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INDIAN INSTITUTE OF SCIENCE
Centre for Ecological Sciences
BANGALORE-560 012, INDIA

REMOTE SENSING ANALYSIS OF SIRSI TALUKA, UTTARA KANNADA DISTRICT

S. NARENDRA PRASAD
K. VENKATA RAO

CENTRE FOR ECOLOGICAL SCIENCES
LIBRARY
I.I.Sc., BANGALORE

January 1987

Technical Report No. 35

Introduction

The district Uttara Kannada is one of the richest districts harbouring forest resources in Karnataka. The utilization of these forests is going on in an indiscriminate way. 80% of this districts geographic area is under the control of the forest department. However the exact area under the forest cover is not known. Centre for Ecological Sciences, Indian Institute of Science, has taken up the project to assess the precise land use patterns and to estimate the forest cover in this area. Initially for the above purpose about 200 sq. Km area in Sirsi taluka was covered.

Methodology

Aerial survey was made in this area by the Institute's air craft-fitted with Hasselblos cameras. Three sets of the flights were made over the selected locatities of Sirsi taluka(Table.1). The scale of photography was 1:20,000 with an overlap of 60% and sidelap of 40%.

Preparation of Mosaic: With the black and white prints made from CIR frames a semi controlled mosaic was prepared. As Pushpak's flying height above the terrain didnot remain constant, and also due to the variable terrain features a completely controlled mosaic could not be prepared. This semicontrolled mosaic gives us the idea about the actual area coverage, scale of photography and gaps in the flights.

Visual Photo Interpretation: Ground data in the selected regions was collected prior to the flights and an interpretation key was developed.

In the lab CIR frames were enlarged four times the original size on a modified B_2 enlarger. Various landuse patterns including different types of forests were delineated. In the study area forests are of three types (1) Natural (2) Plantation (3) Leaf Manure forests.

Overall land use patterns: Total area covered by the flights was 20961.16 hectares. Out of this forests and agriculture occupy 50.3 and 22.7 percent respectively. Miscellaneous land (barren and Marshy land), water bodies, orchards and isolated trees occupy 16.5, 2, 1.2 and 0.5 respectively. Land under public use is 6.4 percent.

Impact of human Habitation: With the help of a calculating grid strip transects of variable lengths were made in different directions from each of the habitation. forest area and canopy gaps were measured in each of the transect. Mean % of the forest area and canopy gaps have been calculated (Table 2). In order to obtain a quantitative relation between the presence of habitation and the extent of canopy gaps, we regressed Y (the canopy gaps) on x (distance from the human habitation).

The canopy gaps of the forests inhabitated by humans vary from a minimum of 18.82% to a maximum of 73.82%. However there is no statistically significant correlation between the distance froom human habitation and the canopy gaps. ($Y=76.61+0.114x/r=0.21;T=1.09;P>0.05,df=26$). It appears that in heavily populated areas such as F flight, canopy gaps are more (neighbourhood of Sirsi). This is true also in the case of B, G, C, H and D. The size of the population in the villages of flight A and

E are relatively smaller and hence the low value of canopy gaps.

Conclusion: The landuse results show that forests occupy 50% of the total area in contrast to the official claim of 82 percent. The difference of 32 percent is largely due to shift inland use towards agriculture, horticulture and addition of degraded land.

TABLE - 4.1

Details of Flight Path of the Remote Sensing Programme in Uttara Kannada District.

Date	Film	Flight Pass	No. of frames
19.2.1984	CIR	A	72
		B	74
	PAN	A	64
		B	83
20.2.1984	CIR	C	29
		D	19
		E	78
	PAN	C	70
		D	46
21.2.1984	CIR	F	83
		G	71
		H	69

TABLE - 2

Impact of habitation on forests:

The following are the mean percentages of forest area and canopy gaps surrounding the habitat in Uttara Kannada District.

Flight	Forest area (percent)	Canopy gaps (percent)
A	80.42	19.57
B	32.24	67.75
C	49.73	50 26
D	59.68	40.31
E	81.2	18.79
F	57.09	42.6
G	44.41	55.58
H	57.02	42.97
F 15,20,35	26.17	73.82
Overall mean (percent)	54.25	45.73

TABLE - 3

Key for Interpretation of CIR Imagery generated in the Remote Sensing Programme in Uttara Kannada District.

Units	Feature for identification	Elements of Interpretation Tone	Texture	Pattern	Shape	Size
1	2	3	4	5	6	7
A.AGRICULTURAL						
A1 Rice Paddy	Paddy fields appear as compact square blocks in bright purplish pink colour to dull brownish pink with irregular rosy patches, medium to smooth. Harvested field appears in brownish tone with dull blue background	Purplish pink with rosy patches dull brownish pink	M to S	R	RF to SF	V
A2 Sugarcane	Crop appears medium pink to bright pink when young and dull pink to brownish rosy when mature with canopy protruding well above the soil surface harvested fields are seen in dull white and dull grey to dark grey when the field is burnt.	Medium pink with brownish rosy	M to C	R	RF	V

A3 Ragi

Pure crop of ragi appears in medium pink tone with medium texture. Some dry soil can also been seen in between where the crop growth is not uniform or crop is young	Medium pink	M	U	RF or O	V

A8 Pineapple

Pineapple field are seen in bright pink to brownish rosy with canopy protruding above the soil surface. The fields are seen with columnar lines of planting buds side by sides.	Bright pink	C	U	RF	V

A9 Other crops

Unidentified crops can be put in this category.	Pink	S to M	R	RF ro O	V

A10 Fallow land

Uncroped recently ploughed fields appear very light blue with smooth texture. A field ploughed longback can be seen with dull white tone and Medium texture brown patchy growth of grass appear in medium texture and	Light blue to dull white with brown patches	S to M	U	RF or O	V

grown dense canopy where individual species cannot be separated.					

D.FOREST

D1 Plantation

Regularly planted trees mostly on contours with medium pink canopies of varying sizes casting dark shadows. These plantations cover very large area at a stretch.	Medium pink back-ground white or brownish pink	M	R	F	L

D2 Natural

Scattered trees of varying size usually growing on hilly terrain. Plant canopy has bright to medium pink tone and coarse texture.	Bright to medium pink	C	I	I	L or NS

E.MISC.LANDS

E2 Waste barren lands

Large pieces of land having no field bunds only same grasses in brownish pink tone or stones in light brown tone	Brownish pink to light brown	M to C	I	I	V

E4 Marshy land

Area by the sides of water bodies	Purplish pink	M	I	I	V

having stagnant water. Vegetation appear in purplish pink tone with medium texture.					

F.WATER BODIES

F1 Tanks

Fairly large water bodies with irregular shape bund on one side and streams towards higher gradient side. Weeds appear in different tone of pink from purplish to rosy pink.	Light blue to dark blue with patches of purplish pink to rosy pink	S to C	I	I	V

F2 Streams and drains

Blue or dull bluish white depending upon presence or absence of water. Some times on the margin pink line can be seen because of some vegetation.	Blue or dull bluish white	S to M	I	Me	V

F3 Rivers

Dark blue water body with marshy land irregularly bordering on both sides.	Dark blue	S	I	Me	V

F6 Ponds and Other water bodies

Appear in dark to light blue patches sometimes surrounded by some vegetation appearing pink in tone.	Dark to light blue/ pink	S	I	I	V

G. PUBLIC USE

G1 Road

Tar roads appear as medium blue lines of uniform width. Unmetelled road appears dull white usually tree liningon both sides. Wavy course.	Medium blue dull white	S	R	–	–

G3 Habitation

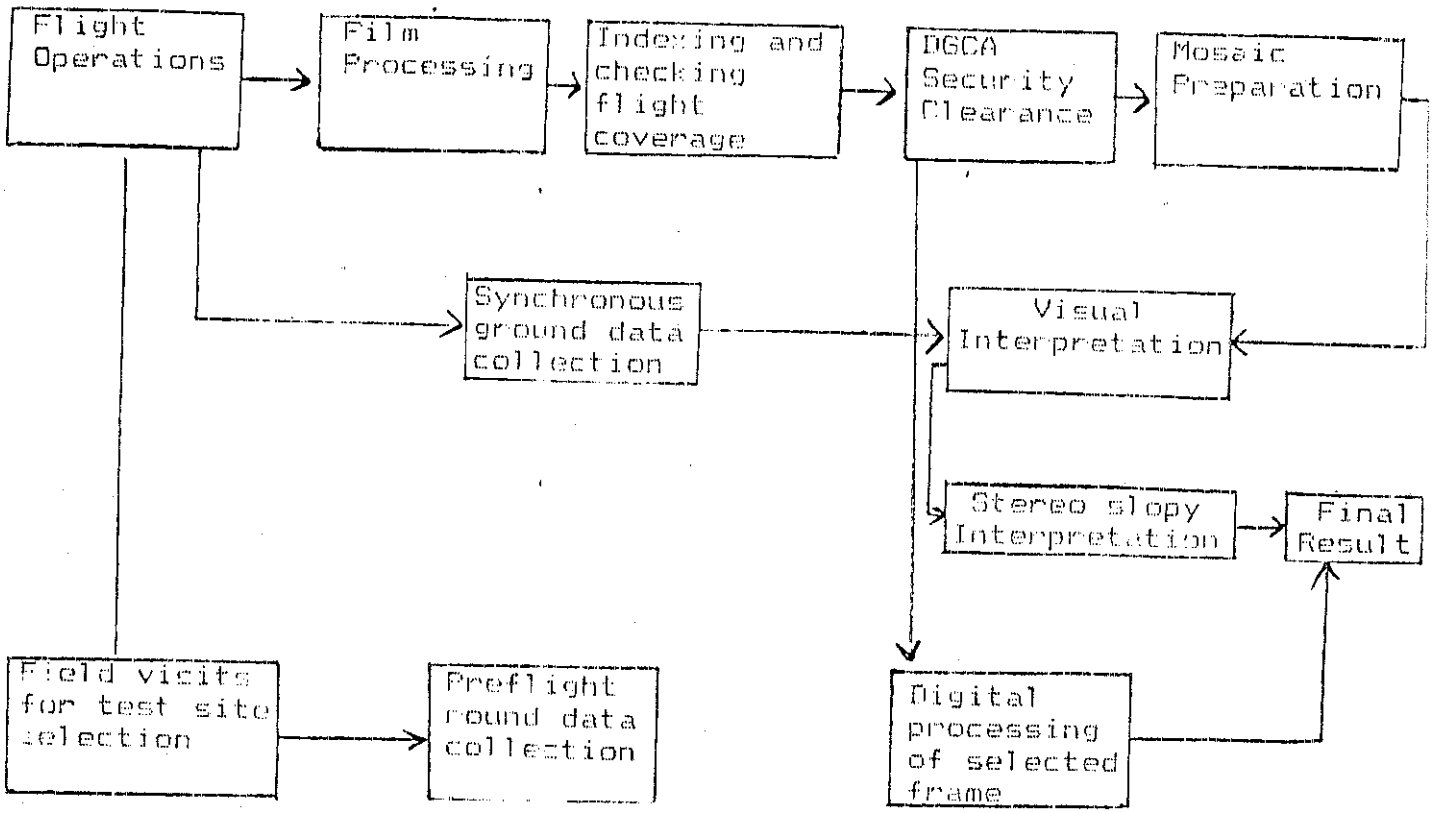
Tiled roof tops of houses appear as light grey rectangles cemented roofs appear dull white to dull grey. Individual houses have smooth texture but overall texture is coarse.	Light grey dull white	S to C	R	I	V

Abbreviations used in Table 4

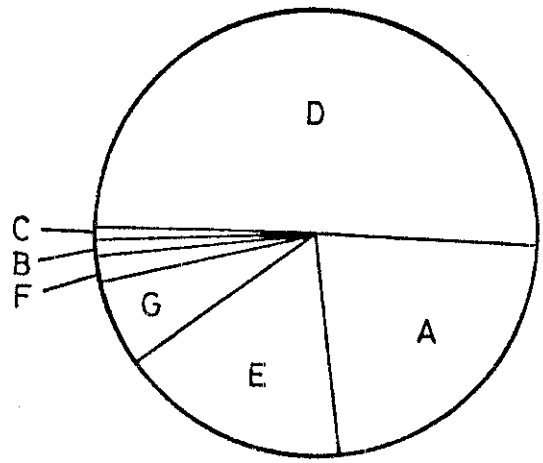
C	Coarse
F	Finger print like
I	Irregular
L	Linear
M	Medium
Me	Meandering
O	Oval
R	Regular
RF	Rectangular field
Ro	Round
S	Smooth
SF	Square field
SS	Star shaped
U	Uniform
V	Varying

FIGURE - 1

SCHEMATIC DIAGRAM OF THE SIRSI REMOTE SENSING OPERATION



OVERALL
LAND USE PATTERNS



		Percentage
Forests	(D)	50.3
Agriculture	(A)	22.7
Miscellaneous land (Barren land and Marshy land)	(E)	16.5
Public use	(G)	6.4
Water bodies	(F)	2.0
Orchards	(B)	1.2
Isolated trees	(C)	0.5

Fig.2

Flight A

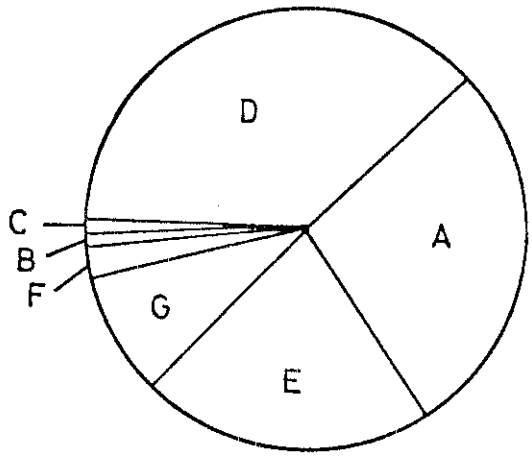


Fig. 3

		Percentage
Forests	(D)	37.01
Agriculture	(A)	28.09
Miscellaneous land (Barren land and Marshy land)	(E)	21.7
Public use	(G)	8.79
Water bodies	(F)	2.68
Orchards	(B)	0.89
Isolated trees	(C)	0.81

Flight B

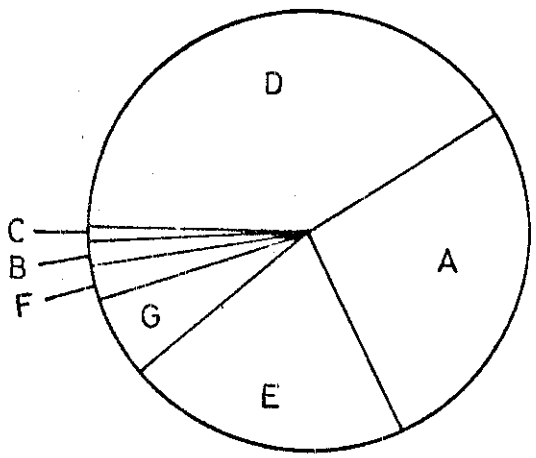


Fig. 4

(D)	40.5
(A)	27.22
(E)	20.72
(G)	6.22
(F)	2.68
(B)	1.83
(C)	0.78

Flight C

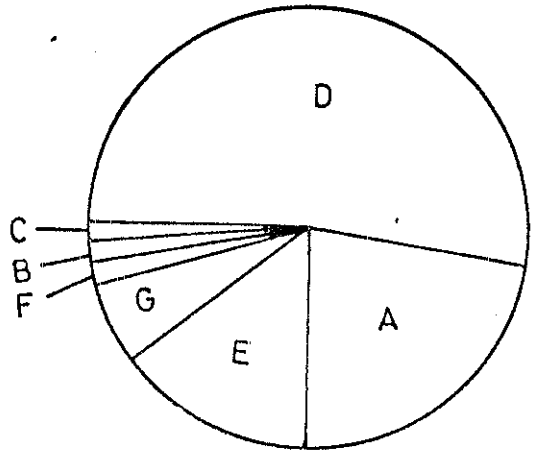


Fig.5

		Percentag
Forests	(D)	52.26
Agriculture	(A)	22.66
Miscellaneous land (Barren & Marshy lands)	(E)	14.74
Public use	(G)	6.06
Water bodies	(F)	1.6
Orchards	(B)	1.58
Isolated trees	(C)	1.07

Flight D

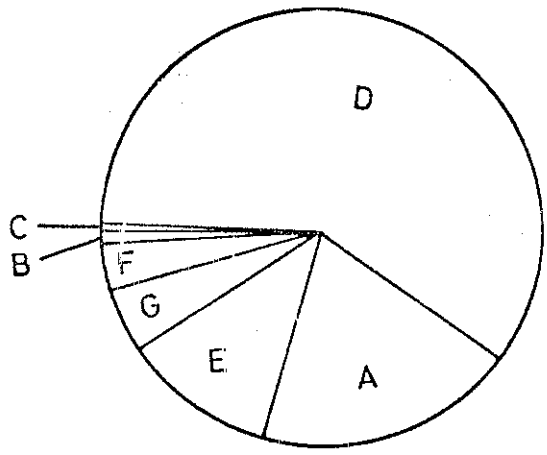


Fig.6

(D)	59.59
(A)	19.34
(E)	11 24
(G)	5.07
(F)	3.39
(B)	0.85
(C)	0.49

Flight E

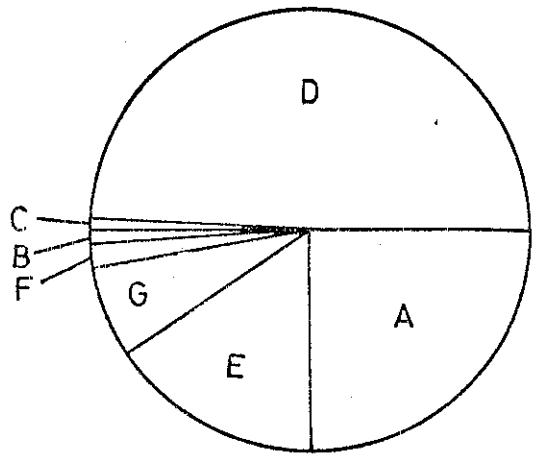


Fig. 7

	Percentage
Forests	(D) 49.43
Agriculture	(A) 24.39
Miscellaneous land	(E) 15.8
Public use	(G) 6.92
Water bodies	(F) 1.88
Orchards	(B) 1.07
Isolated trees	(C) 0.46

Flight F

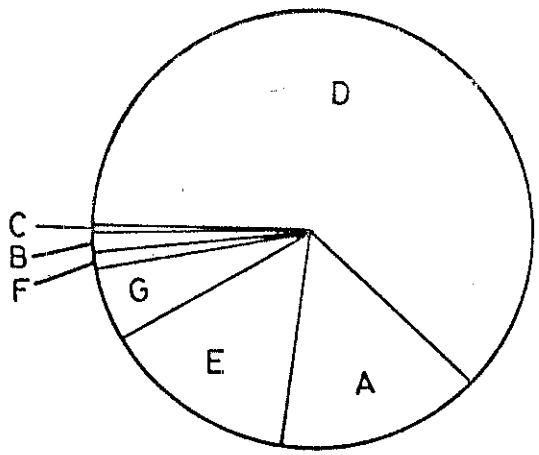


Fig. 8

(D) 61.81
(A) 15.1
(E) 14.6
(G) 4.96
(F) 1.7
(B) 1.49
(C) 0.18

Flight G

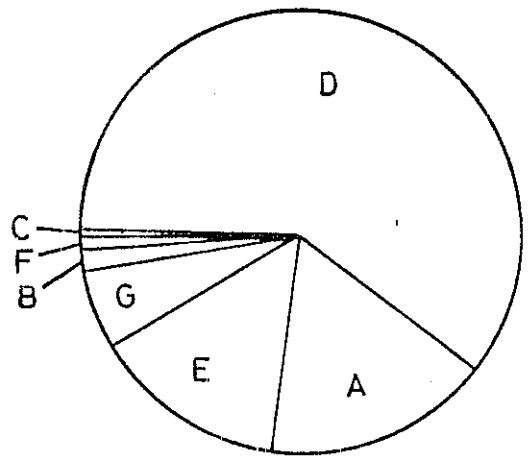


Fig. 9

	Percentage
Forests	(D) 60.4
Agriculture	(A) 16.7
Miscellaneous land	(E) 14.22
Public use	(G) 5.97
Water bodies	(B) 1 33
Orchards	(F) 1.23
Isolated trees	(C) 0.10

Flight H

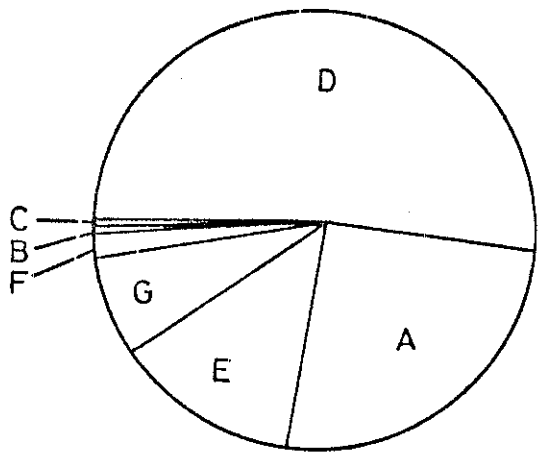


Fig. 10

(D) 51.98
(A) 25.67
(E) 13.01
(G) 6.71
(F) 1.79
(B) 0.65
(C) 0.15

Legend for Figures

Fig.2 - Overall Land use patterns of the study area in Sirsi Taluk.

Fig.3 - Land use patterns in the areas covered by flight A in Sirsi Taluk, Uttara Kannada district.

Fig.4 - Land use patterns in the areas covered by flight B in Sirsi Taluk, Uttara Kannada district.

Fig.5 - Land use patterns in the areas covered by flight C in Sirsi Taluk, Uttara Kannada district.

Fig.6 - Land use patterns in the areas covered by flight D in Sirsi Taluk, Uttara Kannada district.

Fig.7 - Land use patterns in the areas covered by flight F in Sirsi Taluk, Uttara Kannada district.

Fig.8 - Land use patterns in the areas covered by flight F in Sirsi Taluk, Uttara Kannada district.