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Fresh Water Resource Optimization

- *Importance and Need*

FRESH WATER SOURCE

As we move towards the 21st century, water professionals and policymakers must face new threats to the world's freshwater resources. These threats include pollution, the impacts of global warming & climate change, a resurgence of water-related diseases and the destruction of freshwater ecosystems. Today, according to United Nations, around 80% of all wastewater is discharged in to the world's waterways where it creates health, environmental and climate-related hazards.

Despite the pressing nature of these threats, till now we are unable to develop the tools and approaches needed to address these problems in an efficient and sustainable manner.

WATER ECOSYSTEM

Threats to the World's Freshwater Resources focuses on four emerging issues and challenges:

1. water and ecosystem health 2. the destruction of freshwater ecosystems 3. freshwater quality concerns and 4. long-term global climate change and its impact of water resources.

One of the major solutions is a realization of sustainable use of freshwater which requires a new and focused approach.

Freshwater ecosystems such as lakes and rivers are primarily affected by over-extraction, dumping of waste, discharge of wastewater and climate change. These ecosystems are essential for human health, biodiversity, and the functioning of other ecosystems on land and at sea.

India based on area is the seventh largest country in the world and by population it ranks at number two after China. About 17 % of the world population lives in India while contribution to freshwater resources accounts for only 4% of world freshwater resources.

Due to rapid industrialization with population growth and urbanization, the per capita availability of fresh water in the country has come down below 1600 cum/person/year- declaring India as a water stressed country. If present trend continue India will soon declared as a water scare country.

Optimization techniques in water resources system management are used to reach a system of optimum solutions, whereas simulation techniques approach the system evaluation by a trial and error method to lead to the identification of the best possible solution for the system. Therefore, the water resources planning and management, as well as sustainable development and optimal use of natural resources seems to be utmost important in today's perspective.

POLLUTED WATER

Water crisis, increasing water demand, and the occurrence of intermittent droughts, saving water consumption, and efficient use, it is necessary to use appropriate optimization techniques (like RWH, Recycling & Reuse) those can be helpful in this regard. Limited freshwater resources, on the one hand, and growing demand, on the other, are exacerbating people's concerns about water resources. The unnecessary and inappropriate groundwater harvesting has occurred over the last few years and it is a serious threat to water resources, which drastically affects the environment, especially in dry and semi-arid areas. Using the concept of optimization, which is the most appropriate output value of a system due to its constraints, it can be concluded that optimizing water resources is one of the best ways to conserve our water resources.

WATER TREATMENT PLANT

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