

Mapping the efforts of communities in the conservation and protection of commons

A case study in Sadhukonda RF in Chittoor district, AP, India

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Abstract:

The Geographical Information System has been widely applied for the management of natural resources across the world to understand their status, spatial distribution, and to quantify it for the human and ecological needs. This paper talks about an attempt to map the efforts of village communities protecting a Reserve Forest and to understand the supply and demand scenario of the biomass available in the RF as well as in commons and to frame strategies to discuss with the communities in the conservation of the resources. Remote sensing and GIS techniques have been used in the study to enumerate the species, to quantify the above ground phytomass and to understand the extraction patterns by the communities. The dependant villages are randomly selected based on their proximity to the resources, size of the village and their economical status. The findings of the study show that there is an improvement of the vegetative cover and diversity in the RF due to the community protection. Concerns however have also emerged from the study that despite the improvement in the forest cover current levels of fuelwood extraction, both for self use and for sale, are well above the recommended limits. Thus protecting reserve forests alone without making efforts to increase the fuelwood availability and to create alternate livelihood options may not yield the desired results. The study posits a need for bringing more revenue wastelands under vegetative cover such that it meets the local needs as well as offsets the pressure on the reserve forests. The findings of the remote sensing analysis and the field survey are now forming the inputs for discussions with communities on provision to and appropriation from the forests and common lands.

Purpose

The results of efforts made towards the improvement of the natural resources through the participation of village communities were regularly captured by field visits, process documentation, photo documentation, survival counts and ground studies. During the year, these outcomes were also enriched and corroborated by applying Remote Sensing and GIS techniques. The study was aimed to assess the potential availability and extraction patterns of biomass in a forest range, thereby assisting in developing strategies for further course of action. As a part of the exercise efforts were initiated to begin a process of collection of information on the biodiversity of the area. The broad objectives of the study are to (a) ascertain the improvement in vegetation (b) observe where these changes are happening (c) observe whether the village institutions contributed to the

improvement (d) assess whether the extraction of phytomass is within the permissible limits and (e) begin stock-taking of bio-diversity of the given area.

Methodology

Satellite imageries of different years and of the same season were procured from NRSA Hyderabad, and interpreted to produce classified maps of vegetation. The classified maps are validated by ground truthing surveys. Out of the various sampling methods, justified random sampling method of modified Whittaker's method was adopted to enumerate the species considering the forest type, topography, species composition and types of micro habitats. Simultaneous field study was conducted to estimate biomass and diversity. The quantity of biomass was estimated using interpolation techniques using GIS. In order to study the extraction patterns of phytomass seven villages based on parameters such as proximity to the forest, economic condition, size of the habitation were selected and information on the extraction of fuelwood, NTFP and fodder through household survey was conducted.

Study Area

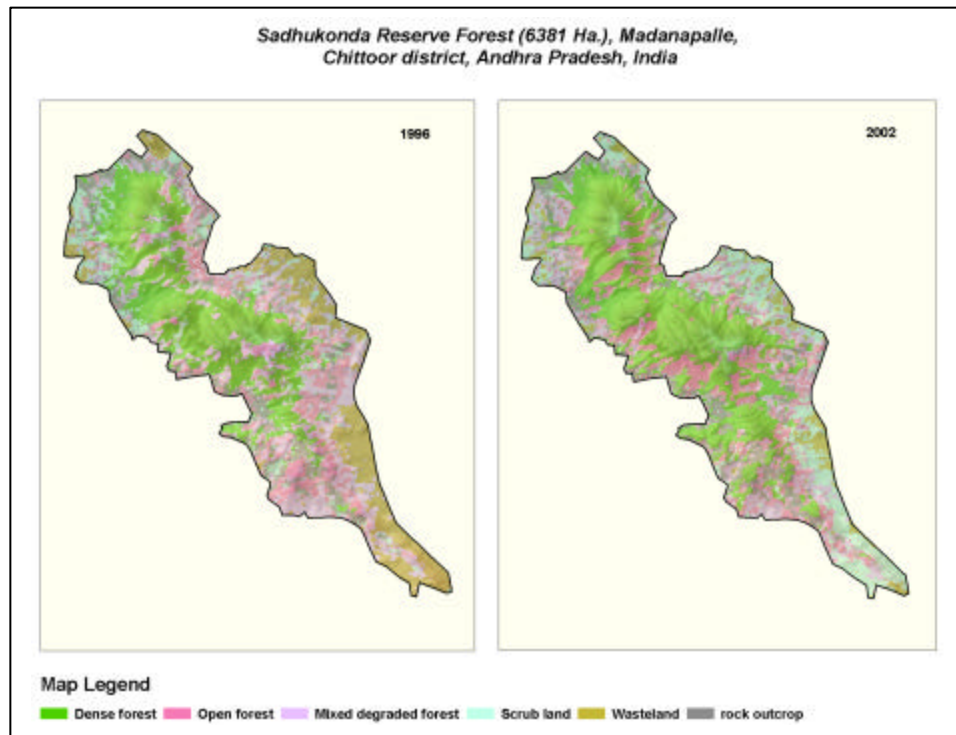
The Sadhukonda Reserve Forest in District Chittoor, Andhra Pradesh constitutes the designated area for the change detection study. The Reserve Forest area is sufficiently large and compact and the period of intervention has been around six years. Of the 25 villages protecting the forest 8 villages were supported by the Forest Department since 1996. FES worked with the remaining 17 villages since 1998. The area of the Reserve Forest is 6380 hectares. Besides campaigns to refrain from injudiciously harvesting of trees and putting fire to the forests, no other physical activities were undertaken by FES in the forest area during this period.

Findings

A comparison of satellite imageries of December 1996 and December 2002 indicates considerable improvement in vegetative cover during this period on Reserve forestland in spite of six consecutive years of drought. The improvement in tree cover can be singularly attributed to natural regeneration from the available rootstock. The increased green cover is mainly due to efforts of the communities at protection and self-regulation, as they have not undertaken any physical measures in most of the area

Table 1: Change in vegetation from 1996 to 2002 in Sadhukonda Reserve Forest

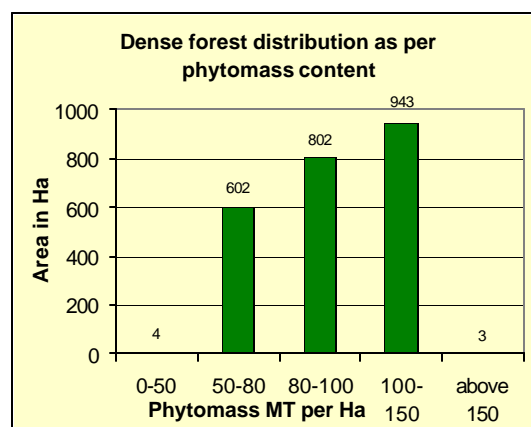
Landuse	Area in Ha		Change	(%)
	1996	2002		
Dense forest	1977	2449	472	24
Open forest	742	1184	442	60
Mixed degraded forest	1541	844	-697	-45
Scrubland	449	886	437	97
Wasteland	985	331	-654	-66
Rock out crops	686	686	0	0
Total	6380	6380		



A field study conducted simultaneously to assess the phytomass in Sadhukonda found 121 species of trees, 58 species of Shrubs and 73 species of Herbs and grasses. The bio-diversity indices such as Simpson's and Shannon-Weiner's reveal that although there is a rich diversity of species, a few such as *Anogeissus Latifolia*, *Acacia Sundra*, *Dolichandrone Atrovirens*, and *Chloroxylon Swietenia* are dominant in numbers. Apart from the diversity element, the quantity of aboveground phytomass of the entire Sadhukonda Reserve Forest has also been estimated as 4,72,315 MT using GIS. This yields an average tree biomass of 80 MT/ha for the Reserve Forest.

The chart depicting the amount of tree biomass of the Reserve Forest shows that the dense category of the forest has a very high quantity of tree biomass (at least 50 MT per ha and above), with more than 75% of the dense category forest land having a biomass of 80 MT per ha and above, thereby corroborating the remote sensing analysis.

The extraction per annum is 8,185 MT, which is 1.73% of standing tree biomass. Literature suggests that in a regenerating



forest, the maximum permissible limit is 'one-third to half' of the mean annual increment (MAI = 2.84% of standing tree biomass). Thus, the current level of extraction seems to be well above the permissible limit.

75% of the total phytomass is extracted for fuelwood either for local use or as a means of livelihood where they sell the wood in the nearby towns.

Issues:

The study posits a need for bringing more revenue wastelands under vegetative cover such that it meets the local needs as well as offsets the pressure on the Reserve Forests. Considering that the bulk of biomass extraction is for fuelwood, for use as well as selling, protecting Reserve Forests alone without making efforts to increase the fuelwood availability may not yield the desired results. Efforts would have to be made to conserve the use of fuelwood as well as to create opportunities for alternative livelihoods for the poor. The findings of the remote sensing analysis and the field survey are now forming the inputs for discussions with communities on provision to and appropriation from the forests and common lands.

Note: The above paper would be presented by R.Ravindranath

Biodata of the Author :

I have done my masters in Resource Development Technology from College of Engineering, Andhra University, Visakhapatnam, AP in 1990. I have been involved in identification of wastelands using remote sensing imageries with NRDMS project for one and half years in Dept. of Geo-engineering, Andhra University after my PG. Later on worked with Institute of Rural Management (IRMA), Anand for another one and half years on large canal management systems.

I am presently working with Foundation for Ecological Security (FES), Anand, since 1992 as Senior Project Officer. FES is promoted by National Dairy Development Board (NDDB), Anand and financially supported by Canadian International Development Agency (CIDA). The FES aims to work towards the ecological restoration and conservation of land and water resources, in the uplands and other eco-fragile, degraded and marginalized zones of the country, and to set in place the processes of co-ordinated human effort and governance to this end.

I have been looking after the GIS activities of FES in the management of natural resources and my interests are to develop GIS applications for the conservation of natural resources such as land and water.