Review on role of geospatial technology in vegetation mapping, conservation and land use land cover analysis

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Abstract - **Population demands power generation and industrial applications for secure energy due to fulfilling basic requirements. It causes land cover changes; produces destruction of environment, geological resources and biological resources. This impact can be examined by using geospatial applications; remote sensing (RS) and geographical information system (GIS). Present review based on the role of geospatial technology in vegetation mapping, biodiversity conservation and land use land cover (LULC) analysis. This review focused on the utility of geospatial technology in vegetation mapping, in an analysis of land use land cover as well as the correlation between land cover change and destruction of biodiversity. However geological resources are the raw material of development, due to mankind cannot admit defeat on it. As per this paper, it is concluded that astute use of geological resources, ecological restoration, urban development planning and eco- friendly substitute and alternatives must provide the answer of sustainable development.**

keywords - **Vegetation mapping, Remote sensing, Geographical information system, Land use Land cover, Biodiversity conservation**

1. INTRODUCTION

Worldwide environmental and global environmental changes, such as climate change, land use land cover change produces destruction of the environment, geological resources and biological resources. An incomparable period of history, from the last few century humans, rapidly transforming the ecosystems, it results from the declination of species, verity of genes or biodiversity [1]. The lack of awareness about the importance of biodiversity among people creates huge increscent of human interaction, resulting in drastic globalised change. The vegetation type map previously used by researchers as a key input for biodiversity characterization at a landscape level. The vegetation of particular area can be considered as an important indicator for measuring local environment changes, it is an important technical task for managing natural resources and plays a vital role in affecting global scale at a certain period or over a continuous period due to base provider of all living beings [2][3]. Monitoring and examine of earth surface state is the most required for the global change research [4][5][6]. Land use Land cover (LULC) play vital role in understanding human activities and interaction with the environment, and assessment of LULC is essential for the planning and management as well as maintain a sustainable environment, to understand the earth's features and for its modelling [7]. Remote sensing offers accurate systematic observation at various scales and it provides data archives from present time to over a few decades back [8]. Time series of remotely sensed data are frequently used in environment change detection due to their temporal resolution and regular updating. In recent time, numbers of case studies have been administrated to examine with GIS technology and remote sensing application to monitor and map change of vegetation coverage at multi-spatial scales, especially at macro-spatial scale such as global [9][10][11] and provincial scales [12][13] with few studies conducted at lower level. Contradictorily supervision of long-term change in vegetation coverage time after time escort with the application of archaeological or historical data and habitually covers hundreds to 10,000 years [14][15][16].

2. REVIEW OF LITERATURE

Role of Geospatial application in vegetation mapping and conservation

A Geographical information system is a computerized tool designed for the management and use of spatial data. Threefold approaches such as; Phytosociological basis, uses of remote sensing and GIS and multi-scale approach including landscape ecology are more common for plants mapping or vegetation [17]. GIS technology has been used to analyze distribution patterns of individual plant species [18] plant communities [19] vegetation formations [20][21][22] and vegetation changes [23]. However, this tool has been rarely applied for the analysis of high taxonomic groups such as the whole flora of a particular region. To determination of vegetation cover change over large areas remote sensing technology provide practical and economical mean [24][25]. Geospatial techniques provide various kinds of satellite data. These satellite data brings information which can be used for assessment and verification of the target area at any given time, this data can be re-used for a reassessment of changes in the target area or site. Satellite data collect authentic information; this information's can use for a different purpose. Satellite data provides records of vegetation pattern, forest pattern, land- use patterns and much more information of a particular area. These data and historical data open the door of a comparative study of two and more different times or decades. Its provide insights into various changes in land use pattern [26]. Xie *et al., 2008* used different features of image products from the different sensors Landsat TM Spot for regional-scale mapping, vegetation mapping at the community level. Landsat TM, Landsat ETM+

(Landsat7) used for regional-scale mapping, vegetation mapping at the community level. SPOT for vegetation mapping at a species level, IKONOS at 1m, QUICKBIRD (2.4-0.6m) for high-resolution imagery, vegetation mapping at the species level [8]. GIS techniques are useful in developing a tree mapping system, spatial analysis by creating a geo-database. Also added those integrating more data into the system generate accurate evaluation in these studies. This application used to assess the impact of human activities, also used to extend and understand the nature of vegetation. GIS analysis provides mean information for making management decisions of biodiversity conservation. Debinkski, D.M. *et al*., 1999 was used remotely sensed data and GIS for map creation to biodiversity sampling in the greater Yellowstone ecosystem in USA [27]. Turner 1989 stated that remotely sensed data and GIS has the ability to analyzed landscape-level habitat at fine- scale resolutions to abet in explaining species diversity patterns [28].

Role of Geospatial Technology in Land Use Land Cover Analysis

H.S. sudhira *et al.,* 2004 considered; GIS and remote sensing provide basic information's that could be considered for providing convenience such as water, sanitation, electricity as well as for urban planning, it also provides basic data to understand the pattern of urban sprawl and growth rate [29]. Shreenivasulu Ganugapenta *et al.,* 2015 analysed land use land cover by using a combination of satellite images and predated topographic sheet of the survey of India. They used this technology to identify land use categories such as forest land, constructed area, agricultural land, open area, river, waterbody, they stated; these micro information could be considerable for authentic planning [7]. Abubakr A.A.Al-sharif and Biswajeet Pradhan 2014 used CA-Markov model for the prediction of land use in future by calibrating compute optimal transition rules and reported that GEOMOD2 is frequently used for spatially explicit and dynamic landscape modeling to simulate future land-use change based on statistical analysis of future land use by people, and the algorithm used to hypotheses how land will be used by people. This model is also for future prediction of deforestation according to past and current patterns and drivers of deforestation [30]. G.D. bhatt *et al.,* 2013 used Landsat TM with a spatial resolution for geometrical correction of satellite data. The assessment of land suitability is necessary for agricultural development and future planning. Comparison of texture values of images makes a way measurement of change [31]. Soil moisture conditions, atmospheric condition, temporal constraints, spatial, radiometric resolution, spectral are affected the digital change detection [32]. Some conditions must be satisfied before the process of change detection such as calibration between multi-temporal images. Researchers prefer satellite imagery for agricultural land assessment [33][34]. Rawat and kumar 2015 reported; for the understanding of landscape dynamics and land change detection of LULC of any geographic place; multi-temporal satellite image would help [35]. The use of satellite data is common for the LULC change detection and Landsat data using for identification of global LULC change since 1972, due to their constant availability of images [36].

3. CONCLUSION

RS, GIS Applications have been used to vegetation mapping and frequently used in the monitoring of LULC change by researchers and it would be useful for the assessment of biodiversity and natural resources. Anthropogenic activities cause changes in land cover [37]. Cultivated land drastically decreased by 18.9% in the year 1999 in Raipur due to encroachment of urbanization and it affects the land degradation, soil texture and fertility, crop productivity [38]. Continuous use of land for various human activities and rapid growth of human population demands land and soil resources [39]. Change in LULC is linked with the destruction of biodiversity due to rapid use of land and natural resources by humans. Remote sensing and geographic information system techniques make an easy way to study of change in land use land cover [40][41][42]. Emad Mohamad Ali Gabril *et al.,* 2019 admitted that Strategic process of urban development requires selection of suitable site, new approaches, planning's, operations, networks and urban project management. However, cooperation between academia, government and the private sector are necessary for sustainable development of the urban area as well as biodiversity conservation [43].

4. REFERENCES

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