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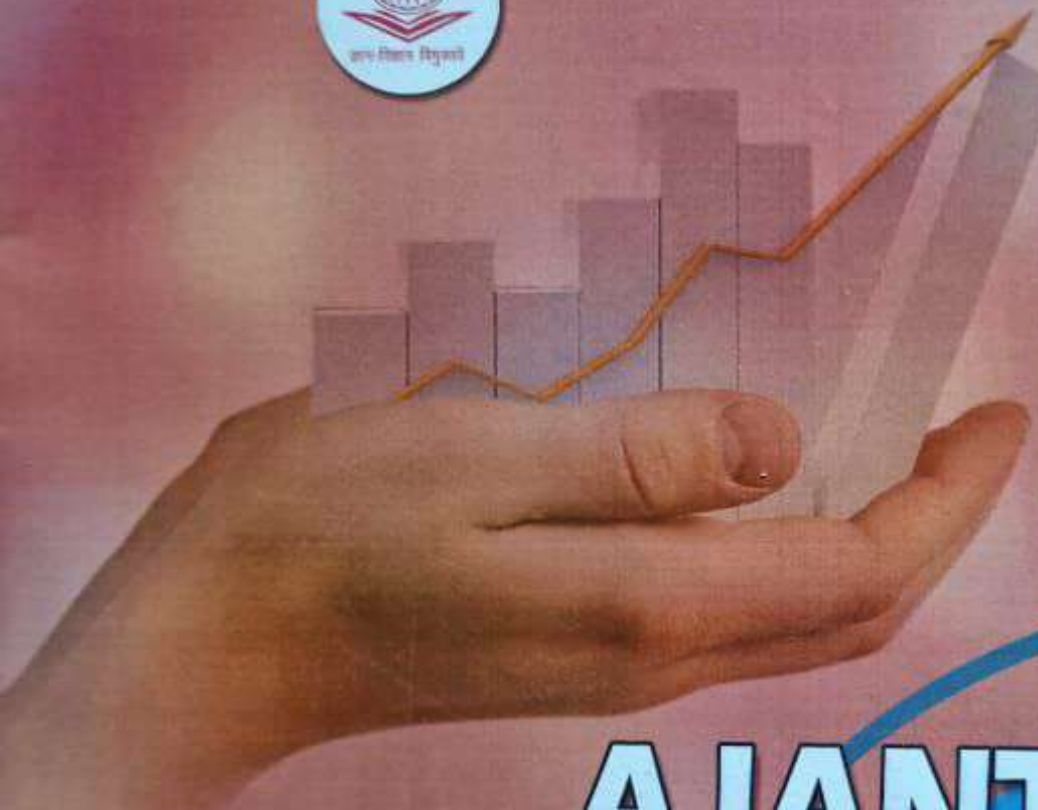

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CONTENTS OF ENGLISH PART - II

3. Water Conservation and Management in India: Its Need and Importance

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Abstract

Water is prime life sustaining natural resource which cannot be created like other commodities. It is a nature's gift to all living beings on the earth. Water is the elixir of life. Unfortunately for our planet, supplies are now running dry – at an alarming rate. The world's population continues to soar but that rise in numbers has not been matched by an accompanying increase in supplies of fresh water. In India, the increasing stress on the availability of water is due to population explosion and improved standard of living. The scarcity is compounded further because of massive agricultural and industrial development coupled with improper and indiscriminate.

Exploitation of ground water resources. 18% of the world population. Only handful of countries in the globe can boast of such an extensive river network that our country has. The mighty Indus-Ganga Brahmaputra in the North, the Narmada-Tapi-Mahanadi in the Central region and Godavari-Krishna-Cauvery in the South have been symbols of existence and growth of our country right from its inception. Yet, the availability of water resources in India has its unique complexities.

Need For Reservoirs

The reservoirs created through construction of dams were instrumental in achieving the Green Revolution and food sufficiency in India. It also acted as a catalyst for the economic and industrial growth in India. Per Capita availability of water is a vital parameter used worldwide to indicate resilience of the nation against uncertainties of water availability in space and time. Compared to the other developed and developing nations of the world like China, Brazil, USA, South Africa etc. the per capita water availability in India is very low. To sustain the economic growth, to ensure food security and water availability to the future generations, India will need a more reservoirs, at all locations wherever, techno-economically, socially and environmental feasible. The large reservoirs are also very important to mitigate the uncertainties that are likely

of Ground Water Development is more than 100%, which implies that in the states the annual ground water consumption is more than annual ground water recharge. In the states of Gujarat, Tamil Nadu and Uttar Pradesh and UTs of and UT of Daman & Diu, Lakshadweep and Puducherry, the stage of ground water development is 70% and above. In rest of the states / UTs the stage of ground water development is below 70%. The ground water development activities have increased generally in the areas where future scope for ground water development existed. This has resulted in increase in stage of groundwater development from 58% in the year 2004 to 61% in 2009

Water Quality Issues of Surface and Groundwater in India

Most of our water sources are polluted with untreated/partially treated wastes form industry, domestic sewage and fertilizer/pesticide run off from agricultural fields. Unregulated growth of urban areas, particularly over the last two decades, without infrastructural services for proper collection, transportation, treatment and disposal of domestic wastes led to increased pollution & health hazards. The municipalities and such other civic authorities have not been able to cope up with this massive task which could be attributed to various reasons including erosion of authority, inability to raise revenues and inadequate managerial capabilities. The over-exploitation of ground water resources is widespread across the country, and is projected to grow with time.

The major WQ issues are;

- Pathogenic pollution in both sources
- Salinity in both sources
- Fluoride, Nitrate and Arsenic problems in Groundwater
- Oxygen depletion in Surface water
- Eutrophication in Surface water
- Toxicity in Ground and Surface water
- Ecological Health in surface water
- Major causes for water quality degradation are:
- Domestic Wastewater
- Industrial Wastewater
- Rural and Slum Population
- Wastewater and Pollutants from Un-sewered Towns

- Pollutants in Agricultural Run-off and Drainage Waters (Diffuse pollution)
- Deposition of Air-Pollutants

Issues and Challenges In The Water Resources Development And Management

The pressure on our water & land resources is continuously increasing with the rise in population, urbanization and industrialization. Consequently, a number of issues have cropped up in water sector which call for timely and effective redressal.

Spatial and Temporal variation in water availability

The spatial unevenness and temporal variation in precipitation has led to complex situations like the distinctly different monsoon and non-monsoon seasons, the high and low rainfall areas and the drought-flood-drought syndrome

Declining per capita water availability

The declining per capita water availability is a cause of serious concern. Though from the point- of-view of the National level scenario, India may be above the Internationally accepted standards of water scarcity, yet the figures at the basin level vary widely from 13636 cu.m per year in Brahmaputra-Barak basin to 298 cu.m per year in Sabarmati basin. The situation is projected to get even more serious in 2050 when, about 22% of the area and 17% of the population in the country may be under absolute scarcity condition.

Inequitable water distribution

Inequitable distribution of water among the head and the tail reaches of the command area has led to problems in bridging the gap between irrigation potential created & utilized as well as water logging and salinity.

Low Irrigation Efficiency

The irrigation efficiency in our country is of the order of only 25% to 35% in most irrigation system, with efficiency of 40% to 45% in a few exceptional cases. Some of the prime reasons for low irrigation efficiency are completion of dam/ head works ahead of canals, dilapidated irrigation systems, unlined canal systems, lack of field channels, lack of canal communication network, lack of field drainage, improper field leveling etc.

Deteriorating Water Quality

Water pollution is a major environmental concern in India. The main sources of water pollution are discharge of domestic sewage and industrial effluents, which contain organic pollutants, chemicals & heavy metals and run-off from land based activities such as agriculture

and mining. Non-availability of minimum flow in the rivers has also reduced natural purification capacity of rivers thus increasing pollution.

Over-exploitation of Ground water resources

Rapid pace of ground water development has resulted in a number of problems. In many arid and hard rock areas, overdraft and associated water quality problems are increasing. The unscientific development of groundwater in some coastal areas in the country has led to landward movement of seawater fresh water interface resulting in contamination of fresh water aquifers. In addition to problems caused due to human interference, natural factors like occurrence of high content of fluoride, arsenic and iron also affecting the ground water quality in several parts of the country.

Climate Change and Water Resources

Climate change is predicted to have profound impact on to water resources. Temperature drives the hydrological cycle, influencing hydrological processes in a direct or indirect way. A warmer climate may lead to intensification of the hydrological cycle, resulting in higher rates of evaporation and increase of liquid precipitation. These processes, in association with a shifting pattern of precipitation, would affect the spatial and temporal distribution of runoff, soil moisture, and groundwater reserves and increase the frequency of droughts and floods. The future climatic change, though, will have its impact globally but likely to be felt severely in developing countries with agrarian economies, such as India. Surging population, increasing industrialization and associated demands for freshwater, food and energy would be areas of concern in the changing climate.

Strategies for Facing the Challenges

There is urgent need for addressing the above-stated issues effectively. Broadly, the approach route for mitigating the issues & challenges can be categorized into three principal heads.

- **Developmental activities** to reduce Gap between availability and utilization
- **Management Practices** to bridge Gap between creation and utilization of facilities
- **Research & Development** to mitigate Gap between demand and availability

It is to be however noted that the proper implementation of all the activities identified under each category is of paramount importance to eradicate or even dilute the looming threats being

mounted by those steep challenges. Therefore, co-operation and co-ordination among all the agencies involved in the water sector is a prerequisite for achieving any success in the future.

Conclusion

Water resource development is to be seen not merely as a single-sector-end objective, but as a prime mover in developing larger systems with multiple linkages. This calls for a well set out multi-disciplinary agenda covering not only technological issues but also issues of social, economic, legal and environmental concerns. Therefore the planning, development and management of water resources has to be taken up in an integrated manner for addressing the concerns facing the water sector. This integration has to be a multi-disciplinary approach which would take care of all the conflicting issues and deliver solutions that would be technically feasible, economically viable, socially acceptable and ecologically & environmentally sound. Water use, in turn, has its impact on water quality and therefore utilization of water has to be so managed as not to contribute to the deterioration of water quality that may seriously jeopardize its future availability.

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