

FRESH WATER DEPLETION – A CRISIS: CAUSES & REMEDIES

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ABSTRACT

The global problem of fresh water depletion is addressed. The seriousness and the need to have concern about this crisis are emphasized. The causes for this crisis and some suggestions in handling this alarming situation at the local level with reference to Indian conditions are discussed in detail.

Key words: *Fresh water depletion, Drinking water crisis, Water resources planning, Water conservation, Environmental pollution, Public participation, Agencies co-ordination.*

INTRODUCTION

The drinking water crisis in many Indian cities is reaching alarming proportions. Urban population is suffering from irregular water supply, sometimes leading to clashes among them. A recent joint study conducted by United Nations International Children Education Fund (UNICEF) and the World Wide Fund (WWF) for Nature revealed the alarming situation of fresh water depletion in the country. They opined that the fall in the quality and quantity of available water resources is due to the following reasons:

- Pollution of water sources
- Improper water resources management
- Shortcomings in the design and implementation of legislation and regulations, which address these problems.

More number of similar cases can be expected from many of the developing countries. This article focuses on the problems addressed above in Indian context with few suggestions for overcoming from the same.

WATER REOURCES – AVAILABILITY & CONSUMPTION

The total amount of water available on earth has been estimated at 1.4 billion cubic kilometers, enough to cover the planet with a layer of about 3-km deep. About 95% of the earth's water is in the oceans, which is unfit for human consumption and other use because of its high salt content; about 4% is locked in the polar ice

caps; and the remaining 1% constitutes all the fresh water in hydrological cycle including ground water reserves. Only 0.1% is available in as fresh water in rivers, lakes, and streams, which is suitable for human consumption. This highlights the significance of the need to preserve our fresh water resources.

The annual precipitation of rainfall over India is 400 million-hectare meters. The surface water resources carry 17,68,000 million cubic meters out of which only 50% can be put to beneficial uses. In addition, the ground water potential of 4,22,900 million cubic meters is available for utilization and about 1,00,000 million cubic meters is being exploited at present.

Indian rivers have been classified into fourteen major, forty-four medium, and fifty-five minor & desert river basins. The major river basins cover 83% of the total drainage basin and contribute to 85% of the total surface flow whereas medium and minor river basins share 8% and 8% respectively of the total surface flow. But, the major problem is the quality of surface water in majority of the locations, which is affected by pollutants from various sources such as domestic waste discharges, industrial waste disposal, and other human activities like bathing, washing and swimming etc. The UNICEF & WWF study identified the prevalence of fluoride and iron deposits or ingress of salt water as the other sources affecting water quality of both surface and ground water. The projected demands for the annual requirement of fresh water (both surface and ground water) in the country indicate an estimated 40% increase by the year 2025 to that in the year 2000 (shown in Table-1 below) for various purposes of usage.

Few studies have been conducted by the Central Pollution Control Board with regard to the

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projected status of water consumption in various cities and towns in the country. According to these studies conducted in a total of 453 cities and towns in the country, the water supply is being provided at a rate of 135 liters per person per day.

Table-1 Annual requirement of fresh water (km³)

Usage	Year		% increase
	2000	2025	
Irrigation	630	770	22.22
Other uses (domestic & livestock, industries, miscellaneous)	120	280	133.33
Total	750	1050	40.0

POLLUTION PROBLEMS

Consumption of any item is likely to be followed by disposal of the same either in the same phase or in some other phase. It was estimated that, approximately 13.443 Million Liters per Day (MLD) of wastewater being generated from the 453 cities for consuming 16,814 MLD of water. The disposal of this domestic wastewater needs to be considered seriously. However, the consumption and waste generation rates of the industrial groups vary with each group or with each industry depending on the measures they adopt for the same.

Several instances have been reported in literature pertaining to the adverse impacts received by the common public due to indiscriminate disposal of both domestic and industrial waste effluents. When instances of industrial pollution reach the notice of the Supreme Court, it initially relies on the State Pollution Control Boards (SPCBs) to provide scientific data. The SPCBs are given wide range of powers under the Environment (Protection) Act, 1986 to impose strict directives to the erring industries causing pollution. But, if the SPCBs are found to have failed in their duty, the court will not hesitate to pass strictures against them. In fact, the Indian Apex court has even issued notices to SPCBs in selected cases.

APPROACHES TO HANDLE THE PROBLEMS

In order to address the problems discussed above, an attempt is made in the present study to suggest a few approaches and methodologies as follows:

- Identification and isolation of contamination sources
- Adoption of latest technologies in order to reduce the waste generation and/or to treat them effectively.
- Improved and innovative planning of water resources
- Increased participation of the public, either directly or indirectly in solving the crisis
- Enhanced co-ordination among the Agencies involved (both Governmental and Non-Governmental) for the cause of the Nation

Few aspects of each of the above are discussed below:

Identification and isolation of contaminant sources

This calls for the need for zonal demarcation of ‘Pollution zones’ from non-pollution zones and working on them to reduce the ambient levels of environmental pollution. Even latest information systems such as Geographical Information Systems (GIS) based on Remote Sensing can be utilized in studying the local resources at a given location. A well-planned development of industrial zones can help the Nation in its march towards progress. Otherwise, cases such as Bichri (in Rajasthan); environmental damages done by the greedy aquaculture farmers in the coastal regions of the country including few fresh water lakes etc. will prevail. The isolation and identification of zonal demarcation is expected to put only a halt, in preventing total damage to our resources.

Adoption of latest technologies

This aims for adoption of waste minimization techniques in minimizing the waste generation both from the domestic and industrial sources. It comprises of mainly two main streams – source reduction and recycling. Source reduction comprises of the changes in product/material through substitution, changes in product/material composition, changes in technology and good operating practices etc. Recycling constitutes the adoption of use and reuse, reclamation etc. Any promising technology to be adopted for the

treatment of the waste effluents should give a close look at the following aspects:

- Cost
- Availability
- Reliability
- Development nature
- Limitations of treatment capacity

The developmental nature of the technology considered could offer flexibility in overcoming its limitations, if any, for its improved usage over a long period of time.

Improved and innovative planning of water resources

In the planning of water resources, the important questions that may arise are:

- How much water is needed?
- How much water is available?
- How the supplies satisfy the requirements/
- How the used up water is disposed-off ?

The development of water resources involves the conception, planning, designing, construction, and operation of facilities to control and utilize water with the national objective of improving the quality of life of the people. Few strategies for improved planning of water resources are summarized below:

- **Basin management:** Water resource development is to be planned in an integrated manner at the river basin level and effective basinwise programs have to be evolved considering the inter-relationships of soil conservation, afforestation, land development, controlled grazing etc. careful selection of crops to be planned in water short basins. The development of forests in upland of the water basin where the slopes are high will help in minimizing the landslides, leading to lesser sediment transport. Environmental monitoring of the catchment area on continuous basis and soil conservation measures such as contour bundling, check dams, afforestation etc. to be practiced.
- **Water conservation measures:** Various water conservation measures suggested for adaptation are: (i) creation of low reservoirs for storing the water (ii) prevention of losses through seepage and leaks (iii) improving usage efficiency through better usage practices (iv) educating the users, and (v) recycling and reuse of wastewater. For example, the last of the above measures, i.e., the recycling of wastewater is currently

being practiced in few industries, where the treated liquid effluent is used for gardening purposes. It not only reduces the load on the water resources but also gives indirect financial benefit for its usage instead of fresh water. In addition, the percolated water will improve the ground water resources. Similar kind of benefits can be expected and should be explored using the other above suggested measures as well.

- **Increased participation of the public:** The public can approach the SPCBs or Local Administration for taking necessary action against the polluters in their locale. Few State Governments, such as Andhra Pradesh, are encouraging people to take part in developmental programs. Isolated cases are reported in literature that people have taken initiative on their own and successfully solved their drinking water problems after not getting much encouragement from the local Governments or administration. Such successful cases may induce inspiration among the public in other parts of the country. This will help in spreading mass awareness about significance on usage of water resources. It leads to pride and satisfaction for being part of the Governance and sharing the responsibilities.
- **Enhanced co-ordination among Agencies:** The last, but not the least, of the strategies is the enhanced co-ordination among various Agencies such as SPCB, Industrial Development Corporation, State Finance Corporation, Irrigation Department, Panchayatraj Department, Ground Water Department, and some other non-Governmental Agencies etc to name a few. In fact, this is also one of the major aspects pointed out by the UNICEF-WWF study. Even though the regulations are very strong, the lack of co-ordination among the concerned Agencies will not produce the result (at a faster rate) with the same effect. As a result, the estimates of the developmental project cause rise so steeply that no more economically viable. In fact, there are a few instances reported, where the absence of the co-ordination of among above-mentioned Agencies led to alarming and severe economic problems. Therefore, the concerned Agencies should co-ordinate among themselves to see that the developmental projects/programs reach the public in time.

SUMMARY AND CONCLUSIONS

- The fresh water depletion and the drinking water crisis in many Indian towns and cities are becoming serious and alarming.
- The need of the hour is to have concern about the situation and to find out appropriate solutions for the same.
- Few aspects related to its cause are addressed.
- Selected suggestions in handling the crisis even at the local level are made.

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