

Water Management in Indian Perspective

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INTRODUCTION

Distribution of water resources of India: Water is the most basic resource to sustain the life on earth. It is a natural resource, fundamental to life, livelihood, food security and sustainable development. India has more than 17 percent of the world's population, but has only 4% of world's renewable water resources with 2.6% of world's land area. The total surface flow, including regenerating flow from groundwater and the flow from neighboring countries, is estimated at 1,869 cubic kilometers per year (km^3/year), of which only 690 km^3 are considered as utilizable in view of the constraints of the present technology for water storage and inter-state issues. The Central Water Commission estimates the groundwater resources at 418.5 km^3/year . Part of this amount, estimated at 380 km^3/year , constitutes the base flow of the rivers. The total renewable water resources of India are therefore estimated at 1,907.8 km^3/year .

Water related disputes : With a growing population and rising needs of a fast developing nation, availability of water is coming under severe strain. Many international as well as intra national conflicts owe their origin to water sources. Baglihar project, Kishanganga project etc. are often discussed in India Pakistan talks, sharing of water of Teesta River is discussed in India Bangladesh talks, and India is also concerned with China's plan to divert the water of Brahmaputra River. Within India also, states like Tamil Nadu and Karnataka, Punjab Haryana and Rajasthan comes at loggerhead for water sharing issues.

Significance of effective water management: Most of the water disputes are due to its unequal distribution and lack of a unified perspective in planning, management and use of water resources.

Large parts of India have already become water stressed due to rapid growth in demand for water due to population growth, urbanization and changing lifestyle pose serious challenges to water security.

The problem is more intensified due to wide variations in availability of water, which may increase substantially due to climate changes, causing more water crisis and incidences of water related disasters, i.e., floods, increased erosion and increased frequency of droughts etc. Climate change may also increase the sea levels. This may lead to salinity intrusion in ground water aquifers / surface waters and increased coastal inundation in coastal regions. Access to safe drinking water still continues to be a problem in some areas. Skewed availability of water between different regions and different people in the same regions is has the potential of causing social unrest.

Causes of water mismanagement:

Inequitable exploitation of groundwater without any consideration to its sustainability is causing its over-exploitation in several areas. Inter-State, inter-regional disputes in sharing of water hamper the optimum utilization of water through scientific planning. The existing water resources infrastructure is not being maintained properly resulting in under-utilization of available resources. Growing pollution of water sources is affecting the availability of safe water besides causing environmental and health hazards.

Measures for effective water management :

At present the water consumption in India is about 750 km³/year for all the applications, viz. agricultural, industrial, domestic and commercial. Therefore the any water management in India must be holistic in nature where Centre, the States and the local bodies (governance institutions) must ensure access to a minimum quantity of potable water for essential health and hygiene to all its citizens, available within easy reach of the household through proper planning, development and management of water resources which need to be governed by national perspectives on an integrated and environmentally sound basis, keeping in view the human, social and economic need. Large water supply schemes to meet the urban as well as rural needs of water for both irrigation and drinking, and piped water supply schemes for drinking water are

need of the hour. Governance through informed decision making is crucial to the objectives of equity, social justice and sustainability. Application of 3R principle by treatment of domestic/industrial effluents and recycling of usable water for irrigation and commercial purposes thereby diverting the water used in these areas for domestic consumption can prove an effective water management strategy. Employment of modern irrigation techniques like drip irrigation, sprinkler irrigation are found to be more efficient one where wastage of water is minimum.

Water conservation practices like rain water harvesting and artificial recharge of ground water sources should be employed at local level. It must be made compulsory for all new building and the government buildings. Government provides subsidy to the farmers for purchasing tube wells. The excessive use of tube wells is leading to fast depletion of ground water. At least in urban areas government may impose an extra levy on extracting ground water. Declining ground water levels in over-exploited areas need to be arrested by introducing improved technologies of water use, incentivizing efficient water use and encouraging community based management of aquifers. In addition, where necessary, artificial recharging projects should be undertaken so that extraction is less than the recharge. This would allow the aquifers to provide base flows to the surface system, and maintain ecology.

An effective mechanism should be established at national level and within each State to amicably resolve differences in competing demands for water amongst different users of water, as also between different parts of the state. Regular training and academic courses in water management should be promoted. These training and academic institutions be regularly updated by developing infrastructure and promoting applied research, which would help to improve the current procedures of analysis and informed decision making in the line departments and by the community. A general

awareness about water management is needed to be created and the community must proactively involve itself in the conservation of most vital resource of earth for its sustainable development. Decision support systems are required to be developed for planning and management of water resources project.

Approaches for sustainable water resource management:

Rainwater harvesting: Rainwater harvesting is the accumulation of rainwater from rivers or roofs and its storage in a deep pit for reuse on-site, rather than allowing it to run off. Rainwater can be collected from rivers or roofs, and in many places, the water collected is redirected to a deep pit (well, shaft, or borehole), a reservoir with percolation, or collected from dew or fog with nets or other tools. Its uses include water for gardens, livestock, irrigation, domestic use with proper treatment, indoor heating for houses, etc. The harvested water can also be used as drinking water, longer-term storage, and for other purposes such as groundwater recharge. Rainwater harvesting provides an independent water supply during regional water restrictions.

Watershed Management: Watershed management is the study of the relevant characteristics of a watershed aimed at the sustainable distribution of its resources and the process of creating and implementing plans, programs, and projects to sustain and enhance watershed functions that affect the plant, animal, and human communities within the watershed boundary. Features of a watershed that agencies seek to manage include water supply, water quality, drainage, storm water runoff, water rights, and the overall planning and utilization of watersheds. Landowners, land use agencies, storm water management experts, environmental specialists, water use surveyors and communities all play an integral part in watershed management.

Effluent treatment: Effluent treatment is the process of removing contaminants from wastewater, primarily from household sewage.

Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safer for the environment. A by-product of sewage treatment is usually a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land.

Water resource management: It is a concept which emphasizes policies and strategies. Contributions examine planning and design of water resource systems, and operation, maintenance and administration of water resource systems. Coverage extends to these closely related topics: water demand and consumption applied surface and groundwater hydrology; water management technique simulation and modeling of water resource systems; forecasting and control of quantity and quality of water; economic and social aspects of water use; legislation and water resources protection.

CONCLUSION

Owing to current rate of population growth, India could well have the dubious distinction of having the largest number of water-deprived persons in the world in the next 25 years if the available resources are not managed judiciously and with care. It is estimated that by the year 2050, half of India's population will be living in urban areas and will face acute water problems. Furthermore, there are serious inequities in the distribution of water. Consumption of water ranges from 16 litres per day to 3 litres per day depending on the city and the economic strata of the Indian consumer. Governments play and will continue to play a critical role in rural development and resource management. Governments define the legal, policy and institutional frameworks within which water resources are managed and rural economies and societies function. If every State adopts strategy to tap rain water, scarcity would be a matter, forgotten. Hence Water resource management is essential, not only in India but around the globe.