

Conservation of Wetlands in India: A Profile

(Approach and Guidelines)

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Cover pictures

Back cover




Front cover





Nalsarovar Wetland – one of the identified wetlands under National Wetland Conservation & Management Programme



'India's freshwater resources comprise the single most important class of natural endowments enabling its economy and its human settlement patterns. The fresh water resources comprise the river systems, groundwater and wetlands. Each of these has a unique role, and characteristic linkages to other environmental entities----- Wetlands, natural and manmade, freshwater or brackish, provide numerous ecological services. They provide habitat to aquatic flora and fauna, as well as numerous species of birds, including migratory species'----- A holistic view of Wetlands is necessary which looks at each identified Wetlands in terms of its causal linkages with other natural entities, human needs, and its own attributes.

National Environment Policy, 2006



A. Raja
Minister
Environment & Forests
Government of India

MESSAGE

Water and Wetlands play a critical role for the rural poor as they impinge on their health, livelihood and economic prospects. It is the rural poor who are directly dependent upon natural eco-systems such as Wetlands for their survival, and thus are the most vulnerable when eco-systems undergo degradation. Environmental degradation is a primary cause of poverty and not a consequence of poverty. Rural poverty is often rooted in lack of access to, and control of natural resources. It is, therefore, the duty of the local communities, district level administrations, State Governments, and Central Government to alleviate the suffering of the poor on this account.

2. While globally there may not be dearth of water in the aggregate, it is clear that there is not enough water in the right places. As per the information made available by Ramsar Convention 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 ailments 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.

3. The Wetlands, a term which includes water bodies of different types ranging from lakes, estuarine area, and riparian flood plains to tidal mud-flats, play a vital role in ensuring both the quantity and quality of water for human beings and the entire range of flora and fauna. Wetlands provide fresh water for agriculture, livestock and domestic consumption, and recharge the groundwater levels which are under immense strain of over-exploitation.


4. This publication being brought on the occasion of the World Wetlands Day, brings out the paramount role played by Wetlands in sustaining all life-support systems. The theme of World Wetlands Day for the current year is 'Fish for Tomorrow?' It underlines the food and livelihood needs met by the Wetlands. Fish is the major source of animal protein in the Asian Region. While it is true that over 90% of marine fish catch is dependent on coastal waters for spawning and rearing, the health of marine fish is dependent upon the health of inland Wetlands. It is, therefore, imperative to effect improvements in current practices for management of inland Wetlands to minimize their degradation.

5. I note with appreciation the scale-up in the National Programme on Conservation and Management of Wetlands by my Ministry and am confident that State Governments and Union Territory Administrations will commit themselves to the safeguarding of wetlands for the welfare of people at large.

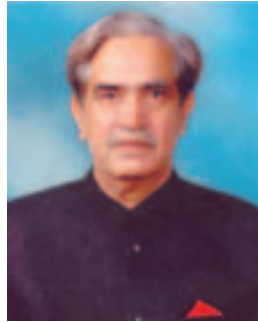
25 January 2007



(A. Raja)

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- A National Wetland Conservation Act should be framed.
 - Inclusion of all types of wetlands (freshwater, coastal, marshes, swamps, mangroves, waterlogged areas) in the landuse classification in the country should be done.
 - A National Wetland Biodiversity Register should be started.
 - An inventory of 'user groups' also should be prepared while collecting information for the biodiversity register. It should also list out the priorities of the communities on particular wetland resources.
 - To establish a National Wetland Inventory and Monitoring Programme and a National Wetland Information System and therefore, to develop a sustained and serious programme for monitoring wetlands.
 - The economic evaluation of wetlands must be computed and it must be integrated with National Resource Accounting.
 - Wetland productivity studies on a long-term basis by identified organizations from different parts of the country need to be undertaken. This would bring out indisputable data on wetland productivity, which is many times more than that of other ecosystems. Moreover, it would be an excellent tool to check the wetland ecosystem health.

Report of the National Forest Commission, 2006



Namo Narain Meena
Minister of State for
Environment & Forests
Government of India

MESSAGE

Wetlands have great significance for more than one reason, most notably because they charge aquifers, conserve moisture, act as pollution filters, and are habitat for biodiversity. In the 20th century while the world's population has trebled, freshwater withdrawal has increased six times, due to massive urbanization, growing dependence on irrigated agriculture, and higher standards of living. In this context, availability of water for meeting multiple requirements of ecosystems as a whole is a major challenge confronting us in the 21st Century. The role of Wetlands, which encompass in their range lakes, estuaries, river flood plains, mangroves, & coral reefs for human well-being can hardly be overemphasized.


2. Wetlands perform numerous vital functions and, thus, need to be looked after and used wisely. They help in water storage and purification, flood control, ground water replenishment, are nurseries for freshwater and marine fish, provide shoreline stabilization and protection against nutrient and sediment retention, harbour and support biological diversity, mitigate effects of climate change and pollution and are resources for recreation and tourism, transport and other services. Wetlands Conservation has to be taken up as a crusade at district, State, national, regional, and global levels for the welfare of present and future generations.

3. I appreciate the good work done by my Ministry for the cause of Wetlands.

4. Let us on this important day resolve that we will do nothing, individually or collectively, that diminishes the value and extent of wetlands, and that we shall proactively nurture, and enrich these precious aquatic resources.

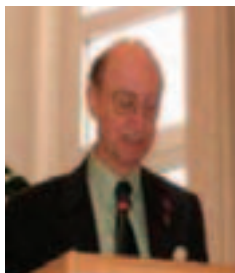
(Namo Narain Meena)

27 January 2007



Wetlands should be conserved by ensuring their **wise use**. Wise use is defined as '*sustainable utilization for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem*' – sustainable utilization is understood as '*human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of the future generations*'. 'Wise use' may also require strict protection.

Ramsar Convention



Peter Bridgewater
Secretary-General
Ramsar Secretariat
Gland, Switzerland

MESSAGE


Today is that special day in the Ramsar Convention calendar, when we celebrate wetlands worldwide! And, by the way, today we are 36 years old – quite young for some of us, but in the world of environmental conventions, we are very old indeed. And perhaps we are wise, too, because one of the three key principles of the Convention deals with wise use of wetlands. This is perhaps the key focus of our Convention for the future, because while Wetlands of International Importance (Ramsar sites) are emblems for each party, without wise use of wetlands everywhere we cannot keep these emblems intact and functioning well.

The theme of this year's day - *Fish for Tomorrow?* - is an important one. Many people would not associate wetlands with fish, believing this food source comes only from the sea... Yet all around the world, whether for food for daily life, food for luxury, or for recreation and food, people are fishing, and their place of fishing is often a wetland, or their fish started life in a wetland.

Our Convention is directly concerned with inland waters and the near-shore coastal areas, but not deeper marine areas. Near-shore coastal areas, however, are the nursery grounds of deeper ocean fish species – as well as most of the coastal species that make up fish catches. So we rightly emphasize that safeguarding the health of coastal ecosystems – such as estuaries, mangroves, sea-grass beds and coral reefs – is critical for the maintenance of both coastal and offshore fishing stocks as well as the many other ecosystem services these wetlands provide.

The near coast zone and freshwater lakes, swamps and rivers are major sources of fish protein for the developing world, and fish also keep ecosystems functioning, as it's not just people who like them as food!! Many of the migratory birds which Ramsar sites seek to protect avidly eat the fish which feed and breed in wetlands. So let's try to celebrate WWD 2007 for the role of wetlands in feeding the birds and us fish, as well as remembering that healthy wetlands overall means healthy people!

Peter Bridgewater



'The dominant theme of this policy is that while conservation of environmental resources is necessary to secure livelihoods and well-being of all, the most secure basis for conservation is to ensure that people dependent on particular resources obtain better livelihoods from the fact of conservation, than from degradation of the resource.'

National Environment Policy, 2006

Preface

'Wetland' is a generic term for water bodies of various types, and includes diverse hydrological entities, namely, lakes, marshes, swamps, estuaries, tidal flats, river flood plains, and mangroves. The finite natural resources of our planet are under tremendous stress due to demographic pressures and economic growth. Fresh water – which holds the life-line for human beings, and for that matter for all living organisms – is a rapidly shrinking resource, and is likely to be the cause of competing claims and resultant conflicts.

2. Recognizing the importance of wetland ecosystems, the National Environment Policy (NEP), 2006, contains an unambiguous assertion of the need for a holistic view of wetlands, which looks at each identified wetland in terms of its causal linkages with other natural entities, human needs, and its own attributes. The NEP's six-fold 'Action Plan' in this direction comprises, among others, formulation of a regulatory framework, linkage with poverty alleviation, and programmes for employment generation.

3. Wetlands are neither ecosystem specific nor confined to particular biodiversity hot-spots. They are ubiquitous and call for concerted action by all States and Union Territories. The Central Government can at best play a catalytic role. The National Programme for Conservation and Management of Wetlands has emerged as a flagship scheme of the conservation sector under which Central assistance is provided as 100% grant. We look upon State Governments to commit budgetary and non-budgetary support, establish multi-disciplinary entities like the Wetland Development Authorities as done in the States of Andhra Pradesh, Karnataka, Orissa and West Bengal for formulation of scientific and comprehensive Management Action Plans (MAPs), and to have an effective interface with researchers.

4. Let us dedicate ourselves to the cause of healthy and dynamic aquatic ecosystems, and sensitize other members of society to the need for their effective conservation and scientific management.

24 January 2007

Prodipto Ghosh
Secretary
Ministry of Environment & Forests



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World Wetlands Day, 2007

February 2 of every year is observed as World Wetlands Day. It marks the date of the signing of the Convention on Wetlands on 2 February 1971, in the Iranian city of Ramsar on the shores of the Caspian Sea. Therefore, this Convention came to be known as the Ramsar Convention (1971). Making an encouraging beginning in the year 1997, each year on 2 February, government agencies, non-governmental organizations, groups of citizens at all levels of the community commemorate this day by *undertaking actions aimed at raising public awareness of wetland values and benefits.*

Ramsar Convention on Wetlands, an intergovernmental treaty with more than 150 member-countries, deals with conservation aspects of inland waters and the near-shore coastal areas.

This year, the theme of World Wetlands Day is 'Fish for Tomorrow?'. In this context, it is notable that among the nine criteria for designation of a wetland as a Ramsar Site, one relates to the category of wetlands supporting a significant proportion of indigenous fish subspecies, species or families that are representative of wetland benefits and contribute to global biological diversity. The other fish-centric criterion relates to a wetland being an important source of food for fishes, spawning ground, nursery and/or migration path on which the fish stocks depend.

The following statistics amply brings out the relevance of the current year's theme for the World Wetlands Day, namely 'Fish for Tomorrow?'

- One billion people rely on fish of various types as they are the source of protein.
- 35 million people are directly engaged in fishing and aquaculture, out of which 95% belongs to developing countries.

As the demand for sea food is increasing, wetlands are being over-fished beyond their sustainable capacity. Therefore, it becomes necessary to enforce effective fisheries management plans that promote sustainable use of this important resource.



Shrimp from Chilika Lagoon, Orissa



Fish yield from Chilika Lagoon, Orissa



Irrawaddy Dolphins – endangered flagship species of Dolphins from Chilika Lagoon, Orissa



Pangong Tso – a transboundary wetland between China and India,
district Leh, Jammu and Kashmir

National Wetland Conservation & Management Programme (NWCMP)

Introduction

Freshwater bodies perform many vital functions including the ones listed below.

- Provide food, fodder, fuel and water for domestic, irrigation, and industrial purposes
- Support fisheries and a number of rare and endangered species of flora and fauna
- Maintain natural biodiversity
- Help in regulating hydrological regimes, flood control, and recharging of aquifers.

Recognizing the importance of protecting such water bodies, the Government of India operationalized a wetland conservation programme in 1985/86 in close collaboration with concerned State Governments. Several steps were taken to arrest further degradation and shrinkage of water bodies due to encroachment, siltation, weed infestation, catchment erosion, surface run-off carrying pesticides and fertilizers from agricultural fields, and discharge of domestic sewage and effluents, which resulted in deterioration of water quality, prolific weed growth, decline in biodiversity and other associated problems. *Figure 1* shows the 94 identified wetlands under National Wetland Conservation & Management Programme.

Wetlands

The wetlands encompass diverse and heterogeneous assemblage of habitats ranging from lakes, estuaries, river flood plains, mangroves, coral reef and other related ecosystems. Abundance of water at least for a part of the year is the single dominant factor.

Ramsar definition

Ramsar is a city in Iran where the first World Convention on Wetlands was held on 2 February 1971. The Ramsar Convention defines wetlands as given below:

‘Wetlands are area of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres.’



Disclaimer: Map is not to scale and does not represent political boundaries

Figure 1
Ninety-four identified wetlands under National Wetland Conservation and Management Programme



Phumdis in Loktak Lake – the largest freshwater lake in northeast region, district Bishanpur, Manipur

This definition talks about the maximum water depth in case of marine areas, for these to qualify as wetlands. However, it does not indicate the same for other aquatic bodies. Therefore, it becomes difficult to classify other aquatic bodies into wetland group.

In order to prepare a status of wetlands in USA, the US Department of Interior Fish and Wildlife Service Authority adopted the following definition of Cowardin in 1979:

‘Wetlands are lands, transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by the shallow water.’

For the purpose of this classification, wetlands must have one or more of the following attributes.

- At least periodically the land supports predominantly hydrophytes.
- The substrate is predominantly undrained hydric soil.
- The substrate is non-soil and is saturated with water or covered by shallow water sometime during the growing season of each year.



Ashtamudi – an estuarine wetland, district Quillon, Kerala



Nainital Lake – an urban lake subjected to anthropogenic pressures, Uttaranchal

This definition emphasizes three key attributes of wetlands: (1) hydrology which is a degree of flooding of soil saturation, (2) wetland vegetation (hydrophytes), and (3) hydric soils. This definition has been broadly followed as it specifies various attributes of wetlands. This definition does not contradict Ramsar's definition but only specifies the parameters to be used for identification.

Broadly speaking, wetlands are shallow water bodies in which water keeps up for most part of the year and recedes below the surface level during the dry season. The biotic community undergoes time changes from aquatic/marshy to mesophytic types. These are complex hydrological and biogeochemical systems and have been recognized as distinctly separate ecosystems between the terrestrial and aquatic ones.

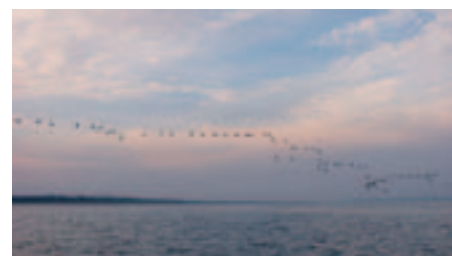
Distribution

Wetlands in India are distributed in different geographical regions ranging from Himalayas to Deccan plateau. The variability in climatic conditions and changing topography is responsible for significant diversity. They are classified into different types based on their origin, vegetation, nutrient status, thermal characteristics, like

- *Glaciatic Wetlands* (e.g., Tsomoriri in Jammu and Kashmir, Chandertal in Himachal Pradesh),
- *Tectonic Wetlands* (e.g., Nilnag in Jammu and Kashmir, Khajjiar in Himachal Pradesh, and Nainital and Bhimtal in Uttaranchal),
- *Oxbow Wetlands* (e.g., Dal Lake, Wular Lake in Jammu and Kashmir and Loktak Lake in Manipur and some of the wetlands in the river plains of Brahmaputra and Indo-Gangetic region. Deepor Beel in Assam, Kabar in Bihar, Surahthal in Uttar Pradesh)
- *Lagoons* (e.g., Chilika in Orissa)
- *Crater Wetlands* (Lonar lake in Maharashtra)
- *Salt water Wetlands* (e.g., Pangong Tso in Jammu and Kashmir and Sambhar in Rajasthan)
- *Urban Wetlands* (e.g., Dal Lake in Jammu and Kashmir, Nainital in Uttaranchal and Bhoj in Madhya Pradesh)
- *Ponds/Tanks, man-made Wetlands* (e.g., Harike in Punjab and Pong Dam in Himachal Pradesh)



Wular Lake – an oxbow lake, district Baramulla, Jammu and Kashmir



Pong Lake – haven for resident and migratory birds, district Nurpur, Himachal Pradesh



Keoladeo National Park – an important waterfowl refuge, district Bharatpur, Rajasthan



Lonar Lake – the only crater lake in India formed by meteoritic impact, district Buldhana, Maharashtra

- *Reservoirs* (e.g., Idukki, Hirakud dam, Bhakra-Nangal dam)
- *Mangroves* (e.g., Bhitarkanika in Orissa)
- *Coral reefs* (e.g., Lakshadweep)
- *Creeks* (Thane Creek in Maharashtra), seagrasses, estuaries, thermal springs are some kinds of wetlands in the country.

Ninety-four wetlands have been identified for conservation and management under the National Programme for Conservation and Management of Wetlands (refer *Annexure D*). These wetlands are eligible for financial assistance on 100% grant basis to the concerned State Governments for undertaking activities like survey and demarcation, weed control, catchment area treatment, desiltation, conservation of biodiversity, pollution abatement, livelihood support, creation of minor infrastructure, educational awareness, capacity building of various stakeholders, and community development. So far 24 States have been covered; the remaining States are expected to be covered in the Eleventh Five-Year Plan. Table 1 shows state-wise distribution of wetlands under National Wetland Conservation Programme.

Table 1

Statewise distribution of wetlands under National Wetland Conservation & Management Programme

State	Number of wetlands	Area (ha)
Andhra Pradesh	1	90100
Assam	2	4504
Bihar	3	11490
Chandigarh	1	148
Gujarat	8	1270875
Himachal Pradesh	5	15736
Haryana	2	288
Jammu and Kashmir	7	117325
Jharkhand	2	98965
Karnataka	7	4250
Kerala	5	213229
Madhya Pradesh	12	359814
Maharashtra	3	40298
Manipur	1	26600
Mizoram	2	285
Orissa	4	122580
Punjab	3	5648
Rajasthan	1	24000
Sikkim	6	164
Tamil Nadu	3	46283
Tripura	1	240
Uttar Pradesh	9	12083
Uttaranchal	1	800
West Bengal	5	553090

Benefits of Wetlands

Wetlands offer several substantive benefits. Unfortunately, they are often not fully understood. Some of the most obvious advantages are listed below.

- Life support systems.
- Winter resorts for a variety of birds for shelter and feeding.
- Suitable habitats for fish and other flora and fauna.
- Effective in flood control, waste water treatment, reducing sediment loads and re-charging of aquifers.
- Valuable for their educational and scientific interest (especially their high diversity or species richness).
- Recreational benefits (swimming, diving, tourism).

Threats

Threats to wetland ecosystems comprise the increasing biotic and abiotic pressures and perils.

Biotic

- Uncontrolled siltation and weed infestation
- Uncontrolled discharge of waste water, industrial effluents, surface run-off, etc. resulting in proliferation of aquatic weeds, which adversely affect the flora and fauna
- Tree felling for fuel wood and wood products causes soil loss affecting rainfall pattern, loss of various aquatic species due to water-level fluctuation
- Habitat destruction leading to loss of fish and decrease in number of migratory birds.

Abiotic

- Encroachment resulting in shrinkage of area.
- Anthropogenic pressures resulting in habitat destruction and loss of biodiversity.
- Uncontrolled dredging resulting in successional changes.
- Hydrological intervention resulting in loss of aquifers.



Weed infestation in Harike Lake, district Ferozepur, Punjab

- Pollution from point and non-point sources resulting in deterioration of water quality.
- Ill-effects of fertilizers and insecticides used in adjoining agricultural fields.

Cardinal Constituents of Comprehensive Strategy for Wetland Conservation

The conservation and management of wetlands calls for a comprehensive strategy, ranging from legal framework and policy support to inventorization, institutional mechanism, capacity building, and community participation. The position with regard to these aspects is as follows:

Legal framework

Though there is no separate provision for specific legal instrument for wetland conservation, the legal framework for conservation and management is provided by the following legal instruments:

- Several legislations have been enacted which have relevance to wetland conservation. These include Forest Act, 1927, Forest (Conservation) Act, 1980, the Wildlife (Protection) Act, 1972, the Air (Prevention and Control of Pollution) Act, 1974, the Water Cess Act, 1977 and the umbrella provision of Environment (Protection) Act, 1986.
- India has set up 505 Wildlife Sanctuaries and 100 National Parks, 14 Biosphere Reserves, 6 Heritage Sites, Projects on Tiger conservation and Elephant conservation and Marine Turtles conservation with the objective of effective conservation of wetlands, and floral and faunal wealth in forest areas.
- Notification declaring the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters, which are influenced by tidal action (in the landward side) up to 500 metres from the high tide line, and the land between the low tide line and the high tide line as the Coastal Regulation Zone Notification, 1991 under the provision of Environment (Protection) Act, 1986. This proposes graded restriction on setting up and expansion of industries, including pressures from human activities.
- Portions of the listed sites have been declared as Wildlife Sanctuaries and National Parks.
- Guidelines for sustainable development and management of brackish water aquaculture have been drawn up. State Governments like Andhra Pradesh and Tamil Nadu have aquaculture guidelines also at the local level.
- The Biodiversity Act, 2002, and the Biodiversity Rules, 2004, are aimed at safeguarding the floral and faunal biodiversity, and regulating their flow from the country to other countries for research and commercial use. Thus, their provisions also contribute towards conserving, maintaining, and augmenting the floral, faunal and avifaunal biodiversity of the country's aquatic bodies.

Policy Support: National Environment Policy (NEP), 2006

Our National Environment Policy (NEP), approved by the Cabinet on 19 May 2006, recognizes the numerous ecological services rendered by wetlands. The NEP states:

‘Wetlands are under threat from drainage and conversion for agriculture and human settlements, besides pollution. This happens because public authorities or individuals having jurisdiction over wetlands derive little revenues from them, while the alternative use may result in windfall financial gains to them. However, in many cases, the economic values of wetlands’ environmental services may significantly exceed the value from alternative use. On the other hand, the reduction in economic value of their environmental services due to pollution, as well as the health costs of the pollution itself, are not taken into account while using them as a waste dump. There also does not yet exist a formal system of wetland regulation outside the international commitments made in respect of Ramsar sites. A holistic view of wetlands is necessary, which looks at each identified wetland in terms of its causal linkages with other natural entities, human needs, and its own attributes.’

The Environmental Policy identifies the following six-fold Action Plan:

- 1 Set up a legally enforceable regulatory mechanism for identified valuable wetlands to prevent their degradation and enhance their conservation. Develop a national inventory of such wetlands.
- 2 Formulate conservation and prudent use strategies for each significant catalogued wetland, with participation of local communities, and other relevant stakeholders.
- 3 Formulate and implement eco-tourism strategies for identified wetlands through multi-stakeholder partnerships involving public agencies, local communities and investors.
- 4 Take explicit account of impacts on wetlands of significant development projects during the environmental appraisal of such projects; in particular, the reduction in economic value of wetland environmental services should be explicitly factored into cost-benefit analysis.
- 5 Consider particular unique wetlands as entities with ‘Incomparable Values’, in developing strategies for their protection.
- 6 Integrate wetland conservation, including conservation of village ponds and tanks, into sectoral development plans for poverty alleviation and livelihood improvement, and the link efforts for conservation and sustainable use of wetlands with the ongoing rural infrastructure development and employment generation programmes. Promote traditional techniques and practices for conserving village ponds.

Inventorization

Survey and inventorization should take into consideration identification of different human activities, effect of both industrial and domestic effluents, and information obtained through remote sensing to be verified with the ground truth data for getting proper results. This component includes mapping of catchment areas through revenue records, survey and assessment, and land-use pattern using GIS techniques, with emphasis on drainage pattern, vegetation cover, siltation cover, encroachment, conversion of wetlands, human settlements, total area encroached, human activities at the primary, secondary, and tertiary levels, and their impact on catchment and water body.

The following surveys of wetlands have been undertaken so far:

- Asian Wetland Directory, 1989 – identified 93 Wetlands of International Importance
- Wetland Directory published in 1990 by the Ministry of Environment and Forests using questionnaire survey
- Identification of 2167 natural freshwater wetlands covering 1.5 million ha area
- Identification of 65,253 man-made freshwater wetlands covering 2.6 million ha area
- WWF-India and the Ministry of Environment and Forests in 1993 identified 54 additional wetlands of international importance with more details.
- Space Application Centre using remote sensing techniques identified 27,403 inland and coastal wetlands covering 7.6 million ha
- Salim Ali Centre for Ornithology under UNDP project has undertaken survey of 72 districts.
- A project on 'National Wetland Information System and Updation of Wetland Inventory' has been sanctioned by the Ministry of Environment and Forests. The objectives of this project are (1) to map and inventorize wetlands on 1:50,000 scale by on-screen interpretation of digital IRS LISS III data of post and pre-monsoon seasons, (2) to prepare State-wise wetland Atlases, and (3) to create a digital database in GIS environment in respect of all wetlands in the country.
- The Centre for Advanced Studies in Marine Biology at Annamalai University, Parangipettai, has been assisted in project mode for updating all wetlands in the country.



Bhriku – a sacred high altitude lake at Rohtang, Himachal Pradesh



Mansar Lake from Jammu – an example of ecotourism and recreation



Institutional mechanism

- (a) It is imperative to have multi-disciplinary, holistic and integrated approach for achieving long-term sustainable wetland conservation and management measures. At present, various models exist in States and different nodal agencies are responsible for implementing the Wetland Conservation Programme. In some States, the programme is executed by the Department of Forests and/or Environment or Urban Development; in some others, it is the Department of Irrigation or Science and Technology or Fisheries.

However, the Wetland Conservation and Management is a specialized technical and scientific field where multi-disciplinary approach is needed, involving a number of components like water management, sustainable fisheries development, hydrological aspects, socio-economic issues, community participation, weed control, biodiversity conservation and use of aquatic macrophytes for nutrient recycling process, hydrological aspects providing information about inflow/outflow pattern in the system, nutrient fluxes and nutritional dynamics.

These aspects need to be dealt with in a coordinated manner by managers having expertise in the relevant fields.

- (b) Taking into consideration the complexity of the issue, the State Steering Committees have been constituted under the chairmanship of Chief Secretaries of the States having members from all Departments concerned. The Committee is also expected to have representatives from communities, NGOs and academicians. The officer from the nodal department acts as a member-secretary of the Committee.

The success of the programme depends upon its strong institutional mechanism where conservation efforts are undertaken through integrated and multi-disciplinary approach. However, due to inadequacy of infrastructure and staff, conservation activities are yet to acquire comprehensiveness and sustainability in some States.

State Governments have been advised to consider constitution of Wetland Conservation Authorities so that experts from various Departments undertake conservation activities in a more scientific, cohesive and sustainable manner.

- (c) Some States have already constituted Authorities for execution of wetland conservation programmes in their respective States. Notable among them are Chilika Development Authority in Orissa (mandated to manage all identified lakes in the State); Loktak Development Authority in Manipur; Shore Area Development Authority in Andhra Pradesh; Lakes and Waterways Development Authority in Jammu and Kashmir; Lake Development Authority in Karnataka and Lake Conservation Authority in Madhya Pradesh.

Capacity building

Capacity building is a major tool without which no conservation activity is possible. We need to have good infrastructure, trained people, and case studies to teach values and functions of wetlands in an integrated and multi-disciplinary manner. The Ministry has taken several initiatives in this regard as per details given below.

- (a) It has published several reports/documents on conservation and wise use of wetlands which include six monographs on Ramsar sites in collaboration with WWF-India and eco-tourism guidelines for Chilika lake.
- (b) During the Tenth Five Year Plan, several training programmes have been conducted in collaboration with different academic organizations/research institutes/State Governments/international NGOs to impart training on various components of wetland conservation which include wise use, catchment area treatment, weed control, hydrological aspects, research methodology, preparation of management action plans and community participation. Training is imparted to policy makers, senior/middle level managers, organizations, stakeholders and others.

A National Training Programme for Integrated Water Resource Management and Wetland Conservation was organized during 7-11 August 2006 by Chilika Development Authority with the financial support from Ministry of Environment and Forests. More training programmes are proposed to be organized at different regions of the country for which following institutions have been identified:

S. No.	Organization	Regions covered
1	Gujarat Ecological Education and Research (GEER) Foundation, Gandhinagar	Western region
2	Environmental Planning and Coordination Organization (EPCO), Bhopal	Central region
3	Wildlife Institute of India, Dehra Dun	Northern region
4	Centre for Water Resources Development and Management (CWRDM), Kozhikode	Southern region
5	Institute of Management and Ecological Designs (IMED), Kolkata	Eastern region



East Kolkata Wetland – a Ramsar site, district 24 Parganas, West Bengal. An example of use of wetlands where usage of city sewage for traditional practices of fisheries and agriculture is practiced

A series of regional workshops were organized in various parts of the country to make people aware of the importance of wetlands and integrate their traditional knowledge in the planning process. The following regional and international workshops were organized during the Tenth Plan:

- 1 Western Region, Gujarat
- 2 Southern Region, Kerala
- 3 Eastern Region, Orissa
- 4 North-Eastern Region, Manipur
- 5 Central Region, Madhya Pradesh
- 6 Northern region, Uttar Pradesh
- 7 Northern region, Jammu and Kashmir
- 8 Southern region, Lakshadweep
- 9 International Workshop on High Altitude Wetlands, Sikkim
- 10 Meeting of Board of Directors of Wetland International, Rajasthan

Holding regional workshops along with research organizations and wetland managers is an ongoing feature.

Community Participation

- (a) No decision-making is complete without participation of local people whose livelihoods depend on wetland resources. People have been using wetlands since time immemorial. We have to blend both traditional and latest scientific technologies to achieve long-term conservation goals. Participatory Rural Appraisal exercise involving local communities should be the main ingredient of community participation. It should also take into consideration issues of women and gender sensitization and involve women in the management process.
- (b) The component of community participation comprises the following constituents.
- Assessment of resource availability by surveys and participatory rural appraisal of the site.
 - Stakeholder analysis
 - Contact with external institutions for resource and technical advice
 - Utilization of wastes and aquatic weeds for energy regeneration, for example through installation of community-based biogas plants.



Participation of women in wetland management at Chilika Lagoon, Orissa

- Additional alternate income generation programmes like handloom, handicrafts, integrated farm management techniques and other measures to reduce pressure on wetlands.
 - Highlighting of gender-related cross-cultural, governance-related practices and other special concerns for assessment by community.
- (c) The Joint Forest Management Committees (JFMCs), also referred to as Village Protection Committees (VPCs) or Eco-Development Committees (EDCs), are expected to play an active role in conservation and management of wetlands located in forest fringe areas, i.e. normally within a radius of 5 km of forest boundary. The JFMC/VPC/EDC shall be instrumental in mobilization of communities and for implementing equitable access to information rights.

Admissible Components for Assistance

The Ministry provides assistance on 100% grant basis for the following components:

- (a) *Survey and Assessment*
- Survey and mapping through revenue records and ground truthing
 - Changes in land use pattern through GIS
 - Survey of human settlements and other human activities in the catchment, including encroachments
- (b) *Catchment Area Treatment*
- Status of conservation activities in erosion-prone areas
 - Activities in terms of vegetative control, gully plugging, stream bank erosion, water harvesting structures, raising of nurseries, propagation of plant material, and tree planting
- (c) *Protection and Monitoring*
- Patrolling and surveillance
 - Setting up of watch-towers and patrolling
 - Socio-economic development through community participation
 - Formation of advisory committees for mid-term reviews
- (d) *Restoration Measures*
- Rehabilitation of Rare, Endangered and Threatened (RET) species
 - Methods employed to maintain biological diversity, both floral and faunal.



Conservation activities with people's participation in catchment area of Loktak Lake, district Bishanpur, Manipur

(e) *Desilting and Dredging*

- Manual and mechanical desilting and dredging
- Compartmentalization of watersheds in the catchment to check desiltation.

(f) *Water Management*

- Inflow-outflow patterns and hydrographic survey
- Studies on infiltration, interception and soil moisture.
- Inflow-outflow assessment of major and minor streams including water balance and flushing rates
- Quantification of siltation rates in the wetlands
- Identification of point and non-point sources of pollution
- Flood mitigation through hydraulic structures
- Developing water quality models
- Treatment of effluents and sewage before their entering the wetland
- Changes due to inter-mixing of water, particularly in areas which remain dry for most part of the year
- Recharging practices
- Water harvesting structures and their use

(g) *Biodiversity Conservation*

- Conservation of sensitive species through in-situ and ex-situ methods
- Identification of RET species, and Endemic and Vulnerable (E and V) species



Acropora – a fragile coral species from Andaman Islands



Olive Ridley Turtles at Gahirmatha beach, Orissa – a spot for mass nesting and breeding

(h) *Sustainable Resource Development*

- Economic valuation of wetlands to determine and allocate resources on equitable basis.
- Assessment of current resource utilization and its impacts
- Enhancement of sustainable wetland resources for communities
- Studies on carrying capacity of wetlands

- (i) *Weed Infestation and its Control*
 - Use of weeds as mineral recycling agents
 - Use of traditional knowledge for better use of weeds to generate revenue, e.g., conversion of weeds into compost
- (j) *Pollution Control*
 - Identification of point and non-point sources of pollution
 - Solid waste management
 - Minimization of the impact of agricultural run-off/insecticides/fungicides in the wetland areas
- (k) *Supplementary/Alternate Livelihoods*
 - Involvement of local people in decision-making on alternate/supplementary livelihoods
 - Amalgamation of traditional wisdom with latest conservation techniques.
 - Encouraging various activities like piggery, animal husbandry, duckery, small cottage industry, mushroom cultivation, tailoring, and carpet weaving to reduce pressure on wetlands for livelihood options
- (l) *Environmental Education and Awareness*
 - Launching various environmental awareness campaigns
 - Organizing various programmes, workshops, folk dances, street theatre for creating environmental awareness
 - Using both formal and non-formal education tools for awareness generation.
 - Creation of environmental awareness through brochures, training programmes, padayatras, and hoardings
 - Developing various publicity materials on wetlands
 - Use of media



Sarus Cranes – an endangered species, Keoladeo National Park, district Bharatpur, Rajasthan



Wetland Research Centre, Chilika – the venue of training for wetland managers in 2006



Interpretation Centre, Chilika, Orissa

(m) *Impact Assessment through Concurrent and Terminal Evaluation*

- Preparation of baseline data for parameters like extent of silt, quantum of biomass, quality of water, groundwater level, change in biodiversity.
- Assessment of quantitative and qualitative changes in wetlands through various conservation activities.
- Evaluation of programmes through independent agencies/consortia of agencies.

Formulation of Management Action Plans

Check List of Formulation of Management Action Plans

The State Governments are encouraged to formulate long-term comprehensive Management Action Plans (MAPs) for a period of 3-5 years, preferably 5 years, coinciding with the Plan period. The State Governments are expected to define objectives taking into consideration factors responsible for degradation of the wetland. The Action Plan should also have short-term objectives to cater to immediate problems confronting wetlands and to go in for immediate rectification measures. The comprehensive MAP should be based on integrated and multi-disciplinary approach. The MAP should cover the following aspects:

- Location, area and altitude, latitude, longitude, depth, ecological features, inflow-outflow pattern, zonation, if any, geological and climatic features
- Baseline data, i.e. pre-project status in terms of various relevant parameters, particularly, soil texture, extent of silt, quantum of biomass, soil moisture content, quality of water, extent of obnoxious weeds, groundwater level and variety and range of biodiversity in terms of flora, fauna including birds and fish
- Land use pattern in the catchment including vegetation, human settlements, agriculture, and major and minor industries
- Sources of qualitative and quantitative inflow of effluents, sewage, pesticides, and other chemicals entering into wetlands
- Flora including distribution of macrophytes, plankton, and benthos
- Fauna including details of major animal groups like birds, fishes, reptiles, mammals. Details regarding invertebrate fauna should also be included
- Population/families directly dependent on wetland resources
- Socio-economic survey of wetlands through questionnaires
- Cultural and indigenous practices of wetland resource utilization
- Jurisdiction of various concerned Departments dealing with wetland conservation
- Existing conservation measures taken
- Interface with Researchers to incorporate relevant Research findings in MAPs
- Involvement of people up to Panchayat level in decision-making
- Wise-use practices of wetland research, if any in existence
- Monitoring mechanism at local and State levels

Monitoring

A three-tier system at National, State, and District levels is in operation for effective co-ordination to implement the programme:

National level

- The National Wetland Committee renders advice on appropriate policies, research and training, identification of wetlands, and review of progress of MAPs.

It has recently been broad-based to include representatives of State Governments and Union Territories Administrations to make it more participatory and to bridge the gap between policy-making and the field-experiences

- Thematic Research Committee has been recently reconstituted on a more rational and scientific basis to approve appropriate user-driven research projects with applied research approach.
- The Expert Group on Wetlands (EGoW) appraises MAPs of identified wetlands received from various State Governments for financial assistance.

State level

- The State Steering Committees have been constituted under the chairmanship of Chief Secretaries/Additional Chief Secretaries /Principal Secretaries of concerned departments. The committees will have members from subject matter Departments/academicians/stakeholders/representative from Central Government to discuss Management Action Plans and review conservation activities undertaken from time to time. The Secretary of the nodal implementing Department is the Member-Secretary of this Committee.

The representatives of other relevant State Departments like Industry, Urban Development, Municipal Administration, Mining, and Agriculture, and State Pollution Control Board are members of State level Committee. The activities of these sectors like obnoxious chemical, industrial effluents, toxic run-off due to chemical inorganic fertilizers, pesticides and weedicides, sewage discharge, solid waste and soil erosion cause pollution to wetlands and as such, sensitization of these stakeholders is essential to secure their support and cooperation.

District level

District level committees have been constituted in some states for involving stakeholders in the decision-making process. However, much more work needs to be done in this regard.

The MAPs are discussed in the State-level Committee, inputs from various members obtained and the Plans approved by the State-level Committee are sent to the Ministry for examination.

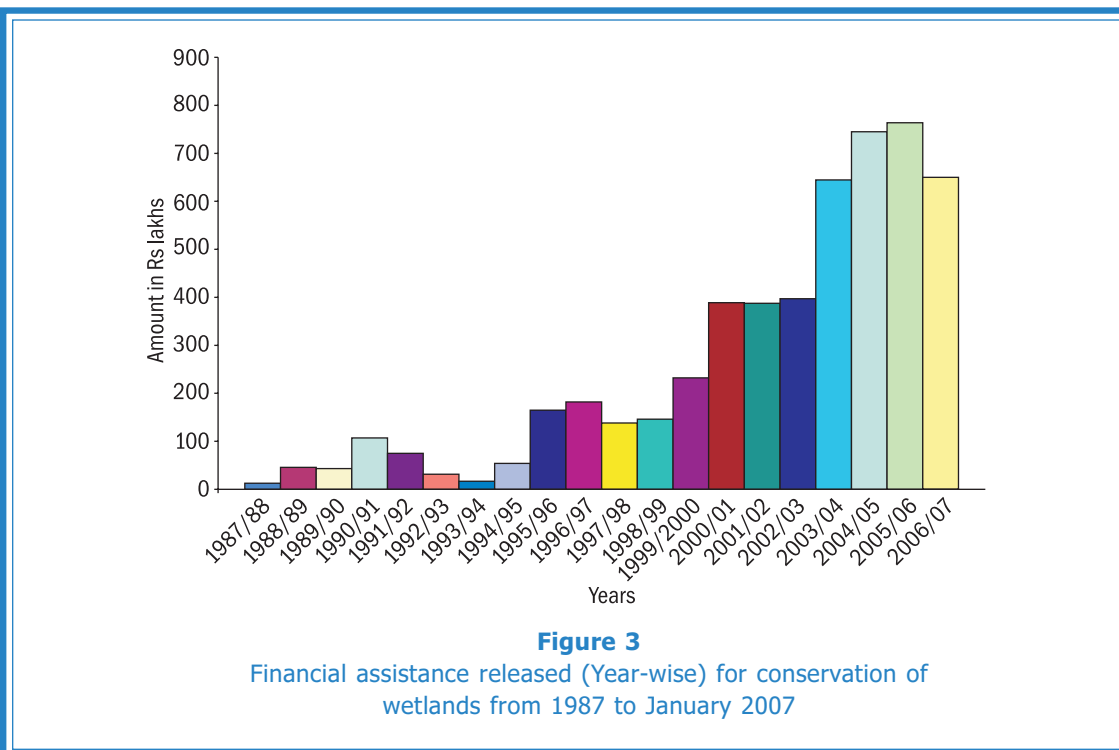
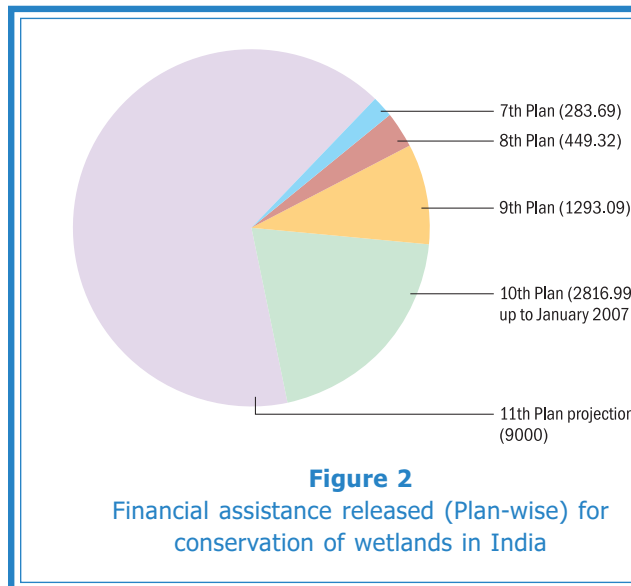
Research Component under National Wetland Conservation & Management Programme

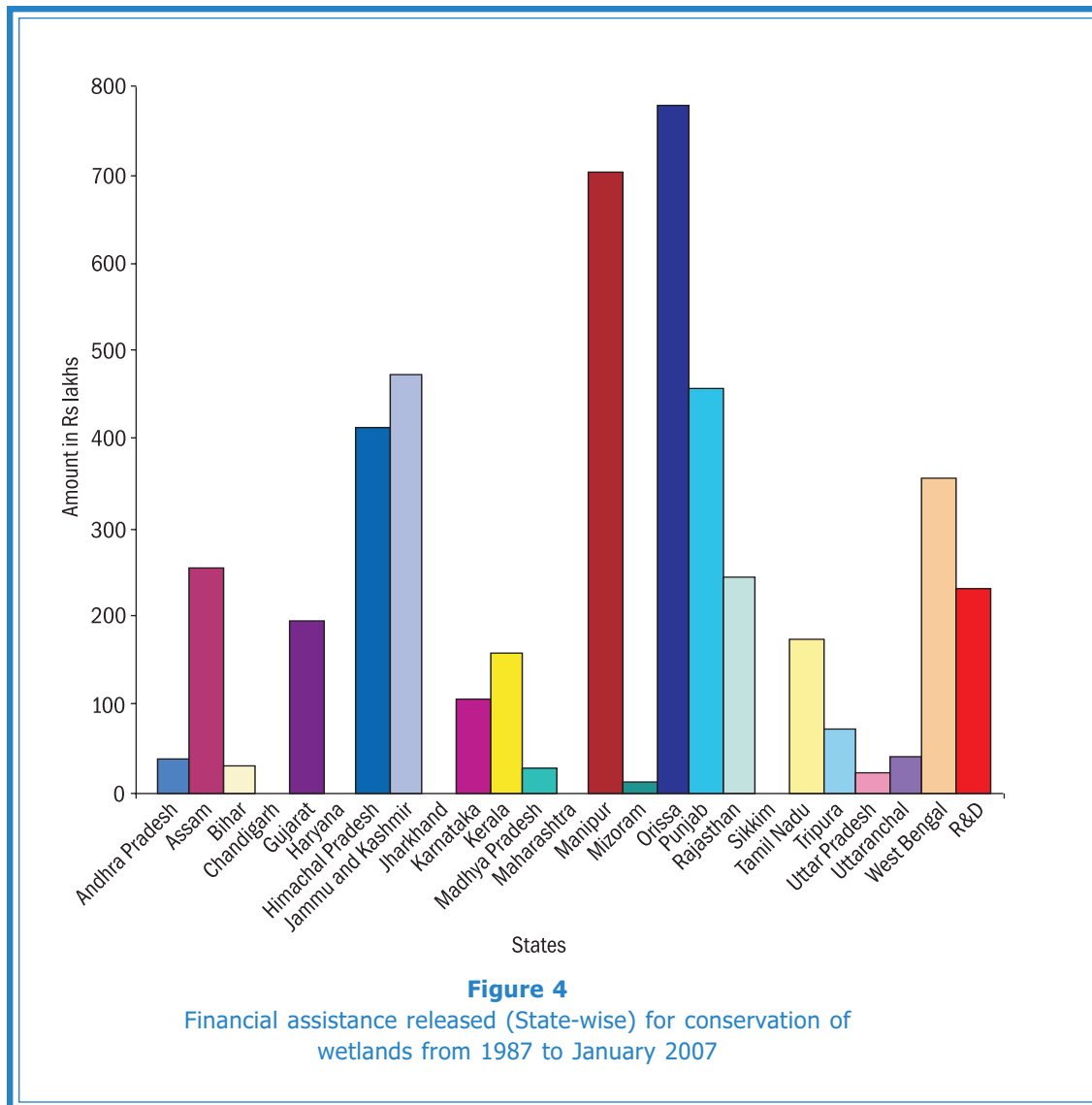
Without effective research inputs, no MAP can be successful. The research should supplement MAP for implementation. These research inputs should help in formulation of MAPs and should be application-oriented.

Research priority areas have been finalized in such a manner so that they help in execution of Management Action Plans and consolidate data thus generated on various parameters for acting as models.

Programme in Successive Years

The National Wetland Conservation & Management Programme has grown from strength to strength. *Figure 2* gives plan-wise expenditure over plan periods. *Figure 3* indicates the trend of year-wise scale up in the Programme. *Figure 4* contains state-wise releases in the last two decades on a cumulative basis.





Recommendations of Working Group on Strategies for Biodiversity Conservation during XI Plan

The Working Group on Biodiversity Conservation, Wildlife and Animal Welfare, constituted by the Planning Commission, formed a Sub-Group on Biodiversity Conservation for recommending Strategy for the Eleventh Plan period for effective conservation of natural terrestrial, aquatic, and marine resources. The Sub-Group comprising eminent experts in the field has made the following observations and recommendations:

Inland aquatic biodiversity of rivers, lakes, reservoirs and wetlands is very rich in India. Inland aquatic systems (excluding paddy fields) cover 5.3% of the country's land area but harbour 15% and 20% of India's floral and faunal diversities, respectively. Many

aquatic plant and animal species are used as protein-rich foods and the aquatic biodiversity also provides ecological services essential for human welfare. Many wetlands are threatened. Although initiatives such as National River Conservation Plan (NRCP), National Lake Conservation Plan (NLCP) and Wetland Conservation have been taken up by the Ministry for the Conservation of rivers, lakes and wetlands, there are gaps in the knowledge relating to hydrological parameters and ecosystem processes and taxonomy of aquatic biodiversity. To fill this gap, the *existing institutions carrying out work on fisheries, aquaculture and aquatic biology need to be strengthened as well as a new Centre/Institute be created for carrying out inland aquatic ecosystem studies*. The implementation of various programmes of the Ministry of Environment and Forests (MoEF) such as NRCP, NLCP and wetland conservation have been constrained by the paucity of funds as well as studies on the aquatic ecosystems....

The Central Inland Fisheries Research Institute of the ICAR had in its early years contributed substantially to these studies but now their programmes are concentrated on fisheries alone. The National Research Center for Coldwater Fisheries focuses primarily on the fisheries of Himalayan water bodies. Various University Departments are engaged in testing water quality studies or examine a few organisms over a very short period. Several developed countries have one or more institutes devoted exclusively to the study of inland water bodies. Often there are specialized Institutes or Divisions, and many field stations, for the study of rivers, lakes and wetlands. These Institutes generally cover all aspects: systematics and biodiversity, water quality, ecology, management, and information systems. In order to support the MoEF's programmes related to rivers, lakes and wetlands, and to meet its obligations under the CBD and Ramsar Conventions in particular, it is highly desirable that the MoEF sets up an *INSTITUTE OF INLAND AQUATIC ECOSYSTEM STUDIES*.'



Tsomoriri – a Ramsar site, district Leh, Jammu and Kashmir

Regulatory Framework for Wetlands

Recognizing the value of Wetlands and taking cognizance of the fact that there does not yet exist a formal system of Wetland Regulation, the National Environment Policy (NEP), 2006 as approved by the Cabinet in May 2006 seeks to set up a legally enforceable regulatory mechanism for identified valuable Wetlands to prevent their degradation and enhance their conservation. It also undertakes to develop an inventory of such Wetlands. In pursuance of the policy resolution a Multi Disciplinary Expert Group has held a series of meetings to formulate a regulatory framework for the Wetlands. The Expert Group has prepared its recommendations on the Categories of Wetlands for Regulation, Process and Procedure for Identification, Composition of Regulatory Authority, Functions of the Authority, and Activities to be Regulated. A draft notification is proposed to be brought out under the provisions of the Environment Protection Act, 1986.





Dal Lake – pride of Kashmir, assisted under NLCP

National Lake Conservation Plan (NLCP)

In 1993, National Lake Conservation Plan (NLCP) was carved out of Wetland Conservation Programme to focus on lakes particularly those located in urban areas which are subjected to anthropogenic pressures. Initially, 10 lakes were identified for conservation and management.

Broad objectives

The objective of the National Lake Conservation Plan (NLCP) scheme is to restore and conserve the polluted and degraded lakes of the country. To begin with, NLCP proposed to cover urban lakes of tourist importance especially those not covered under the wetland program of the Ministry. The scope of work under NLCP has, however, been expanded during the Tenth Plan to include rural water bodies also.

Activities covered under NLCP

The activities covered under NLCP include the following:

- i) Prevention of pollution from point sources by intercepting, diverting and treating the pollution loads entering the lake.
- ii) In situ measures of lake cleaning such as desilting, dewatering, and bioremediation depending on the site conditions.



Hussain Sagar: A man-made lake in Hyderabad, Andhra Pradesh assisted under NLCP

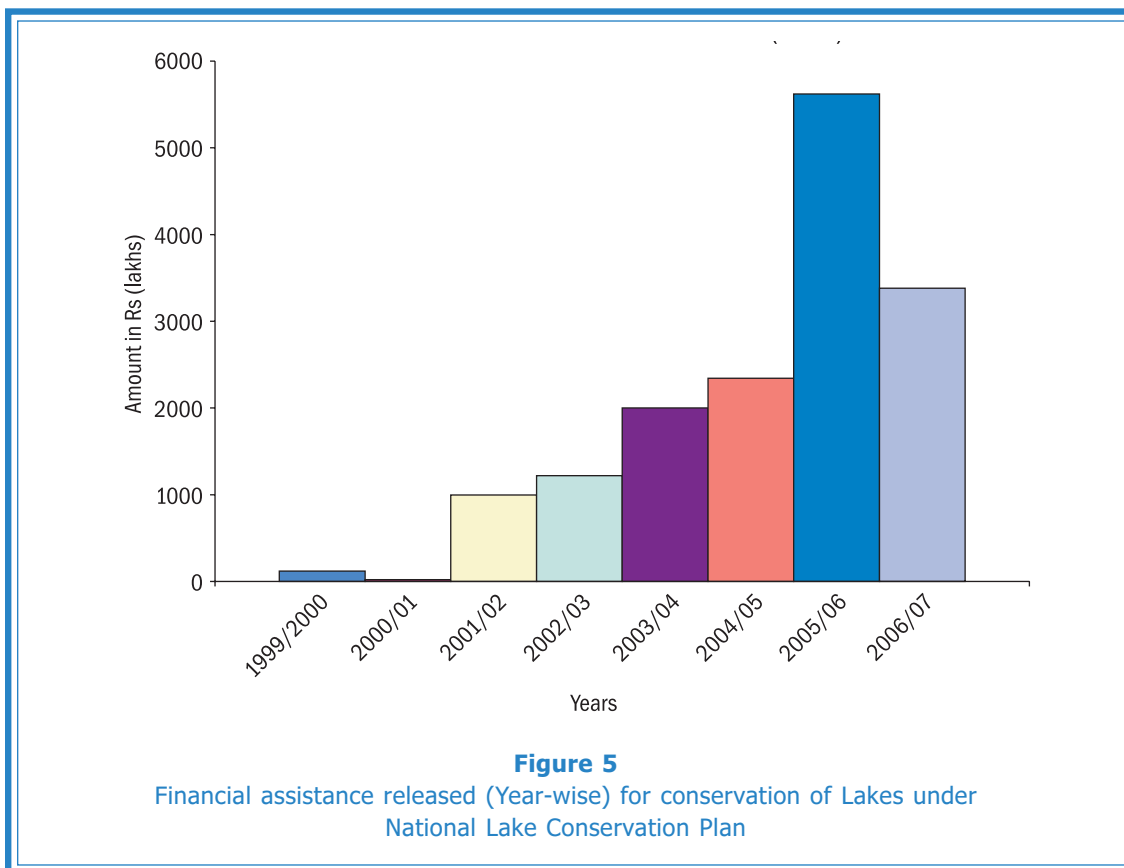
- iii) Catchment area treatment and lake front eco-development which may include bunding, fencing, shoreline development, creation of facilities for public recreation and entertainment.
- iv) Public awareness and public participation.
- v) Other activities depending on location-specific conditions including the interface with human population.

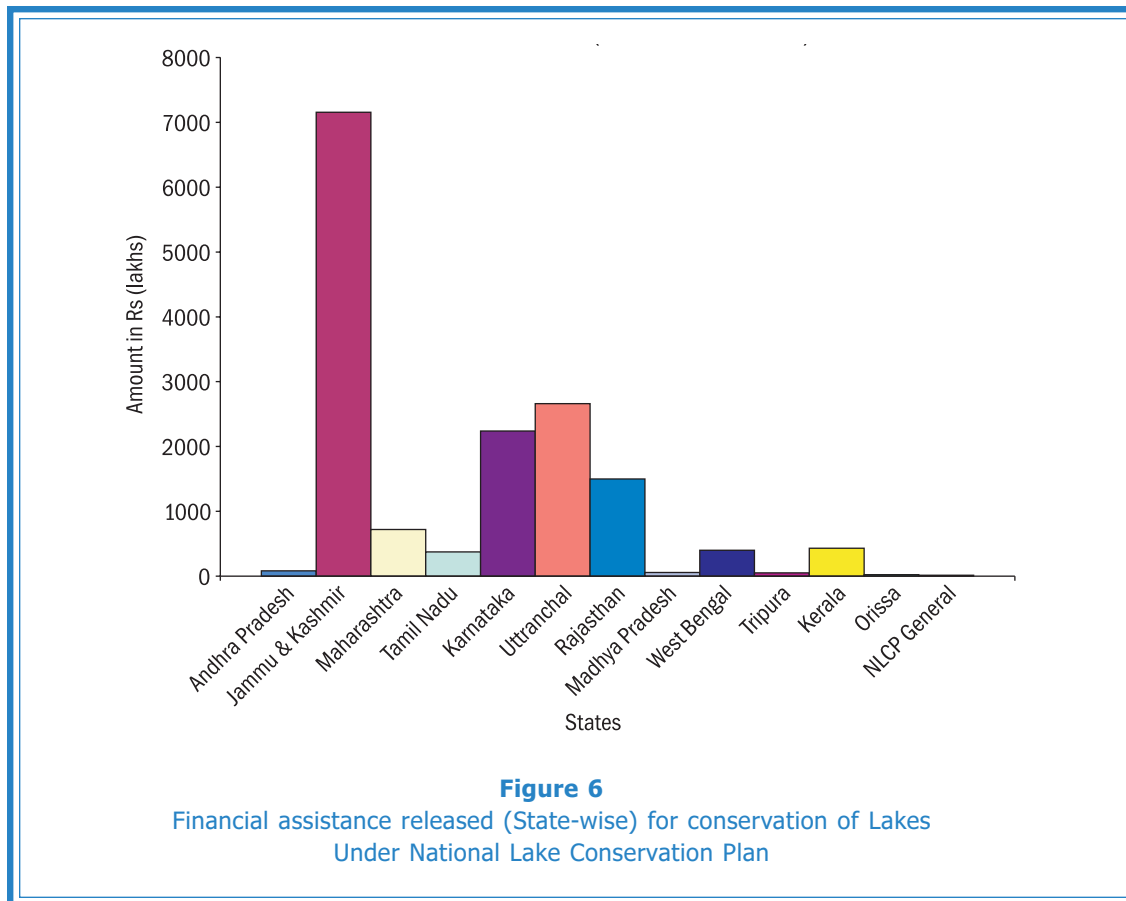


Dal Lake, Srinagar, Jammu and Kashmir

Growth of NLCP

The NLCP has expanded in scale since its genesis in 1999–2000. *Figure 5* illustrates the year-wise scale-up of the plan.





Proposals sanctioned under NLCP

The Ministry has till date approved 27 projects for conservation of 42 lakes in 12 States (refer *Annexure III*). *Figure 6* shows the state-wise financial assistance as approved.

The Ministry, at the instance of the Planning Commission, carried out a study for identification of priority lakes for conservation. This study report prioritized a list of 62 lakes. This list of 62 lakes was sent to all State Governments for their consideration and response. About 15 States have already responded. A substantial number of proposals are being received from the State Governments for restoration of some of their very polluted lakes. A number of such proposals have been examined and are under consideration. At present, the Ministry is taking up new proposals depending upon their pollution status, prioritization and availability of funds under the Plan.

The Ministry has also agreed to hosting the 12th World Lakes Conference at Jaipur (Rajasthan) in October-November, 2007.



CONVENTION ON WETLANDS

(Ramsar, Iran, 1971)

Ramsar Convention

The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are at present 154 Contracting Parties to the Convention, with 1634 wetland sites, totalling 145.73 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. *Figure 7* shows identified Ramsar sites in India.

Figure 8 provides regional distribution of Ramsar sites at global level. *Figure 9* represents state-wise area of Ramsar sites in India.

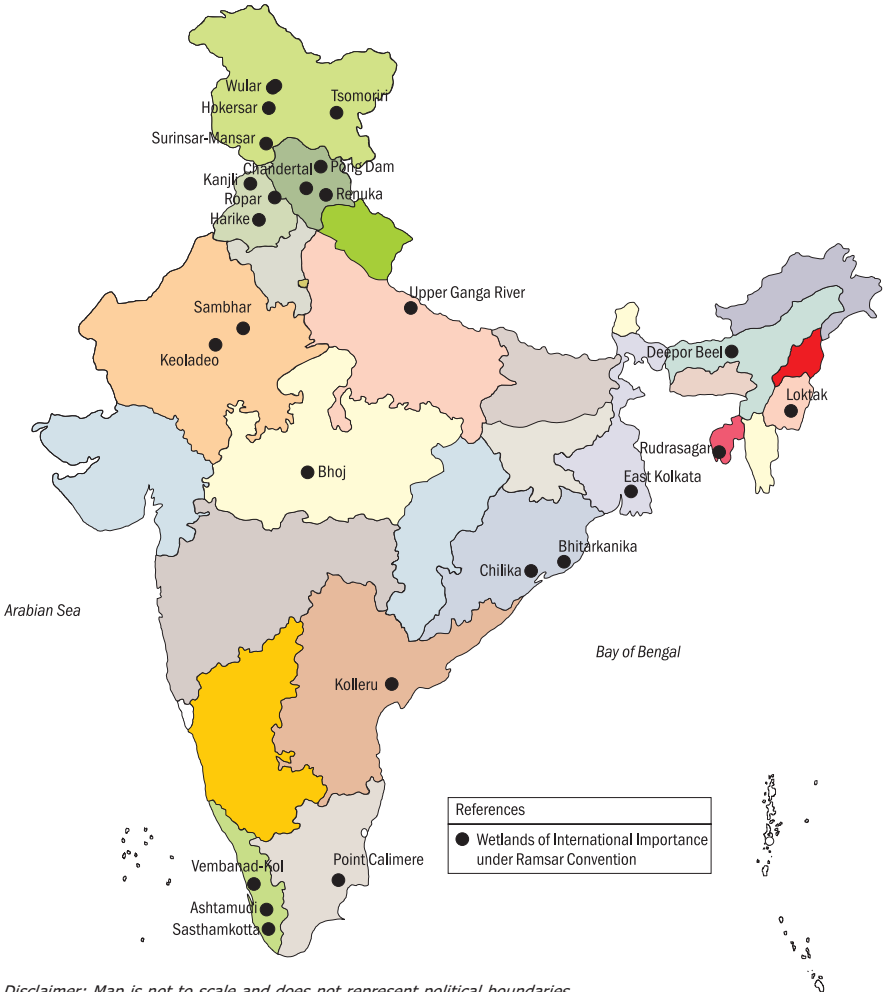
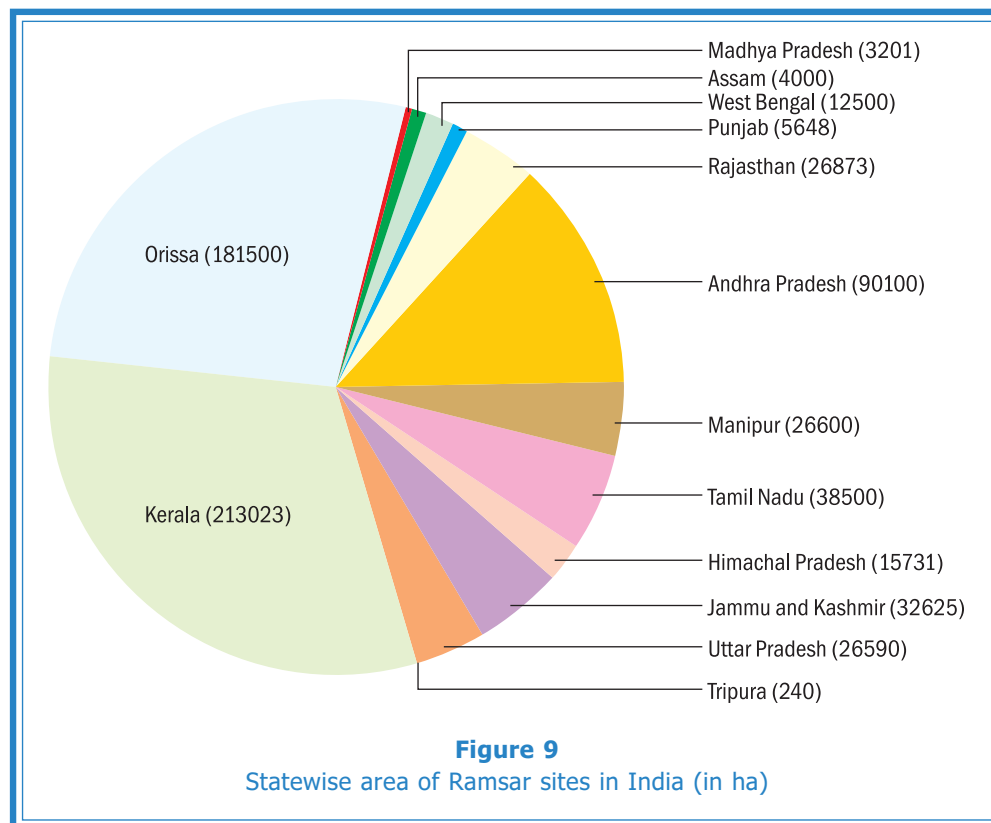
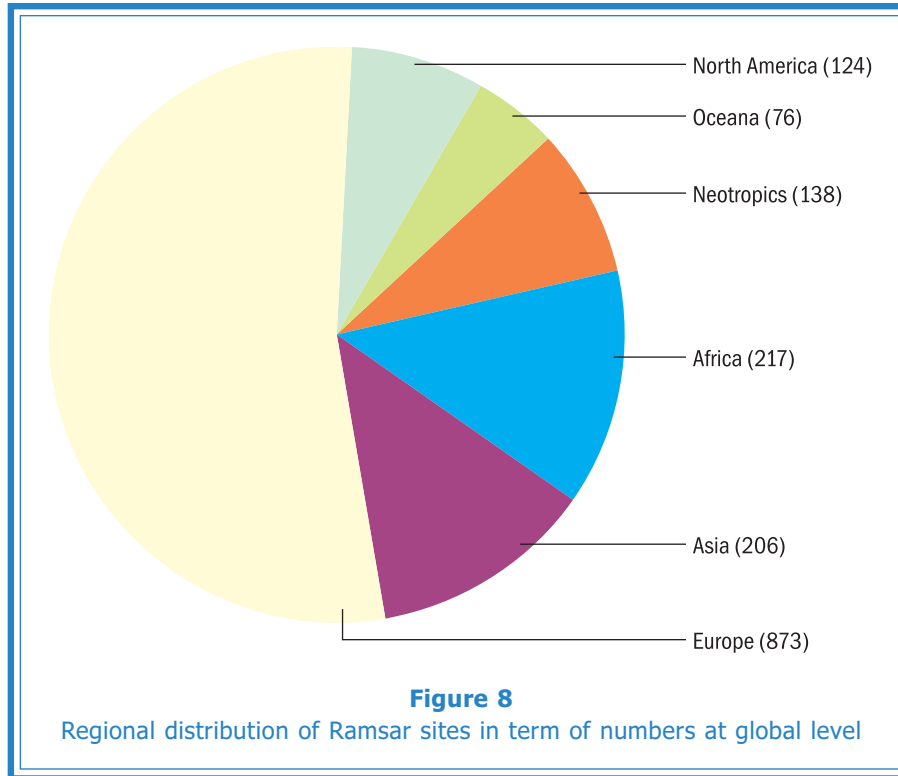


Figure 7
Identified Ramsar sites in India



The Convention has 12 Articles which deal with the various aspects of wetlands, including their definition, criteria for designation of wetlands, wise use of wetlands, establishing nature reserves, research, monitoring, management of wetland species, international cooperation and transboundary wetland issues.

India is a signatory to Ramsar Convention and plays an important role in conservation and wise use of wetlands. On the basis of our country's work in the field of wetland conservation, India had been nominated as a member of standing committee from 1993-1996 and from 1999-2002.

Twenty-five sites from India have been designated as Ramsar sites of International Importance (refer *Annexure II*) and 6 are under process of designation. During the next triennium, it is proposed to include at least ten sites under the list which will include mosaic of habitats such as high altitude wetlands, corals, mangroves, creeks, alpine wetlands in the list from India.

The Mission of the Ramsar Convention

The Convention's mission is 'the conservation and wise use of wetlands by national action and international cooperation as a means to achieving sustainable development throughout the world.'

The Criteria for Identifying Wetlands of International Importance/National Importance

Group A of the Criteria

Sites containing representative, rare or unique wetland types

Criterion 1 A wetland should be considered internationally/nationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Group B of the Criteria

Sites of international importance for conserving biological diversity

Criteria based on species and ecological communities

Criterion 2 A wetland should be considered internationally/nationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.



Pong Dam Lake – declared Ramsar site in 2002, district Nurpur, Himachal Pradesh



Chilika Lagoon – conferred Ramsar award in 2002, district Ganjam, Orissa

Criterion 3 A wetland should be considered internationally/nationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Criterion 4 A wetland should be considered internationally/nationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Specific criteria based on water birds

Criterion 5 A wetland should be considered internationally/nationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6 A wetland should be considered internationally/nationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Specific criteria based on fish

Criterion 7 A wetland should be considered internationally/nationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Criterion 8 A wetland should be considered internationally/ nationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

Specific criteria based on water/life and culture

Criterion 9 A wetland should be considered internationally/nationally important if it is an important source of food and water resource, increased possibilities for recreation and eco-tourism, improved scenic values, educational opportunities, conservation of cultural heritage (historic or religious sites)

Advantages of joining Ramsar Convention

- Elevates the importance of the site at the international level.
- Encourages international cooperation
- Brings access to expert advice and latest information
- Provides an opportunity for learning the best global practices for wise use of wetlands
- Opportunity for getting international guidelines on various wetland conservation themes
- Represents a contribution to global environment protection and maintenance of global biodiversity



India's Response to Ramsar Convention: Some Initiatives

- Twenty-five sites have already been designated as Ramsar sites in India till date.
- Ramsar Conservation Award has been given to Chilika Development Authority in 2002 for ecological intervention of Chilika Lake. This is for the first time that any Asian country has been given such an award.
- India got special recognition at World Park Congress held at Durban during 2003 for maximum number of sites being designated as Ramsar sites in a given year.
- Ministry has published 6 monographs on Ramsar Sites in collaboration with WWF India. Facts Sheets on 19 designated Ramsar sites have also been published.
- Eight regional workshops on Wetlands have been organized in different regions of the country on various aspects related to wetland conservation and management under capacity building exercise.
- India organized Asian Wetland Symposium in February 2005 at Bhubaneshwar, attended by 34 countries from Asian region.
- India organized a capacity building workshop on High altitude wetlands in Himalayas at New Delhi during June, 2006.
- India participated in the meeting of Boards of Directors of Wetland International during November, 2006.
- India has been nominated on the Board of Directors of Wetland International and on request from India, a meeting of the Board of Directors was held at Manesar, Rajasthan during 19–20 October 2005 in which 23 countries participated.



Chandertal – a glacial lake, a Ramsar site assisted under NWCMP, Kunjum, Himachal Pradesh

Role of India at Ramsar Convention

- India was member of:
 - Standing Committee of Ramsar Convention
 - 1993–1996
 - 1999–2002
 - Committee on Communication, Education and Public Awareness (CEPA)
 - 1999–2002

- India chaired a session at CoP 9 (held in Uganda in November 2005) on Himalayan Initiative jointly organized by the Ramsar Secretariat and other countries having high altitude wetlands.
- India co-chaired a session on agriculture and wetlands at CoP 8 held at Valencia, Spain in November 2002.

International Cooperation

Among other instances of International Cooperation in the field of Wetlands are:

- India is party to the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity, the Convention on Migratory Species, the World Heritage Convention and inter-linkages among these Conventions are frequently discussed in the inter-Ministerial and intra-Ministerial meetings to develop comprehensive Action Plans for their implementation.
- Apart from Ramsar Convention, the Memorandum of Understanding has been signed by our country with Iran, Kazakhstan, Pakistan and Russian Federation for conservation of Siberian cranes.
- Project on Conservation of Upper and Lower lake, Bhopal has been supported by OECF, Japan
- Recently Small Grant Fund from Ramsar Convention has approved the proposal entitled 'Integrated Management Planning for Conservation and Wise use of Chilika Lake' submitted by Chilika Development Authority, Bhubaneswar.
- A project on water management involving community participation has been completed for Loktak Lake, Manipur with assistance from the Indo-Canadian Environment Facility (ICEF).
- A UNDP Project on 'Threatened Wetlands of India' involving survey and study of 700 wetlands (of less than 56 hectare size) in 72 districts has been completed.
- Three projects have been posed for assistance from JBIC, Japan viz., Chilika in Orissa, Loktak in Manipur and Vembanad in Kerala.

Montreux Record

Montreux Record is a list of such wetland sites maintained by Ramsar Convention Secretariat where changes in ecological character have occurred or are likely to occur as a result of pollution and other anthropogenic activities. It is maintained as a part of Ramsar database. Inclusion of a wetland within Montreux record does not mean red listing or black listing a wetland site. It highlights the action to be taken for management of these wetlands on priority basis.



12TH WORLD LAKES CONFERENCE



Taal 2007

Theme: 'Conserving Lakes & Wetlands for Future'

'We will be very pleased to host the ILEC's 12th World Lakes Conference in India during 2007. We have chosen the theme, 'Conserving Lakes & Wetlands for Future' for the Conference. It reflects our concerns for lakes & wetlands and our recognition of their value for sustainable development for future generations. It has been named "Taal 2007" as taal is a common Indian word for lakes. We invite scientists, managers, technologists, educators and all those interested in the conservation and management of lakes & wetlands, from all countries to participate in the 12th World Lakes Conference where we can learn from their experiences and share ours with them. Come and enjoy our lakes and an incredible India'

I look forward to welcoming you in India in November 2007.

(A.Raja)
Hon'ble Minister of Environment & Forests

Vision for the Future

The Programme on Conservation of Wetlands is poised for a big leap as the flagship scheme of the Conservation Sector. The ramp-up from 27 Wetlands till December, 2003 to 94 Wetlands till date in the latter half of the Tenth Five-Year Plan has set the tone. The programme will witness further escalation in the five years of the Eleventh Plan and in the years to come. The tremendous potential for securing freshwater and marine aquatic biodiversity, improving moisture regimes, replenishing aquifers and developing eco-tourism sites has remained grossly under-tapped, and demands immediate attention. It is expected that adequate number of significant wetlands will be identified in each of the States and Union Territories and will act as catalytic factors in eliciting the required budgetary and non-budgetary support from State Governments and other stakeholders.

The envisaged expansion of the programme imposes a definite set of obligations on both the Central and State Governments in terms of allocation of financial resources, trained and well-equipped manpower, robust interface between researchers and managers, sound and systematic database, methodical monitoring, conduct of insightful economic valuation studies, and independent and impartial evaluation processes. Confronted with this complex and multi-dimensional task, it is proposed to establish an Institute for Inland Aquatic Ecosystem Studies in the Eleventh Five-Year Plan. It is expected that an increasing number of State Governments will set up the multi-disciplinary Wetlands Conservation and Development Authorities as has been already done by some of the States and has yielded significantly positive results.

The coming years will also see the Central Government discharge the responsibilities cast upon it by the National Environment Policy, 2006 which makes an emphatic assertion about the need to set-up a legally enforceable regulatory mechanism for identified valuable wetlands. Putting in place a well-considered regulatory framework based on consultative process will receive high priority. It is hoped that the combination of promotional and regulatory measures backed by financial and administrative commitment will result in generation of optimal efforts in the direction of conservation of the freshwater and marine aquatic entities of various types which are collectively known as Wetlands.



**Inter-school Poster Competition
organized on 1 February 2007 on the occasion of World Wetlands Day**



1st Prize
Arun Nanda, Class IX
Universal Public School



2nd Prize
Ananyaa Mital, Class IX
The Shri Ram School, Gurgaon



3rd Prize
Aditi Singh, Class IX
Springdales School, Pusa Road

Annexure I

State-wise area of identified Wetlands under National Wetland Conservation & Management Programme (NWCMP)

S. No.	State/UT	Name of Wetland	Area (ha)
1.	Andhra Pradesh	Kolleru	90100
2.	Assam	Deepar Beel Urpada Beel	4504
3.	Bihar	Kabar Barilla Kusheshwar Asthan	11490
4.	Gujarat	Nalsarovar Great Rann of Kachh Thol Bird Sanctuary Khijadiya Bird Sanctuary Little Rann of Kachh Pariej Wadhvana Nanikakrad	1270875
5.	Haryana	Sultanpur Bhindawas	288
6.	Himachal Pradesh	Renuka Pong Dam Chandratal Rewalsar Khajjiar	15736
7.	Jammu and Kashmir	Wular Tsomoriri Tisgul Tso & Chisul Marshes Hokersar Mansar-Surinsar Ranjitsagar Pangong Tso	117325
8.	Jharkhand	Udhwa Tilaiya Dam	98965
9.	Karnataka	Magadhi Gudavi Bird Sanctuary Bonai Hidkal & Ghataprabha Heggeri Ranganthittu K.G. Koppa	4250
10.	Kerala	Ashtamudi Sasthamkotta Kottuli Kadulandi Vembanad Kol	213229

S. No.	State/UT	Name of Wetland	Area (ha)
11.	Madhya Pradesh	Barna Yashwant Sagar Wetland of Ken River National Chambal Sanctuary Ghatigaon Ratapani Denwa Tawa Kanha Tiger Reserve Pench Tiger Reserve Sakhyasagar Dihaila Govindsagar	359814
12.	Maharashtra	Ujni Jayakawadi Nalganga	40298
13.	Manipur	Loktak	26600
14.	Mizoram	Tamdil Palak	285
15.	Orissa	Chilika Kuanria Kanjia Daha	122580
16.	Punjab	Harike Ropar Kanji	5648
17.	Rajasthan	Sambhar	24000
18.	Sikkim	Khechuperi Holy Lake Tamze Tembao Wetland Complex Phendang Wetland Complex Gurudokmar Tsomgo	164
19.	Tamil Nadu	Point Calimere Kaliveli Pallaikarni	46283
20.	Tripura	Rudrasagar	240
21.	Uttar Prdaesh	Nawabganj Sandi Lakh Bahoshi Samaspur Alwara Semarai Lake-Nagaria lake Complex Keetham Lake Shekha Saman Bird Sanctuary & Sasai Nawar Complex	12083
22.	Uttaranchal	Ban Ganga Jhilmil Tal	800
23.	West Bengal	East Kolkata Wetlands Sunderbans Ahiron Beel Rasik Beel Santragahi	553090
24.	UT (Chandigarh)	Sukhna	148
		Total Wetlands (94)	3018795

Annexure II

State-wise list of Wetlands of International Importance in India under Ramsar Convention

S. No.	State/UT	Name of Ramsar Site	Area (ha)	Date of Declaration
1.	Andhra Pradesh	Kolleru Lake	90100	19/08/02
2.	Assam	Deepor Beel	4000	19/08/02
3.	Himachal Pradesh	Pong Dam Lake	15662	19/08/02
		Renuka Wetland	20	8/11/05
		Chandertal Wetland	49	8/11/05
4.	Jammu and Kashmir	Wular Lake	18900	23/3/90
		Tsomoriri	12000	19/8/02
		Hokera Wetland	1375	8/11/05
		Surinsar-Mansar Lakes	350	8/11/05
5.	Kerala	Ashtamudi Wetland	61400	19/08/02
		Sasthamkotta Lake	373	19/8/02
		Vembanad-Kol Wetland	151250	19/8/02
6.	Madhya Pradesh	Bhoj Wetland	3201	19/8/02
7.	Manipur	Loktak Lake	26600	23/3/90
8.	Orissa	Chilika Lake	116500	1/10/81
		Bhitarkanika Mangroves	65000	19/8/02
9.	Punjab	Harike Lake	4100	23/3/90
		Kanjli	183	22/1/02
		Ropar	1365	22/1/02
10.	Rajasthan	Sambhar Lake	24000	23/3/90
		Keoladeo National Park	2873	1/10/83
11.	Tamil Nadu	Point Calimere Wildlife and Bird Sanctuary	38500	19/8/02
12.	Tripura	Rudrasagar Lake	240	8/11/05
13.	Uttar Prdaesh	Uppar Ganga River (Brijghat to Narora Stretch)	26590	8/11/05
14.	West Bengal	East Kolkata Wetlands	12500	19/8/02
Total sites (25)			677131	

Annexure III

State-wise list of Lakes approved under National Lake Conservation Programme (NLCP)

S.No.	State	Lake	Amount (Rs lakhs)
1.	Andhra Pradesh	Banjara	82.10
2.	Jammu and Kashmir	Dal Lake, Srinagar	7154.15
3.	Karnataka	3 lakes of Bangalore namely, Vengaihnkere, Nagavara and Jarganahalli Bellandur lake, Bangalore Kotekere, Belgaum Bhishma, Gadag Lal Bagh, Bangalore Sharanabhasveshwara Akkamahadevi, Haveri Chanapatna, Hasan Kundwad lake, Davengere, Karnataka Kote Tavarekere lake, Chikmagalur	2240.14
4.	Kerala	Veli Akkulum, Thiruvananthapuram	429.80
5.	Madhya Pradesh	Rani Talab, Rewa	58.00
6.	Maharashtra	Powai 9 lakes in Thane Mahalaxmi Lake, Vadagaon Rankala, Kolhapur	719.82
7.	Orissa	Bindusagar, Bhubneshwar	21.31
8.	Rajasthan	Mansagar, Jaipur	1500.00
9.	Tamil Nadu	Ooty Kodaikanal	373.23
10.	Tripura	3 Lakes of Agartala	50.00
11.	Uttaranchal	4 lakes of Nainital District Nainital Lake	2661.17
12.	West Bengal	Rabindra Sarovar, Kolkata Mirik	400.00
Subtotal Lakes (42)			15689.72
13.	NLCP General		13.66
Total			15703.38