

Managing Water for Sustenance of Life, Biodiversity and Development

Shekhar Srivastava and Pradeepti Shekhar

Ecology and Environment, Dy. Director (A.H.), A.D.A.H. Allahabad
Email: Shekhu.env@gmail.com

Introduction

Biotic resources are totally dependent on abiotic resources like water, air, soil and their various forms. Biotic resource include plants, animals and humans. No world can survive without natural resources like water, air and soil. Water is most essential and it is said, “**Water is elixir, water is life, water is driver of nature**”. Water and biodiversity are the key parts of our natural resources. Today water has become the most valuable natural resource but shrinking due to population explosion, unplanned urbanization, indiscriminate development, water overuse by industries, faulty agricultural practises, heavy extraction of underground water, wastage of huge portion of rain water, misuse of water instead of recycling, improper attention and planning of conservation of water reservoirs and habit to safe and inefficient use of water. All these factors need immediate attention for future survival. Water is prime component for every living object, man, plant and animals. Man has 70% water by weight and some plants have water up to 95%. Water comes next after oxygen for survival of living being.

‘Agni and water are givers and sustainers of life, they are affectionate mothers, givers of life, they have healing powers’

–Rig-Veda

A succinct warning of impending water crises issued by ‘International Conference on Water and Environment’ held in Dublin, Ireland Jan. 1992 stated “scarcity and misuse of fresh water pose a serious threat to sustainable development, ecological security, human health, food security, welfare and industrial

development and the ecosystem on which they depend, are at risk, unless water and land resources are managed more effectively in present decade beyond that they have been in the past”. It is no exaggeration to say that biodiversity is just as important as oxygen and water are for life sustenance. Any sphere of life, be it health, food, clothing, aesthetics, industry, sports or recreation, each one is linked to either the wild or domestic component of biodiversity. So biodiversity is very important for human survival and sustenance, like water. Above all this biodiversity also plays important role in maintaining the ecological balance. Biodiversity is certainly directly related with development and economic progress of the country. Sustainable use of natural resources like water and biodiversity with sustainable livelihood lifestyle is the need of the hour.

Water management and conservation of water can be done by promoting the idea in 5 ways:

1. Managing fresh water resources
2. Watershed management
3. Rainwater harvesting
4. Water quality
5. Right to water

1. Managing fresh water resources

Total water resource on earth is estimated to be about 1400 million cubic kilometres, but sea and only 2.7% constitute fresh water. Nearly 75.2% is in glaciers and ice caps, 22.6% is ground water of which 1% is only available and can be extracted for use.

Indian scenario: India which has 16% of the world population, 2.45% of the world’s land area and 4% of the

world water resources, is already heading towards as a water scarce state in certain regions. India is among 12 mega biodiversity centres of the world, having 25 biotic provinces, 20 bio geographic zones, representing 2% biodiversity, 17% livestock population, 6.5% fauna and 7% flora of the world. India has still rich natural resources but needs to protect and conserve for future.

The magnitude of the problem of scarcity of fresh water, that some 200 million Indians do not have access to safe and clean water, it may be one of the major water stressed country in the world by 2025, when 50% population of the country will experience water shortage.

Main Water consumers

1. Agriculture - 90%
2. Industrial - 4%
3. Domestic - 6%

Agriculture is the biggest consumer of surface as well as underground water. Considering the fast decline of irrigation water potential and low water use efficiency under flood (conventional) method of irrigation, drip and sprinkler methods should be widely practised. These methods besides assisting land degradation, save substantial amount of water and help increasing productivity of crops that too with reduced cost of cultivation.

System of irrigation Efficiency

* Drip and sprinkler	—	above 85%
* Furrow system	—	75%
* Border with precision land levelling (PLL)	—	65%
* Flooding	—	below 40%

Water is the source of life and livelihood. Water also sustains natural ecosystems. Excessive human water withdrawals and pollution has disrupted many vital habitats and species, leading to calls to reduce water withdrawals and reserve water for nature. Two ways of dealing with scarcity are to increase supply and limit demand. Rapid increase in water and degradation of water quality are putting extreme pressures on this vital resource. Finally, as the water is getting scarce due to

population growth and development activities, it is of utmost importance for judiciously balancing water resources in India.

Water Conservation

Due to increasing scarcity, there is greater emphasis on water conservation, which has 3 dimensions:

- Water resources conservation- Efficient management of rain water through storage, allocation and transfer for use and preservation of the quality of resource including its supporting ecosystems.
- Water use, conservation, water supply and distribution with minimal losses and consumption through prevention of wastage.
- Efficient use of water through adoption of water saving technologies and cropping patterns.

Some of the suggested measures to overcome water scarcity are:-

- Changes in cropping patterns
- Artificial recharge and retrieval
- Dry Irrigation
- New Integrated Water Harvesting Technique
- Micro Irrigation
- Through mulching practice, by the use of LDPE (Low density polythene sheets).
- Water Pricing Policy
- Stake holder's participation in winter resource management-PPP Model
- Domestic Water use efficiency
- Dual supply system
- Reuse of Industrial Waters

Interlinking of Rivers

Projects for inter-basin transfer of water are in existence and also being planned in countries such as the US, Canada, Mexico, Spain and China, etc. For India long distance water transfer is not a new concept as

Western Yamuna canal and Agra canal project, Kurnool-Cuddapah canal and the Periyar-Vaigai canal project, oldest is the link canal by diverting surplus water

of the Ravi to the Beas in Punjab in 1955. Interlinking of the basin's 3 rivers has also facilitated better control in regulating river flows through integrated operation of the storage reservoir at Bhakra, Pandoh, Pong and Ranjit Sagar.

Interlinking of rivers in India will increase irrigated agriculture in 35 million hectares, over and above the 140 million hectares envisaged by conventional methods, can meet the requirement of food grains in the year 2050 for the projected population. Further, there will be an addition of hydro power of 34000MW, drinking water to many cities and villages, drought mitigation projects in respect of economic viability, socioeconomic impacts, environmental impacts and preparation resettlement plans.

2. Watershed Management

It refers to managing entire land area served by all the rivers and aquifers that drain into a particular body of water. River basin management is the system applied to only one river system, although two terms are used interchangeably. Major activities may be operated through watershed management include:

- * Land development including *in situ* soil moisture conservation measures.
- * Afforestation including block plantations, agro forestry and horticulture development. Shelter-belt plantations, sand dune stabilization etc.
- * Drainage line treatment with combination of vegetative and engineering structures.

- * Development of small water harvesting structures such as low cost farm ponds, nallabunds, check dams and percolation tanks ground water recharge measures.
- * Renovation and augmentation of water resources, desalination of tanks for drinking water and irrigation.
- * Pasture development either by itself or in conjunction with plantation.
- * Crop demonstration for popularizing new crops and crop varieties or innovative crop management practices.
- * Promotion non conventional energy saving devices and energy conservation measures.

3. Rainwater Harvesting

It is action of collecting rainwater either directly or redirecting it into the ground to improve ground water storage to aquifer. Rainwater harvesting is being touted as the better alternative to conserve and augment the storage of ground water, reduce water table depletion and improve the quality of ground water. Rainwater being ultimate source of fresh water and it is very much needed because:-

1. The maintenance and running of the existing system of water supply are deteriorating for paucity of funds.
2. Growth of water usage particularly in agglomerates and urban fringe area is outstripping the ability of Govt. to expand existing water treatment and distribution system.

Our water wants (in b.cu.m)

Use	Year 2000	2010	2025
Domestic	30	56	73
Irrigation	501	688	910
Industry	20	12	23
Energy	20	5	15
Other	34	52	72

Sources of drinking water

1. Tap water - 36.7%
2. Hand Pump - 35.7%
3. Well - 18.2%
4. Tubewell - 5.6%
5. Othersource - 3.8%

India receives an annual precipitation (snowfall and rain) of around 4000 bcm. Of this, the runoff-accessible water is 1869bcm, of which barely 690bcm is used. Nearly 1179bcm of water drains into the sea, much of it in the 100 days that define India's wet season. India's water problem stems from disparate precipitation and the fact that while nearly 70% of precipitation occurs in 100 days, the requirement is spread over 365 days. So conservation of rainwater can resolve water requirement in larger extent to sustain Biodiversity and to foster development.

4. Water Quality

It is unfortunate that despite more than 6 decades of planned development, safe drinking water remains a problem area for the country and nearly 45% of India's rural population does not have access to portable water in adequate quantity.

Safe water in sufficient quality is fundamental to human health. Safe water and sanitation shape health through portable water supply, safe food preparation, hygiene, better nutrition and relaxation in terms of water quality it comes third bottom up. In India water availability per capita which was earlier 5000 cubic meters, is fast approaching a phase of extremely stressed water availability conditions. Water is regarded as man's best friend in the physical environment. It is required for life processes for the proper functioning of the organs much of the ill health in India and other under developed countries is largely due to lack of availability of safe drinking water.

The problem is so serious in most of the developing countries that globally one child dies every 8 seconds from lack of access to safe water- UNICEF.

The national water policy 2002 concludes that the

planning of water resource and its optimal, economical and equitable use has become a matter of utmost urgency considering its increasing scarcity and in view of the vital importance of water for human and animal life, for maintaining ecological balance and for economic and developmental activities of all kinds.

5. Right to water

Water is used to fulfil many different needs and perform many different functions. These uses can be divided into three broad categories-

1. Water for life
2. Water for citizens
3. Water for development

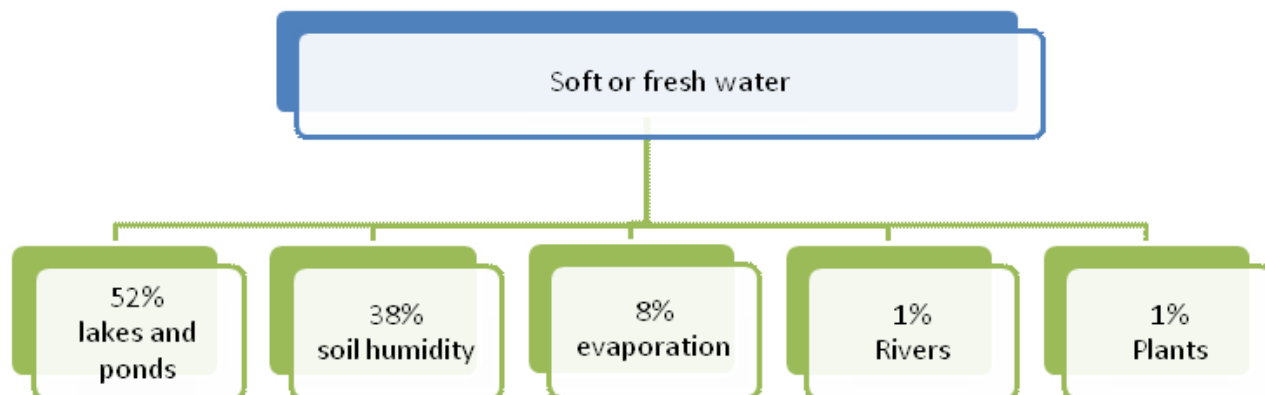
Water for life is usually given the highest priority as it concerns the provision of water for the survival of all living beings including humans. This function makes it necessary to guarantee the sustainability of the ecosystem so that a quantity of good quality water is accessible to all.

Water for citizens concerns the provision of water for public health and for public institutions and is related to the social rights of the individuals and the community. This function takes into account the interest of the society as a whole including values of social cohesion and equity.

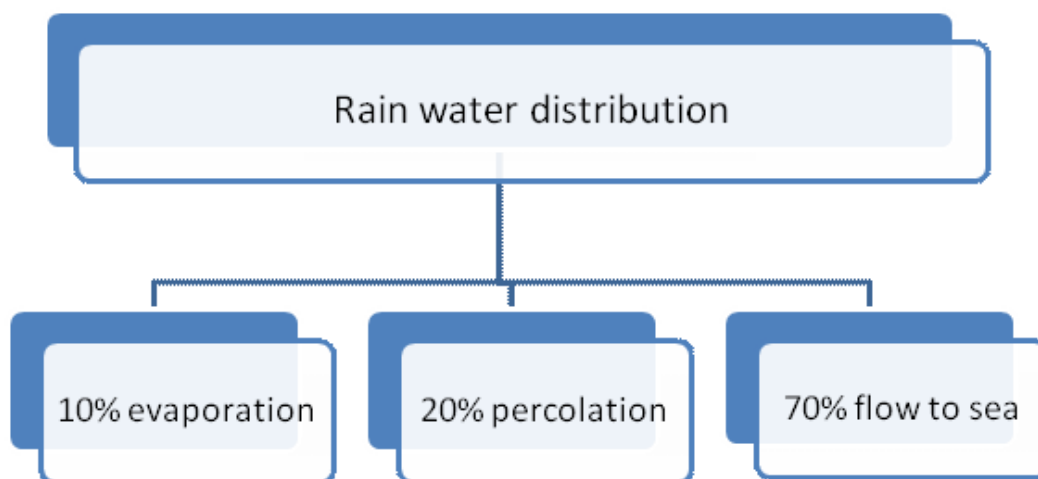
Water for development is an economic function and is related to production activities which fulfil private interests such as irrigation for agriculture, hydro-electricity, or industry.

However, water for development consumes the largest quantity of water from all surface and groundwater resources and consequently is largely responsible for creating problems of local scarcity and also of pollution.

The first official UN document clearly highlights the content of the human right to water was General Comment No. 15 issued by 2002 by the Committee on Economic, Social and Cultural Rights (CESCR). This is actually acceptance of fundamental human rights like the 'Right to Life' and 'Right to Health'. The right to water focuses on the amount of water necessary for basic human needs.



Rain water harvesting is actually collection, conservation and storage of storage. If we conserve 60% to 70% of rain water then 50% water problem will be solved.



The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent death from dehydration, reduce the risk of water related diseases and provide for consumption, cooking, personal and domestic hygiene requirements- (CESCR 2002)

Conclusion

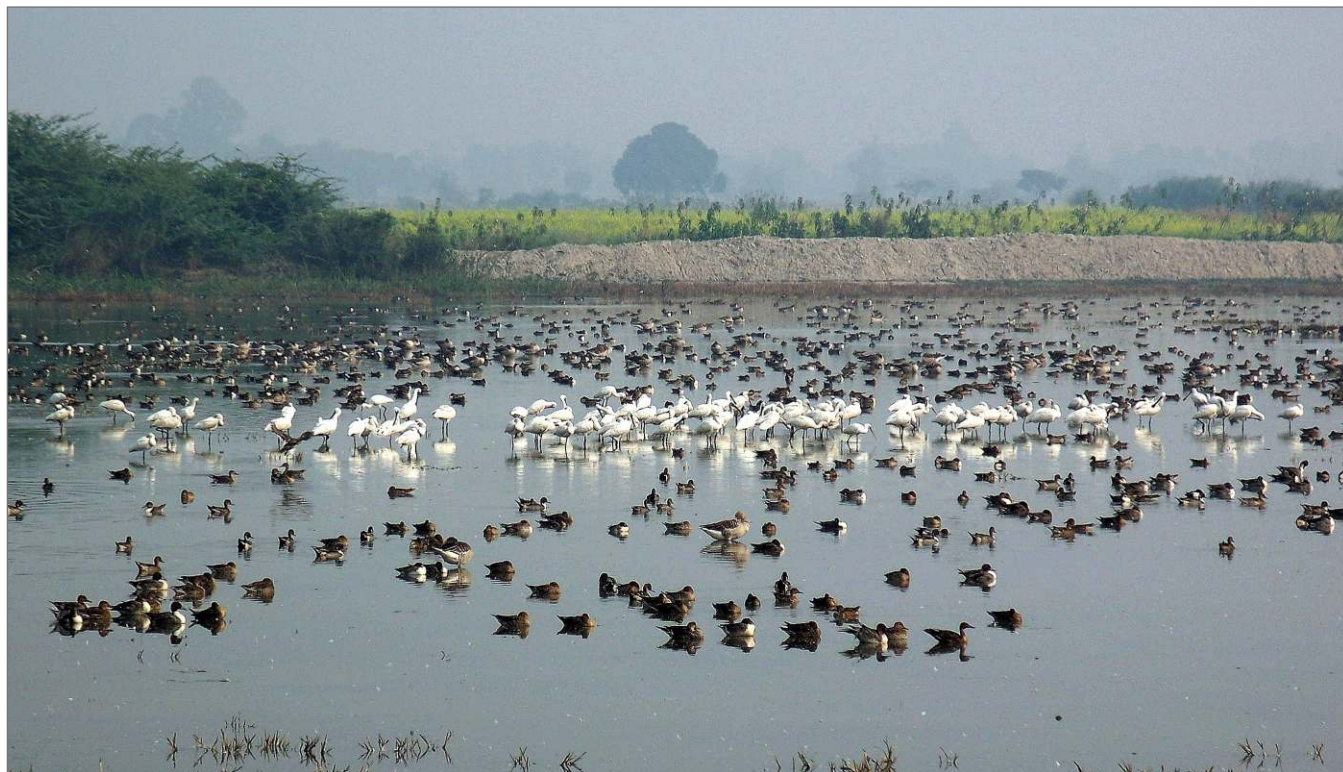
Therefore an urgent need of water resource planning which will aim not only at optimizing the utilization and management of water resources, but also

to make the development experts aware of environmental and social equity considerations as well as to make environmentalists aware of economic and development needs. If every drop of water that is drained or wasted is recycled, it is enough to irrigate a million hectares of cultivable land. In the end we may say;

1. Make water everybody's business.
2. Prevent the impending water famine/drought by adopting simple techniques of water harvesting.
3. Ask not what the others can do for you but ask what you can do for all.

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Lakh-Bahosi Wildlife Sanctuary (Photo credit : Neeraj Srivastava)