

Water Resources Management and Planning under Climate Change a case study

¹Mrs. S. A. Chougule, ²Mrs. S. M. Madhale, ³Mr. S. A. Mahadik

¹ Assistant professor Civil engineering Department, ATS's SBGI Miraj, India

² Assistant professor Civil engineering Department, ATS's SBGI Miraj, India

³ Assistant professor Civil engineering Department, ATS's SBGI Miraj, India

ABSTRACT:

Water is the essential requirement of human life support system. The population of India is 16% of global population it has only 4% of the water resources. To reduce the scarcity of water, watershed management is necessary. The national water policy gives prime importance to drinking water followed by agriculture, industry and power generation. The object of water resource management is to pay special attention to rainwater conservation and reduce soil erosion. The aim of paper is to study different methods of watershed management practice to cater the water scarcity.

Keywords: *Water, Water scarcity, Watershed Management, Rainwater conservation*

I. INTRODUCTION:

All living organisms including plants, animals and human beings need water to live and to carry out different day to day life activities. Water is a precious, essential and an abiotic component of the ecosystem. The basic objective of watershed management is to meet the problems of land and water use. For development of agriculture and drinking water resource the basic elements required are land and water. So it's prime responsibility of everyone to preserve water. As India is agricultural nation, it's necessary to study and implement various methods of watershed management to increase crop yield. Watershed management techniques adoption is useful to get perennial crops. Non perennial crops are also possible due to implementation watershed management techniques. By adopting ground recharging methods water can be made available for drinking purpose in summer season. The possibility of drought can be reduced by implementing various watershed management techniques.

II. Watershed Management Concept: Watershed management means developing and implementing various techniques to store and preserve rainwater to satisfy water need of human being. Rainwater is the main source of water for all human being. Watershed management helps to maintain the conservation, regeneration

and use by humans of land and water by adopting different method of storing and recharging. Watershed management deals with the soil and water conservation. It aims to reduce the floods and sediment control besides increasing agricultural food production. Thus, watershed as a unit enables planners and implementing agency to consider all inputs, processes and expected outputs systematically which are essential for a holistic development approach.

1. Types of Watershed techniques

- 1.1 Contour farming
- 1.2 Bench terracing
- 1.3 Farm ponds
- 1.4 Percolation ponds
- 1.5 Waterways
- 1.6 Rainwater harvesting

III. Objectives of Watershed Management

- 3.1 To improve resource conservation (soil & water) and land use.
- 3.2 To minimize the risks of floods, droughts and landslides.
- 3.3 To manage and utilize the runoff water for useful purpose
- 3.4 To develop rural areas in the region with clear plans for improving the economy of the regions.
- 3.5 Improving the socio – economic status of the farmers.

IV. Methodology

Following steps were followed for implementing techniques:

- 4.1 Selection of Site for implementation of watershed techniques.
- 4.2 With direct discussion with the local people, analyze the problems faced by the villagers regarding water scarcity.
- 4.3 Collection of the data of site condition and surrounding area.
- 4.4 Preparation of contour map of selected site.
- 4.5 Profile leveling is used to select the water outlets.
- 4.6 Constructing the suitable structures on water outlet points.

V. Case study

Belanki village is located in Maharashtra in Sangli district at latitude of 16° 51' 0" North and longitude of 74° 52' 0" East. Total agricultural area is 1698 ha. About 125 ha is un-irrigated area. About 1573 ha is irrigated area. About 1 ha is irrigated by canal water. About 124 ha are irrigated by wells/tube wells. About 67 ha is in non-agricultural use. About 80 ha are under miscellaneous tree crops. About 150 ha is lying as current fallow area.

About 190 ha is culturable waste land. About 160 ha are lying as fallow land other than current fallows. About 278 ha are covered by barren and un-cultivable land. So to make maximum land cultivable following Watershed Management methods to be adopted in Belanki are as follows:

5.1 Contour Farming:



Figure no. 5.1 counter farming for enhance soil fertility

Contour farming enhances soil fertility by preventing downwash of the fertile topsoil of a farm and resulting in good yields. It promotes infiltration process. Contour farming increases the soil's water retention ability to ensure that enough water soaks into the soil for good health of the crops. At the same time, water retention improves soil quality, irrigation, and water conservation.

5.2. Rooftop Rain water harvesting

Rainwater harvesting is the simple method used to conserve rainwater by collecting, storing, conveying and purifying of rainwater that runs off from rooftops of buildings, roads for later use. The types of homes in the area are Mangalore tile homes, Slab type home, and Flat roof soil type homes. So it will be beneficial, roof top rainwater harvesting should be practiced for water conservation at home level. The rainwater collected from roads can be used to recharge ground water and tube wells.

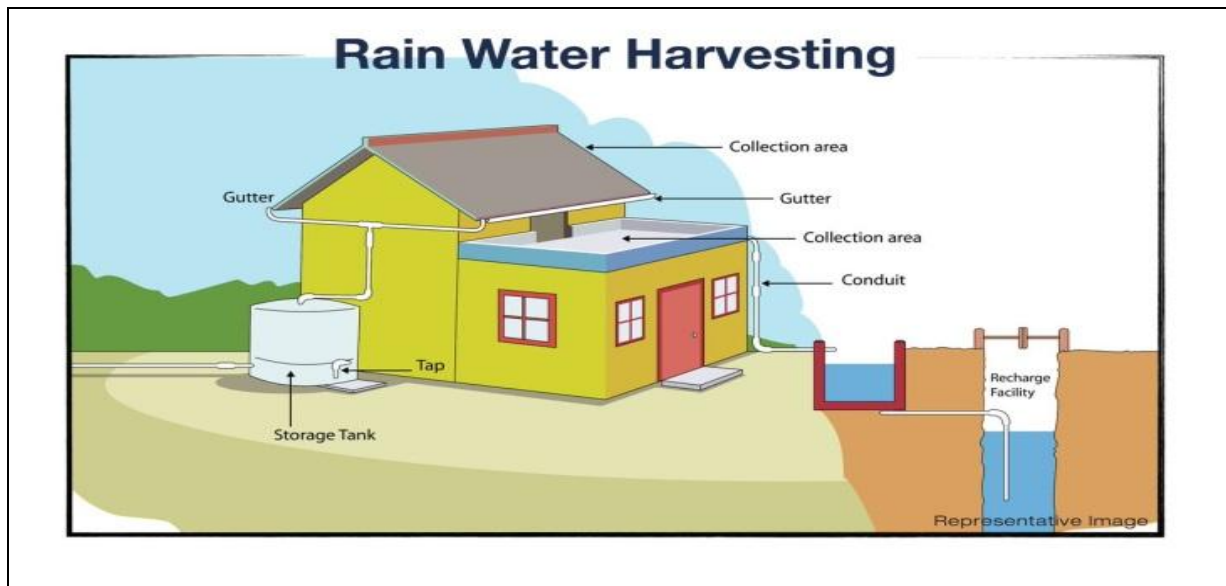


Figure no. 5.2 rainwater harvesting at top of roof

5.3 Farm ponds



Figure no. 5.3 farm pond water harvesting

Farm ponds are small tank or reservoir-like constructions, built for the purpose of storing the surface runoff, generated from the catchment area. Farm ponds are water harvesting structures that meet many farm needs, viz. supply of water for irrigation, cattle feed, fish farming, etc. A pond that is about 10 meters by 10 meters and 3 meters deep is an ideal size. The pond should have an inlet and an outlet lined with rock to prevent erosion.

5.4 Percolation tank



Figure no. 5.4 percolation tank

Percolation tank is one of the effective methods of refilling groundwater table. These tanks are intended to percolate the surface water so that it recharges ground water level which supplies water for drinking as well as for farming. These are usually constructed across streams and larger riverbeds to impound a portion of run-off water. The soil should be permeable at the location of percolation tank.

VI. CONCLUSION:

After implementing above watershed management methods following things will be possible:

1. By adopting Rainwater harvesting at home level, the ample water will be available in summer season.
2. By formation of Farm ponds crops in winter and summer season can be grown.
3. By construction of percolation tanks ground water level will be raised, which will help for plantation on barren land to reduce soil erosion.
4. By adopting Rainwater harvesting at roads will recharge tube wells and wells in Belanki.
5. To make a watershed project a success, it is very important for the community to come together and participate in planning, initiation and execution of location-specific watersheds development activities such as soil, water and biomass conservation measures.

VII. REFERENCES:

- [1] H. Rao, Watershed development in India, *Recent experience and emerging issues II economic and potential weekly*, November 4, 2000, pp. 3943- 3947.
- [2] 1Pandurang D. Jankar, 2Dr.Mrs. Sushma S. Kulkarni PG Student, *A CASE STUDY OF WATERSHED MANAGEMENT FOR MADGYAL VILLAGED*Department of Civil Engineering, Director, Department of Civil Engineering, RajarambapuInstitute of Technology, Rajaramnagar, Islampur, Dist. Sangli, Maharashtra, India
- [3] Mr. Vishal P. Kumbhar¹, Mrs. Vidula A. Swami², Mrs. Sushma S. Kulkarni³ 1&3 Department of Civil Engineering, K.E. Society's Rajarambapu Institute of Technology, Sakharale, Dist- Sangli, Maharashtra State, India. 2 Department of Civil Engineering, KIT's College of Engineering, Gokul Shirgaon, Dist- Kolhapur, Maharashtra State, India., Effectiveness of Watershed Management- Means of Economical Development- A Case Study *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE)* e-ISSN: 2278-1684, p-ISSN: 2320-334X, Volume 6, Issue 6 (May. - Jun. 2013), PP 07-14 www.iosrjournals.org
- [4] Dr. (Mrs.) Hansa Shukla (Principal, Swami Shri Swarupanand Saraswati Mahavidyalaya, Amdi Nagar,Hudco,Bhilai, C.G., India)Watershed Management: Its Role In Environmental Planning And Management *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)*e-ISSN: 2319-2402,p- ISSN: 2319-2399.Volume. 1 Issue 5, PP 08-11www.iosrjournals.org
- [5] Snehal S. Patil, Deepali R. Kulkarni, Padmasinh D. Patil.Watershed Management for Ingrul village inSangli District, Maharashtra by using GIS *International Journal of Recent Technology and Engineering (IJRTE)*ISSN: 2277-3878, Volume-8 Issue-2, July 2019
- [5] Dr. K.R.Arora, *irrigation,water power and water resources engineering*, Standard Publishers, Distributors 2012