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Delineation of Drainage Pattern and Water Projects - A Geographical Overview

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Abstract: ***In the context of present study the term Delineation means bordering of any kind of area by using scale and reveals in maps. In the context of present study the term Delineation is refer to mapping the drainage and check dams in the study area. The region is drained by the Arunavati River a northern tributary of Tapi, flowing towards the south. River Aner in the east marked an eastern boundary, which flows towards south while in the west Nandurbar district and in the east Jalgaon district. The Northern boundary is marked by Madhya Pradesh. The basaltic lava flows in the hilly tract are not favorable for groundwater development but give rise to perennial and seasonal springs. The contact of the basaltic lava flows with alluvial mountain front deposit is demarcated by a major fault. The alluvial deposits are further subdivided into (a) Talus and Scree deposits bordering in the Satpura foothills and (b) Alluvium consisting of sand clays gravel. Secondly, Evapotranspiration is an important parameter to decide the quality of water is available for plant growth. Evapotranspiration in this tehsil is higher during the plant growth period, thus reducing the availability of water for plant growth. Drought Prone Taluka the semi-arid tracts of the State which receives rainfall between 750 to 1000 mm are drought-prone areas. The Shirpur taluka comes in the drought-prone area of the State. The annual normal rainfall is 617 mm received over period of 36 days during south west monsoon. A surface water resource in the Taluka is unevenly distributed. This resource is also not assured as it depends on rainfall. Irrigation projects in the Taluka cover the only small area in southeastern part of the Taluka. Because of this, the use of groundwater for irrigation, drinking water, and an industrial purpose has increased many folds. In entire taluka intensive development of groundwater has led to critical situations resulting in manifestations of problems like declining ground water levels, shortage of water supply, etc. This situation warrants for taking up programmers to augment groundwater resources on strong lines in the whole taluka. In this paper, groundwater resources in different formations of the entire taluka, industrialization, problems caused due to excessive utilization of groundwater, method store adopted in conserving the scarce resources and recharging the aquifers have been discussed.***

Keywords: Water, Drainage, Delineation, Pattern, Suitable Geology, Check Dams

I. INTRODUCTION

The term Tehsil or Taluka is referring to administrative unit in the district. Delineate is defined as to trace an outline, to sketch something or to describe with great specificity [4]. Delineate is defined as to trace an outline, to sketch something or to describe with great specificity [5]. An example of delineate is to draw the outline of study area. An example of delineate is to explain a specific drawing down to the last details [6]. Watershed - land area that drains water to the outlet during a rainstorm [7]. Boundary of a watershed consists of the line drawn across the contours joining the highest elevations surrounding the basin [8]. A common task in hydrology is to delineate a watershed from a topographic map. Rainfall the average annual rainfall in the Taluka is 617.00 spread over 35 days. It is interesting to note that about 75% of the total rainfall occurred during 13days.This is the main reason for scarcity [9]. Evapotranspiration is an important parameter to decide the quality of water available for plant growth. Evapotranspiration in this taluka is higher during the plant growth period, thus reducing the availability of water for plant growth [10]. Drought Prone Taluka the semi-arid tracts of the State which receives rainfall between 750 to 1000 mm are drought-prone areas. The Shirpur taluka comes in the drought-prone area of the State. The annual normal rainfall is 617 mm received over 36 days [11].

II. STUDY AREA

Shirpur tehsil is chosen as a study region. Shirpur is a city and tahsil place in Dhule district of Nasik Division of Maharashtra. It is located on NH3.The Arunavati River flows through the city. It has located between the coordinate of 21 11 ′ 1 ″ and 74 0 52 ′ 43 ″ and situated on the Northern part of Tapi river and foothills of Satpura mountain. As per 2011, total population of Shirpur tahsil is 312000 [12].The main occupation of the people is agriculture in this tahsil with cotton and Sugarcane as the major product. It has three agro based industries like Textile, Sugar Factory and Corn Mill. The relief of this region has Satpura Mountain on the northern side and Tapi or Tapti River flows in the south, the central part of this region has rich alluvial plain [13]. The mountain region is very ragged ranging in height from 300 to 900 meters above t Shirpur Tehsil is one of the four tehsils of Dhule district, occupying a strategic position on the North Eastern boundary of the Maharashtra State. It is bounded by the Satpura hills in the North, the Tapi River in the South, Chopda tehsil of Jalgaon district in the East and Shahada tehsil of Nandurbar district in the west, situated near the border areas of Maharashtra. Border of Madhya Pradesh state connected to Shirpur tehsil so it is regarded as an important tehsil from the point of view of inter-state trade, commerce and industry. The study region is characterized by distinctive physical setting and socioeconomic conditions. It is delimited by Satpura ranges in the north and Tapi River in the south.

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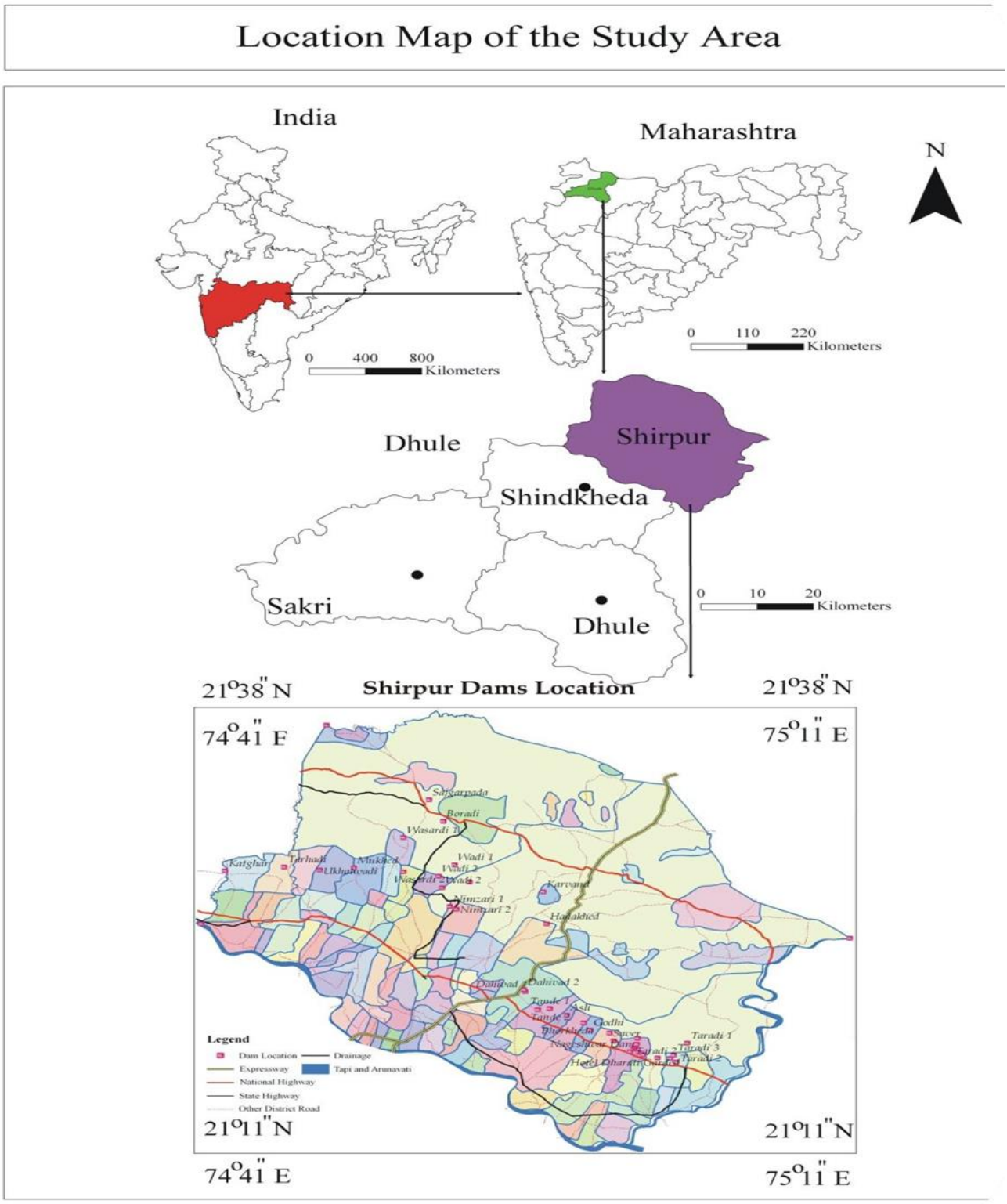
Table No 1. Showing location Map of Study Area



The climate of this tehsil is overall dry except during the south-west monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The south-west monsoon Season which follows thereafter lasts till September. October and November months are the post-monsoon season. It comprises 147 villages among them Thalner (rural) is the most populous village with population of about 11 thousand and Devsingpada is the least populous village with population of 230. There is only one city (urban) comes under the tehsils administration which is Shirpur-warwade Municipal Council with 76905 population.

For the purpose of administration, Shirpur tahsil is divided into six administrative circles. The total population of the tahsil according to the 2011 census is 422137.

III. DRAINAGE

Tapi is the main river flowing through the southern part and its tributaries are Aner, Dharamkhuli, Dahivad, Arunavati, kordi, lendi, Kasari in study area.

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Aner, Arunavati are relatively more important for irrigation purposes. The Northern tributaries due to because of the proximity of the high ranges of the Satpura are relatively short in length. Risings from innumerable springs they have been put to use for irrigation, their peculiarity is that they are near the hills and again for several kilometers before they fall into the Tapi. Streams flows throughout the year but in the middle belt where the course piedmont debris-slopes attain their maximum depth, their waters sink below, leaving the bed perfectly dry in the summer season. It has a cultivable area of 653.77 sq.km (78.07%) and forest area of about101.09 sq.km. Land not available for cultivation is 82.53 square kms. Out of the cultivable area under irrigation is about (12.94 %). The occurrence and distribution of rainfall in the Shirpur taluka are highly erratic. A surface water resource in the Taluka is unevenly distributed. This resource is also not assured as it depends on rainfall. Irrigation projects in the Taluka cover the only small area in southeastern part of the Taluka. Because of this, the use of groundwater for irrigation, drinking water, an industrial purposes has increased many folds. In entire taluka intensive development of groundwater has led to critical situations resulting in manifestations of problems like declining ground water levels, shortage of water supply, etc. This situation warrants for taking up programmers to augment groundwater resources on strong lines in the whole taluka. In this paper, groundwater resources in different formations of the entire taluka, industrialization, problems caused due to excessive utilization of groundwater, method store adopted in conserving the scarce resources and recharging the aquifers have been discussed.

Table No 2. Showing Drainage Map of Study Area

IV. GEOLOGY

The tahsil Shirpur in Dhule district falling in Tapi alluvial basin is mainly underlain by alluvial formation with basaltic lava flows occupying hilly tract. The basaltic lava flows in the hilly tract are not favorable for groundwater development but give rise to perennial and seasonal springs. The contact of the basaltic lava flows with alluvial mountain front deposit is demarcated by a major fault. The alluvial deposits are further subdivided into (a) Talus and Scree deposits bordering the Satpura foothills and (b) Alluvium consisting of sand clays gravel. Talus And Scree Deposits (Bazaar) the mountain front deposit consisting of talus and scree locally known as Bazada are highly porous and have the capacity to accept a higher quantity of water recharge. The maximum thickness of this formation is not ascertained but it has been found to be 50 m at many places. This deposit mainly consists of a poorly sorted unconsolidated formation having an admixture of large to small size boulders, pebbles and gravels and coarse to fine sand and clay in varying proportions.

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The groundwater occurs under unconfined conditions and depth to water level at present ranges from 50 to 60 m bgl during pre-monsoon. Normally this zone forms potential aquifers yielding copious groundwater. At present the dug wells and shallow tube wells are dry. Previously the yield of the dug wells was ranging from 160-200 cum /day with 3 to 4 m drawdown. The discharge of tube wells was varying from 2.8.to 43.8 cum /hours. The specific yield of the aquifers varies from 6 to 12 percent Transmissivity ranges up to 950 square m/day. The gradient of the water table is between 20 to 30 m/km towards south.

V. OBJECTIVES

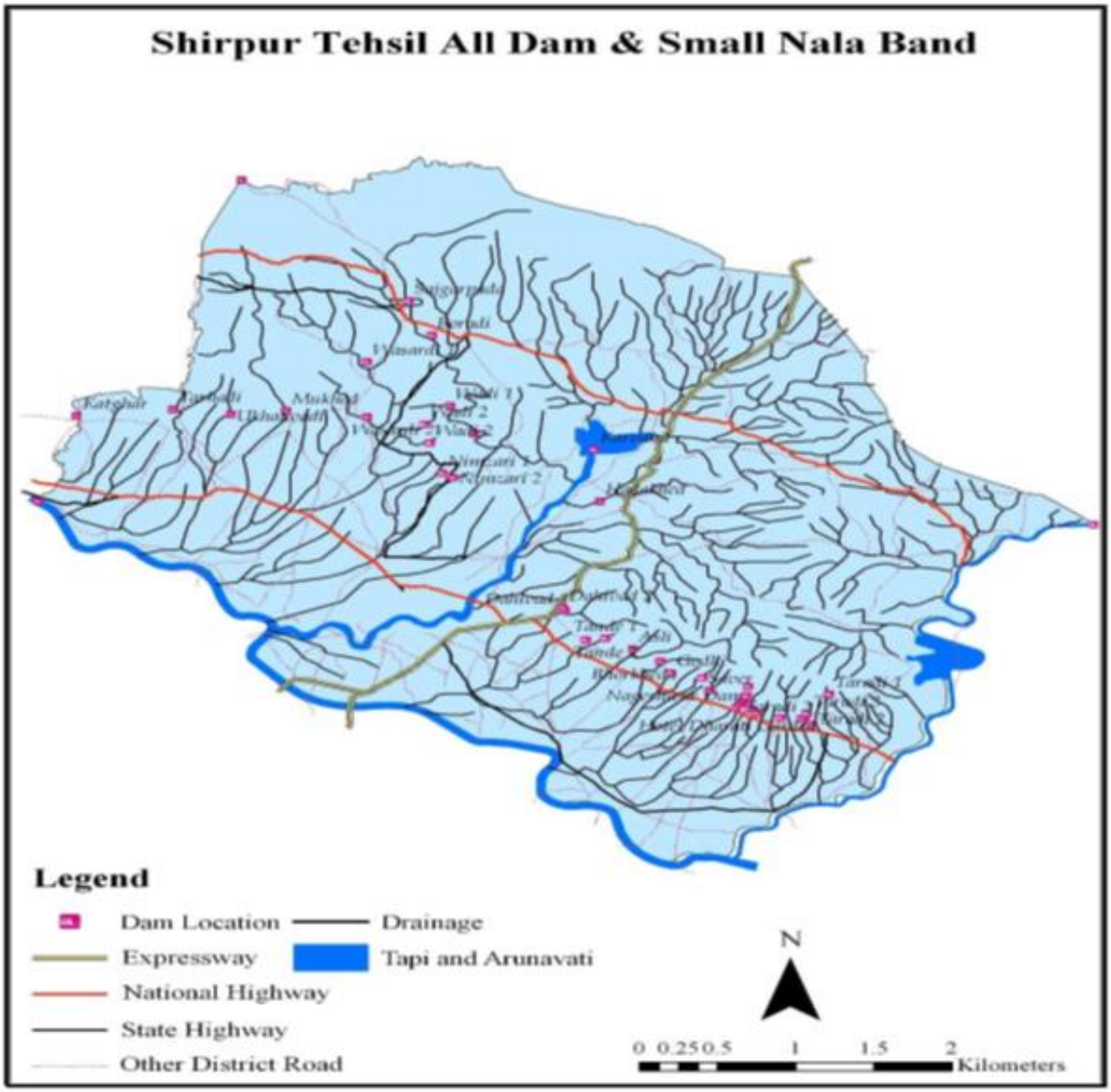
The objective of the present study is to delineation and mapping of drainage and medium water management projects in Shirpur tehsil.

VI. METHODOLOGY

The primary data has been collected through questionnaire and several field visits make for the collection of data through pilot survey of the study area. The essential data collected through primary have been processed and represented by cartographic techniques for delineation or mapping of drainage pattern and water management projects. Preparation of the location and base map has been drawn with the help of SOI topographical sheets. Maps are represented with the help of computer and GIS software

VII. DELINEATION AND MAPPING OF MEDIUM WATER MANAGEMENT PROJECTS AND CHECK DAMS.

Table No 3 to 6 Showing check dams of Study Area



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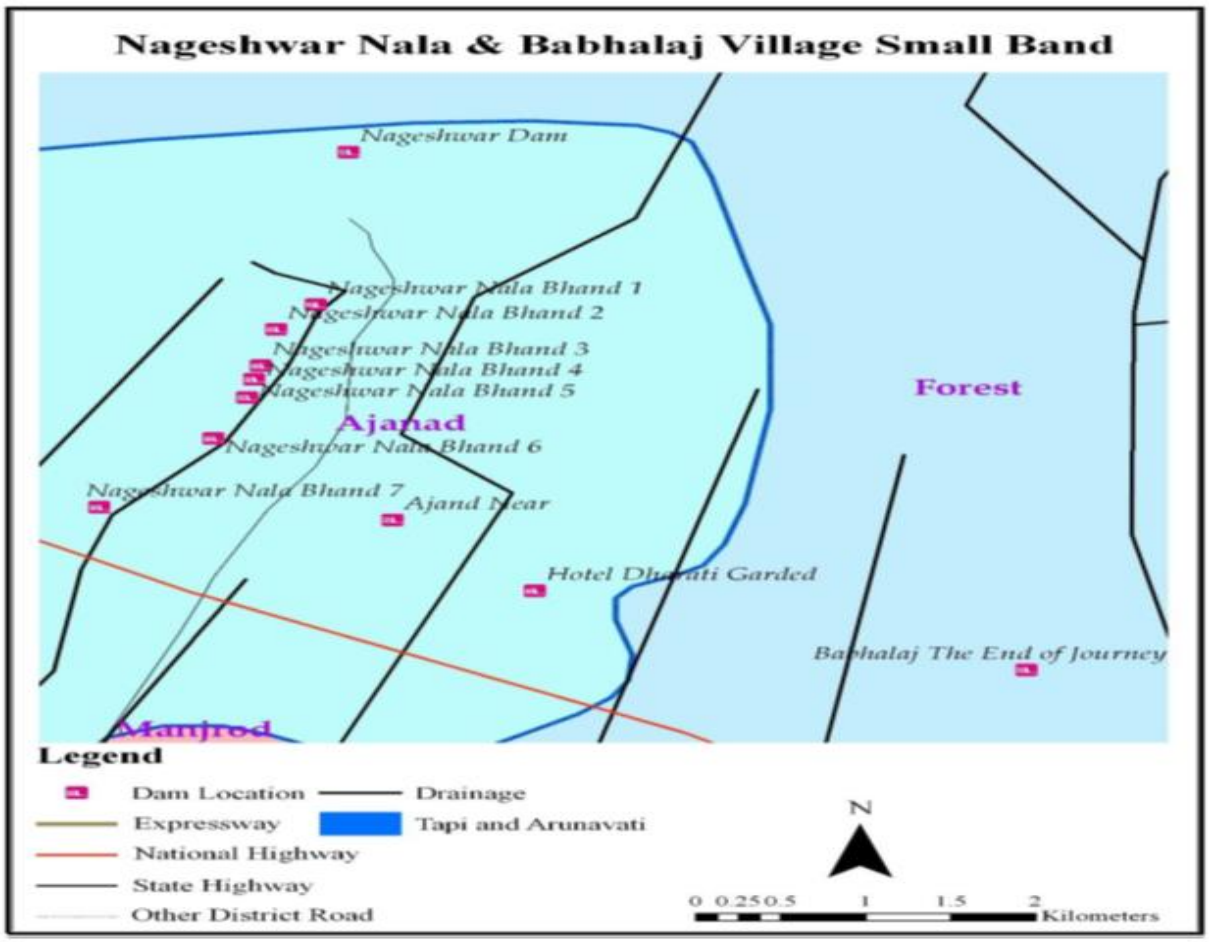

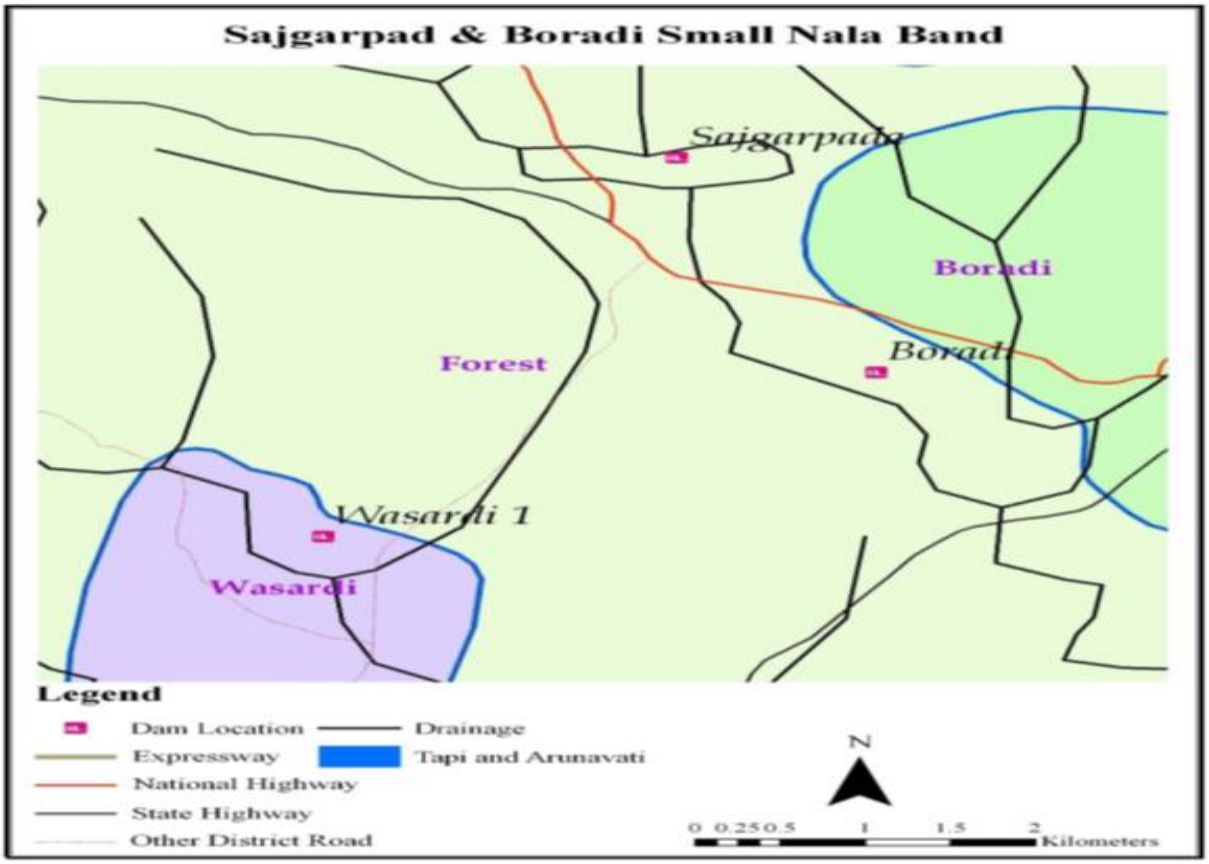

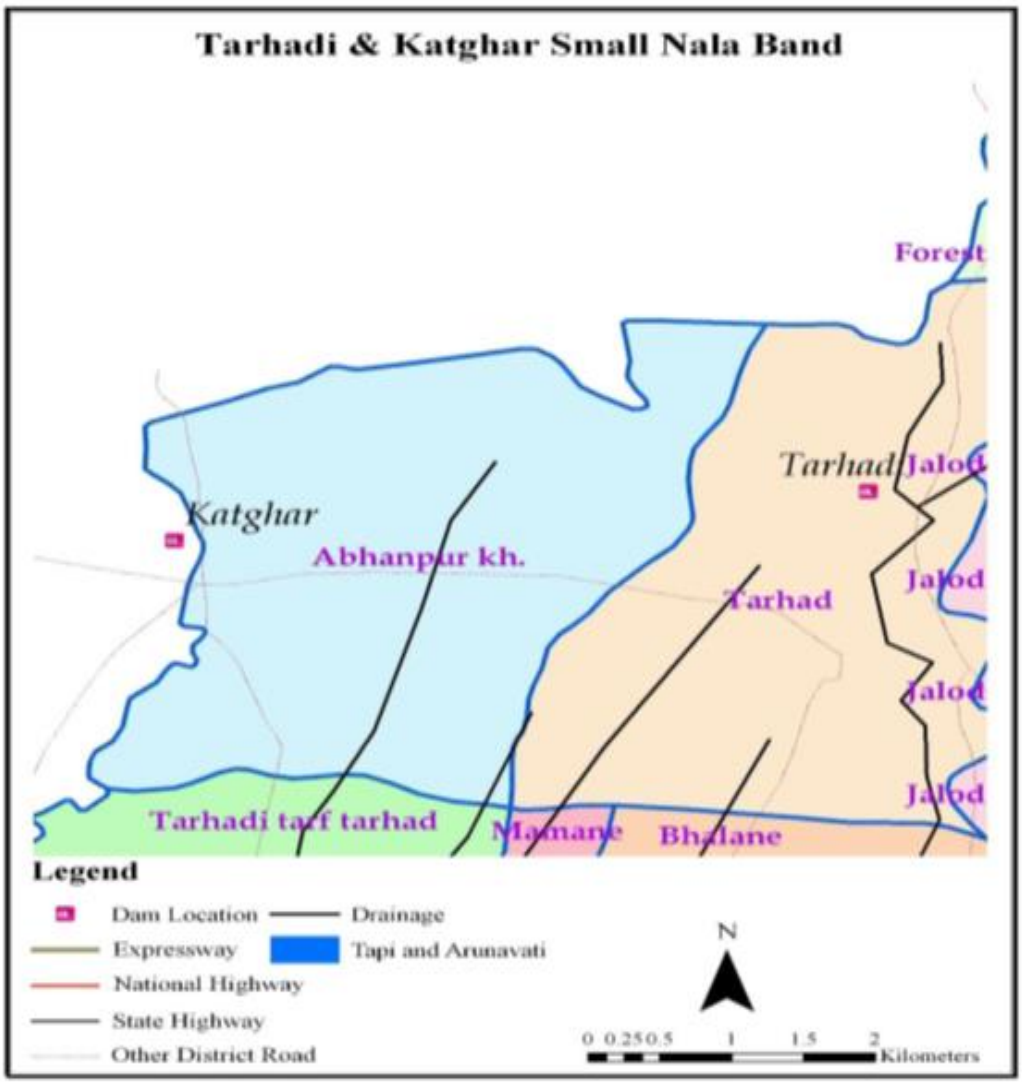

VIII. CONCLUSION

Construct check dams on every stream, small or big, without gate sand waste weir to augment huge storage of water following the principle of the ridge to valley. Since 2004 water Conservation is under progress. The project area is about 100 sq. kms [1].

Cement bunds have been constructed on small streams. Deepen the stream up to15 to 20 meters and widen up to 30 meters to store the water. The water level in alluvial area which has depleted up to 100 meters has risen by 60 to 70 meters. Now water level is about 40-metre below ground level. Now water remains in the streams [2].

Drinking water problem solved forever. Irrigated area increased. Now farmers are taking double crop in this rain fed and non-command area [3].

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AUTHER PROFILE

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