



RESEARCH ARTICLE

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RAIN WATER HARVESTING, CONSERVATION AND MANAGEMENT STRATEGIES FOR DROUGHT – PRONE TAHSILS OF JALGAON DISTRICT MAHARASHTRA STATE, INDIA: URBAN AND RURAL SECTORS

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ABSTRACT

Water is our most precious natural resource and something that most of us take for granted. We are now increasingly becoming aware of the importance of water to our survival and its limited supply. The human beings require water for various purposes. The most part of the earth surface i.e. about 71 % is covered by water. Out of total volume of water available on the surface of the earth 97 % is saline water, 2 % water is in the form of ice and glaciers and only 1 % is fresh and potable water. India is well endowed nations in the world in terms of average annual rainfall. It is unbelievable but it is true that Mousinram which gets 11000 mm annual rainfall still suffers from serious drinking water shortage. Though India's average annual rainfall is 1170 mm; in the deserts of western India it is as low as about 100 mm. Hence, it is necessary to opt for rainwater harvesting measures for fulfilment water requirement. The paper discusses related concerns and outlines what need to be done.

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INTRODUCTION

Water is essential for all life and used in many different ways, It is also a part of the larger ecosystem in which the reproduction of the bio diversity depends. Fresh water scarcity is not limited to the arid climate regions only, but in areas with good supply the access of safe water is becoming critical problem. Lack of water is caused by low water storage capacity, low infiltration, larger inter annual and annual fluctuations of precipitation (due to monsoonic rains) and high evaporation demand. The term water harvesting was probably used first by Geddes of the University of Sydney. He defined as the collection and storage of any form of water either runoff or creek flow for irrigation use. Meyer's of USDA, USA has defined it as the practice of collecting water from an area treated to increase runoff from rainfall. Recently Currier, USA has defined it as the process of collecting natural precipitation from prepared watershed for beneficial use. Now a days water harvesting has become a general term for collecting and storing runoff water or creek flow, resulting from rain in soil profile and reservoirs both over surface /under surface. Previously this was used for arid and semi-arid areas, but recently their use has been extended to sub humid and humid

regions too. In India water harvesting means utilizing the erratic monsoon rain for raising good crops in dry tracks and conserve the excess runoff water for drinking and for recharging purposes.

Objectives

- Restore supplies from the aquifers depleted due to over exploitation.
- Improve supplies from aquifers lacking adequate recharge.
- Store excess water for use at subsequent times.
- Reduced storm water runoff and soil erosion
- Recycle urban and industrial wastewater etc.
- Rehabilitate the existing traditional water harvesting structure like village ponds, percolation tanks etc.
- Use the existing defunct wells and bore wells after cleaning and also the operational wells as recharge structures.

Need for Rain Water Harvesting

Water is a becoming a scarce commodity and it is considered as a liquid gold in this part of the country (especially in

drought – prone tahsils in Jalgaon district of Maharashtra State. The demand of water is also increasing day by day not only for Agriculture, but also for household and Industrial purposes. It is estimated that water need for drinking and other municipal uses will be increased from 3.3 MHm to 7.00 MHm in 2020/25. Similarly the demand of water for industries will be increased by 4 fold i.e. from 3.0 MHm to 12.00 MHm during this period. At the same time more area should be brought under irrigation to feed the escalating population of the country, which also needs more water. But we are not going to get one litre more water than we get at present though the demand is alarming. The perennial rivers are becoming dry and ground water table is depleting in most of the areas. In the study region depletion is about 30-60m in the last 30-40 years. Country is facing floods and drought in the same year in many states. This is because, no concrete action was taken to conserve, harvest and manage the rain water efficiently. The rainfall is abundant in the world and also in India. But it is not evenly distributed in all places. India being the monsoonic country, the rain falls only for 3 to 4 months in a year with high intensity, which results more runoff and soil erosion. Total rain occurs only in about 100 hours out of 8760 hours in a year. It also erratic and fails once in 3 or 4 years. This is very common in many parts of the country.

The availability of water in the world, in India and in Tamil Nadu is given below with rainfall.

Places	Rainfall (mm)	Population	Availability of water /Person/ Year M3/P/Y
World	840	6 Billion	700
India	1150	1 Billion	2200
Maharashtra	901	112Million	1800
Study region	682	21Million	1096

Methods of Water Harvesting in Rural and Urban Areas:

There are different / various system of water harvesting depending upon the source of water supply and places as classified below.

1. In situ Rainwater harvesting

- Bunding and terracing.
- Vegetative / stone contour barriers.
- Contour trenching.
- Contour stone walls.
- Contour farming.
- Micro catchments.
- Tie ridging methods
- Farm ponds.

2. Direct surface runoff harvesting

- Roof water collection
- Dug out ponds / storage tanks
- Tanka's
- Kundis
- Temple tanks
- Diversion bunds
- Water spreading

3. Stream flow / runoff harvesting

- Nalla Bunding
- Gully control structures
- Check dams – Temporary
- Silt detention tanks
- Percolation ponds

4. Sub surface flow harvesting

- Sub surface dams
 - Diaphragm dams
5. **Micro catchments / watershed**
- Inter terrace / inter plot water harvesting
 - Conservation bench terrace
6. **Runoff inducement by surface treatment**
- Roaded catchments
 - Use of cover materials – Aluminium foils, Plastic sheet, betonies, Rubber, etc
 - Using chemicals for water proofing, water repellent etc. to get more run off water.
 - A comprehensive watershed development on

To sum up the following types of Water Harvesting System for different uses can be implemented in different parts of the country.

No	Region	Types of water	Use
1	Arid plains	Artificial catchments Drinking plains to capture rainfall (tankas or kundis in Rajasthan)	Drinking
		Tanks or talabs in Rajasthan to capture and surface runoff	Drinking and Irrigation
		Embankments / obstructions across drainage / Nalla to capture surface runoff	Irrigation water & also for recharging
2	Semi Arid Places	Tanks / Ponds/Eri to capture surface runoff places and also chains of tanks called cascade.	Irrigation water and drinking water through recharge of ground water
3	Flood Plain	Mud embankment Irrigation which may be breached during the floods.	Irrigation water and drinking water through recharge of ground water
4	Hill and Mountain region	Diverted stream flows irrigation Jammu, M.P., Water Maharashtra region	Irrigation Water

Case Study in Water Harvesting There are numerous case studies available in water harvesting both in Rural and Urban sectors. In Rural areas it is Soil and Water conservation measures taken on watershed basis to conserve and augment ground water. In the urban sector, it is mostly roof water harvesting for direct use and recharging the ground water and also collecting of surface runoff from pavements / roads and recharging it into the ground through recharge pits or using abandoned / existing wells. The following are the places where rain water / roof water harvesting has been implemented in a successful manner.

Rural Areas

- Ralegoan Siddhi in Maharashtra state
- Lakshman Nagar and Varisai Nadu in Theni Dt., Tamil Nadu.
- Alankulam Taluk in Tirunelveli Dt., Tamil Nadu.
- Aravari watershed in Alwar Dt., of Rajasthan.

- Maheshwari watershed in Andhra Pradesh.
- Kapilnalla watershed in Karnataka.

Urban Sectors

Mostly the roof water harvesting measures are taken up.

a. India

- Tamil Nadu Agricultural University, Coimbatore all main buildings.
- PRICOL, Periyanaickenpalayam (Industry Building), Coimbatore
- TWAD Board / office and PWD office at Chennai.
- Numerous Apartment buildings in Chennai.
- Sundaram and Clayton Ltd, Padi, Chennai (Industry buildings)
- TVS training school at Vanagaran, Chennai
- Rastrapathi Bhavan, Delhi.
- Centre of science and environment building at Delhi.
- Institute of economic growth, New Delhi.

Conclusions

Water is a very valuable resource. There are no serious efforts to gain water by practices like rainwater harvesting, watersheds and mini-ponds. Rainwater harvesting should be made mandatory. It is very important to make water everybody's business. It means a role for everybody with respect to water. Every household and community has to become involved in the provision of water and in the protection of water resources. Make water the subject of a people's movement. It means the empowerment of our Urban and Rural community, i.e., to manage their own affairs with the state playing a critical supportive role.

Further involving people will give the people greater ownership over the water project including watershed development, Soil and Water conservation and water harvesting will go a long way towards reducing misuse of government funds. It will also develop the ownership, they will also take good care of them. For agriculture, an integrated water management practice consisting of three main components – rain water harvesting, water-saving micro-irrigation, and highly efficient crop production – should be adopted. In this way it is possible to solve water problems facing the county in the 21st century. Conservation of water should be taken as a way of life and widely adopted.

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