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Research Paper

Village Level Detailed Relief Map Preparation Using SRTM Data and GIS in Kolli Hill, Tamil Nadu, India

Geology

KEYWORDS : Relief map, Koill hill, SRTM, GIS

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ABSTRACT

Detailed Relief information up to village level is prepared in the present investigation for Kolli hill, Tamil Nadu, India. The Kolli hill is a part of Central Tamil Nadu region and is taken up for the present investigation. The large scale data derivation is extracted using the contour data. The complete contours were traced from the Survey of India Totopsheet. The maps were registered in ArcGIS and the height values were given as an input in GIS. The attribute data information is added to prepare the relief information of the hill. The village boundary information is extracted from the Taluk map of the study area. The boundaries were digitized and overlaid to assess the relief variation in the study area. The results show that the relief is varied from 1200 - 900 m in the entire Perakarai Nadu, northern and southeastern parts of the study area. Similarly, the relief variation is extracted for all the villages.

Introduction

The proposed study is taken up in Kolli hill, the area lies almost wholly in the Namakkal District of Tamil Nadu State (Fig.1), except a small pocket on the eastern part of the hills, which lies in Tiruchirappalli District. The study area is geographically situated between the north latitudes 11°11' N to 11°30'N and east longitudes 78°16'E to 78°29'E covering an area of 485 km2. On the northern side, it is bounded by Salem District and in the eastern and the south eastern sides it is bounded by Tiruchirappalli District.

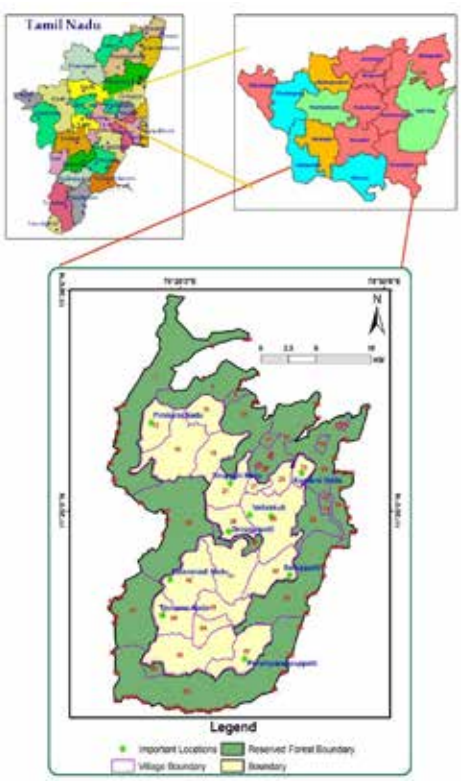

Fig. 1. Study area

The study area forms parts of two taluks viz. Rasipuram Taluk and Namakkal Taluk. While the northern portion of the hills forms part of the Rasipuram Taluk, the southern portion forms part of the Namakkal Taluk. The part of the Kolli hill, which falls in Namakkal Taluk, has seven revenue villages viz. Selur Nadu, Devanur Nadu, Thinnanur Nadu, Valappur Nadu, Vazhavandhi Nadu, Ariyur Nadu and Gundur Nadu. The northern part of the hills, which comes under the Rasipuram Taluk also, has seven revenue villages viz. Perakarai Nadu, Bail Nadu, Sittur Nadu, Edapuli Nadu, Thirupuli Nadu, Alathur Nadu and Kunduni Nadu. All these villages are confined to the upper plateau portion of the hills, which are surrounded by reserved forests.

Methodology

The SRTM data is used as the input data to study the area. DEM map was generated (Gonçalves, et al. (2008), Beijing Rabus, (2008), Rodriguez, et. al., (2006), Smith, (2003) Schenk (1999)) from GIS tool giving the elevation component from the SRTM source. The resulted map is used for the preparation of relief map. The village boundary were digitized and taken for the further overlay analysis in GIS. The village wise detailed relief variation is extracted for the present investigation. This is representing the altitude of the study area ranging from 244 to 415 msl. Relief map was generated in ArcGIS software from the input data to know the topographical slope direction and geological features of the area.

Result and discussion

Relief

The relief of the area depicted in figure 2.2 clearly shows that the Kolli hill rises abruptly from the adjacent plains from about 200 m to 900 m. In some parts of the hills, such abruptness continues even up to 1100 m. Such a trend is seen all along the flanks of the hills where the rise in height is less abrupt. The valleys on these outer slopes of the hills are not much developed and are linear in trend and shorter in length. At higher altitudes (>900 m), the variations are relatively less and these parts of the hills are crisscrossed by numerous streams, which have given a dissected appearance to the terrain. The continued stream action through the geological ages has imparted an undulating character with several long, steep sided valleys and resistant hills. The Kollimalai peak (1415 m) situated in the western part of the hills is the highest point.

The study area has been divided into five zones based on their altitudinal ranges. Areas where the altitudes above 1,200 m are found restricted to the plateau portions of the hills. Such areas are found in the northern part of Ariyur Nadu, most parts of the Ariyurshola reserved forest, small pockets in the north eastern and south eastern parts of Vazhavandhi Nadu, small pockets in the north western part of Thinnanur Nadu, most parts of Selur Nadu except its northern part, small pockets in the western part of Valappur Nadu, north western part of Gundur Nadu, southern part of Thirupuli Nadu, and western and central parts of Tamil Nadu.

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Areas where the altitudes range from 1,200 to 900 m are also restricted to the plateau portion of the hills and these category covers more area than the other relief categories found in the study area, Such areas are found well distributed in the plateau portion or the hills and are found to occupy almost the entire Perakarai Nadu, northern and southeastern parts of Tamil Nadu, the entire Sittur Nadu and Edapuli Nadu except their northeastern parts, the central and northern parts of Thirupuli Nadu, western part of Alathur Nadu, the southern and eastern part of Gundur Nadu, the southern and eastern parts of Ariyur Nadu, a small pocket in the southeastern parts of the Ariyur Shola reserved forest, the entire Valappur Nadu, except a small pocket in its western part, most parts of the Vazhavandhi Nadu except small pockets in the northeastern, southeastern and southwestern parts of the Vazhavandhi Nadu, the entire Thinnanur Nadu and Devanur Nadu and the northern part of Selur Nadu. It is observed that most of the human habitations in the villages are restricted to this relief category. Also the higher altitudes of Karavallikombai reserved forest, Jambuthu reserved forest and Selur reserved forests are also found to be of this relief category.

Areas where the altitude ranges from 600 - 900 m are found mostly in the higher reaches of the outer slopes, which are mostly covered by the reserved forests. Among the villages 'of the study 'area, the entire Kunduni Nadu, the northeastern margins of the Gundur Nadu, the eastern ,parts of Alathur Nadu, and the north eastern parts of Edapuli Nadu and Sittur Nadu are found to have the altitude range.

Areas where altitude ranges from 300 - 600 m are confined to the outer and lower slopes of the study area; reserved forests cover the entire part where this relief category is found. Similarly areas where the altitude is less than 300m are also found in the outer slopes of the hills especially in the lower reaches of the hills. The area where such relief category occurs is also found occupied' by the reserved forests. Thus from the above description it is clear that the very high and high relief categories are found on the plateau portion and human habitations are confined to these relief categories. On the other hand, the categories moderate, low and very low relief areas are found in the outer slopes of the hills and these areas are mostly occupied by reserved forest.

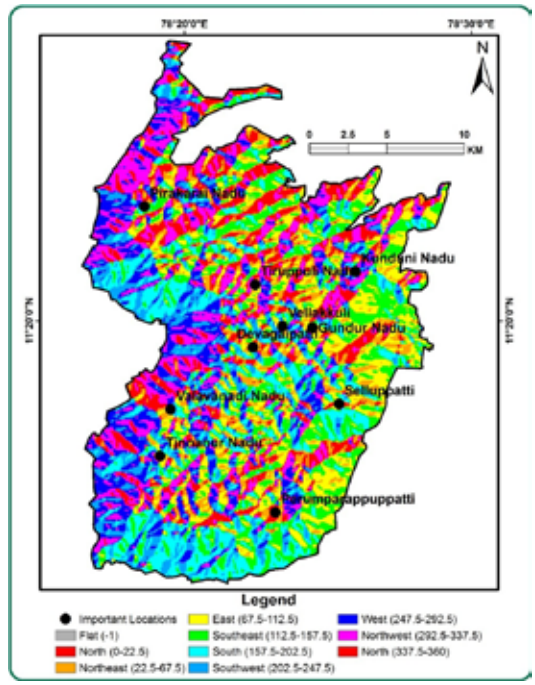

Fig. 2. Relief map of the study area.

Conclusion

Based on the data above study, it is concluded that comparing the results obtained by relief range and features were derived from SRTM data using GIS. The relief of the area depicted in clearly shows that the Kolli hill rises abruptly from the adjacent plains from about 200 m to 900 m. Areas where the altitudes range from 1,200 to 900 m are also restricted to the plateau portion of the hills and these category covers more area than the other relief categories found in the study area, Such areas are found well distributed in the plateau portion or the hills and are found to occupy almost the entire Perakarai Nadu, northern and southeastern parts of study area. The altitude ranges from 600 - 900 m are found mostly in the higher reaches of the outer slopes, which are mostly covered by the reserved forests. Among the villages of the study area, the entire Kumauni Nadu, the northeastern margins of the Gundur Nadu, the eastern, parts of Alathur Nadu, and the north eastern parts of Edapuli Nadu and Sittur Nadu are found to have the altitude range. Relief ranges from 300 - 600 m are confined to the outer and lower slopes of the study area; reserved forests cover the entire part where this relief category is found in the Kolli hill.

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