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Watershed management for Kari River Basin a tributary of Sina River Maharashtra

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Abstract

Most of the part of the India face water scarcity problem in each year. Every after five year India faces to drought. Watershed management means mechanism of creating and implementing plans programs and project to sustain and enhance watershed functions that affect the plant, animal and human communities within a watershed boundary. Watershed management is not so much managing natural resources but about human activities as it is affect these resources. The present study is focus on the techniques which are help to conserve the available rain water in situ i.e. Check dams, Continuous contour trenches and Percolation tanks. Morphometric analysis also helpful to understand river and terrain conditions in the basin area. This purpose S.O.I. toposheets, ASTER data and guideline given by various departments are used as basic information. Basically this region is very worst about water and water management. there is need to develop water harvesting techniques. every possible water harvesting techniques such as CCTs, Check Dams and Percolation Tanks are suggested in this research.

Keywords: Watershed management, ASTER data, water harvesting, Check dam, Continuous contour trench, Percolation tank

Introduction

The annual rainfall over India is computed to be 1170 mm, which is much higher than the global average of 800 mm. However, this rainfall in India occurs during short periods of high intensity and because of such high intensity and short duration most of the rain falling on the surface tends to flow away fast leaving little scope for re-charging of ground water resulting thereby lack of water in most part of the country even for domestic uses.(Rainwater Harvesting & Conservation, Manual, India). Because of tremendous increase in Population, Urbanization and Industrializations, incline water demand in India. Lots of population is depends on agriculture and agriculture depends on monsoon. Study area is affect by erratic monsoon and water scarcity from last decade. Hence there is basic need to manage rain water trough different possible watershed management techniques implemented by government and local level.

Study Area-

Study area lies Beed District and surrounding area of Kada and Devi Nimgaon Villages in Asti Taluka. The Latitudinal extension is 180 48' 15" North to 190 6' 74" North and Longitudinal extension is 750 4' 92" East to 750 7' 50" East. Kari River rises near Dhangarwadi village and meats to the Sina River near Dhahire village. The total basin area is 422 sq. km. Near about 55 villages are comes under Kari River Basin. RahutiNadi is major tributary of this river.

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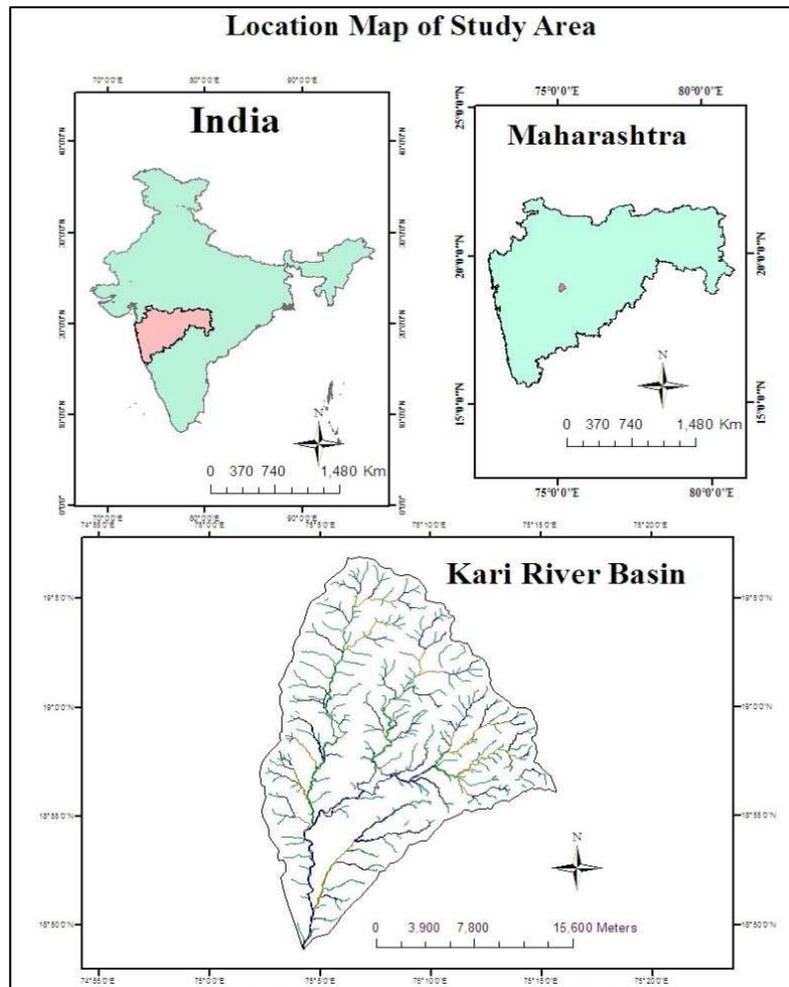


Fig 1: location map of study area

Objective

1. To find suitable site for watershed management.
2. To find out relationship of watershed management and geohydrological units of region.

Methodology

Methodology which is adopted this study technical watershed development guidelines are used which is given by Soil Conservation and Agriculture Department, Government of Maharashtra and Ministry of Rural Development, Government of India. All river and Tributaries are digitized from S.O.I. toposheets. Terrain maps are made by ASTER data which is downloaded from USGS website.

Site Selection Criteria for Water Harvesting Structure-

To overcome water scarcity of study area various watershed management structures are proposed in hilly, plateau and lower reach in Kari River watersheds i.e. continuous contour trenches, check dams and percolation tanks.

Continuous Contour Trench

Continuous Contour trench (CCT) is a trench dug along a contour line. CCTs are constructed in the ridge area, basically located in upper reaches of a micro watershed. This structure checks soil erosion, slowing down the velocity of runoff and improves soil moisture profile. (i) For this structure 5.71 to 14.04 degree slope area is suitable. (ii)

If the slope is more than 14.04 degrees, one can't be dug contour trenches because of digging in high slope causes soil erosion. (iii) If the slope is less than 5.71 degrees, other structures other than contour trenches and CCT are best for such place (Govt. of India, 2007).

Check Dam

(i) Earthen or cement check dams can be constructed across bigger first order or second order streams. (ii) It should be constructed in areas of gentle slopes (less than 1.72 degrees). (iii) Depth of nala should be more than 1 m. (iv) The soil downstream of the bund should not prone to water logging. (v) Vertical distance between two check dams should be more than 1 m. (vi) It can be constructed in area having mix material.

Percolation Tank

(i) The tank can be located across streams by creating low elevation. (ii) Terrain with high fractured and weathered rock for speedy recharge. (iii) Submergence area should be uncultivated. (iv) Rainfall pattern based on long-term evaluation is to be studied so that the tank gets filled up fully during monsoon, preferably more than once. (v) Soils in the catchment area should be of light sandy type to avoid silting of the tank bed. (vi) The location of the tank should preferably be downstream of runoff zone or in the upper part of the transition zone, with a gradient of 1.72 to 2.86

degrees. (vii) Tanks can be constructed in middle or lower reaches of watershed.

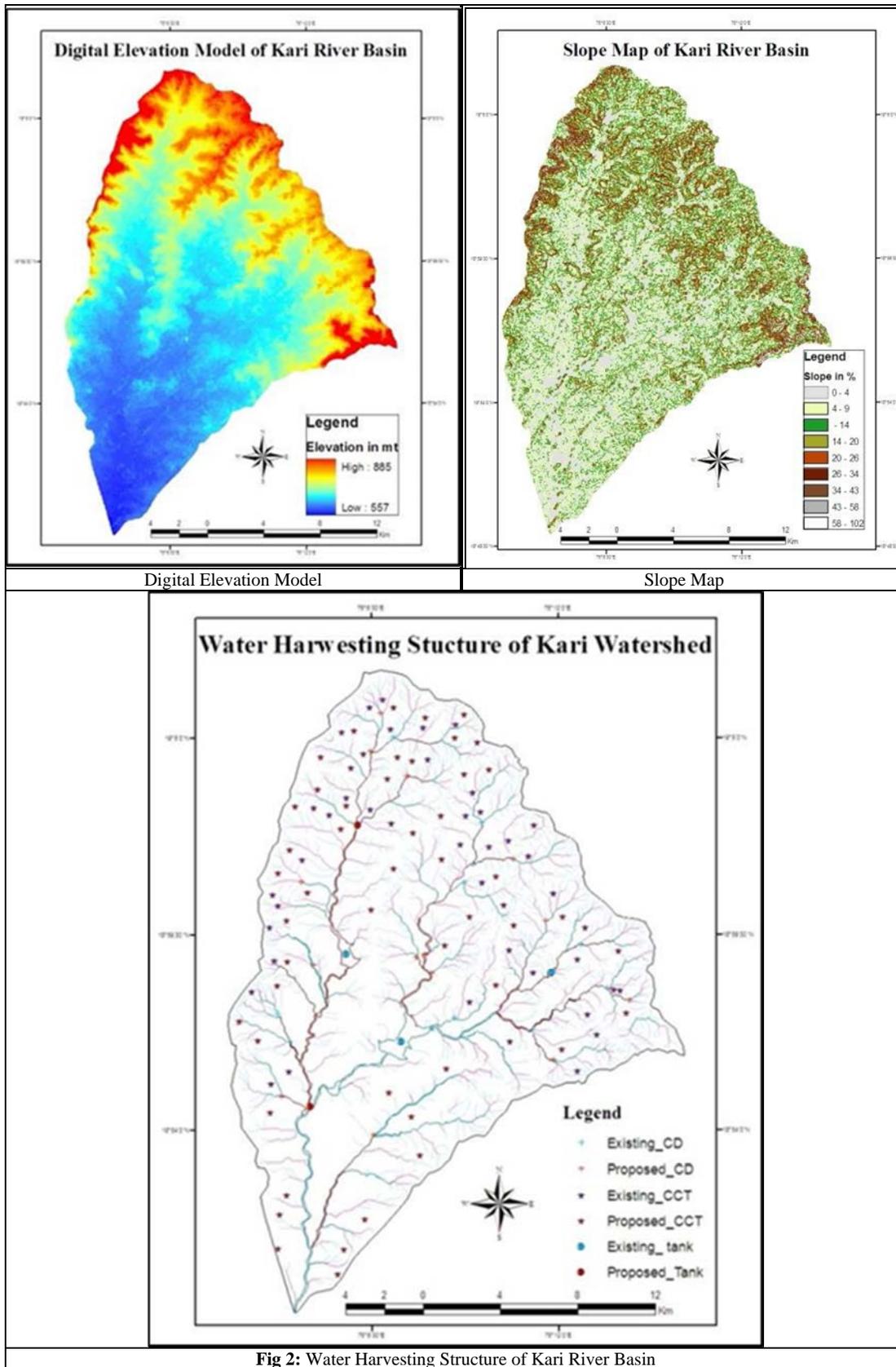


Fig 2: Water Harvesting Structure of Kari River Basin

Morphometric Analysis-

The term morphometry literally means measurement of forms and geform or landform.

Therefore morphometric analysis means analysis of geometry of landform. Horton (1945).

Morphometric Analysis of Kari River Drainage Network		
1	No. of Stream Order	6
2	Total Stream Length (Km)	1053.04
3	Area (Km ²)	422.5
4	Basin Length (Km)	30.82
5	Perimeter (Km)	95.08
6	High Height (m)	885
7	Low Height (m)	557
8	Relative Relief (m)	328
9	Bifurcation Ratio	4.07
10	Length Ratio	2.70
11	Drainage Density (Km/Km ²)	2.49
12	Stream Frequency (Km ²)	3.41
13	Texture Ratio (Km)	11.65
14	Circularity Ratio	0.029
15	Elongation Ratio	0.75
16	Length Of Overland Flow (Km)	0.20
17	Constant Of Channel Maintenance (Km ² /Km)	0.40
18	Form Factor	0.44
Table- 1		

The Morphometric analysis is important in any hydrological investigation like assessment of groundwater potential, groundwater management, pedology and environmental assessment. Geomorphologists and hydrologists have recognized that certain relations are most important between runoff characteristics, and geographic and geomorphic characteristics of drainage basin systems. Various important hydrologic phenomena can be correlated with the physiographic characteristics of drainage basins such as shape, size, slope of drainage area, drainage density, length and size of the tributaries etc. (Rastogi *et al.* 1976). Morphometric analysis helps to understand relationship between basin area and topography of region that allows how we deal with natural system basically for land use e.g. water harvesting techniques apply on particular watershed

Conclusion

Whatever water is getting to the area by rainfall it is enough for basic needs of human activities, yet also lost of area faces water scarcity problem in India. In case of Morphometry of this river has 6th stream order with drainage length of 1053.04 Km. Bifurcation Ratio has indicated this area having hydrological and geological control. Shape of basin is elongated it means this river has flow very short period in monsoon and most of period is dry even there large number of tributaries are there. According to texture ratio and length ratio there is lots of erosion and soil loss, which control by continuous contour trenches. Morphological and geohydrological units are helpful for water harvesting. According to them 14 check dams, 49 Continuous contour trenches and 2 Percolation tanks are suggested in study area. (Fig-2)

References

1. Govt. of India Watershed Works Manual, National Rural Employment Guarantee Act, Produced by Baba Amte Centre for People's Empowerment Samaj Pragati Sahayog for Ministry of Rural Development, Govt. of India, Oct. 2007, 139-225.
2. Horton RE. Erosional development of streams and their drainage basins: Hydrophysical approach to quantitative

morphology. Geological Society of America Bulletin. 1945; 56:275-370.

3. Rainwater Harvesting and Conservation Manual Govt. of India, 2002.
4. Rastogi RA, Sharma TC. Quantitative analysis of drainage basin characteristics, Jour. Soil and water Conservation in India, 1976; 26(1, 4):18-25.