



22 MAY 2013  
INTERNATIONAL DAY  
FOR BIOLOGICAL DIVERSITY  
WATER & BIODIVERSITY



# National Biodiversity Authority

(An Autonomous and Statutory Body of the Ministry of Environment and Forests, Government of India)

## Watering Biodiversity, Ecosystem Management



This Report was prepared to commemorate  
International Day for Biological Diversity - 2013 on the  
theme "Water & Biodiversity"



# **Watering Biodiversity, Ecosystem Management**

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ISBN : 978-81-926996-7-7

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Design & Layout  
D. Muthukumaran

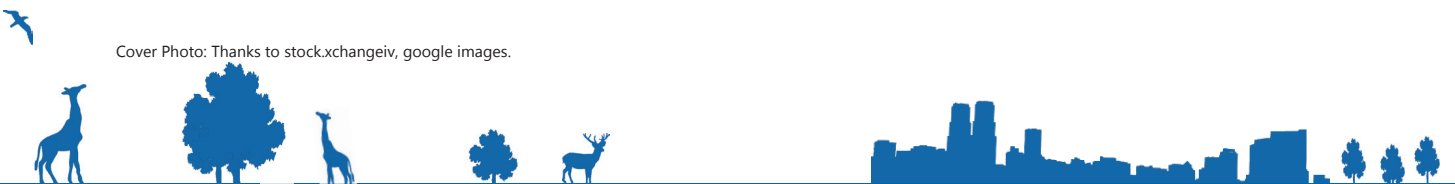
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## Printer

Chellaiya Prints  
8/19, Begum Sahib Street, Royapettah  
Chennai - 600 014

Cover Photo: Thanks to stock.xchangeiv, google images.



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# Watering Biodiversity, Ecosystem Management

Member States to the United Nations adopted a resolution at the United Nations General Assembly in 2010 recognizing safe and clean drinking water and sanitation as a human right which was reconfirmed at the Rio + 20 Summit held in 2012. Yet, according to recent estimates, at least 780 million people lack access to improved sources of drinking water and 2.5 billion people lack improved sanitation<sup>1</sup>. As detailed in the concept paper on Post 2015 Development Agenda on Water (2012), water is essential for fostering both rural and urban livelihoods, growing food, producing energy, encouraging industrial and service sector growth and ensuring integrity of ecosystems and the goods and services they provide.

There are about 35 million km<sup>3</sup> of fresh water on the earth of this 24.4 million km<sup>3</sup> are as glacial ice, perma frost and permanent snow, 10.7 million km<sup>3</sup> as ground water and soil moisture, 0.1 million km<sup>3</sup> on lakes and marshes and 0.002 million km<sup>3</sup> as river<sup>2</sup>.

Sustainable water management is a long standing policy challenge for many countries. According to World Health Organization investing USD 1 in water and sanitation services saves USD 4 in avoided health care alone. With increasing demand for water from cities, industry and energy suppliers there will be limited scope for increasing water for irrigation purposes (Fig. 1). Such a trend of diverting water for non-agricultural purposes already is having a toll in India's agricultural production scenario. This demand of water for non-agricultural purposes is expected to raise up to 55% by 2050 according to a recent OECD study across the world<sup>2</sup> (Fig. 2).

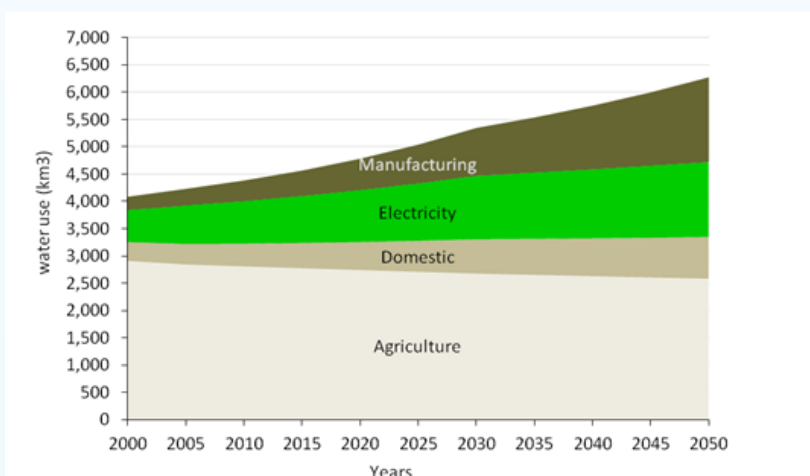


Fig: 1

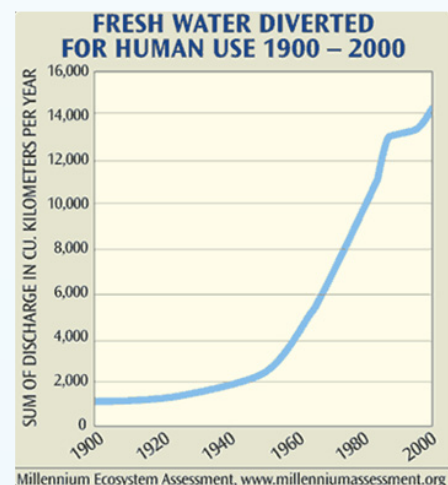


Fig: 2

(Source : OECD Environmental Outlook Baseline)

<sup>1</sup> UNICEF and WHO, Progress on drinking water and sanitation 2012 update, Joint Monitoring Programme, 2012.

<sup>2</sup> OECD work on water, OECD, 2012.

According to the Living Planet Index 2012<sup>3</sup>, the freshwater Living Planet Index declined more than for any other biome. The index includes 2,849 populations of 737 species of fish, birds, reptiles, amphibians and mammals found in temperate and tropical freshwater lakes, rivers and wetlands. Overall, the global freshwater index declined by 37 per cent between 1970 and 2008 (Fig. 3)<sup>4</sup>. The tropical freshwater index declined by a much greater extent, 70 per cent – the largest fall of any of the biome-based indices – while the temperate freshwater index increased by about 35 per cent (Fig. 3a)<sup>5</sup>.

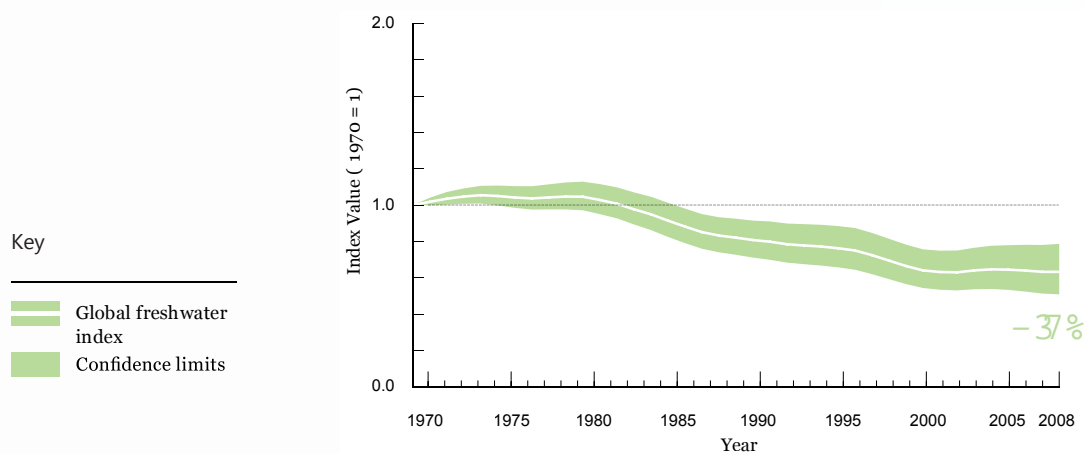


Fig: 3

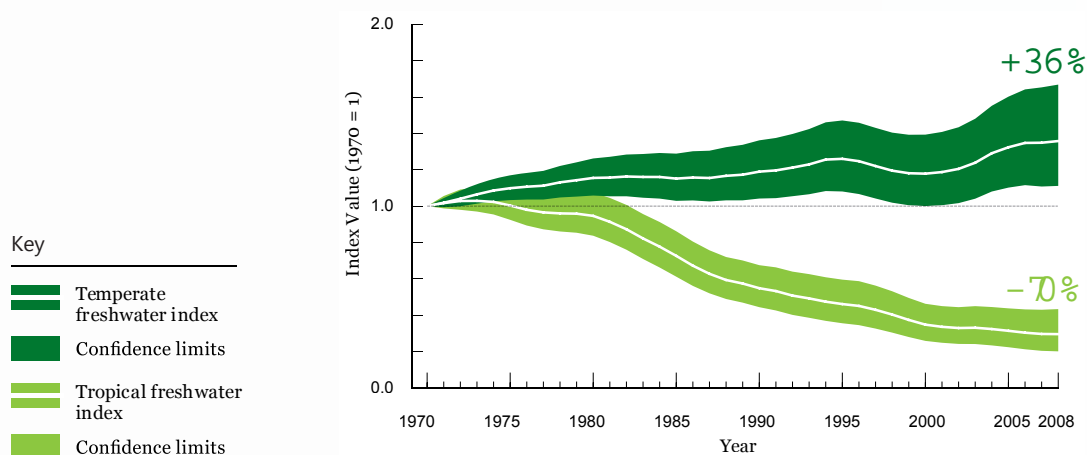


Fig: 3a

<sup>3</sup> Living Planet Index, 2012, WWF, Switzerland, <sup>4</sup> *ibid*, <sup>5</sup> *ibid*,

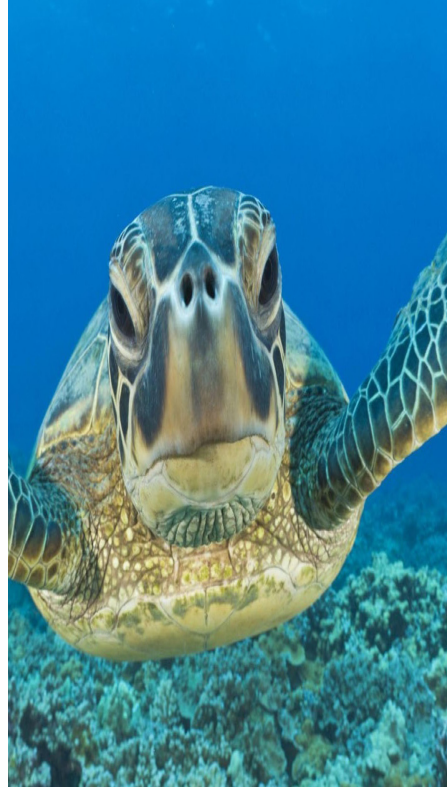






35% fall  
for freshwater  
species

(LPI, 2012)



25% fall  
for marine  
species



24% fall  
for terrestrial  
species

Biodiversity underpins the ability of the environment to supply clean water. The Programme of Work under the Convention on Biological Diversity (CBD) and the Convention on Wetlands (Ramsar Convention) calls for promotion and restoration of biologically diverse ecosystems in a manner that contributes to better access to water and thereby supporting sustainable development.

The key challenges faced by developing countries, including India, is lack of focus on impacts of commercial use of water resources, increasing subsidies for infrastructure that guzzles away precious water at cheap and often no costs, limited attention on securing payments for ecosystem services for services such as water provision and seemingly absent inter-sectoral and inter-ministerial cooperation to create an impact on governing our ecosystems and water resources. The National Water Policy of Government of India is largely silent on water for nature (See Box).



## National Water Policy - India, 2012

The Policy seeks to address issues such as the scarcity of water, inequities in its distribution and the lack of a unified perspective in planning, management and use of water resources. Under the Constitution, states have the authority to frame suitable policies, laws, and regulations on water (Item 17 in List II of the Seventh Schedule or the State List). The National Water Policy (NWP) proposes an overarching national legal framework of general principles on water that can be used by states to draft their own legislation on water governance.

The current scenario of water resources and their management have given rise to several concerns, some of which are:

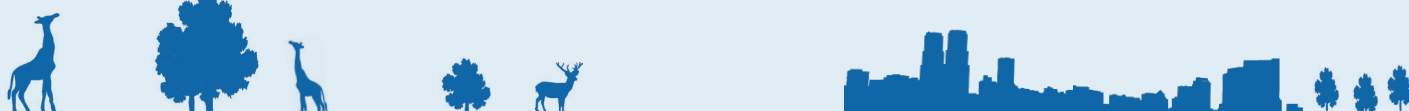
- Increasing variation in availability of water caused by incidences of water related disasters such as floods and increased erosion.
- Poor access to safe drinking water and water for sanitation and hygiene continues to be a problem.
- Groundwater, though a community resource, continues to be perceived as individual property.
- It is exploited inequitably and without any consideration for its sustainability.
- Grossly inadequate maintenance of existing irrigation infrastructure results in wastage and under-utilization of available resources. There is a widening gap between irrigation potential created and utilized.

Some of the basic principles that govern the NWP are as follows:

- The principle of equity and social justice must inform the use and allocation of water.
- A common integrated perspective should govern the planning and management of water resources. Such a perspective would consider local, regional and national contexts and have an environmentally sound basis.
- Water needs to be managed as a common pool community resource that is held by the state under the public trust doctrine to ensure equitable and sustainable development for all.
- Water may be treated as an economic good to promote its conservation and efficient use after basic needs such as those of drinking water and sanitation are met.
- The river basin should be considered as the basic hydrological unit for the purpose of this policy.

The NWP makes recommendations on several issues such as adapting the availability of water to climate change, water pricing, and conservation of river corridors, water bodies and infrastructure.

( Source : PRS Legislative Research, 2012)



As described in the Good Practice Guide to Drinking Water, Biodiversity and Development (2010)<sup>6</sup>, water is unique amongst our natural resources because whilst it is renewable, it is not replaceable. There is no direct substitute for water.

Lack of suitable water supplies not only diminish our abilities to manage our ecosystems but also raise a range of other socio-economic problems at various levels ranging from inability for women and children to focus on education, sanitation and health care, local pollution and human development.

Forests directly influence hydrological cycles by impacting rates of transpiration and evaporation and by influencing how water is routed and stored in a watershed. The soils absorb the water besides storing and filtering them. Wetland biodiversity including the micro-organisms remove high levels of nutrients such as phosphorous and nitrogen preventing them from reaching drinking water. Wetland plants also remove toxic substances, such as heavy metals, from water, accumulating them in their tissues at 100,000 times the concentration in the surrounding water<sup>7</sup>.

## Six Challenges for Water Management

1. Increasing competition for available water
2. Lack of treatment facilities for polluted water from industrial and house-hold usage
3. Lack of policy tools that integrate issues of biodiversity conservation and ecosystem management with protection and management of watersheds
4. Absence of focused dialogue on payment for ecosystem services as an option to secure future water management options and pay for the services by non-core sectors such as industry and private sector
5. Limited emphasis on prioritizing for 'Water for Nature', and
6. Limitations to inter-sectoral and inter-ministerial planning at National and State levels.

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<sup>6</sup>CBD Secretariat and Ramsar Secretariat, Good Practice Guide: Biodiversity, Water and Development, 2010.

<sup>7</sup>ibid



# The Options

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Studies and review of policy options provide us with two options to deal with challenges for managing water for nature and people<sup>8</sup>. These are:

**“Technological Fixes”** - such as water desalinization or water treatment facilities which are expensive and unsustainable for poorer regions of the World

**“Ecosystem Restoration”** – that involves restoring biodiversity that supports drinking water provisions. Not only this option inexpensive but is also sustainable and effective.

In addition to the above, Integrated Water Resources Management (IWRM) approaches have also been used and reviewed across the World to deal with challenges in water management.

## Principles of Integrated Water Resources Management (IWRM)

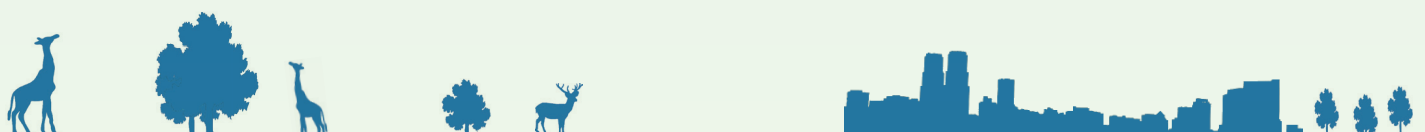
Based on the idea that sustainable development must address three fundamental issues, viz., environmental integrity, economic development and social justice, four principles of IWRM were agreed at the International Conference on Water and Environment in 1992. These are:

- Fresh water is a finite and vulnerable resource, essential to sustain life, development and, the environment;
- Water development and management should be based on participatory approaches involving users, planners and policy makers at all levels;
- Women play a central part in the provision, management and safeguarding of water; and
- Water has an economic value in all its competing uses and should be recognized as an economic good.

(Source : CBD, 2010)



<sup>8</sup>ibid



### **Ecosystem Approach**

The ecosystem approach developed under the Convention on Biological Diversity (CBD) is defined as 'A strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way'.

Ecosystem Approach emphasizes the need for adaptive management and enhanced benefit sharing and is an integral part of most of success stories on sustainable water management around the World.

( Source: CBD, 2000)

## **Managing Ideas and Finances to Manage Water**

Experience across the world indicates that sustainable water management and related biodiversity and ecosystem well-being fails because of lack of timely and adequate interventions and finances. For example, in Europe, lack of finance has delayed the implementation of the EU Water Framework Directive in a number of countries. The achievement of Millennium Development Goals (MDGs) in many countries is yet to be achieved for Goal 7 on environmental sustainability due to limitations of funding.

According to an OECD study<sup>9</sup>, financing water resource management relies on four principles, the polluter pays principle, the beneficiary pays principle, equity and coherence. It is to be mentioned, however, that the first two of the Principles form the cornerstone of policy making in many countries but not the latter two. For the purpose of discussion on linking sustainable management of water for conservation and protection of biodiversity and ecosystem goods and services, all the four Principles are to be addressed with equal weightage and policy making should focus more on the latter two elements since these can be achieved using simple policy prescriptions and adjusting governance models existing in many countries.

<sup>9</sup>OECD Studies on water – A framework for financing water resources management. OECD, 2012.



## India: Sustainable Land, Water and Biodiversity Conservation and Management for Improved Livelihoods in Uttarakhand Watershed Sector Project

The Sustainable Land, Water and Biodiversity Conservation, and Management for Improved Livelihoods in Uttarakhand Watershed Sector Project for India aims to improve the productive potential of natural resources and increase incomes of rural inhabitants in selected watersheds through socially inclusive, institutionally and environmentally sustainable approaches. The additional financing aims at scaling-up and mainstreaming the outcome of the activities under the Uttarakhand Decentralized Watershed Management Project (UDWDP) and enhancing their sustainability by restoring and sustaining ecosystem functions and biodiversity while simultaneously enhancing income and livelihood functions. The project encompasses three themes: (i) community participation in watershed development and management aimed at integrating land-water use with the objectives of moisture retention and biomass production, while simultaneously enhancing incomes and livelihood options; (ii) strengthening administrative capacity of Gram Panchayats to manage project financial resources, implement sub-projects, deliver legally mandated service, and to sustain those services beyond the duration of the project; and (iii) ensuring equitable participation by all groups, especially the landless and women who rely disproportionately on common resources for fodder, fuel, and other forest products.

(Source : World Bank, 2012)

### Examples of Payment for Ecosystem Services financing schemes

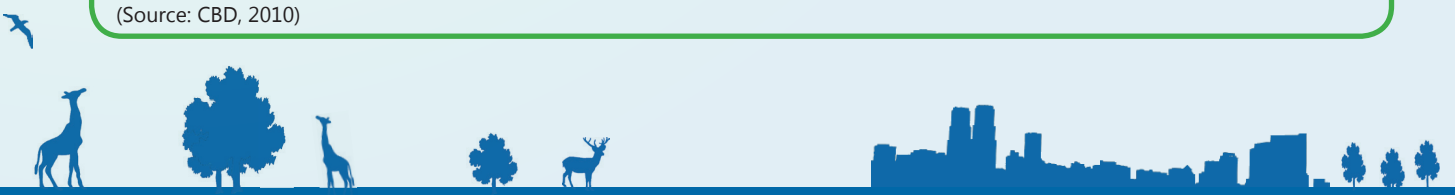
**Direct Public Payments** – the government body makes payments (from general revenues or user fees) directly to providers of ecosystem services;

**Direct Private Payments** – organizations or businesses 'buy' ecosystem services directly from those who provide it;

**Cap-and-Trade-Schemes** – a government body sets a limit (cap) on the amount of ecosystem services to be used through a permit in a given area. Users need to adhere to these and undertake activities to offset any damages. Credits reflecting the offsets can be traded to acquire a market price; and

**Eco-certification Programmes** – consumers opt to pay premium price for products produced in an ecologically friendly way through a certification programme/scheme.

(Source: CBD, 2010)



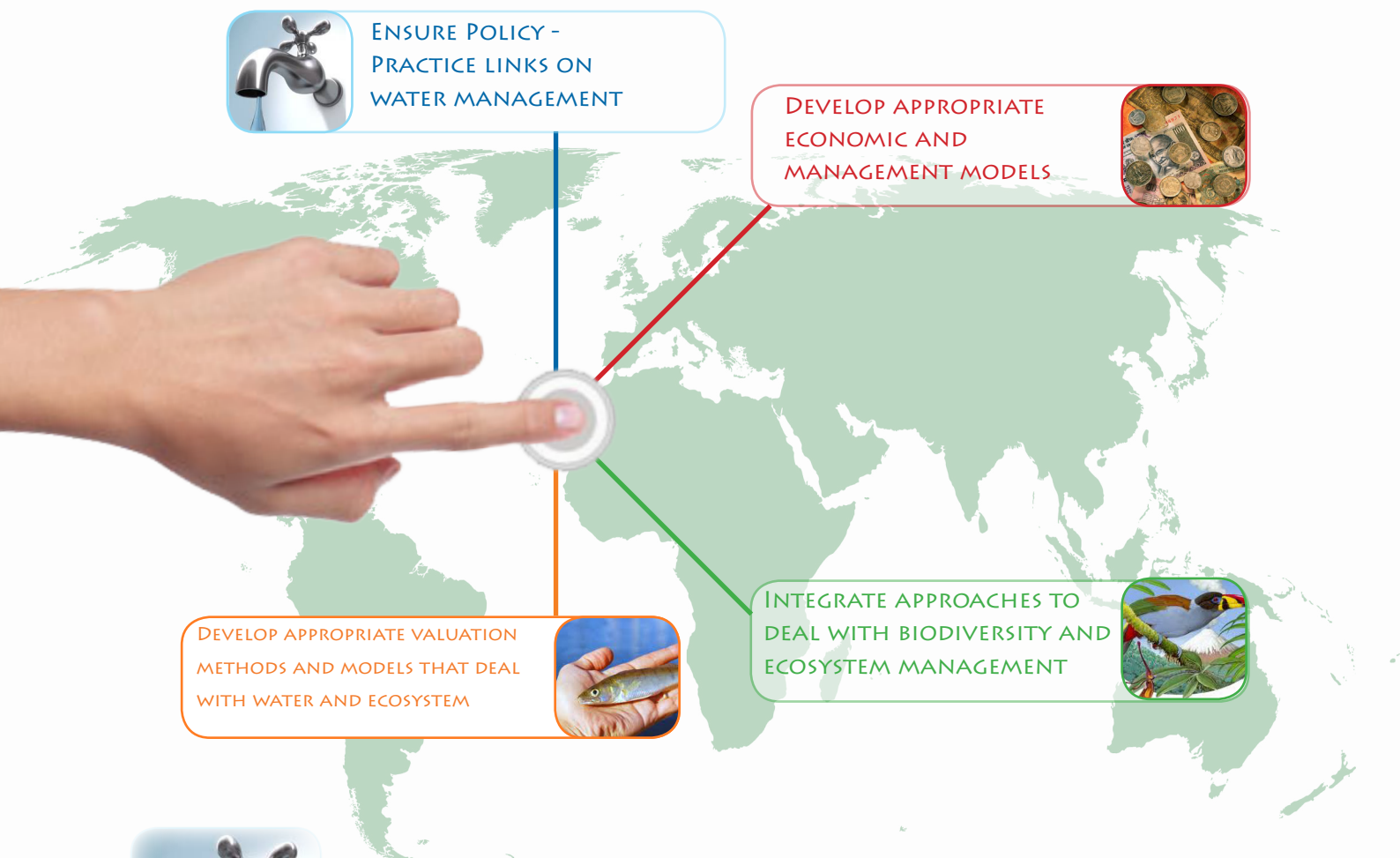
## The Governance Challenges

It is true that effective governance of water resources is challenging and expensive due to the range of factors such as coordination, subsidies, decision to attract private sector and investments, regulatory systems and need for more public sector investments. In order to maintain and improve use of water by different user groups, water resources need to be managed at the watershed level requiring suitable policies at National and State levels with predictable and timely availability of water for purposes including those of water flow and management at ecosystem level, including for forests.



# The key policy interventions and associated action programmes

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## Ensure policy-practice links on water management contribute to long term sustainability of ecosystems and biodiversity

**Focus:** With emerging socio-economic development in the country supported by policies that aim at increasing growth and per capita income, India needs to take on board a broad based, inclusive view on managing water resources for the components of nature management, agriculture and non-agricultural components. Current ways of policy making needs a review to ensure it is implementable on the ground with suitable monitoring options based on metrics and temporal scales.

**Actions:** Through the process of setting national biodiversity targets, specific targets related to water and biodiversity needs to be identified and responsibilities to achieve the targets be provided to relevant Ministries and sectors in India.





In addition, identify successful interventions at different levels across the country with specific focus on how current management practices are contributing to nature management, including sustainable agriculture, and replicate/scale them up across ecosystems.

Develop an on-line platform in national languages for identifying, exchanging the using community-based water management practices that are contributing to integrated water management using ecosystem approach.



**Develop appropriate economic and management models to ensure available water is used sustainably and proportionately for biodiversity and livelihoods, in the interest of sustainable development**

**Focus:** India's development interests need to balance with its long term ecological sustainability since compromising on sustainable water management options into the future will cause severe hardships to development sector that will combine reputational, regulatory and resilience risks. Policies and programmes supporting development, especially across sectors like non-agriculture needs to be reviewed in light of long term impacts of short-term uses. Such policies should be based on issues of polluter pays principle, willingness to pay and offsets using suitable models including the payments for ecosystem services and related provisions. the role of participatory decision making at local level is critical in this regard.

**Actions:** State-wide and National level policy review is needed on development sector's role and impact on water uses, sustainability of supply and contributions to renewing water supply bodies and chains.

Develop suitable economic models for pay back options by non-core sectors who use water as a primary source for business and development with an aim that such models not only looks at monetary gains for the stakeholders but also appropriate investments into rejuvenating the water cycles and ecosystems that supply such resources.

Link business models, investment plans to long term ecological sustainability not merely as a social responsibility but also as an investment option.





## Integrate approaches to deal with biodiversity and ecosystem management and water resource management at National and State levels.

**Focus:** Present scenarios in National and State level policy making and practices on water are a cause of concern for long term sustainability of the resources and ecosystems. National and State level policy making should be based on an inclusive approach that considers issues of appropriate, site-specific integrated approaches including the ecosystem based approach to managing a national resource like water. Current policies and action programmes needs a review so that appropriate linkages can be found for managing a resource like water in the future.

**Actions:** Prepare a National level and State-wise review of water policies, including pricing and sourcing to come up with a suitable formula that answers the interests of development and ecological security.

Use principles of development and welfare economics along with environmental economics in coming up with inter-sectoral action plans on natural resources like water.



## Develop appropriate valuation methods and models that deal with water and ecosystem management.

**Focus:** Current policies and formulae for valuing the water services at ecosystem level needs to be re-cast to ensure not just the value of the resource and services, an ecosystem provides but appropriate pricing for extracting such resource is suitably captured at different levels.

**Actions:** Develop a National, State and location specific economic valuation programmes in the country that captures both the appropriate pricing component and value of water resources in a manner such valuation considers the linkages between the product (water) and process (ecosystem functions including hydrological cycles).



# National Biodiversity Authority

(An Autonomous and Statutory Body of the Ministry of Environment and Forests, Government of India)



*Anniversary*

2003 -2013





## About National Biodiversity Authority

The National Biodiversity Authority (NBA) was established in 2003 to implement India's Biological Diversity Act (2002). The NBA is a Statutory, Autonomous body and it performs facilitative, regulatory and advisory functions for Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources.

The Biological Diversity Act (2002) mandates implementation through a decentralized approach with the NBA focusing on advising the Central Government on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilization of biological resources; and advising the State Governments in the selection of areas of biodiversity importance to be notified under Sub-Section (1) of Section 37 as heritage sites and measures for the management of such heritage sites besides supporting conservations and sustainable management of biodiversity.

The State Biodiversity Boards (SBBs) focus on advising the State Governments, subject to any guidelines issued by the Central Government, on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of the benefits arising out of the utilization of biological resources. The State Biodiversity Boards (SBBs) also regulate, by granting of approvals or otherwise requests for commercial utilization or bio-survey and bio-utilization of any biological resource by Indians.

The local level Biodiversity Management Committees (BMCs) are responsible for promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

The NBA with its headquarters in Chennai, Tamil Nadu, delivers its mandate through a structure that comprises of the Authority, Secretariat, SBBs, BMCs and Expert Committees.

Since its establishment, NBA has supported creation of SBBs in 28 States and facilitated establishment of around 33,000 BMCs at local level.



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