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IMPORTANCE ITS RESOURCES, POLICIES, TECHNOLOGY, PROBLEMS, AND MICROBACTERIA PRESENT IN WATER

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ABSTRACT

Water is one of the most essential substances needed to sustain human life, animals and plants. It is direly needed for drinking, cooking, bathing, washing for sanitary disposal of domestic and human wastes, and for agriculture. It is also one of the most important engineering materials and is used for steam generation, as a coolant in power plants, for air conditioning and fire fighting and in building and other concrete constructions water has a unique position in industry. It is needed for the production of such a wide variety of materials as steel and other metals, paper, textiles beverages, dairy products, petroleum, coal, rubber and plastics automobiles industry and a solvent in chemical processing. In fact, production units not using water for some purpose or the other may be hard to find. It is for this reason that before setting up a production unit at a particular site, the quantity of water needed, the character and quality of the water available and the effect of impurities in water on the processing must be carefully considered.

KEYWORDS: Water policies, micro bacteria, water sources

INTRODUCTION

Water is one of the most essential substances needed to sustain human life, animals and plants. It is direly needed for drinking, cooking, bathing, washing for sanitary disposal of domestic and human wastes, and for agriculture. It is also one of the most important engineering materials and is used for steam generation, as a coolant in power plants, for air conditioning and fire fighting and in building and other concrete constructions water has a unique position in industry. It is needed for the production of such a wide variety of materials as steel and other metals, paper, textiles beverages, dairy products, petroleum, coal, rubber and plastics automobiles industry and a solvent in chemical processing. In fact, production units not using water for some purpose or the other may be hard to find. It is for this reason that before setting up a production unit at a particular site, the quantity of water needed, the character and quality of the water available and the effect of impurities in water on the processing must be carefully considered.

NATURE OF WATER

Water is one of the abundantly available substances in nature. It is an essential constituent of all the animal and vegetable matter and forms about 75 per cent of the matter of earth's crust. It is also an essential ingredient of animal and plant life. In India, the average water consumption for health and sanitation per head is about 15 per cent per annum. In our country about 22 million hectare meters of ground water is required for industrial purpose, steel, oil refineries. About 56 million hectare meters of groundwater is used for irrigation and agriculture purpose. The average annual surface water resources of the country have been placed at a total of about 170 million hectare meters.

Sources of Groundwater

Groundwater is the major source of drinking water in both urban and rural India. Besides, it is an important source of water for the Agriculture and Industrial sectors. Approximately 70 per cent of the fresh water used by human beings goes to agriculture. Intensive irrigated agricultural discharge and industrial waste effluents into the groundwater can bring about the considerable change in the groundwater quality. Groundwater is used for domestic and industrial water supply and irrigation all over the world. It is an important source of drinking water but is polluted because of the waste generated in the industrial, agriculture and domestic sectors. Water is very essential for any development activity and the availability of good quality of water for domestic and industrial use will help in fast development of the region.

RESULTS AND DISCUSSION

WATER RESOURCES DEVELOPMENT IN INDIA

India continues to struggle with growing financial crunch to complete its water sector infrastructure and its operation and maintenance cost. On the other hand, inadequate institutional reforms and effective implementation has affected its performance level. In recent years, the Government of India has initiated several steps to improve investment and management of water management sector, which include Accelerated Irrigation Benefits Programme, Hydrology Project, Command area Development and Water Management Programme, National Project for Renovation and Restoration of Water Bodies to Agriculture, Flood Management, and River Basin Organizations.

NATIONAL WATER POLICY 1987 AND 2002

The National Water Policy adopted by the Indian National Water Resources Council recognizes that water is a scarce and precious resource and there by outline the broad principles that govern the management of the country's water resources⁶. The first National Water Policy was adopted in September 1987. However, a very little has been achieved in the fulfillment of the objectives laid down in the first policy⁷. Hence, there was a need to revise the National Water Policy of 1987 and a new policy was thus adopted in 2002 with a few more provisions.

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Eleventh Five Year Plan Focus

The 11th Five Year Plan Focus (2007-12) lays down provisions for efficient management of water resources in the country. These are as follow (GOI, 2006):

- a) **“The Jal Abhiyan Programme”** was launched in December 2005 for mass awareness among the stakeholders of surface and groundwater for judicious utilization, which covered about 20, 000 villages, developed one lakh harvesting structures and revamped canal system.
- b) **“The Bharat Nirman Programme”** launched in 2005 identifies seven major areas where infrastructure gaps need to be addressed. The programme currently extends into initial two years of the 11th Plan⁸. Bharat Nirman is a time bound plan for action in rural infrastructure over the four year period (2005-2009). Under Bharat Nirman, action is proposed in the areas of irrigation (to create 10 million hectares of additional irrigation capacity), rural roads, rural housing, rural water supply, rural electrification and rural telecommunication connectivity.

2 Approach to 12th Five Year Plan

i) Flagship Development Programmes

1. **“Accelerated Irrigation Benefit Programme (AIBP)”** and other water Resources programmes under the ministry of water resource Govt. of India.
2. **“Rajiv Gandhi National Drinking Water Mission”**. Department of Drinking water supply, Ministry of Rural development. Government of India, New Delhi.
 - Water quality monitoring and surveillance’. The programme organized by Ministry of Rural Development and recommended institutionalization of drinking water quality monitoring and surveillance in the country, has given the guidelines for the National Rural Drinking Water Quality Monitoring and Surveillance programme (NRDWQM & SP).
 - As drinking water quality monitoring and quality surveillance are two distinct but closely related activities, requiring drinking water quality monitoring by suppliers of the drinking water and surveillance by the Health authorities, the workshop had also recommended close collaboration between drinking water supply agencies and health authorities all over the country. The enormous task of drinking water quality monitoring and surveillance in rural areas requires 160 lakh samples to be tested annually with a norm of one sample per 200 populations.
 - In order to institutionalize water quality monitoring and surveillance systems four pilot projects were implemented in Nellore (Andhra Pradesh), Sehore (Madhya Pradesh), Allahabad (Uttar Pradesh) and Kangra (Himachal Pradesh) based on Catchment Area Approach. After analyzing the findings of these pilot projects, it has been decided to scale up the programme all over the country⁹. Accordingly, an implementation manual on National Rural Drinking Water Quality Monitoring and Surveillance programme was got prepared through all India institute of Hygienic and Public Health, which was circulated to all state Governments in January 2004.

WATER RESOURCES AND TECHNOLOGY

India is one of the wettest countries receiving as much as 4000 billion cubic meters of rainfall every year. Barely a third of the potentially available water is being utilized. With rapid population explosion and rising expectation for a better life, this natural resource on earth faces an increasing pressure. It is projected that by 2025, the availability will be below 1000 cubic meters which will represent acute scarcity levels. The rapid industrialization and indiscriminate use of chemicals in agriculture are polluting the known resources of fresh water thus further aggravating the problem.

Over the years the issue of safe drinking water has gained momentum and national importance. The challenges which are posed for achieving this goal are to provide technologies at affordable, accessible and acceptable level. Issues which primarily concern safe drinking water are presence of pathogenic micro-organisms, hazardous heavy metals, inorganic salts and pesticides. The areas in which technological interventions are required include water purification, recycle, brackish water treatment and desalination of

brine water. Many CSIR labs have initiated programmes for providing technological interventions in making safe drinking water availability to masses.

The eleventh plan of CSIR in the area of 'water' aims at delivering products and systems which will further strengthen our efforts in developing affordable, accessible and acceptable technologies for fulfilling the national requirements in public and social sectors. The proposals put forward broadly cover important areas, viz. cost effective mine water reclamation technology for providing safe drinking water, sustainable development of groundwater resources in problematic terrain, use of membrane technology for water disinfection / purification and waste water reclamation, membrane technology for water purification and desalination and technology package for high capacity arsenic removal plants and wastewater treatment using ceramic MF-UF membranes.

NETWORK PROJECTS TAKEN BY THE GOVERNMENT OF INDIA

Project No.1 Development of hollow fiber membrane technology for water purification and waste reclamation (CSMCRI) Hollow fibre membranes are flexible, have large surface area, low operation cost and produces no waste product are increasingly used for water treatment.

Project No.2 Development of cost effective mine water reclamation technology for providing safe drinking water (CMRI, Dhanbad). In spite of the availability of large water resource of in the form of mine water in the area around Dhanbad, Jharia and other mining belt of India, the mining areas suffer from acute shortage of potable water. In view of this, a project is proposed for development of cost effective technology for harnessing mine water resources of that area for drinking water purposes.

Project No.3 Sustainable development and management of water resources in different problematic terrains (NGRI, Hyderabad) Water resources of many regions in the country face problems owing to fractured, alluvium or island terrain. The proposal is to augment techniques to exploit water sources in these areas. It involves development of techniques to delicate, characterize and asses groundwater potential through geophysical, hydrogeological, isotope and mathematical modeling technique.

WATER QUALITY PROBLEMS IN INDIA

Quality of Groundwater

The quality of groundwater has become an issue of prime national concern. Groundwater monitoring wells are one of the most important tools for evaluating the quality of ground water and establishing the integrity of hazardous material management facilities.

Growing demand across competitive sectors, increasing droughts, declining water quality, particularly of groundwater, Inter-state River disputes growing financial crunch, inadequate institutional reforms and enforcement are some of the crucial problems faced by the country's water sector. Availability of safe drinking water is inadequate. Severe water shortages have already led to a growing number of conflicts between users (agriculture, industry, domestic), intra state and interstate, emerging challenges include management of existing infrastructure and of the water resource itself. Water reform in India mostly focuses on organizational issues rather than the instruments which govern the relationship between the regulator and the user.

Access to and Adequacy of Safe Water

The per capita water availability at national level has declined over the years. Deteriorating water quality, pollution problems and seasonal water shortages are increasingly making water unsuitable and inadequate for basic human needs. Key challenge is providing safe and adequate water to all. In rural areas burden of fetching water from distant sources falls on women and yet women (who are the providers and managers of water in the household) have little or no voice in 'water resources planning'. As for the urban areas, most large cities are chronically short of water.

Over-extraction of Groundwater and Quality Problems

Problems related to groundwater governance include high extraction rates, fluctuating water tables, groundwater pollution, and reduced agricultural production and equity issues. Complexities such as the existence of millions of wells across the country, unhindered public access to groundwater and often poorly understood character of the system dependent on groundwater, pose a serious challenge to the groundwater managers. There are no legal and financial checks to ensure that the resource developed only are safe and semi-critical¹⁰. The over extraction of groundwater in some coastal areas has led to the problem of saline water intrusion processes are also responsible for deterioration of groundwater quality (arsenic and iron concentration). Therefore, policy makers face a unique dilemma; how to ensure and preserve the benefits to farmers and the wider economy of rapid groundwater expansion; while attempting to control its excesses. Private land owners in India have absolute ownership of groundwater beneath their land and they can extract any amount of groundwater are recognized only indirectly through land right. Therefore, under conditions of unequal land. The practice of linking groundwater with land and the fact of defacto control by better endowed persons only accentuates rural inequality and water used inefficiency.

The Impact of Micro Bacteria on Water

Water may contain bacteria which are very small organisms. Some bacteria are harmful and called pathogenic bacteria while some are innocuous and are known as non-pathogenic bacteria. Pathogenic bacteria present in water are responsible for causing diseases like cholera, typhoid, dysenteries etc. It is, therefore, extremely important to treat the public water supply for removing these pathogenic bacteria, if they are present.

It is, however, very difficult to isolate pathogenic bacteria. Since isolation of pathogenic bacteria is time-consuming as well as difficult, simple tests are performed to determine the possible of intestinal organisms, which are known as coliform group of bacteria, some of which may also be non-pathogenic.

CONCLUSION

Water is main source for irrigation and industrial purposes. A variety of land and water based activities are causing pollution of water and over-exploitation is causing aquifer contamination in certain instances. The three percent of global fresh water is large enough to meet the requirements of man for millions of years. Majority of rural population living in India largely depends on ground water for domestic use. Immense increase in world's population resulting in spurt in urbanization, industrialization, agriculture etc. has put simmering pressure on the limited fresh water resources there by threatening the fresh water bodies with pollution.

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