Degradation of Forest in Western Ghats - A Case Study of Sirsi Taluk, Uttara Kannada District, Karnataka State, India

Komala Bhat

Associate Professor
Head, Department of Geography
M. M. Arts and Science College Sirsi-581 402

Abstract: **Located on the eastern fringe of the Western Ghats in the mid-western part of Karnataka state, Sirsi is one of the 11 taluks in Uttara Kannada district. Sirsi is situated in the Upper Ghat region adjoining Sayhadri hill range at an average elevation of 600 m above mean sea level. The area receives an average rainfall of more than 2000 mm. Perennial rivers/streams, waterfalls, dense forest cover and horticultural gardens have enhanced the scenic value of the taluk. The area is known as one of the biodiversity, forest rich districts of Karnataka.**

The paper highlights the result of the study carried out based on the secondary data obtained from the concerned government offices, field data collected and change detection in the forest cover utilizing the high resolution multi spectral LISS-IV data with a spatial resolution of 5.8 m from the Indian Remote Sensing Satellite, Resourcesat-1. The study has revealed that whereas the dense forest land cover has come down, the scrub forest land has increased. The natural forest degradation in the area is evident.

Key words: Forest degradation, Sirsitaluk, Uttara Kannada district, Western Ghat Region, Karnataka

I. INTRODUCTION

The forests of the Western Ghats of India are very prominent for local, regional and national well-being in different ways. Needs and greed's of the human beings are fulfilled by providing timber, fuel wood, fodder, manure, medicines and a range of other products besides soil and water conservation. Thesetropical forests are home to more than half of all species living on land.The Western Ghat is a hotspot, ecologically most sensitive area in the country and it is home to at least 5,000 of species of plants, 139 species of mammals, 508 species of birds and 325 globally endangered species. Such an eco-sensitive Western Ghat forest lands have been allocated for setting up of many projects which have adverse effect on environment in the area.

II. OBJECTIVES

The objectives of this study are:

(i) Assessment of spatial pattern of land use land cover and forest change detection in the area
(ii) Determine the degree of forest degradation
(iii) Study the relative impact of change through time and space.

III. METHODOLOGY AND DATA USED

Survey of India toposheet No. 48J/14 of 1:50000 scale, secondary data collected from the government departments and the field data collected were used for further analysis. Remote Sensing (RS) and Geographic Information System (GIS) techniques were adopted to obtain synoptic view and for further analysis. The available high resolution multi spectral data of LISS-IV sensor with a spatial resolution of 5.8 m from the Indian Remote Sensing Satellite (IRS) Resourcesat-1 have been used for change detection study. The ground truth verification was made at random selection. The imageries were analyzed thematically depicting the area under various types of land use/ land cover namely Forest, Farm Land, Scrub forest, Dense Scrub, Open Scrub, Land with Scrub etc. The extent of area under each category is derived using the thematic map thus generated.

IV. STUDY AREA

The study area covering Sirsitaluk, has a geographical extent of 1322 sq.km in which 78.11% is occupied by forest land. It is located on the eastern fringes of the Western Ghats hilly region of Uttara Kannada district and lies between 14º 28′ and 14º 51′ Nlatitudesand 74º 34′ and 75 º 04′ E longitudes and at an elevation of 600 m above mean sea level. As per 2011 census population of the taluk is 1,75,550. Sirsi, the taluk head quarter is one of the important towns in Uttara Kannada district. It is one of the major trading centres for Arecanut and other spice crops like pepper, cardamom etc; grown in the district. The major food crop is paddy and rice is the staple food of the people. The area is surrounded by lush green forest and the region is popular for a large number of waterfalls. Kumta being the

nearest rail-link to Sirsi, introduction of Konkan Railway has improved connectivity to other parts of the country.

The taluk has four administrative hoblies and 227 villages (Fig.1). The four hoblies are: 1) Banavasi, 2) Hulekal, 3) Janmane and 4) Sirsi.

Fig. 1 Administrative Divisions of Sirsitaluk

V. CLIMATE AND RAINFALL

The taluk has a tropical climate and is mainly influenced by south west monsoon. The average temperature is around 25°C. The area has a pleasant climate between October and February and receives an average rainfall of 2000 mm.

VI. RESULTS AND DISCUSSION

The study of the available literature reveals that several works have been carried out on the land use and forest status of Uttara Kannada district in which mention was made on Sirsi region also. SharachandraLe′le′ (2006) in his research paper on 'Linking Ecology, Economics and Institutions of village-level Forest use in the Karnataka Western Ghats' , mentioned that "our assessments using aerial photographs and satellite imageries demonstrate that there is little truth in the sweeping claims by the Forest Department of rampant degradation of open-access and private-access forests. In the heavily settled region surrounding Sirsi town, the percentage of degraded scrub in private-access Soppinabetta was only 11% in 1973 while that in open-access Minor Forest was 14% only (www.ces.iisc.ernet.in/biodiversity/sahyadrienews/newsletter/../index.ht). It may be noted that these Soppinabetta lands are better stocked than the minor forest of the area. The Soppinabetta is the Forest land facility extended by allocating to the Areca Garden owners between 6 and 9 acres to an acre of Areca garden for its protection, manuring, development etc. This is in practice in the area since 1902. The land cover map prepared by Le′le′ (op.cit.) based on 1:35000 scale aerial photographs of 1973 is given in Figure2.

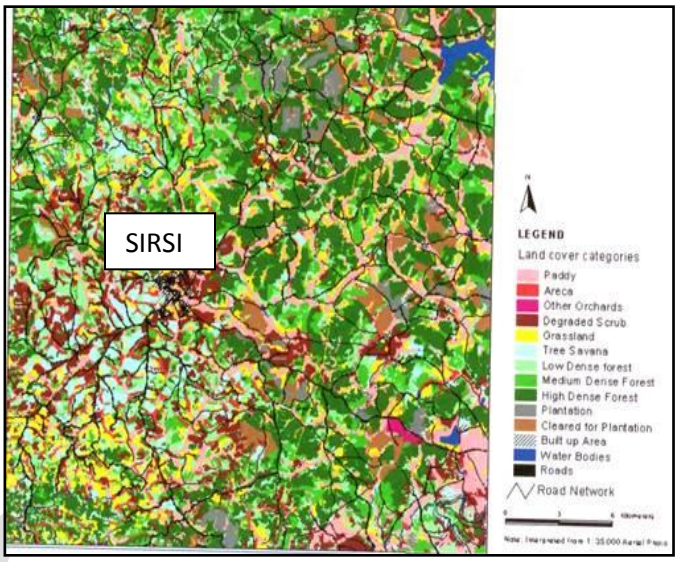

Fig. 2 Land Cover for Sirsi Region – 1973 (48 J/14)
(Source: SharachchandraLélé, 2006)

As per the secondary information obtained from the government departments, it is clear that out of the total geographical area of 132 233 hectares which constitutes 12.90% of the district area, the total forest area that was existed in 1971 and 2001 was 103933 and 103270 hectares, respectively. That is to say, the forest cover was 78.73% of the total geographical area in the year 1971, whereas the same was reduced to 78.09% in the year 2001. That means over a period of 30 years the reduction of the forest cover in Sirsitaluk is of the order of 0.64%. Thus it is evident that the forest loss and degradation is continued at a significant if not alarming rate in this region.

Following are the major types of forests in the Western Ghats of the study area:

1. Tropical wet evergreen forests situated along the upper slopes and protected valleys.
2. Semi ever green forests situated along the lower western slopes.
3. Moist deciduous forests which constitute over 50% of the forest in the Western Ghats and contain many commercially valuable species.
4. Dry deciduous forests which form a small percentage of the lower foot of the eastern slopes, and
5. Grassy blanks which occur along the crest of upper slopes, where the vegetation mainly consists of coarse grass.

The details of the forest area by forest type are given in Table1.

Table1 Range wise Area (Ha) by Forest Type in Sirsitaluk (as on 2006)

Forest Range / Forest type	Banavasi	Hulekal	Janmane	Sirsi	**Total**
Ever green	362	622	709	442	**2135**
Semi-ever green	4425	7606	8669	2909	**23609**
Moist deciduous	2017	2912	1402	875	**7206**
Betta (Soppinabetta)	2090	6231	9657	10465	**28443**
Dry deciduous	6355	8843	9438	4362	**28998**
Grassy blanks and others	5672	9750	11111	5522	**32055**
Total	**20921**	**35964**	**40986**	**24575**	**122446**

(Source: Conservator of Forests, Canara Circle, Sirsi, 2007)

A look at Table 1 shows that Janmane range has the highest total forest cover of 33.47%, whereas Banavasi range has only 17.08% of forest cover. The Hulekal andSirsi range consisted of 29.37 and 20.08% forest land respectively. In terms of forest type, Grassy blanks and other types constitutes a maximum of 26.17% whereas Evergreen forest in the taluk forms only 1.74% and Moist deciduous 5.88%. The Soppinabetta and Dry deciduous forest covers almost 23% each and Semi-ever green forest covers an area of 19.28%.

High resolution multi spectral data of LISS-IV sensor, with a spatial resolution of 5.8 m, from the Indian Remote Sensing Satellite (IRS) Resourcesat-1 for the period November 2014 procured from NRSA, Hyderabad was interpreted by standard image processing methods (Fig.2). The study has revealed that the forest cover in the taluk has been reduced to 105535 hectares. It is further interesting to note that whereas the major forest cover has decreased the open scrub and land with scrub have been increased in the area. This is the clear indication of the degradation of the forest land in the taluk

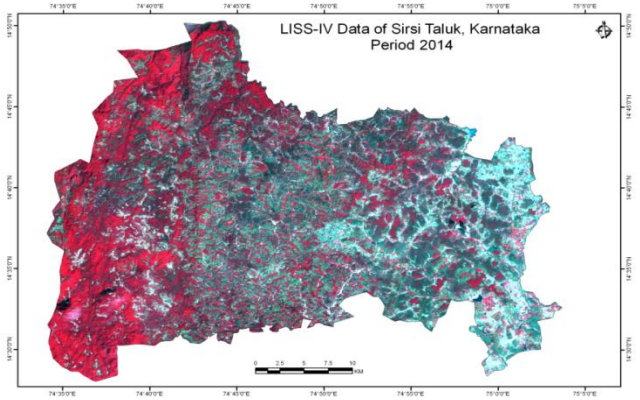

Fig. 2 LISS-IV Data of Sirsi Taluk (November, 2014), Karnataka

VII. CONCLUSIONS AND SUGGESTIONS

- Degradation of the natural forest is not new to the area. The use of forest land for non-forest activities are continued since pre-independence time. As mentioned earlier, in recent years the degree of degradation has increased in spite of several related Acts and Rules in place to protect the forest land cover and its wealth. Illicit felling of trees and encroachment of major forest land is going on unabatedly.
- The forests of the Western Ghats perform several critical ecological functions that support agro-forestry, agriculture and other forest-based livelihoods in the area, since several endemic plant and animal species, non-timber forest products and medicinal plants are found in this region.
- Horticultural area is enhanced by extension and encroachment of adjacent forest land and this also contributes towards the degradation of defined forest.
- In order to maintain the productivity of the arecanut and spice gardens, protected forest land proportionate to the area of areca garden (at 9:1acre) was allocated to the purpose as Soppinabetta land. This was continued since 1902. The studies revealed that nearly 70 per cent of betta lands are in degraded condition and have become grasslands instead of being covered by useful required number of trees in such land.
- It is therefore suggested besides protection, conservation and development of major and minor forest in a true and strict sense, the Forest Department and the Government need to seriously think and act towards the development of Soppinabetta lands that were allocated since the beginning of the last century, for areca garden maintenance and development in the area.
- Immediate necessary orders towards the development of Soppinabetta lands facilitating the participation of the concerned areca garden owners and for better percentage of sharing the soppinabetta forest and non-forest produce proceeds between the farmers and the government. With favorable regulations, agro-forestry may be effectively developed.
- The agro-forestry will help in encouraging the rural human resource towards better direct and indirect employment generation and also help in preventing migration to the urban centers in search of sustainable/assured source of income.

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