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## Water Resource Management Through Community Initiatives

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### ABSTRACT

*Water Resource Management plays a significant role in the economic development of the country. There is an imperative need for people participation in augmenting water resources through rainwater harvesting for sustenance. This research paper examines the challenges facing India's water sector and measures to be taken through government and community initiatives.*

**Keywords : Rainwater harvesting, Water resource management, Tube-well, Groundwater**

### 1. Introduction

Faced with poor water supply services, rural farmers and urban dwellers alike have resorted to helping themselves by pumping out groundwater through tube-wells. Today, 70 percent of India's irrigation needs and 80 percent of its domestic water supplies come from groundwater. Although this ubiquitous practice has been successful in helping people to cope in the past, it has led to rapidly declining water tables and critically depleted aquifers, and is no longer sustainable.

Paradoxical it may seem that while plenty of river basins criss-cross the country's landscape, India faces a bleak water future. With the opening up of the economy there is consequent steep increase in demand for water in both urban and rural areas. The demand for water has gone up manifold due to growing economy and rising population. Unless water management policies and practices are changed soon and new avenues explored, India will face a severe water crisis within the next two decades. Huge outlay is required to build new infrastructure for water management.

### 2. Rationale for the Present Study

Proper water resource management is sine-qua non for country's economic development and prosperity. This research paper examines the challenges facing India's water sector and measures to be taken through government and community initiatives.

### 3. Objectives of the Study

The objectives of the study are:

1. Study the problems and challenges of water resource management
2. Suggest Strategies for its effective management

### 4. Research Methodology

This study is confined to management of water resources in Indian environment. Data and information for the research study were collected and analyzed from secondary published sources viz., books, newspapers, web sites and research studies.

### 5. Findings of the Study

#### 5.1 Problems and Challenges of Water Resource Management

The World Water Development report of the United Nations has categorized India among the worst countries for poor quality of water, as well as their ability and commitment to improve the situation. The major problems and challenges in water management in India are listed below.

- i) Water shortages across the country have led to growing number of conflicts among states. Some 90% of India's territory is drained by inter-state rivers. There is not enough political will to solve the inter-state river disputes. Lack of clear allocation rules and uncertainty about water rights of each state has imposed high economic and environmental costs.
- ii) Sewage and waste water from rapidly growing cities and effluents from industries have turned many rivers, including major ones, into fetid sewers. Some of the rivers have almost become extinct like Mahe river in Mumbai, Nag river in Nagpur, etc.
- iii) Climate change projections show that India's water problems are only likely to worsen, with more rains expected to fall in fewer days and rapidly melting glaciers, especially in the western Himalayas. There will be increasing incidences of droughts and floods.
- iv) While cities get the attention of politicians, rural areas continue to face acute water shortages.
- v) Groundwater resources have been heavily over-used. Such has been the level of extraction from rivers that most of India's river basins have degraded and are polluted.
- vi) Large dams are major sources of water storage, and canals are the major distributor route. While former have caused large-scale community displacement and ecological havoc, the latter has led to large-scale degradation of land.
- vii) Apart from water shortage, there are problems of mismanagement resulting in inequitable and erratic distribution of water.

Thus water availability, both in terms of quality and quantity, has declined to such an extent that many parts of India, rural and urban, today face drought-like situation.

### 6. Strategies for Effective Water Resource Management

There is clearly an urgent need for action in both rural and urban areas to meet the water shortages. Many Indian cities lack sufficient water supplies. Demand for water in rural areas is increasing due to increase in cultivation area and multiple crops, increasing population and changing socio-economic conditions. Taping ground water is increasingly becoming expensive and unreliable.

- i) New water infrastructure needs to be built especially in areas such as water-rich northeast where such investments can transform water from a curse to a blessing. Furthermore, India desperately short of power during peak periods, has utilized only about 20% of its economically viable hydropower potential, as compared to 80%

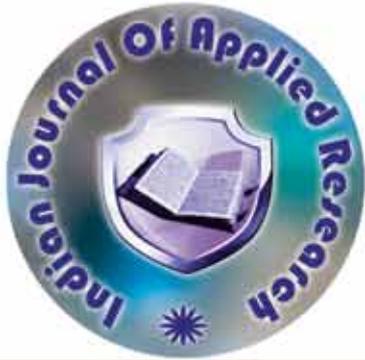
- in developed countries. India needs to invest in water infrastructure at all levels – from large multipurpose water projects to small community watershed management and rainwater harvesting projects.
- ii) The State should focus on flood control and sewage treatment and play the role of regulator in water infrastructure development.
  - iii) The State has to define water entitlements at all levels, improve quality and quantity of data and make these data available to public so as to stimulate formation of user groups at all levels – the river basin, the aquifer, and the irrigation.
  - iv) Open spaces are ideal spots for collecting rainwater. Instead of causing instant floods, flooding storm drains and sewage pipes that are blocked with junk can be repaired to provide simple ways to re-charge the underground with rainwater.
  - v) Factories need water for their industrial processes. Many factories install equipment to filter used-water, return their pH to neutral and reuse the same water. Petroleum refinery for example purchases city sewage and converts to usable industrial water.
  - vi) Hostels associated with Universities, Colleges and other Institutes need lots of drinking water. It should be made mandatory for them to have rainwater harvesting systems for their use. For example, at IIT Madras, there are 12 hostels in the hostel sector, each with about 250 students, with daily needs of about 75 litres per day per person (for drinking, washing and toilet usage). Using a group of 4 large agricultural wells that were present, rainwater collecting on the roofs of these hostels were collected and diverted to these wells.
  - vii) State Governments can play key role in promoting rainwater harvesting across all districts of their State. Like charity beginning at home, all government offices across the state in both rural and urban areas must have their own water harvesting systems. All municipal offices, Collector's offices, Block Development Offices, Project Offices, Police quarters, Krishi Vigyan Kendras, etc. should install rainwater harvesting systems for their own water needs thereby setting an example for other residents of their district to follow
  - viii) Mandatory laws should be brought in every state making buildings to install rainwater harvesting structures. New buildings should take the additional step of filtering and recycling grey water and reducing sewage sent out from the building.
  - ix) Hotels, holiday homes, etc. should set up rooftop rainwater harvesting systems for all their water needs.
  - x) In cities and towns all residential complexes can make harvested rainwater potable by boiling in parabolic solar cookers, adding alum and chlorine to disinfect water before consumption. Appropriate technology such as solar water disinfectant; provide low-cost disinfection options for treatment of stored rainwater for drinking.
  - xi) Shopping malls, railway stations, bus terminals, government buildings, schools, educational institutions, temples, churches, mosques etc., should have their own water harvesting systems.
  - xii) Local communities in rural areas have an excellent knowledge of the geology, topography of the land and are thus best placed to decide on the design, height, location, etc. of the check dams. Villagers and farmers should be encouraged to involve themselves in the construction work of water harvesting systems suited to their place. This would reduce the costs and also ensure quality construction. Role of government bodies should be that of facilitator.
  - xiii) To ensure sustainability of water harvesting movement in rural areas, it is necessary to set up participatory systems to manage, sustain and expand by forming village management committees. Such committees would consist of village sarpanch, progressive farmers, villagers from agrarian class, etc to ensure proper management and planning of water harvesting systems.
  - xiv) Besides implementing water harvesting structures, villagers should ensure well recharging, building underground tanks, animal husbandry, planting trees and seed sowing for balanced eco-systems.
  - xv) Water resource management can best be undertaken by communities who have a stake in it. Government has an important role to play – that of an enabler. Communities should take advantage of financial support provided by government in order to begin water harvesting activity and then go on to undertake wider watershed activities.
  - xvi) The government should also make available technological resources and technical know-how at its disposal – for instance, by providing scientific tools such as GIS and remote sensing data and have its technical staff provide technical assistance to the villagers.
  - xvii) Traditional systems of water harvesting systems should be revived as a practical solution for drought proofing affected areas.
  - xviii) To meet the increasing demand for water and ensuring continuous supply all round the year, there is a need for strengthening the public private partnerships in both rural and urban areas. While government bodies may provide water supply for common amenities, every residential complex should have their own rain harvesting systems (including recycling used water). Hotels, hospitals, factories, educational institutions, offices etc. should have their own water harvesting systems for their consumption.
  - xix) People in residential buildings, hostels, hospitals, educational institutions, hotels, factories, etc. who have rainwater harvesting systems should ensure that they are maintained properly to reap maximum benefit. They should clean the rooftop, ensure that there are no blocks or cracks in the rainwater pipes, clean the percolation pit, sand / pebbles and refill it, ensure rainwater reaches the gutter and that rainwater flows into the recharge well. They should remove the silt and debris in the recharge well.
  - xx) TV, newspaper and other media can play a constructive role in educating people on the benefits of harvesting rainwater. To encourage community to take to water conservation measures, the State and the media should institute annual excellence awards for such endeavors.

## 7. Conclusion

Though India is well covered by water sources, most of them have been rendered non-functional or rendered unusable. Rainwater harvesting can recharge all these sources through relatively low cost techniques and help India achieve its Millennium Development Goals of fully covering seventy percent of habitations by 2015. The US depends a lot on rainwater harvesting for its irrigation and drinking water needs, dovetailing traditional knowledge and scientific methods. There is therefore no reason why our society cannot emulate this example and take the pressure off from water crises. People of metropolitan cities, cities, towns and villages should adopt rainwater harvesting to augment water resources in a big way. The real need of the hour is to conserve and preserve available water.

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