Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 04, Issue: 06 (NOV-DEC, 2024)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Land Cover Change: An Overview

(*Geetesh Kumar and Ayushi Trivedi)
Department of Natural Resource Management, College of Forestry and Research Station, MGUVV, Sankara, Patan, Durg, Chhattisgarh, India
*Corresponding Author's email: geeteshkumarsinhasinha3343@gmail.com

Land cover change, the transformation of the Earth's surface through natural processes and human activities, significantly impacts ecosystems, biodiversity, and climate systems. This article explores the various drivers of land cover change, including agricultural expansion, urbanization, deforestation, and climate change. It examines the consequences of these changes on environmental health, focusing on soil degradation, water cycle disruption, and habitat loss. Additionally, the article discusses methods for monitoring land cover changes using remote sensing technology and highlights policy measures and sustainable practices aimed at mitigating adverse effects. Through a comprehensive understanding of land cover dynamics, we can better manage and preserve our natural resources for future generations.

Keywords: Land Cover Change, Remote Sensing, Geographic Information Systems (GIS).

Introduction

Land cover change refers to the transformation of the Earth's surface, driven by both natural processes and human activities. This phenomenon encompasses alterations in vegetation, water bodies, and built environments, reflecting dynamic interactions between ecological systems and societal development. Understanding land cover change is crucial for assessing environmental health, biodiversity, and climate impacts, as well as for informing sustainable land management practices. Historically, land cover has shifted due to factors such as urbanization, deforestation, agriculture, and natural events like wildfires and floods. The advent of remote sensing technology and geographic information systems (GIS) has revolutionized the study of land cover change, enabling detailed and extensive monitoring over time. These tools facilitate the analysis of spatial and temporal patterns, allowing researchers to track changes with unprecedented accuracy and scale.

Main Content

Methodology: Land cover change (LCC) refers to the alteration of land surface characteristics, such as vegetation, water, or urban areas, over time. Monitoring and analyzing LCC is crucial for understanding environmental, social, and economic impacts. This article provides an overview of the LCC methodology, highlighting key steps, techniques, and tools.

Data Collection:-Gathering historical and current land cover data is the first step in LCC analysis. Sources include satellite imagery (e.g., Landsat, Sentinel-2), aerial photographs, and field observations. Data quality and resolution significantly affect the accuracy of LCC results.

Data Preprocessing:-Preprocessing involves cleaning and formatting data for analysis. This includes georeferencing, atmospheric correction, and mosaicking. These steps ensure data consistency and accuracy.

Land Cover Classification:-Land cover classification categorizes land cover into distinct classes (e.g., forest, urban, agriculture). Techniques include supervised or unsupervised classification, object-based image analysis, or machine learning.

Change Detection:-Change detection compares land cover maps from different time periods to identify changes. Methods include post-classification comparison, image differencing, and change vector analysis.

Change Analysis:-Change analysis quantifies and describes the changes, including magnitude, direction, and rate. This step examines the extent and pace of land cover changes.

Validation:-Validation verifies the accuracy of land cover maps and change detection results using field observations, reference data, or other independent sources.

Analysis and Interpretation:-This step examines the drivers and consequences of land cover change, considering environmental impacts (e.g., deforestation, habitat loss) and socio-economic factors (e.g., urbanization, agriculture expansion).

Reporting and Visualization:-Findings are presented through maps, graphs, and reports, highlighting key trends, patterns, and insights.

Conclusion

Land cover change is a dynamic and complex process with far-reaching impacts on the environment and human well-being. By leveraging advanced monitoring technologies and implementing sustainable practices, we can mitigate the adverse effects of land cover change and ensure the resilience and health of our ecosystems. Collaborative efforts at local, national, and global levels are essential to manage land resources effectively and sustainably for future generations.

References

1. Treitz, P. and Rogan, J. (2004) Remote-sensing for mapping and monitoring land-cover and land-use change – an introduction, Progress in Planning, 61, 269-279.
2. Verbyla, D. L. and Boles, S. H. (2000) Bias in land cover change estimates dues to misregistration, International Journal of Remote Sensing, 21, 3553-3560.
3. Yang, X. and Liu, Z. (2005) Using satellite imagery and GIS for land-use and land-cover change mapping in an estuarine watershed, International Journal of Remote Sensing, 26, 5275-5296.
4. van Oort, P. A. J. (2005) Improving land cover change estimates by accounting for classification errors, International Journal of Remote Sensing, 26, 3009-3024.
5. Pontius, R. G. and Petrova, S. H. (2010) Assessing a predictive model of land change using uncertain data, Environmental Modelling and Software, 25, 299-309.
6. Mundia, C. N. and Aniya, M. (2005) Analysis of land use/cover changes and urban expansion of Nairobi city using remote sensing and GIS, International Journal of Remote Sensing, 26, 2831-2849.
7. Lunetta, R. S., Knight, J. F., Ediriwickrema, J., Lyon, J. G. and Worthy, L. D. (2006) Land cover change detection using multi-temporal MODIS NDVI data, Remote Sensing of Environment, 105, 142-154.