP, 2007)".

4.1.5 A Preliminary Marine Turtle Survey on the Makran Coast, Balochistan, 1987:

Brian Groombridge conducted this survey to gather preliminary information on marine turtles in Balochistan. The survey was based on four main fishing towns along the Makran Coast of Balochistan. These sites were Jiwani, Gwadar, Pasni and Ormara. According to report the major threats to turtle population were eggs used to fed camels/goats, egg predation by dogs and capturing of turtles for skin and shell to be exported (Groombridge,1987).

4.1.6 Marine Turtle Conservation Project on Karachi's Beaches, Sindh, 1980:

"The Sindh Wildlife Department started this project in 1980 to protect the turtles that come to nest on Karachi's beaches. The staff regularly collects turtle eggs from the beaches and shifts them into secure enclosures. The hatchlings are then counted, weighed

and measured and released into the sea. The project has managed to release 430,000 hatchlings into the sea and tagged 2,000 mother turtles (GoP, 2007)".

4.1.7 Pakistan Mangroves:

The comprehensive study was conducted by Sarah Ahmed, Osman Mian, Akhtar A Hai, Najam Khurshid, Abdul Rafiq Qadir and Noor-un-Nisa (WWF-Pak, 2009). It was focused on four issues contributing to biodiversity loss in the mangrove ecosystem. The analysis was divided into four modules, which were studied in local, national and international context and were investigated with following objectives:

- Scarcity of fresh water and silt in the coastal belt,
- Pollution resulting from industrialization and port activities,
- Over harvesting of mangrove forests and fish resources,
- Geophysical factors.

The study presented an estimation of biodiversity loss by comparing the mangrove cover over a period of eight years (1990-1998) using the Landsat images for two of the project sites, Indus Delta and Sonmiani in Balochistan. It was concluded that the basic reasons behind the drastic loss of mangrove forests and its biodiversity were reduction of fresh water and silt supplies; increased salinity; increased untreated industrial and domestic wastewater discharges; over harvesting of fish resources for increased export demands; use of fishing nets of illegal specification; ineffectiveness of EPAs in controlling marine pollution; and inconsistent industrial, trade and conservation policies. It is suggested that mangrove protection required a comprehensive planning with integration of the relevant ministries and local communities (WWF-Pak, 2009).

4.1.8 Indus for all Programme-WWF Pakistan (on-going):

WWF-Pakistan started this project in August 2007. The project is funded by the Royal Netherlands Embassy in Pakistan and is developed in collaboration with the Government of Sindh and other stakeholders. It is the first, five–year implementation

phase of a 50-year vision of the Indus Ecoregion Programme that aims to conserve the biodiversity in the ecoregion and improve the livelihoods of the local communities. During the first year of this programme the four priority areas selected for the programme interventions were:

- Keti Bunder area, a coastal and mangrove ecosystem and is a Wildlife Sanctuary,
- Keenjhar Lake, a freshwater wetland ecosystem and designated Ramsar site and Wildlife Sanctuary,
- Chotiari Wetlands Complex, blend of terrestrial and aquatic ecosystem,
- Pai Forest, an irrigated plantation and a Game Reserve.

During the first year of the programme the baseline information regarding the four selected sites was collected. For community mobilization 11 Community Based Organizations (CBOs) were formed. To improve the living conditions of local people small-scale development interventions (e.g., mobile medical camps, livestock vaccination and treatment camps) were started with the cooperation of District Governments. For long-term achievements, the WWF-Pakistan collaborated with Sindh Forest Department (SFD) and Planning & Development Department, Government of Sindh (SP&D). For institutional capacity building and awareness raising, workshops were conducted and programme-promoting material was developed and distributed among different stakeholders. Furthermore, detailed plans for four sites were developed in order to conduct ecological, social and economic valuation surveys in the next year (WWF, 2007).

During the 2nd year of programme, three management programmes were initiated for biodiversity conservation and livelihoods improvement, which were environmental monitoring (ecological and socio-economic assessments for four selected sites and use of GIS tool for accuracy in data manipulation); Compilation of NRM information (e.g., reporting on traditional ecological knowledge and launch of decision support system); and deployment of management strategies (e.g., CBOs development, infrastructural and enterprise development for better livelihoods, and capacity building for institutional

strengthening). The programme adopted an integrated approach in order to correlate poverty-environment issues in development plans and policies. Besides financial constraints regarding few activities at the initial stage, the various small-scaled projects started in these areas provided immediate benefits to local communities in terms of improved health conditions and enhanced earning and education opportunities. It also provided an opportunity to number of stakeholders to work at single platform for the improvement of both of society and environment (WWF-Pakistan, 2008).

4.1.9 Balochistan and Sindh Mangrove Conservation Projects by WWF-Pakistan (ongoing):

This project was initiated by WWF-Pakistan for the rehabilitation of mangrove-degraded areas at Sonmiani and Jiwani in Balochistan, and Sandspit in Karachi, Sindh. For this purpose a two-pronged approach was adopted i.e., mangrove plantation and community mobilization. Uptil now total of 200 hectares of area has been rehabilitated in Sonmiani, Jiwani and Sandspit. Four mangrove nurseries have been established at three sites and for the community mobilization many CBOs have been established (WWF-Pakistan, 2008).

4.1.10 Water Quality Assessment by WWF-Pakistan : Hudiara Drain River Ravi, South Asia Water Analysis Network (SAWAN), Taunsa Barrage Rehabilitation Project:

"Hudiara drain originates from Batala (District Gurdaspur - East India, Punjab) and enters into Pakistan near Laloo village. This drain used to be a natural storm water nullah. But from last few years it carries sewage water mingled with untreated industrial waste as it enters Pakistan, taking the highly contaminated water to the River Ravi after travelling 63 Km. WWF - P had assessed the environmental health of this drain through Water Quality Monitoring and found it to be highly unsatisfactory for irrigation as well as domestic purposes. Therefore WWF – P is now working on identifying treatment options to reduce the pollution load of the drain. We have WWF – India as well as local authorities and community on board with us and we are also working with the major

industrial units on the drain and providing them with technical assistance to help them adopt cost effective environmental solutions.

River Ravi plays a vital role in the Punjab's irrigation network and is a major tributary of River Indus. The water quality of River Ravi is being monitored each month, in terms of total pollution load and heavy metals contamination in the river water, under the South-Asia Water Analyses Network (SAWAN) Project. This is being monitored at two different locations upstream and downstream of Lahore city namely Syphon and Balloki.

Taunsa Barrage facilitates the flow of irrigation water from the Indus River in three major canals; Muzaffar Ghar Canal; Dera Ghazi khan Canal and Taunsa Panjnad (T-P) Link Canal supplying some six million acre feet of irrigation water to cultivated lands in districts of Muzaffar Ghar ,Dera Ghazi khan ,Rajanpur, Rahim Yar Khan and Bahawalpur during Rabi and Kharif seasons. In order to establish the baseline conditions for water quality and to provide benchmark for the monitoring of the physical and biological aspects of environment, both surface water and ground water quality is being analyzed during the restoration and rehabilitation of the Barrage. Samples for surface water as well as ground water are being collected, tested and analyzed for physical, biological and chemical elements in order to determine its suitability for aquatic flora and fauna, irrigation purposes as well as human consumption (WWF-Pakistan, 2008)".

4.1.11 Pakistan Wetlands Programme (ongoing):

The seven years Pakistan Wetlands Project started in 2006. The main purpose of this initiative is to promote sustainable conservation of wetlands and their ecological resources. The executing agency is the Government of Pakistan, which has delegated the implementation responsibility of this project to WWF Pakistan. The project is jointly funded by GEF, UNDP-Pakistan, Royal Netherlands Embassy in Pakistan, WWF International and Pakistan Poverty Alleviation Fund at total coast of $11.8 million. The specific objectives of the project are:

- To provide required policy, institutional, technical and financial framework besides generating public support essential for the creation of an enabling environment for wetland conservation in the country.
- To involve the design and implementation of progressive participatory management plans for the four independent demonstration sites: i) Makran Coastal Wetlands Complex, ii) Central Indus Wetlands Complex, iii) Salt Range Wetland Complex, iv) Northwest Alpine Wetland Complex)

During the first year of the project, baseline information was collected and project design was developed with specific objectives, outputs and expected results. To verify the performance of project, ten outputs each with sub outputs were derived that were discussed in the Pakistan Wetlands Programme Annual Report 2007 with the extent of achievement. The ten main outputs were:

1. Sustainable institutions are established,
2. Planning and decision-making of wetlands conservation agencies enhanced,
3. A national wetlands conservation strategy is developed,
4. Comprehensive training and capacity building programmes,
5. A nation-wide wetlands awareness campaign is designed and implemented,
6. Elements of long-term sustainability of wetlands conservation initiatives are developed and adopted,
7. Wetlands biodiversity is sustain ably conserved in the MCWC by designing and implementing a comprehensive management plan,
8. Wetlands biodiversity is sustain ably conserved in the CIWC by designing and implementing a comprehensive management plan,
9. Wetlands biodiversity is sustain ably conserved in the SRWC by designing and implementing a comprehensive management plan,
10. Wetlands biodiversity is sustain ably conserved in the NAWC by designing and implementing a comprehensive management plan (GoP, 2009).

In four different wetland complexes that were identified through GIS and remote sensing techniques the project team conducted field visits in order to establish the ecological baseline information. To facilitate the surveys and to provide basic awareness regarding wetlands issues and conservation four regional site offices were established in four complexes and major threats to wetland resources were recognized in collaboration with the local people during the surveys. The positive aspect of this project is the involvement of multi-stakeholders i.e., government departments, NGOs and community organizations. Uptil now the initiatives taken by the programme included specie restoration (e.g., breeding of captive cranes, conservation efforts for both freshwater & marine turtles and for Indus dolphin); some relief efforts for severely destructive villages by natural storms (e.g., Keti Bunder and Kawari Area); discovery of coral reef at Astola Island; conducted various workshops, seminars, group discussions for capacity building and awareness raising in different areas of four complexes; education centers and CBOs were established in few areas for community mobilization; and introduction of alternative livelihoods in some areas (GoP, 2009).

4.2 DISCUSSION:

Wetlands are the world's most productive ecosystems and it is realized that in order to conserve the wetland resources the ecosystem approach should be adopted. The maintenance of ecosystem functioning (result in a wide range of values including groundwater recharge and discharge, flood flow alteration, sediment stabilization, water quality, food chain support, wildlife habitat, fisheries and heritage) is the most appropriate way of conservation. So there is a need to develop a comprehensive framework based on this approach throughout the region in order to adopt the wise use principle of Ramsar Convention.

Pakistan is a developing country and as mentioned previously no specific budget is allocated by the government for the conservation and protection of its water resources besides considering that an effectual portion of its economy is based on these resources. Very few projects and plans have been developed or implemented for the conservation

(e.g. Lining of water coarses) and management of water resources. Most of them are sectoral and site specific. The major gap exists in planning, legal and institutional framework for integrated management of river basins, catchments, watersheds and coastal zone. The present legislation lacks the specific provision and guidance for preparing and implementing wetland management plans. The plans, designs and operations of wetland administrative authorities lack scientific vigor not conducive to achieve the objectives. The wetland users, including indigenous and local communities, do not have the right to get information or represent and participate in site management under the existing laws but experimentation on small scale started in this direction as few of the projects has been started by collaboration of Government and international NGOs (Rao, A.L., 2008).

Pakistan Wetlands Programme, which provides the main framework for the management of wetland resources, is on the way but at very slow pace. The period of the project is short and the objectives to be achieved are very comprehensive and wide-ranging. Some of the major tasks to be executed by PWP include surveys and assessments of four complexes, database development (using GIS tool for inventorization), development of wetland policy, capacity building, community and local institutional development, education and awareness, eco-tourism development, biodiversity conservation, sustainable resource development, and development of management plans for four complexes.

The status of its activities has already discussed in previous chapters. The PWP team has taken few initiatives regarding dissemination of knowledge, community mobilization, capacity building, species conservation activities, social welfare and alternative income generating sources. It is evaluated that the scope, range and magnitude of these efforts is limited and site specific. The management plans for all the four complexes are still in developing stage. The political instability and varying weather conditions hold back the survey activities required for the baseline data. The monitoring mechanism to review the management activities although exists in the form of annual reporting but only the annual report 2007 is available. The wetland restoration projects

include few species restoration projects and lack the habitat or ecosystem based conservational projects. There is no provision and plan for the control of invasive species (that causes the major threat to indigenous specie and without addressing this issue it is not possible to conserve the native biodiversity). The surveys conducted by the team to enhance the baseline information also lacking various phases of study (e.g. indicators for specie and habitat monitoring, seasonal water flow and water quality monitoring). According to a resource person, central repository system is adopted to take the equipments required for varying surveys but the basic reason for this approach is the limited availability of these resources for surveys. Only one GIS lab exists whereas for the comprehensive inventorization all the four centers should have a GIS lab. The establishment of CBOs is in the preliminary phase of registration in most of the areas. As far as, measures taken for poverty reduction and introduction of alternatives are concerned among the local communities. Solar geysers and fuel-efficient stoves are introduced in few communities. Few steps are taken for the promotion of ecotourism but due to the political instability in the state the tourists are reluctant to approach. Both the National Wetland Inventory and Draft Wetland Policy are in process.

The major constraints that hinder the conservational efforts and management plans include lack of knowledge and awareness regarding the wetland issues and their ecological, socio-economic values; lack of proficiency and technicalities in concerned sectors and departments; incompatible financial resources; cross sectoral legal and political issues and lack of coordination among different stakeholders etc. All these issues are addressed in Pakistan Wetlands Plan and could be resolved by cooperative efforts of all stakeholders. For long term achievement of its objectives there is a need to enhance both the extent and duration of the PWP.

Broad-based mechanisms and procedures are needed to incorporate an integrated multidisciplinary approach into planning and execution of projects concerning water resource of our country. To implement a programme a three-tier system (i.e., at national, provincial and district level) should be adopted in operation for effective coordination. The Ramsar Convention provides general guidelines as well as specific guidelines for

different projects like river basin management, integrated coastal zone management, natural disaster plans etc. So while developing projects consider the principles provided by Ramsar Convention as equity in participation and decision-making factors, Clarity of process, sustainability as a goal, credibility of science, transparency in implementation, flexibility of management, accountability for decisions. Further, encourage the private sector to take initiatives in cooperation with local communities, which helps to improve the living standard and attain the sustainable utilization of these resources.

4.3 CONCLUSION:

It is concluded that efforts are underway to construct a platform where all the stakeholders willingly participate to conserve the water resources. For successful management planning and implementation a constructive legal, political, institutional, economical and social framework is required that could be developed only by the cooperative efforts of all the concerned stakeholders. Furthermore, there is a need to adopt comprehensive wetland approach, which allows the best available knowledge to integrate into rational solutions.

CHAPTER 5
DISCUSSION

'Wetland' a broadly used term for various types of water bodies and posses varied hydrological entities such as rivers, lakes, swamps, marshes, estuaries, mud flats and mangroves etc. These are of great importance for more than one reason. They recharge ground water systems, act as vast sponges for holding water, serve to be pollution filters, and are habitat for biodiversity. During the 20th century massive urbanization, growing dependence on irrigated agriculture, and higher standards of living stressed the freshwater withdrawal. Under these circumstances, the accessibility of water for meeting multiple requirements of ecosystems as a whole is a major challenge confronting us in the 21st Century. Globally there may not be scarcity of water but it is clear that it is not available at the right places.

It is assessed by the Ramsar Convention that 1.1 billion people in the world do not have access to safe drinking water and 3 million die each year (many of them children) from illness caused by polluted water. Thus, we are confronted with the challenges of ensuring adequate quantity of fresh water, as also of the quality of water (Government of India, 2007).

According to the convention, there are four major goals to be achieved. These are i) the wise use of wetlands, ii) wetlands of international importance, iii) international cooperation, and iv) implementation capacity. In order to assess the achievement of these goals, indicators are developed. While reporting on the implementation of the Ramsar Convention, each country has to respond according to the indicator questions so that the extent of implementation could be assessed.

Pakistan's marine and freshwater resources not only provide numerous ecological services but also facilitating its economy and its human settlement patterns. The most important role played by these water bodies is for the poor indigenous people which

directly dependent upon resources provided by them for their survival and hence are the most vulnerable if these fragile eco-systems undergo deterioration. Therefore, an integrated approach of wetlands is needed to look at each identified wetland in terms of its fundamental linkages with other natural entities, human wants, and its own attributes.

Some of the major threats posing a great destruction to these resources in our region included increased erosion and sedimentation from uncontrolled runoff; reduced inflow of water due to irrigation networks; river diversion and the construction of dams; increased inflow of polluted water; overexploitation, hunting and trapping, introduction of exotic species, habitat degradation and injudicious use of tourism. There is a prior need to address these threats critically and adequately in order to minimize the consequences on the aquatic life, public health, and other uses of water.

Increased erosion and increased sedimentation from uncontrolled runoff is negatively affecting water flow and water quality in water bodies. By reducing the storage capacity degrading the habitat quality, which in turn threatens the aquatic life. . For example, Mangla Dam is facing problem of siltation due to deforestation in the catchment area.

The reduced inflow of water due to irrigation networks, river diversion and the construction of dams further exacerbated the condition. Like the Mahaseer and Indus Dolphin that used to move freely between the Lower Indus Estuary and Attock have been constrained in their movement by the construction of new barrages and dams (GOP, 2005).

As irrigation networks and the construction of new barrages and dams cannot be abolished because our agriculture sector is totally dependent upon irrigation water but here we need more efficient water resource management that could ensure more water for natural ecosystems.

Lakes have become contaminated and depleted mainly by inflow of municipal sewerage, agricultural run-off, and discharge of industrial effluents. Over extraction of water resources for human use and recharge of lakes and rivers with highly contaminated and polluted water leads to less availability vital to maintain freshwater ecosystems. Due to the contaminated water the water borne diseases are on the rise in the whole region. The number and diversity of fish and other aquatic species have declined.

Besides a few sewerage and industrial treatment plants in Pakistan which only treat a small quantity of water, a huge amount of raw sewage and toxic industrial effluent is discharged directly into water bodies. As fisheries play a crucial role in national economy by contributing approximately 9.3% of GDP with rupees 8 billion worth of annual exports. But availability of fresh water in traditional lakes, ponds and water reservoirs is an important issue due to the shortage and contamination of water. It is reported that out of 52 fish species only 10 species remain exist in the Manchar Lake (GOS, 2007). Some of the adversely polluted water bodies included Kharal Lake in Punjab, Kheshki Reservoir in NWFP and coastal waters near Karachi (GoP, 2000).

Very few projects are conducted to assess the water quality of major rivers and streams in Pakistan but there is no continuity in these projects (Rao, 2008). Although there is a well defined national environmental policy and legal framework to control the water pollution but lack of coordination among enforcement agencies and private sector further distressed the condition.

Land reclamation in terms of the expansion of cultivated areas, road construction, tourism and recreation, housing development also contribute to the wetlands degradation. Many wetlands are reclaimed for various purposes, particularly for agricultural use. Since the Soil is rich in nutrients and sufficiently moist, the crop yields are rich. The intertidal area at Clifton beach is one of many areas that have been reclaimed for city expansion (GoP, 2000).

There is a prior need of clear water allocations for ecological and wildlife needs with clear distinction between ownership authority, management authority and resource users. As WAPDA (Water and Power Development Authority) and PID (Provincial Irrigation Departments) are in charge of water management, instead of taking the holistic approach for the water resources they just focused on diversion of water that are based on the agricultural and Hydro Power need of water. This puts the stress on environmental water flows which in turn threatens the biodiversity of Pakistan. It hinders the management of water resources by wildlife department even in the presence of legal framework. Therefore, the lack of cooperation and awareness among the governing bodies leads to the instability of resource use and their management so it should be addressed at prior bases.

Illegal hunting and trading is another dominant factor which affects the number and diversity especially of birds and reptiles. The insufficient guarding encourages the numerous hunters to encroach even in the presence of regulatory provisions and after the designation of protected areas and prohibited zones by the government. It is reported that hunting is particularly high in seasons and areas, which host a large flocks of migratory or wintering birds. Although the complaints in press are made by different agencies and people through media but such practices continued unabated and unchecked due to the lack of enforcement. In NWFP the communities in the Dera Ismail Khan are found to be involved in illegal trading of Ganges softshell turtles for their plastron and chest pellicle used in traditional Chinese medicines (Noureen, 2007).

Another threat to wetland biodiversity is the introduction of exotic species. There is a general belief that Fauji Khagga, a kind of catfish, found in Chashma Barrage is invasive specie. It preyed upon several dozens of fish of all kinds so imposed heavy losses to other fish populations (Irshad *et al.*,2008). Further, it is recorded by the Pakistan Wetlands Programme team that feral cats are becoming havoc for turtles and migratory birds at Astola Island.

The changing rainfall patterns, less flood water, increased tube well pumping on ground water levels and prolonged drought conditions caused massive destruction of riverain forests and drying-up of many fragile lakes. It has been assessed by Andreae (2007) that changes in coastal topography have resulted in relocation of the position of Keti Bundear in the Indus Delta. The sea has intruded more than 60km inside the delta and has changed the ecology of river to marine environment.

There is also a lack of coordination among various sectoral policies. It is a fact that most of the policies as to fisheries, agriculture etc. do not exist any provisions for conservation and management of wetlands while have a great impact on the ecology and economy of wetlands. The draft national policy is in pipeline. So after the establishment and implementation of comprehensive Wetland Policy a positive response could be seen.

As mentioned in previous chapters, there is no specific legislation regarding wetlands but presently they are governed by Wildlife, Environmental and Fisheries legislation. The lack of appropriate legislation and low level of law enforcement further exacerbate the consequence of major threats. There is a need to transform the previous concerned laws according to the requirements and need to take effective regulatory measures in order to ensure the wise use of wetland resources.

Development of a comprehensive Wetland Inventory is one of the basic jobs of Pakistan Wetlands Programme. For this purpose the PWP team conducts surveys and assessments while using remote sensing and GIS tools where needed. It is viewed that in order to develop a vibrant inventory, a comprehensive study including the assessment of ecological, economic and socio-cultural significance of different wetlands in the country is required. So that up-to-date information composed in inventory could be used by the concerned wetland conservation agencies and developmental planners for formulation of management action plans.

As already stated disorganized reports, unsatisfactory information and obsolete data related to wetlands management activities further intensified the situation. National

Council for the Conservation of Wildlife is responsible to present country reports to Ramsar Convention. Almost all the reports submitted to the Bureau are lacking the fundamental supportive information and the department while developing the report has adopted the general approach. Enhancement of knowledge through workshops, seminars, refreshing courses and frequent professional trainings is required to bring the proficiency and expertise among the concerned personnel. This kind of opportunities could be driven by conservation agencies, educational institutes, and other non-governmental organizations in order to share experiences and knowledge, develop expertise and promoting cooperation. Moreover, the major documents such as CEPA action plan, modules for education and training courses, manuals based on wetland management techniques, catalogue of mitigation measures are needed to be developed to improve the wetlands management and conservational activities.

During the process of wetland planning and management, the participation of local communities could not be ignored because of the valuable source of indigenous knowledge. For their dynamic participation, it is important to involve them in the entire process, from design and planning to the implementation stages. The female population in our country, especially in rural areas, is discriminated by an extremely low level of education and participation. While they are directly involved in natural resource utilization. So in order to aware and mobilize the community especially the women possible efforts are needed to educate them especially regarding the sustainable utilization of wetland resources.

While applying an integrated ecosystem approach in plans and projects regarding wetland management, there is a need to establish interdisciplinary teams including hydrologists, water engineers, biologists, physicists, planners, anthropologists, ecologists, legal experts, and agro-foresters. So that the teams could handle a wide range of cross-sectoral issues, such as development of a geographical information system, equitable resource allocation, development of community participation in resource management, establishment and running of authorities to coordinate planning and management (Acreman, 1996).

It is also evaluated that throughout the country, only few university courses contain specific components about water resources and biodiversity; and most of them are fairly narrow in their approach. There is a need to broaden the horizon of these courses and to introduce new courses regarding wetlands conservation and management. This will make certain that the students should be aware of the whole spectrum of wetlands benefit. They will have the holistic and cross-sectoral approach in wetland resource management. Further damage to these ecosystems could be avoided if there would be sufficient and constant flow of knowledge among government departments, development agencies, private sector and indigenous community.

In country like Pakistan, even the highest priority areas cannot be managed effectively because of funding limitations. The government has allocated no specific budget for wetlands management so the whole state of affairs is dependent upon private sector and international organizations. For example, the Pakistan Wetlands Programme is totally dependent upon private sector and international organizations for its funding and the government is only facilitating them.

Therefore, it is a long-term process to deal with the challenges of maintaining the biological diversity, hydrological functions, ecological processes, and sustainable management of the economic resources provided by wetlands. We have to tackle the basic issues like ignorance, insufficient resource management policies, inadequate financial resources, poor technical expertise in different areas, lack of alternatives, inadequate legislation and their enforcement. In short, there is a need to develop more efficient water use systems and effective water resource management plans to fulfill the wants of both society and water ecosystem. These efforts could be in terms of research, educational, training and awareness projects, institutional development and fiscal support for the implementation of sustainable practices

CHAPTER 6

CONCLUSION

Although Pakistan has taken many purposeful initiatives for the conservation and management of wetland resources but there is a huge ground with varying features to be covered in our conservation efforts of wetlands. As the dearth of baseline information, inadequate resources, lack of institutional capacity, unsatisfactory communal participation, cross-sectoral issues and low priority to wetland sector by the government are the main obstructions in implementing the conservation and wise-use principle of Convention. First, we have to manage the concerns like dissemination of conservational and wise use information, establishment and implementation of an appropriate policy, allocation of sufficient financial resources, technical expertise in different areas and compliance of laws. Further more a paradigm shift in conservation ethic is also a strong need of the hour. This shift is necessary and perhaps mandatory due to vary nature of resource being conserved and protected. While setting up the programmes regarding the conservation and wise use of wetlands recognize the ecological and socio-economic values of these ecosystems. The wetlands are a common property resource so make sure the participation of principal stakeholders' in terms of sharing traditional knowledge and promoting those practices which lead to sustainable utilization of these resources among the societies.

RECOMMENDATIONS:

- Revise and transform the existing legislation and policies of relevant sectors according to the needs of wetland conservation.
- Ensure the effectiveness of draft Wetland Policy and its proper implementation.
- Insure the cooperation and support of all stakeholders exclusively the local communities, industry, urban development, municipal administration, mining, agriculture, and law enforcement agencies.
- Isolate the wetlands that needed conservational and management measures to be taken at priority bases. For example, the wetlands have ecologically changed or likely to change due to anthropogenic activities.
- Identify major breeding sites, nesting areas and feeding areas of migratory birds and support and strengthen initiatives taken to protect these from habitat destruction, hunting and other forms of disturbance.
- Although the Ramsar sites are designated as protected areas, sanctuaries, game reserves, national parks etc. but there is a need of designating more wetlands as protected areas.
- In order to promote sustainable management, Planning Commission has to integrate various sectors such as environment, agriculture, water, wildlife and industries in decision-making process.
- A comprehensive training program, which covers both theoretical and practical matters, is to be designed to strengthen the capacity of the key agencies responsible for the protection and sustainable use of wetlands.
- To launch a versatile, professionally designed public awareness campaign of groups concerned in wetlands such as the PWP offices, Other GOs, LGOs and NGOs a joint effort should be initiated.
- Build up regional cooperation for management planning in transboundary wetlands with countries sharing the river basins.

- Initiate projects related to low cost sanitation facilities and indigenous methods of income generating avenues to solve the livelihood issues of communities without pressurizing the wetlands.
- The government should allocate specific budge for the conservation and sustainable management of important wetland areas. Seek international aids and funding for the implementation of wetland conservational projects.
- To secure the catchments/ watershed area for the long term sustainable water.

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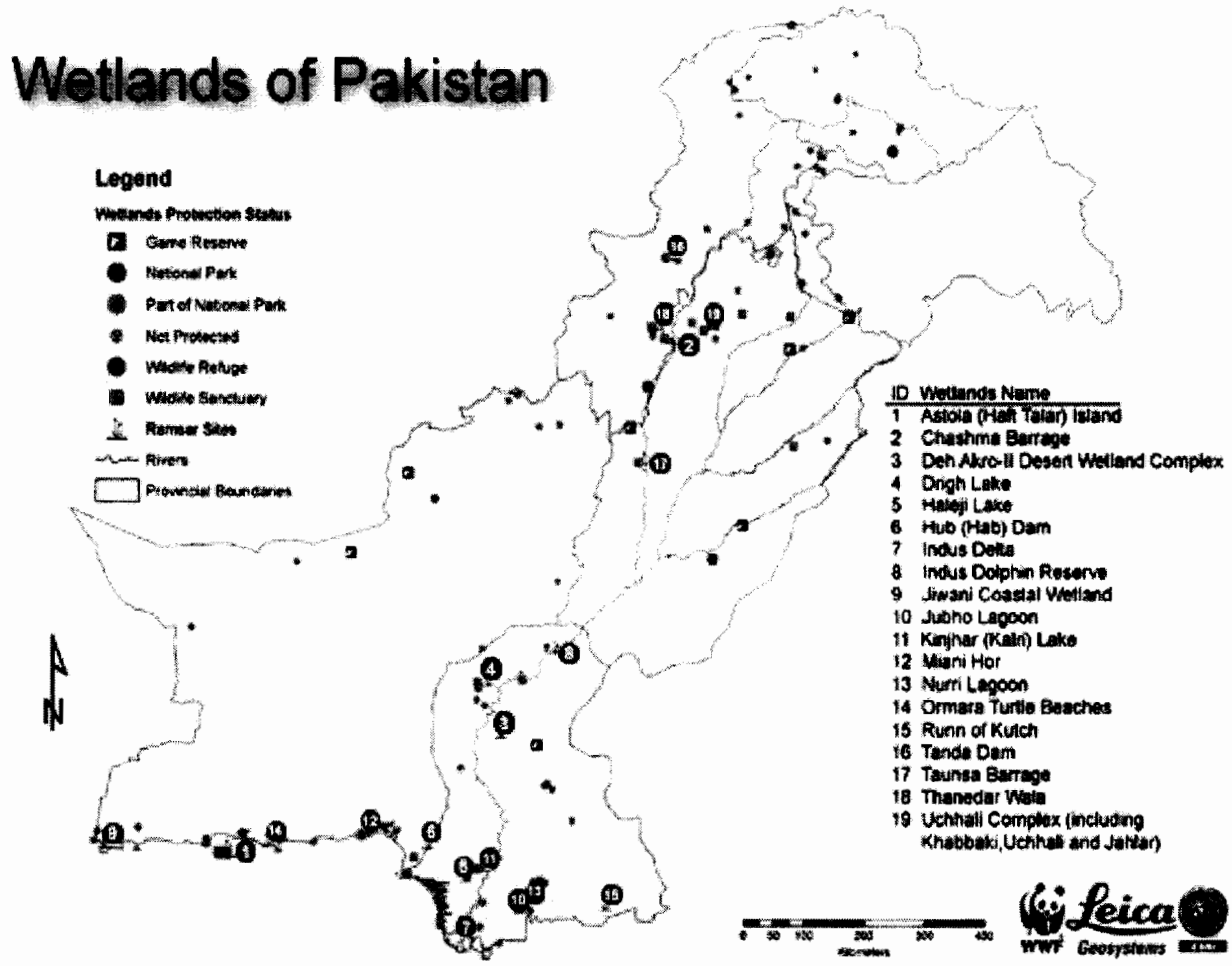
APPENDIX A
The Ramsar sites of Pakistan.



Map Courtesy **Pakistan Wetlands Organization**

Ramsar Sites of Pakistan

The Convention on Wetlands came into force for Pakistan on 23 November 1976. Pakistan presently has 19 sites designated as Wetlands of International Importance, with a surface area of 1,343,627 hectares.

1. Astola (Haft Talar) Island: An uninhabitated island about six km in length, some 25 km south of the desert coast of Balochistan. It is the only significant offshore island along the north coast of the Arabian Sea, and as such maintains the genetic and ecological diversity of the area. The endangered Green turtle (*Chelonia mydas*) and possibly the Hawksbill turtle (*Eretmochelys imbracata*) nest on the beach at the foot of cliffs, and it is a very important area for endemic reptiles such as the viper *Echis carinatus astoli*. The island is said to have an aura of mystery and is venerated by Hindus; there are architectural remains of an ancient temple to the Hindu goddess Kali Devi, as well as a prayer yard constructed for a Muslim saint associated with oceans. Feral cats originally introduced by fishermen to control the endemic rodent population pose an increasing threat to birds' nesting and breeding sites. Ramsar site no. 1063.

2. Chashma Barrage: It has been declared as Wildlife Sanctuary located in Punjab. It is a storage reservoir on the Indus River supporting various aquatic plants. Up to 200,000 waterbirds of numerous species use the site for staging and wintering. Over 50 species of birds, some of which are globally endangered, use the site for breeding. The site is used as storage for irrigation water, electricity generation, livestock grazing, reed harvesting, and fishing. Planned dam construction upstream would affect the water regime, limiting the site's use for water storage. Ramsar site no. 816.

3. Deh Akro-II Desert Wetland Complex. It has the status of notified Wildlife Sanctuary in Sindh. It is complex of four major habitats, desert, wetland, marsh, and agricultural, 330km northeast of Karachi. The site is an example of a natural inland wetland ecosystem comprising 36 lakes and unique desert habitat, which supports a

variety of rare and endangered wildlife species. The complex plays host to a considerable number of fauna that are rare (e.g., Desert cat *Felis libyca*, Darter *Anhinga melanogaster pennant*, Garganey *Anas querquedula,* Black Ibis *Pseudibis papillosa*) and *endangered (e.g., Marsh crocodile crocodylus palustris, Hog deer Axis porcinus, White-eyed pochard* Anthya nyroca), and it supports many indigenous fish species - though commercial fishing is prohibited, subsistence fishing by local people is permitted. Water scarcity during a current long dry spell is considered to be a threat. Ramsar site no. 1283.

4. Drigh Lake: Located in Sindh province and notified as Wildlife Sanctuary. The lake is slightly brackish with extensive reed marshes and rich aquatic vegetation situated in the Indus floodplain. An important breeding and wintering area for a wide variety of waterbirds, regularly supporting over 20,000 birds, mostly Anatidae (ducks, geese, swans, etc.), but including 5,000 roosting Black-crowned Night Heron. The surrounding plains are cultivated for rice production. Ramsar site no. 100.

5. Haleji Lake. The site notified as Wildlife Sanctuary located in Sindh. Its an artificial freshwater lake with fluctuating water levels, fringed by brackish seepage lagoons and supporting abundant aquatic vegetation. It is found to be most important breeding, staging and wintering area for waterbirds in southern Pakistan, supporting between 50,000 and 100,000 birds annually. Thousands of Black-crowned Night Heron roost in the area. Ramsar site no. 101.

6. Hub (Hab) Dam: A large water storage reservoir constructed in 1981 on the Hub River on the arid plains north of Karachi. The reservoir supplies water for irrigation in Lasbella District and domestic and drinking water for the city of Karachi. It is an important staging and wintering area for an appreciable number of waterbirds and contains a variety of fish species which increase in abundance during periods of high water. The Mahseer (*Tor putitora*), an indigenous riverine fish found in the Hub River, grows up to 2m in length and provides for excellent angling. Recent consecutive years of low summer rainfall have reduced the water level. Ramsar site no. 1064.

7. **Indus Delta:** In Sindh declared as wildlife sanctuaries. The fifth largest delta in the world formed under largely arid climatic conditions and characterized by high river discharge. The fan-shaped delta consists of creeks, estuaries, mud, sand, salt flats, mangrove habitat, marshes, sea bays, and straits and rocky shores. Its 129,000 ha. of mangrove, mostly Avicenna marina, comprises 97% of the total mangrove area in the country and is said to be the 6th largest mangrove forest in the world. A large number of species are supported, of birds (including the threatened Dalmatian pelican), of fish and shrimps, and of dolphins (Plumbeous dolphin, Finless porpoise, and Bottlenose dolphin), humpback whale, and reptiles. The area is rich in archaeological and religious heritage. Some 40 settlements in the area, with about one million people, find livelihoods largely from fishing. Ramsar site no. 1284.

8. Indus Dolphin Reserve: River Indus between the Sukkar and Guddu barrages, providing a home for the 500 remaining individuals of the formerly common Indus dolphin *Platanista minor* (or *P. indi*), a blind cetacean endemic to this river. The site is considered essential for the survival of this CITES Appendix I and IUCN Red List species endemic to Pakistan. The area is also home to the historical Sadhu bella Hindu shrine and Satinjo Astan Muslim graveyard. Ramsar site no. 1065.

9. Jiwani Coastal Wetland: Located along Gawater Bay around the delta of the Dasht River, a very significant area of mangrove forests. The site is a particularly important nesting ground for endangered Olive Ridley and Green turtles, especially at four moderately wide and gently sloping sandy beaches in the eastern part of the site. Fishing is the most important human activity. Ramsar site no. 1066.

10. Jubho Lagoon: A large shallow brackish lagoon in Sindh with associated mudflats and marshes, important for wintering waterbirds (particularly Greater and Lesser Flamingos and Dalmatian Pelicans) and for commercial fisheries. The site is privately owned by local inhabitants, who practice fishing and livestock grazing. Ramsar site no. 1067.

11. Kinjhar (Kalri) Lake: The largest freshwater lake in Pakistan found in the province of Sindh and has the status of Wildlife Sanctuary. It supports extensive reedbeds and rich submerged and floating vegetation. Its an internationally important area for breeding, staging and wintering waterbirds, supporting as many as 140,000 birds, including European Wigeon, Black Coot and Common Pochard. The lake is a major source of drinking water for Karachi and supports an important fishery. Ramsar site no. 99.

12. Miani Hor: A large shallow sea bay and estuarine system with several low-lying islands and extensive mangrove swamps and intertidal mud flats, separated from the adjacent Sonmiani Bay in the Arabian Sea by a broad peninsula of sand dunes. The site is the only area of Pakistan's coast where three species of mangroves (*Avicennia marina*, *Rhizophora mucronata*, and *Ceriops tagal*) occur naturally. The Hor receives freshwater input from a number of seasonal streams rising in the hills of eastern Balochistan to the north. The site is important for large concentrations of waterbirds. Smaller fish, shrimp, and crabs are abundant and are both consumed locally and brought to market. Domestic waste disposal and accumulated solid waste debris (plastic bags and bottles, etc.) are growing problems. Ramsar site no. 1068.

13. ***Nurri Lagoon.*** It is a shallow brackish lagoon with barren mudflats on the northern side of Sindh. The site has consistently recorded very large concentrations of migratory waterbirds on a seasonal basis. Salinity and sedimentation are increasing due to the intrustion of the sea in this area. The privately-owned land provides livelihood to about 3,000-4,000 people in surrounding villages, chiefly through fisheries. Invasive species, such as *Typha* and occasionally *Tamarix*, are seen to be hindering the growth and diversity of native flora, and population pressures, including accelerating agricultural and industrial pollution, offer challenges. Ramsar site no. 1069.

14. Ormara Turtle Beaches. A sandy beach of Balochistan extending about 10 km along the shores of the Arabian Sea. The site supports a considerable number of marine turtles, particularly the endangered Olive Ridley and Green turtles and possibly the Hawksbill turtle as well. Because the area falls in the subduction zone of the Indian

Ocean tectonic plate moving northward, clusters of mud volcanos have developed along the shore, where gas-charged water escapes to the surface. The vegetation is composed of salt-tolerant and arid area plants which grow in very harsh, freshwater-scarce conditions. Migratory waterbirds visit the site but not in significant numbers. Subsistence and commercial fishing is the primary economic, social, and cultural activity of the local communities, and drying of fish is an important source of employment. Accumulations of plastic debris along the coast cause significant problems, as does the capture of turtles for export. Ramsar site no. 1070.

15. Runn of Kutch: It has been declared as Wildlife Sanctuary. Part of the great Thar desert and comprising stablized sand dunes, some more than 170m in height, with broad inter-dunal valleys of alluvial soil, integral with the large Rann of Kutch across the frontier with India, which includes permanent saline marshes, coastal brackish lagoons, tidal mudflats, and estuarine habitats. The site supports many locally and globally threatened species, including the Great Indian bustard (*Choriotis nigriceps*), Houbara bustard (*Chlamydotis undulata*), Sarus crane (*Grus antigone*), and hyena (*Hyeana hyaena*) and supports more than 1% of the biogeographical population of flamingos *Phoenicopterus ruber* and *P. minor*. Some 500,000 agro-pastoralists live in 330 villages/hamlets in the site area. Ramsar site no. 1285.

16. Tanda Dam: Wildlife Reserve in NWFP. It's a small water-storage reservoir supporting irrigated agriculture and a small fishery. The site is a wintering area for Anatidae (ducks, geese, swans, etc.) and serves as a staging area for various waterbirds. Bird numbers seldom exceed 500 in mid-winter and 2,000 during migration periods. Ramsar site no. 98.

17. Taunsa Barrage: Found in Punjab and notified as Wildlife Sanctuary. A large reservoir on the Indus River, constructed for irrigation purposes. Vegetation includes riverine forest and numerous species of aquatic plants. Provide a very important wintering area for waterfowl, notably Anatidae (ducks, geese, swans, etc.) which breed in the area. Human activities include commercial fishing, irrigation, reed harvesting,

recreation, and in adjacent areas agriculture, livestock grazing, and forestry. Ramsar site no. 817

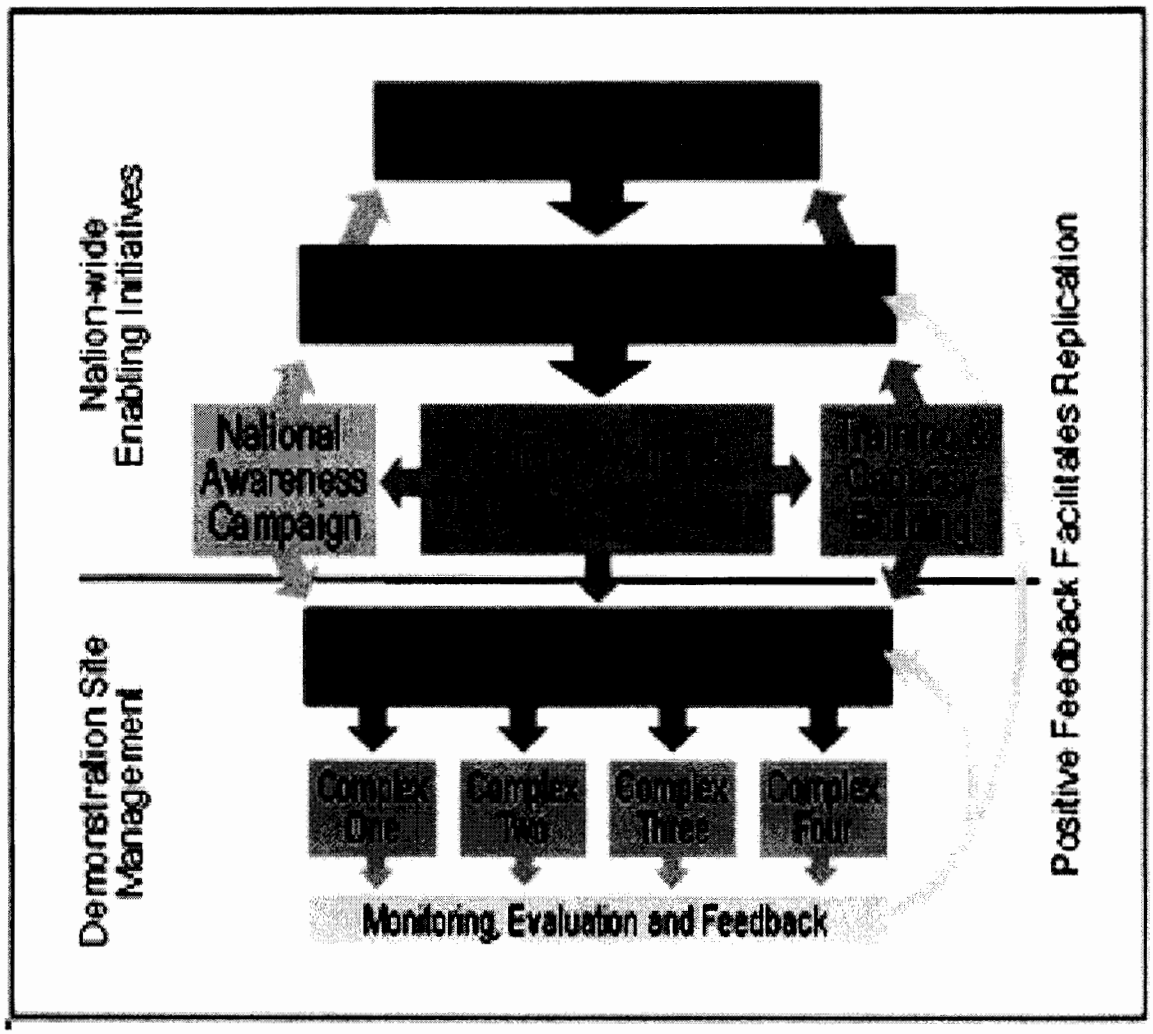
18. Thanedar Wala: Located in NWFP and has a status of Game Reserve. A stretch of the Kurram River and associated floodplain, consisting of braided river channels and seasonally flooded islands. Reeds and sedges occur, along with extensive thickets of *Tamarix*. An important route for migratory birds, the site supports small numbers of various species of breeding and wintering waterbirds. Hunting is the main human activity. Ramsar site no. 97.

19. Uchhali Complex (including Khabbaki, Uchhali and Jahlar Lakes): Found in Punjab and have been declared as Game Reserve, Wildlife Sanctuary. Three separate brackish to saline lakes of fluctuating levels, surrounded by agricultural fields, located in the heart of the Salt Range. These are the important wintering area for the rare or vulnerable White-headed Duck, Ferruginous Duck, Greylag Goose, and flamingos. Villagers depend on the wetland for their domestic water supply. Human activities include fishing, livestock grazing, recreation, and illegal hunting.

The Annotated Ramsar List of Wetlands of International Importance. Available at: www.ramsar.org/profile/profiles_pakistan.htm

APPENDIX B

The relationship between the major components of the Pakistan Wetlands Programme (PWP).



Available at www.pakistanwetlands.org