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Remote Sensing and GIS-Based Evaluation of Forest Cover Changes in Lormi Range of Mungeli Division

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Abstract

The forest area of Mungeli Division was measured through the satellite imagery. The major change in forest area contain the data shows that the **forest age** divided into three categories young 12.5 %, mature 25%, middle 62.5%. In the category of **forest type** zero percent of the teak forest, 12.5 percent of the mixed forest, 87.5 percent of the sal forest and **forest class** divided into six categories other 2.63%, under stock 5.26%, forest village 5.26%, blank 7.89%, encroachment 15.78%, and plantation 36.15%. This project analysed the feasibility study of using remote sensing and GIS in stock map preparation. It has been demonstrated that remote sensing and GIS have potential to provide comprehensive information on various of stock map & fores1.t type map, preparation of treatment types for coupe operations and site specific treatment and zonation of working circles, felling series and coupes.

Keywords: *Forest age, forest type, and forest class.*

Introduction

The term remote sensing means from a distance, it means acquiring information from a distance without coming into contact with it. Remote sensing may be defined as the technique of obtaining and recording physical properties of objects from a distance with the help of electromagnetic radiation reflected / emitted by them. The acquisition and collection of data is accompanied by measuring electromagnetic radiation (EMR) reflected / emitted by the object on the surface of the earth electromagnetic energy this constitute the communication link. Different object, reflect amount of energy at different wave length of the EMR. Thus the reflected/ emitted energies are detected by air- borne or space borne sensors and subsequently converted in to different from of data.

The different stages in remote sensing are:-

1. Electromagnetic energy (sun, transmitter carried by the sensor)
2. Interaction of energy with the intervening atmosphere.
3. Interaction of energy with the earth surface (reflection /absorption /transmission) or self-emission.
4. Transmission of the reflected / emitted energy to the sensor placed on the suitable platform.
5. Detection of the energy by the sensor converting it into photographic image or electrical output.

Remote sensing techniques are important in acquiring useful data of the earth or its surface by mean of sensors. These remotely collected data will be analysed to obtain information about the objects, areas or phenomena being investigated (Schowengerdt, 2007). Also, it includes the analysis and interpretation of

the acquired data and imagery, which are the most aspects for environmental scientists to provide relevant information for monitoring earth resources (Landgrebe, 2003). Multi-spectral imagery can be used for quantification of the resources and monitoring resources during a period of time. Remote sensing techniques help in studying deforestation of changes in vegetation cover. Also, geographic information system is very powerful tool when applied to earth sciences and land use studies (Barredo & Sendra, 1998)

Some feature of natural resources of Chhattisgarh State

1. Forest Resource

Forty one present of the state is covered with the forests. People of Chhattisgarh have symbiotic relationship of the forest. The economy, culture, tradition and livelihood all inextricably linked to the forests. In several tribal districts of the state sacred groves-tracts of virgin forests or vestiges of anancient practices in with people protected a forest to avoid the wrath of its resident god this groves are unique example of ecological understanding and management. These are the area bearing an association predominantly of tree and others vegetation types (within the notified forest boundaries) capable of producing timber and forest produce.

They comprise of thick and dense canopy of tall trees, which can be evergreen, semi evergreen or deciduous (moist, dry). Evergreen forest includes both coniferous and tropical broadleaved evergreen species and predominantly remains green throughout the year. Semi- evergreen is a forest type that includes a combination of evergreen and deciduous species with the former dominating the canopy cover. Deciduous forest type are of predominantly composes of species, which shed their leaves once a year, especially during summer.

2. Land Resources

Soils are the dimensional body which develops naturally by the action of natural forces. It is derived by the rocks through the process of weathering. There are different varieties of soil formulates depending upon the parent materials. Prime among these are red soil , black soil, deep soil, shallow soil, course textural ,fine Textural ,sandy , loamy etc. The information about the major soil group existing in the watershed area have been recorded on the basis of their hydrologic grouping, physical and chemical properties of the soil. The most widely distributed soil types of the study area are loamy sand,loam, clayey loam and clay. Although the black cotton soil and lateritic or red soil are widely dominating in parts of study area. (Dewan *et al*.2009)

Objectives

The remote sensing and GIS based preparation of forest stock map are efficient and cost effective.

The objective of the proposed study are:

Preparation of the quantitative forest growing stock details at the forest compartment level.

Result and discussion

1. FOREST STOCK MAPPING IN PROTECTED FOREST AREAS OF MUNGELI DIVISION

Forest stock maps are defined as the maps which contain detailed spatial information on extent of recorded forest lands including the administrative jurisdiction at various levels, infrastructure and communication facilities, forest resources and the status of forest vegetation. The status of forest vegetation include categorization of forest into density classes, assessment of growing stock map , growth data for various species and age distribution. The forest stock maps depict forest type, density, encroachments, cultivation

patches, human habitats, regeneration status and provide an idea about available resources. The following tables & pie charts showing the forest type, forest age, and forest class wise area available in Mungeli forest division.

1.1. Forest Type

In Lormi Range there are three different categories of forest types: Teak forest is not found in the forest of this region, so the number of the forest type is zero. The Mixed forest is spread over the area of 12.5%. The Sal forest is highly spread over the area of the Lormi Range of 87.5%.

FOREST TYPE			
S.No.	**Forest type**	**Number**	**(%)**
1.	Teak forest	0	0
2.	Mixed forest	2	12.5
3.	Sal forest	14	87.5

Table 1.1 shows the forest type

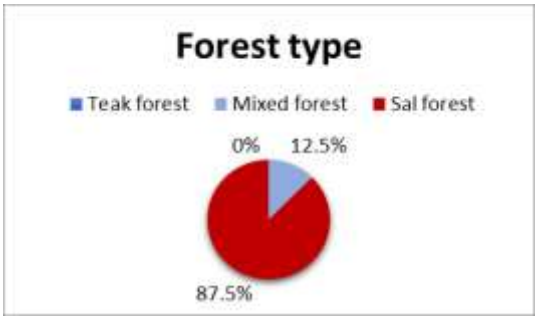


Figure: 1.1 shows the forest type the Sal forest (87.5%), mixed forest (12.5%), teak forest (0%)

1.2. Forest Age

In Lormi range of Forest the forest age is divided into three categories:

- Young forest age
- Mature forest age
- Middle forest age

The young forest age is 12.5% spread over the area. The mature and middle forest age are 25% and 62.5% respectively.

Forest Age			
S.No.	**Forest Age**	**Number**	**(%)**
1.	Young	2	**12.5**
2.	Mature	4	**25**
3.	Middle	10	**62.5**

Table 1.2 shows the forest age

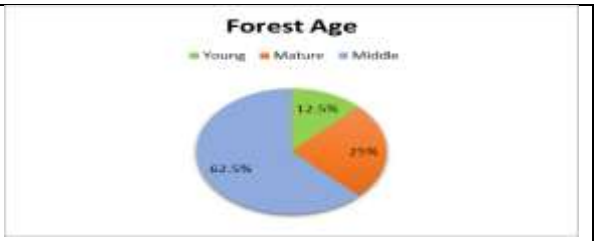


Figure 1.2 shows the forest age the young (12.5%), mature (25%), middle (62.5%).

1.3. Forest class

In Lormi range the forest class categories into six parts:

The Under stock and Forest village forest class is present with the percentage of 5.26%. The blank forest class has 7.89%. The Encroachment forest class with a percent of 15.78%. The plantation forest class having percentage of 63.15%. The other forest class is 2.63%.

Forest class			
S.No.	**Forest class**	**Number**	**(%)**
1.	Other	1	**2.63**
2.	Under stock	2	**5.26**
3.	Forest village	2	**5.26**
4.	Blank	3	**7.89**
5.	Encroachment	6	**15.78**
6.	Plantation	24	**63.15**

Table 1.3. shows the forest class

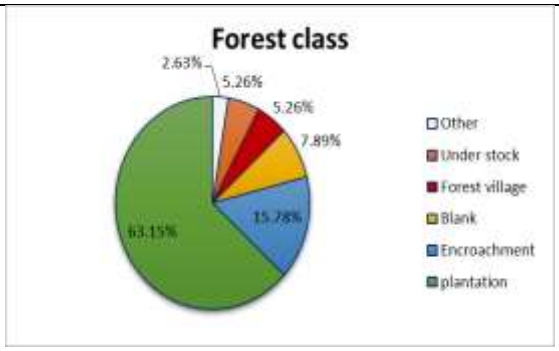


Figure 1.3. Shows the forest class other (2.63%), under stock (5.26%), forest village (5.26%), blank (7.89%), encroachment (15.78%), plantation (63.15%).

Conclusion

Remote sensing and GIS help to monitoring and developing the strategies for better utilization of lands for sustainable development. Change in electronically era the old techniques like surveying, mapping and contouring are done through the digital image and innovative software's. The project shows the stock map preparation in the Lormi Range of Mungeli Division. The forest area of Mungeli Division was measured through the satellite imagery. The major change in forest area contain the data shows that the **forest age** divided into three categories young 12.5 %, mature 25%, middle 62.5%. In the category of **forest type** zero percent of the teak forest, 12.5 percent of the mixed forest, 87.5 percent of the sal forest and **forest class** divided into six categories other 2.63%, under stock 5.26%, forest village 5.26%, blank 7.89%, encroachment 15.78%, and plantation 36.15%.

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