

Terrain Analysis of Herle Village with the Help of GIS

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Abstract— Herle village trending north – east to south – west in the Kolhapur District. The terrain analysis denotes the study area highly elevated to north – east and decrease towards north – west. That analysis is helpful to take some preventive measures like where to build artificial recharge structure to increase groundwater.

Key words: Terrain Analysis, Artificial Recharge Structure, Herle Village

I. INTRODUCTION

Temperature is continuously increasing now a days due to these arise water scarcity problem everywhere. There need to think about the human beings surveillance. The concept of integrated remote sensing and GIS has proved to be an efficient tool in integrating urban planning and ground water studies (Krishnamurthy et al., 2000; Khan et al., 2006). Hydrogeological and geophysical investigations in the Deccan trap region was carried out by various researchers [Bose R. N. and Ramkrishna T. S. (1978), Singhal B. B. S. (1997), Rai et. al. (2011), Ratnakumari Y. et. al. (2012), Deolankar S. B. (1980) and Devi S. P. et. al. (2001)] to demarcate aquifers and study the occurrence and movement of groundwater in the intertrappeans /vesicular and fractured zones within the trap sequence and sedimentary formations below the traps, which are considered a potential source of groundwater. Without any proper understanding of ground nature or topography we can't find solution for selecting any sites for artificial recharge structure. Because, groundwater management and artificial recharge is the key to combat the emerging problem of water scarcity. Hence, an attempt is made to study the terrain analysis of Herle village, Kolhapur, Maharashtra.

II. STUDY AREA

The Herle village of Kolhapur District in Maharashtra State is bounded between latitude N 16.7409 to N 16.7688 and longitude E 74.3112 to E 74.3452 (Fig. 1). The study area is covered by Deccan trap of Upper Cretaceous to Lower Eocene in age. Groundwater is the main source used for drinking, irrigation and industrial purposes.

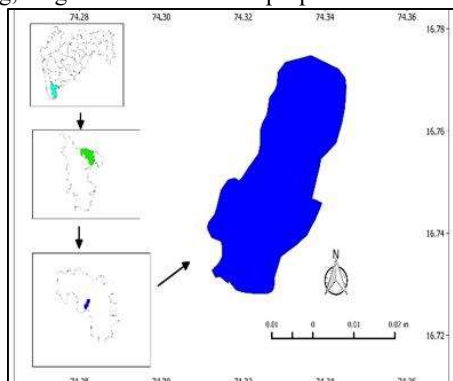


Fig. 1: Map of Herle village, Kolhapur District, Maharashtra, India

III. METHODOLOGY

Software and Data used

- ASTER DEM (USGS/NASA ASTER DEM data), available from <http://www.gdem.aster.ersdac.or.jp>
- Q - GIS 2.6.1 software. For study the terrain analysis of Herle village we prepare the study area with the help of QGIS software.

IV. RESULT AND DISCUSSION

The climate of Herle Village is generally temperate .The area has temperature range from 12 C to 35 C. It is always cooler than the eastern part of the district i.e. the study area is having considerably hot climate. Most of the region has moderate type of climate with very extremes of heat and cold. It receives ample amount of rainfall during the months of June to September. Average rainfall is 875 mm annually.

The study of terrain analysis will use digital elevation model to create several terrain related datasets like slope, aspect and hillshade. These elevation datasets can be important in site selection and other terrain based spatial analysis. Digital elevation model of Herle village is shown in Fig. 2.

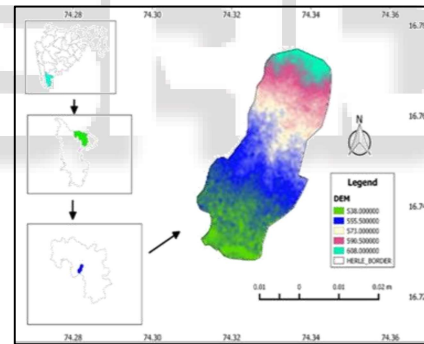


Fig. 2: Digital elevation model of Herle village.

Herle village slope is 5 – 10 percent highly elevated and the other is of gentle slope having 2 – 5 percent (Fig. 3). Aspect map shows the cardinal direction of Herle (Fig. 4). Roughness Index is tool useful to calculates and summarize each cell by the elevation changes within a 3 x 3 cell grid. Roughness index of study area is shown in Fig. 5.

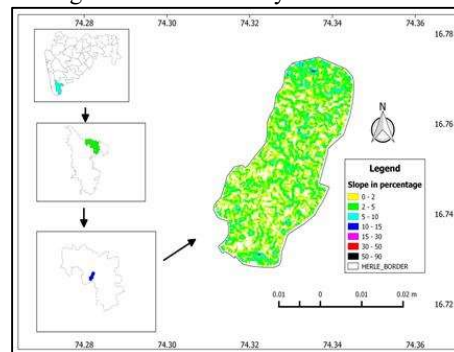


Fig. 3: Slope map of Herle village.