

Remote sensing and GIS techniques for forage production assessment and management of northern Chhattisgarh in India

Nur Salim Ekka^{*}, S. K. Gupta

ICAR- Indian Grassland Fodder Research Institute, Jhansi, UP- 284003, India

^{*}Corresponding author e-mail: nsekka72@gmail.com

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Introduction

Grasslands play a vital ecological and environmental role in global carbon balance and climate change. In the prairie provinces of Canada, grasslands occupy approximately 25 M ha of the land base and provide a valuable resource to the multi-billion dollar cattle industry. In recent years, remote sensing technology has been applied for estimating the fractional cover of arid grasslands and savannah ecosystems (Asner and Heidebrecht, 2003; Marsett *et al.* 2006; Guerschman *et al.*, 2009). Grassland, a specific ecosystem, occurs naturally on all continents excluding Antarctica (White *et al.*, 2000). Remote sensing imagery needs to be converted into tangible information which can be utilized in conjunction with other data sets, often within widely used Geographic Information Systems (GIS). Remote Sensing & GIS is the most important technologies since last decades for the delineation, assessment and management of the natural resource (forage production). Using these methods we delineated the forage resources assessment and management of northern Part of Chhattisgarh. The study areas geo-database has been generated with the help of Arc Map and Erdas Imagine software.

Materials and Methods

Materials used:

(A) Remote Sensing Data:

- Satellite: IRS –P 6
- Sensor: LIIS III
- Row & Path: 102 & 55,56, 103 & 55,56, 104&55,56
- Band: 2, 3, 4
- Date: September – October- 2010

(B) Survey of India Toposheet: -

Toposheet No. 64-I, J, M, N, 64M, 73A, B on 1:2, 50,000 scale were taken for the preparation of base map and thematic layers and generated base map .

Methods used:

- Geo-referencing and transformation
- Generation of base map using SOI map
- Digitization of layers
- Rectification of digital data
- Creation of geo-relational data base
- Data analysis using Arc tools/ Erdas imagine s/w
- Conversion of vector data to raster
- Generation of Final thematic map/ layers.

Results and Discussion

The study areas geo-database has been generated with the help of Arc Map and Erdas Imagine software. After the supervised classification of satellite imagery IRS P 6 LISS IV, 18.41 % high density grazing land, 1.87 % moderate grazing land and low density grazing land 4.17% was found. As per the collection of grass sample the following major species viz: *Sehima nervosum*, *Vetiveria zizanoides*, *Viscosa*, *Digitaria decumbens* Stent, *Setaria sphacelata*, *Macrotyloma axillares*, *Alysicarpus scarabaeoides*, *Desmodium intortum*, *Lablab purpureus*, *Macroptilium atropurpureum*, *Mucuna deeringiana*, *P. phaseoloides*, *Siratro*, *Clitoria ternatea*, *Desmanthus virgatus*, *Lantana camera*, *Bothriochloa intermedia*, *Bothriochloa pertusa*, *Brachiaria brizantha*, *Brachiaria mutica*, *Cynodon dactylon*, *Cenchrus ciliaris*, *Cenchrus setigerus*, *Panicum maximum*, *Panicum antidotale*, *Paspalum dilatatum*, *Paspalum notatum*, *Pennisetum clandestinum*, *Pennisetum pedicellatum*, *Heteropogon contortus*, *Dichanthium annulatum*, *Chrysopogon fulvus*, *Chrysopogon (chaniger)*, *Sehima* etc. Perennial, annual grass, legumes, Shrubs, forbs species are identified in the study area of northern district of Chhattisgarh. The total grazing land area explored is 854449.2 hectares and estimated green biomass production from the study area are 6451091.46 tones and dry fodder 2307012.84 tones from the northern districts of Chhattisgarh. The total average green biomass production 7.55 t/ha and dry bio-mass production was found 2.70 t/ha. Out of total geographical area 24.5 % grazing land area found which is 18.5 % Highly potential, 1.8 % moderate and 4.2 % low potential grazing land area represent.

Table 1. Forage Production Area in Different district & Grazing land Areas (000 ha.)

Class Name	District				Total	Percent
	Surguja	Koria	Korba	Jashpur		
Grazing land (High)	287	119	121	112	639	18.5
Grazing land (Moderate)	25	24	14	0	63	1.8
Grazing land (Low)	83	17	22	22	144	4.2
	395	160	157	134	846	24.5

Conclusion

Remote sensing & GIS is the most important powerful tools for estimation and management grassland / grazing land area and future grassland development.

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