Land Use and Land Cover Analysis using Supervised Classification

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***Abstract* – Land use Land cover change study is veritably important aspect of the natural coffers data base study. The present study aims to find out the LULC features of Aghanashini swash receptacle of the Western Ghats region, Karnataka, India. The Landsat 8 OLS satellite imagery are used for relating the land use/land cover classes. ERDAS IMAGINE software is used to define the land use and land cover features of study area. The land use and land cover analysis of Aghanashini river catchment area has been tried grounded on thematic mapping of the area using satellite image.**

Key Words; Land use and Land cover, Remote sensing and GIS Techniques, Aghanashini river, Landsat satellite 8 OLS.

I. INTRODUCTION

The LULC pattern of a region is an outgrowth fig.1.0 study chart of Uttara kannada natural and socio – economic profitable factors and their applications by man in time and space. Land cover is becoming a scarce resource due to immense agricultural and demographic pressure. Using of Remote sensing technique for accurate evaluation of the land cover mapping is gaining main concern in recent times. Further Quantification of land covers changes by using latest tools and techniques such as remote sensing, GIS and GPS along with ground truth data/ google earth data can generate sound scientific methods of natural resources conservation. Therefore, efforts have been made in this direction to study the changes in land covers in Aghanashini river basin of the Western Ghats region, Karnataka.

II. STUDY AREA

Place – Uttar Kannada District
Longitude – 74º05' to 75º 05' E
Latitude – 13º55' to 15º32' N
Study area is considered Aghanashini river basin of the western Ghats region, Karnataka.

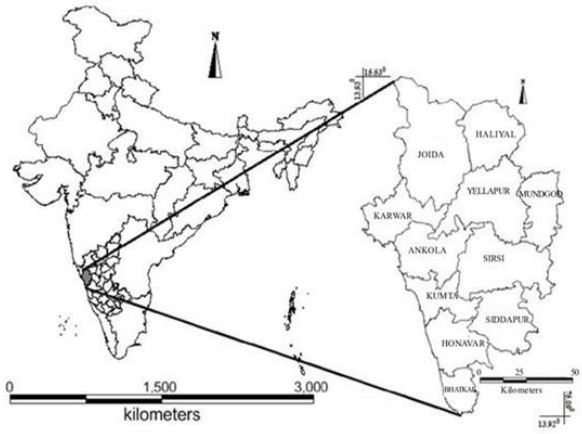

Fig 1. Study map of Uttara kannada

III. OBJECTIVES

- To delineate the land cover changes spatially and quantitatively.
- To prepare the composite image of the study area using ERDAS imagine.
- To develop thematic maps of the study area.
- Identify various types of modifications carried out on agricultural land, open water bodies etc in study area.

IV. MATERIALS AND METHODOLOGY

Goggle earth Data can induce sound scientific style of data processing in flow chart outlines the abstract natural coffers consevations Thus , sweats have been framework for detecting and prognosticating LULC changes in the study area.

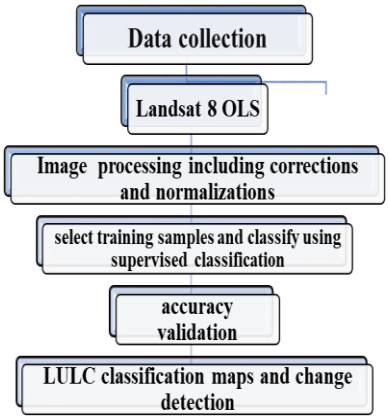

Fig 2. Flow Chart of the Methodology

Steps involved in methodology

1.Data acquisitions and land use
2.Image preproccesing
3.Land Cover Classification

Both supervised and unsupervised classifications will be used to identify land use types in the study area. six LULC types

Table 1: Composite Table of Area Classified into Various Land Cover

Sl No	Classification Of Land Cover Types
1	Agricultural land
2	Built-up land
3	Forest
4	Grassland / Grazing land
5	Others
6	Wastelands

4. Classification Accuracy Assessment

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$$\text{Kappa coefficient} = \frac{\sum ik=1\ nii - \sum ki=1\ nii(GiCi)}{n2 - \sum k\ i=1\ nii\ (GiCi)}$$

V. RESULTS AND DISCUSSIONS

CATCHMENT AREA (AGHANASHINI RIVER)

- Catchment name: Aghanashini river basin
- Shape of the catchment: Fern splint type
- Type of stream: Perennial streams .
- Ends at: Uppinpatna, Kumta, Uttar Kannada district (name town, district, region, etc.).
- Drainage length of catchment area: 3362.31 km.
- Drain into: Arabian Sea at Tadri (estuary- kumta taluk, uttar Kannada).
- Catchment area: Approx. 1456km2
- Elevation: Ranges between < 0m and 786m w.r.t Mean Sea Level.

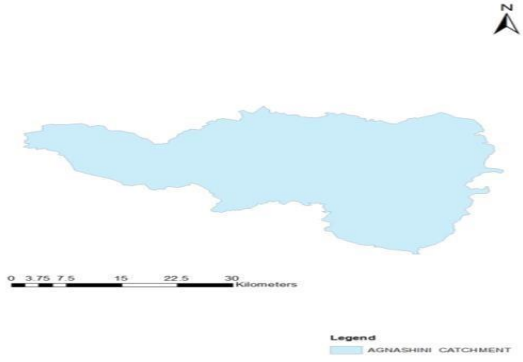

Fig 3. Catchment area map of Aghanashini River

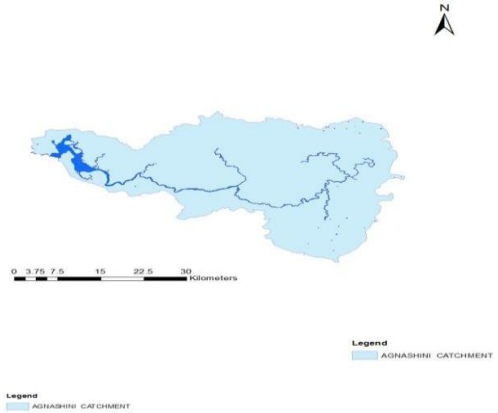

Fig.4 Water bodies map of Aghanashini River

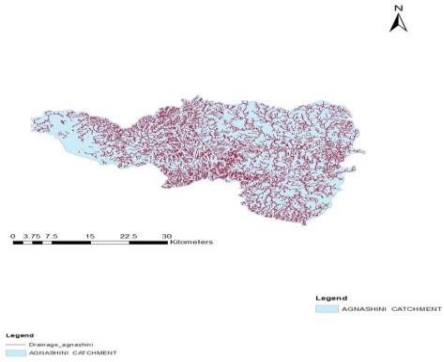

Fig.5 Drainage map of Aghanashini River

Table 2: Drainage length

Sum of Shape_Length	**Total**
Total	3362310.217

That is, the aghanashini river basin is having the overall length of 3362.31 km.

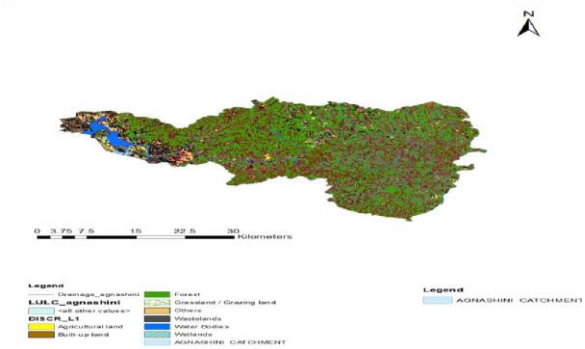

Fig. 6 Land use and land cover map of Aghanashini River

Total area of LULC classification=145616.737 ha

Table 3: Representation of LULC classification in terms of % of area acquired

LULC CLASSIFICATION	**% OF AREA ACQUIRED**
Agricultural land	13.70
Built-up land	2.14

Forest	68.61
Grassland/Grazingland	3.27
Others	7.33
Wastelands	1.93
Water Bodies	2.65
Wetlands	0.37

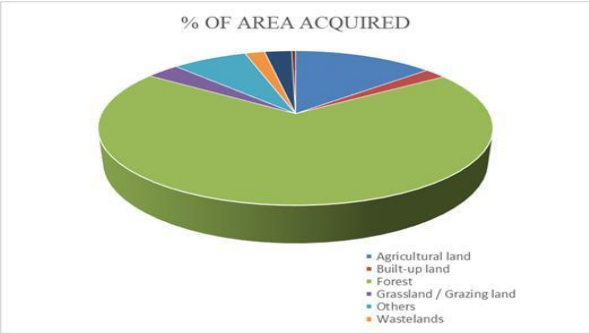

Fig 7. Representation of various areas in terms of pie chart

Table 4: Accuracy Totals of the LULC Map (2020)

Class Name	Reference Totals	Classified Totals	Number Correct	Producer's Accuracy (%)	User's Accuracy
Agricultural Land	154	150	122	79.22	81.33
Barren Land	162	150	143	94.44	95.33
Forest	144	150	127	88.19	84.66
Habitat	147	150	124	84.35	82.66
Water Bodies	143	150	137	95.80	91.33
Total	750	750	653		

Table 5: Error Matrix of 2020 LULC Map Reference Data

LULC map	Overall classification accuracy in %	Kappa coefficient
2020	88.24	0.82

Table 6: Comparison of results of accuracy assessment and kappa co-efficient of the respective LULC maps

Reference Data						
Classified Data	Water Bodies	Forest	Habitat	Barren Land	Agri. Land	Totals
Water Bodies	122	0	5	7	16	150
Forest	8	127	0	9	6	150
Built up Area	13	0	124	3	10	150
Barren Land	0	0	7	143	0	150
Agricultural Land	0	17	11	0	122	150
Total	143	144	147	162	154	750

With reference to above table 5.6, LULC impact analysis has been performed with an overall classification accuracy of 88.24 % for 2020 LULC map with a kappa coefficient of 0.82 which is very good in nature and reflect the ground reality.

VI. CONCLUSIONS

- RS has proved it is the important tool for non-stop supervision and quantification across varied spatial and temporal scales which are else not possible to attempt essay traditional mapping techniques.
- The above presented work demonstrate systematic approach of LULC mapping by using the ERDAS IMAGINE & GPS data for generating estimates of different areas acquired in the Aghanashini river basin.
- The total catchment area of Aghanashini River is estimated to be 1456.017 km2, the forest and agricultural land occupied the major part of the river basin with 68.61 and 13.70 percent of the total area.
- And the other classification like Built-up land, grassland, water bodies, wetlands, wastelands, and other minor groups have occupied areas in a very small extent, i.e about below than 8 percent of the sum area.
- The redounded drainage of catchment area is dendritic in nature.

VII. SCOPE FOR FUTURE WORK

- The above study for the Aghanashini river basin can be continued through the comparative analysis of LULC changes over the decades to the present time.
- This present study can also be continued for future flood forecasting especially in North Karnataka.

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