

# ENVIRONMENTAL AUDIT REPORT FOR SAHYA ARTS AND SCIENCE COLLEGE, WANDOOR, MALAPPURAM DT, KERALA

By, Wildlife Research & Conservation Trust, Kerala, India

---

## Environment Audit Report

---

Prepared for Sahya Arts and Science College.  
Prepared by Dr. K.S. Anoop Das & team, daksas@gmail.com, 09895471987,  
Biodiversity Assessment Team

Report No 02/24/SASW

### All Rights Reserved

Only Ms. Sahya Arts and Science College or their designated representatives or relevant statutory authorities may use this document and only for the specific project for which this document was prepared. It should not be otherwise referenced without permission. This document contains 20 pages.

### Document history

Version	Description	Date	Authors/Contributors	Authorized/ Approved for issue
1.1 Draft	Site visits	06.04.2024 to 10.04.2024	Dr. K.S Anoop Das Dr. S. Sumith Satheendran Dr. Dhanya R	
1.2 Draft	Manuscript preparation / Data analysis	11.04.2024 to 16.04.2024		
1.3 Print		18.04.2024	-do-	Final report for submission



## Wildlife Research and Conservation Trust

A non-profit public charitable trust- Reg. No. 580/2005 ESTD in 2005, under the Societies Registration Act [No.21/1860]

Consultancy No 02/23

18.04.2024

### Certificate

This is to certify that, the information and data presented here is based on the fieldwork and GIS work carried out by the Environment assessment team led by the undersigned for the Sahya College. The rapid assessment with standard protocol has been compiled and executed by the team. We certify the data presented here which is documented and verified by the experts in the relevant field.



Dr. K.S Anoop Das

Dr. Dhanya R

---

# ENVIRONMENTAL AUDIT OF SAHYA ARTS AND SCIENCE COLLEGE

## Introduction

Environmental auditing is a method used to assess an organization's environmental performance against specified objectives. Auditing should be an integral component of environmental management systems of the organization and should not be regarded as a separate or alternative exercise. Green Audit can be summarized as systematic identification, quantification, documentation, reporting, synthesis and analysis of components of environmental diversity and expressing the same in financial or social terms. The International Chamber of Commerce (ICC) defined environmental auditing as a management tool comprising a systematic, documented, periodic and objective evaluation of how well the environmental organization, management and equipment are performing. Conservation of environment is cardinal to the sustenance of life on earth. Environmental audit is an effective management tool towards evolving sustainable development strategies and has become mandatory since the declaration of National Environmental Policy 2006. It is a systematic process of identifying and assessing whether the practices and initiatives of any institution or establishment are sustainable and eco-friendly that help in improving human activities which could reduce the adverse effects on the environment. The auditing is visualized to detect and monitor changes in the environment to improve the quality in terms of different components such as air, water soil, pollution levels, energy

---

consumption, water management, biodiversity, carbon footprint as well as human induced hazards. It has been recognized that the maintenance of healthy environment is the responsibility of both the state and every citizen.

Currently a thorough understanding on the need of the environmental quality has now become an integral part of the educational system. Educational institutions may impose broad negative or positive impacts on the world around them. The Green audit in the campus aims to analyze its environmental practices in the campus, which will have an impact on the eco-friendly ambience. In short, the establishment of infrastructure facilities and associated practices in the campus may directly or indirectly affect the biotic and abiotic life supporting systems. Higher education institutions/universities are key for the implementation of sustainability principles as it owns sustainability-based curricula and culture change is key to mindset to adapt such principles (Pereira 2001). Similarly, it provides a extensive platform for interdisciplinary studies and function as the basis of the transformation towards sustainability. In view of the emerging environmental protection and conservation facet, National Assessment and Accreditation Council (Criterion VII), an autonomous body under UGC has incorporated environmental audit in the accreditation methodologies of Higher Education Institutes/Universities/Colleges.

Environmental audit is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. Depending on the types of standards and the focus of the audit, there are different types of environmental audit. Higher Education Institutions/Organizations of all kinds now recognize the importance of environmental factors and accept that their

---

environmental performance will be scrutinized by a wide range of interested parties. Environmental Auditing is carried out when development is already in place and project is working, and is used to check on existing practices, assessing the environmental effects of current activities. It gives an idea of what is happening at that point in time in the project. Environmental audit of educational institutions is an attempt towards implementing environmental sustainability in the campus.

## **Introduction**

---

This Environmental Auditing Report presents a comprehensive evaluation of the environmental policies, practices, and impact of Sahya Arts and Science College, located in Wandoor, Kerala. As an educational institution committed to sustainability and ecological stewardship, the college recognizes the importance of assessing its interaction with the environment to promote a green and healthy campus.

This report aims to identify the current status of the college's environmental footprint, highlight areas of excellence, pinpoint opportunities for improvement, and provide strategic recommendations to enhance the college's overall environmental performance.

The scope of this audit covers various aspects including energy use, waste management, water conservation, biodiversity preservation, and the integration of ecological considerations into the college's infrastructure and daily operations. By scrutinizing these areas, we endeavor to assist Sahya Arts and Science College in advancing towards its goal of becoming a model institution for sustainability in the higher education sector. The findings and recommendations outlined in this report are based on thorough inspections, data analysis, and a review of the college's environmental policies and

---

procedures. The report is structured to provide a clear and actionable roadmap for the college to follow, ensuring that environmental sustainability remains a cornerstone of its legacy and contributes positively to the wider community and natural ecosystem of Kerala.

### **Scope of Environmental Audit**

---

Sahya Arts & Science College, Wandoor being a pioneering institution provides a high priority to education, research and environmental conservation activities. It also ensures a high quality academic and environmental ambience for its stakeholders. One of the prime vision of the institute is to create a sustainable campus i.e., environmentally responsible citizens. With a growing recognition of environmental challenges and a commitment to shaping a sustainable future, Sahya Arts & Science College is actively integrating sustainability principles into their Policies, academic programmes, campus activities, and community engagement initiatives. This is implemented by equipping students with the knowledge, skills, and values essential to address increasing sustainability issues through curricular and extracurricular activity. Sahya Arts & Science College is fostering a culture of environmental and social responsibility that extends beyond the confines of their campus.

### **Aims and Objectives of Environmental Audit**

- To identify significant environmental issues due to organizational development and propose suitable mitigation measures.
- To ensure proper utilization of resources available in the surrounding areas for the future prosperity of humanity.

- 
- To suggest recommendations to manage the contaminated land, waste, pollution and biodiversity loss
  - To recognize the initiatives taken towards establishing the green campus
  - To implement continuous assessment and evaluation for building healthy practices that help to nurture an eco-friendly campus.
  - To guarantee sustainable utilization of resources existing in the locality beneficial for future prosperity of the humanity.
  - To create a collaborative effort among the university fraternity to foster an eco-friendly learning and working environment.
  - To establish and implement effective environment management.
  - To enumerate suitable environmental policy for the organization

---

### **Benefits of Environmental Audit**

---

- Reducing environmental impacts by identifying cost-saving methods through energy conservation, water conservation, and waste minimization
  - Help to protect the environment of the campus  
Enhancement of biodiversity resources
  - Provide practical measures to minimize carbon dioxide emission making a net zero carbon campus.
  - Providing the foundation for an environmental management system
  - Empower the institute to frame a better environmental performance and impart a good image to the institution through its clean and green campus
  - Improving relations with stakeholders
-



- 
- Increased students awareness of environmental standards and responsibilities
  - Improved employee relations and increased morale to staffs and students

### About the Institution

---

Sahya Arts & Science College campus is located in Wandoor, Malappuram, Kerala, India, under the management of Sahya Pravasi Co-operative Society Limited. Sahya Arts and Science College, has been fostering higher education since its inception in 2013. Following the sanctioning of administrative approval the college, affiliated with the University of Calicut, commenced five undergraduate programs for the academic year 2013-14. With a commitment to evolving into a distinguished institution of higher learning, the college boasts sufficient infrastructure to support its vision. The main college building, which encapsulates a blend of natural beauty and eco-friendliness, stands on a vast expanse of five acres of scenic land, situated five kilometers from Wandoor, by the old railway station in Vellampuram. This serene and expansive setting provides an ideal environment conducive to academic endeavors and the scholarly pursuit of knowledge.

The phenomenon of securing carbon dioxide to prevent it from entering the Earth's atmosphere, to stabilize carbon in solid and dissolved forms so that it doesn't cause the atmosphere to warm, is termed Carbon sequestration. Terrestrial Carbon Sequestration is the phenomenon through which the atmospheric carbon dioxide is absorbed by the plants and tree canopy, through the process of photosynthesis and stored as carbon in the biomass. It is important to remember that terrestrial sequestration does not store CO<sub>2</sub> as a gas but stores the carbon portion of the CO<sub>2</sub>. The forests and vegetative cover thus have a more significant potential for Carbon sequestration in which the carbon dioxide from the atmosphere is in turn stored as the biomass in those trees and vegetation. The present study investigates the terrestrial carbon stock in the Shaya College in the, Malappuram district using Geospatial Technology. The Normalized Difference Vegetation Index (NDVI) derived from satellite data was used to estimate the difference in carbon stock due to the reduction in tree cover as per IPCC guidelines. As per the investigation, the total area mapped in this study is 48570.27 sq.m approximately. The distribution of the Normalised Vegetation Index shows values between 0.45 to 0.12 (Figure.2). This is the best indicator of the greenness of the area. Based on the investigation the carbon distribution of the project site ranges from 107.45 to 108.14 Kg/Pixel (Figure.3). Around 11580.47sq.m of exposed land were occupied in the area. The rest of the tree covers and vegetation are stocked with a good amount of carbon. The project site produces a maximum of 108.14 kg of carbon dioxide equivalent to a 100m<sup>2</sup> area

---

(Figure.4). The vegetation area of the project site shows a high biomass of 216. 30 Kg/Pixel (Figure.5) compared to the built-up and barren area of the project site. This is a good indicator because the area is dominated by lush green vegetation.

### **Relevance of Space-Based Carbon Stock Estimation for Sahya College Campus**

In recent years, monitoring carbon stocks has become increasingly important as the world seeks to mitigate the effects of climate change. Space-based carbon stock estimation is a cutting-edge method that uses remote sensing technology to measure the amount of carbon held within a landscape. For Sahya Arts and Science College, situated in the lush environs of Wandoor, Kerala, conducting a space-based carbon stock estimation is of significant relevance for multiple reasons:

**Quantifying Carbon Sequestration:** The estimation will provide precise data on the amount of carbon sequestered by the vegetation on the college campus, contributing to a better understanding of the campus's role in mitigating atmospheric carbon dioxide levels.

**Environmental Responsibility:** As an educational institution, Sahya College has an inherent duty to promote environmental consciousness. Understanding the campus's carbon stock aligns with this mission and sets an example for students and the community.

**Sustainable Campus Management:** The data obtained through the estimation can inform sustainable land-use management and development planning, ensuring any expansion or modification within the campus is done in an environmentally responsible manner.

**Compliance and Reporting:** With carbon reporting becoming a global norm, having accurate measurements of carbon stock positions the college as a transparent and

---

responsible entity. This data is invaluable for sustainability reporting and may be required for environmental compliance and certifications.

**Scientific Contribution:** The estimation contributes to the scientific knowledge of carbon dynamics in the local ecosystem. It provides valuable data that researchers and students can utilize for ecological studies and research projects.

**Resource Allocation:** Understanding the campus's carbon stock can aid in efficient resource allocation. If certain areas are found to be significant carbon sinks, they may warrant a greater allocation of conservation resources.

**Climate Action Plan:** The resulting data could be a cornerstone in the development of a campus-wide climate action plan that includes strategies for carbon reduction and offsetting.

**Enhanced Biodiversity Conservation:** The data will help in assessing the health of the campus's ecosystem. A healthy, high-carbon stock environment often indicates rich biodiversity, suggesting that conservation efforts are successful.

In summary, space-based carbon stock estimation serves as a vital tool for Sahya College to understand and manage its environmental impact, to foster sustainable practices, and to bolster its commitment to global ecological efforts. It positions the college as a leader in sustainability within the educational sector and contributes positively to broader environmental objectives.

---

*“Conserve water, forests and energy to reduce climate change's effects.”*

Table.1 Carbon Stocking of Various Land Features of the Campus

Land Features	Area (Sq. m)	Average Carbon (Kg/Pixel)
Built-up	11580.47	107.45
Vegetation	36989.80	108.14
Total Area (Sq.m)	48570.27	

Table.2 CO<sub>2</sub> Contribution of Various Land Features of the Campus

Land Features	Area (Sq. m)	Co2 (KgCo2e/Pixel)
Built-up	11580.47	394.35
Vegetation	36989.80	396.90
Barren land	48570.27	

Table.3 Biomass Contribution of Various Land Features of the Campus

Land Features	Area (Sq. m)	Above Ground Biomass (Kg/Pixel)
Built-up	11580.47	214.90
Vegetation	36989.80	216.29
Total Area (Sq.m)	48570.27	

---

## **Relevance of Distribution of Normalized Difference Vegetation Index in Sahya College Campus**

The Normalized Difference Vegetation Index is a widely recognized remote sensing technique used to gauge the health, density, and vitality of plant life in a given area. The distribution of NDVI across the Sahya College campus has significant implications and applications, and understanding these is vital for strategic environmental management and planning:

**Vegetation Health Monitoring:** NDVI provides a clear indication of plant health by measuring the density of green on a patch of land. Regular monitoring of NDVI values across the campus can help in early detection of plant stress or deterioration, enabling timely interventions.

**Land Cover Classification:** Analyzing NDVI distribution helps in classifying the campus land cover into different vegetation types. This facilitates the management of diverse habitats and informs the conservation strategies for different ecosystems within the college grounds.

**Climate Regulation Assessment:** Areas with rich vegetation contribute to the local microclimate through processes such as evapotranspiration. NDVI can help estimate the extent of these climate regulation services, playing a role in maintaining a comfortable campus environment.

**Management of Green Spaces:** NDVI data assists in the quantification and management of the college's green spaces, ensuring they are preserved and enhanced. This contributes to the aesthetic value of the campus as well as the physical and mental well-being of its students and staff.

---

**Sustainable Development:** With the insights provided by NDVI, the college can plan development and infrastructural projects sustainably, minimizing the impact on green areas and making informed decisions to protect and integrate existing vegetation.

**Biodiversity Conservation:** NDVI mapping can indicate areas of high biodiversity by reflecting a variety of plant conditions. This data can support the development of specific strategies for conserving plant species diversity within the campus.

**Educational and Research Tool:** The distribution of NDVI can become a focal point for education and research initiatives in environmental sciences, offering hands-on learning experiences for students who can engage directly with data collection and analysis.

**Baseline Data for Long-Term Studies:** Establishing a baseline NDVI helps track changes over time, enabling long-term studies on vegetation dynamics in response to environmental policies, climate change, and land use changes within the college campus.

**Reporting and Communication:** NDVI data can be used to communicate the college's environmental status to stakeholders, showcasing the institution's commitment to maintaining a green and healthy campus.

In the broader context this would permit the college to track down the impact of development on biodiversity of the campus in the long run.

Figure.1 Distribution of Normalized Vegetation Index in the Campus

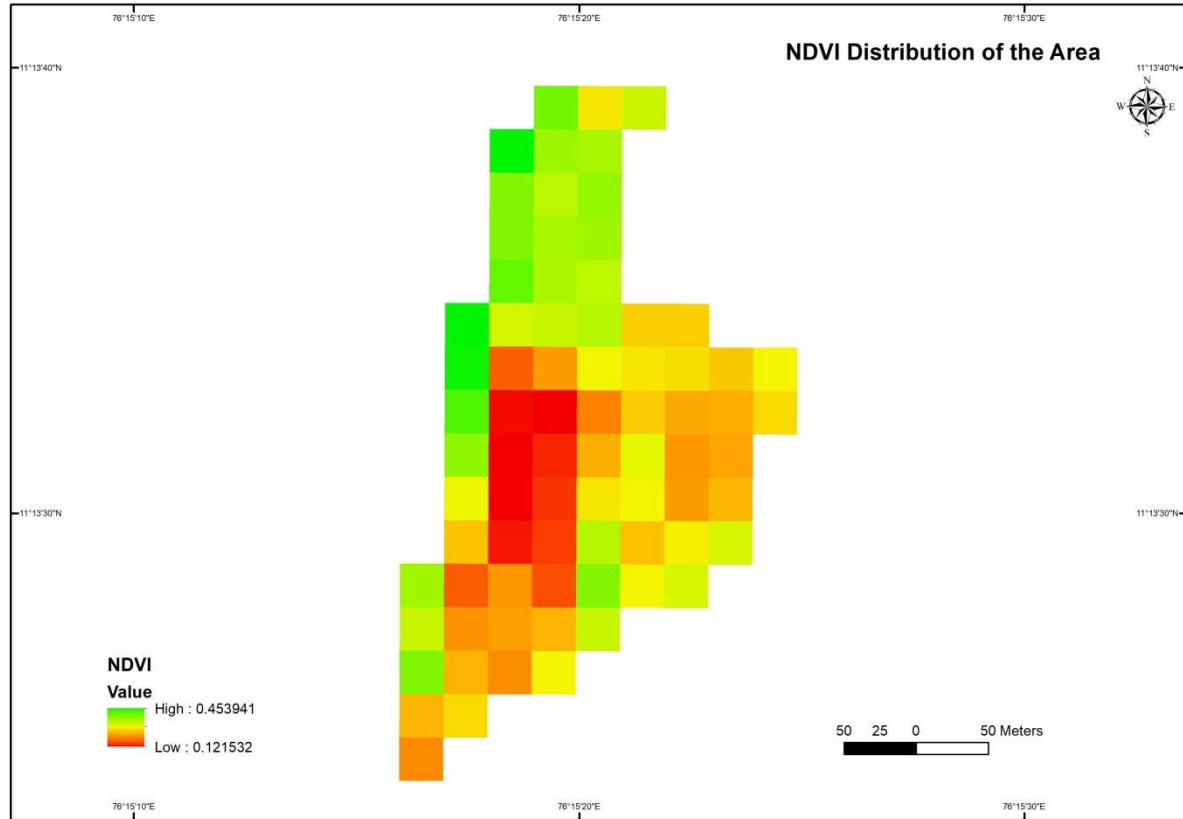




Figure.2 Distribution of carbon stock in the Campus

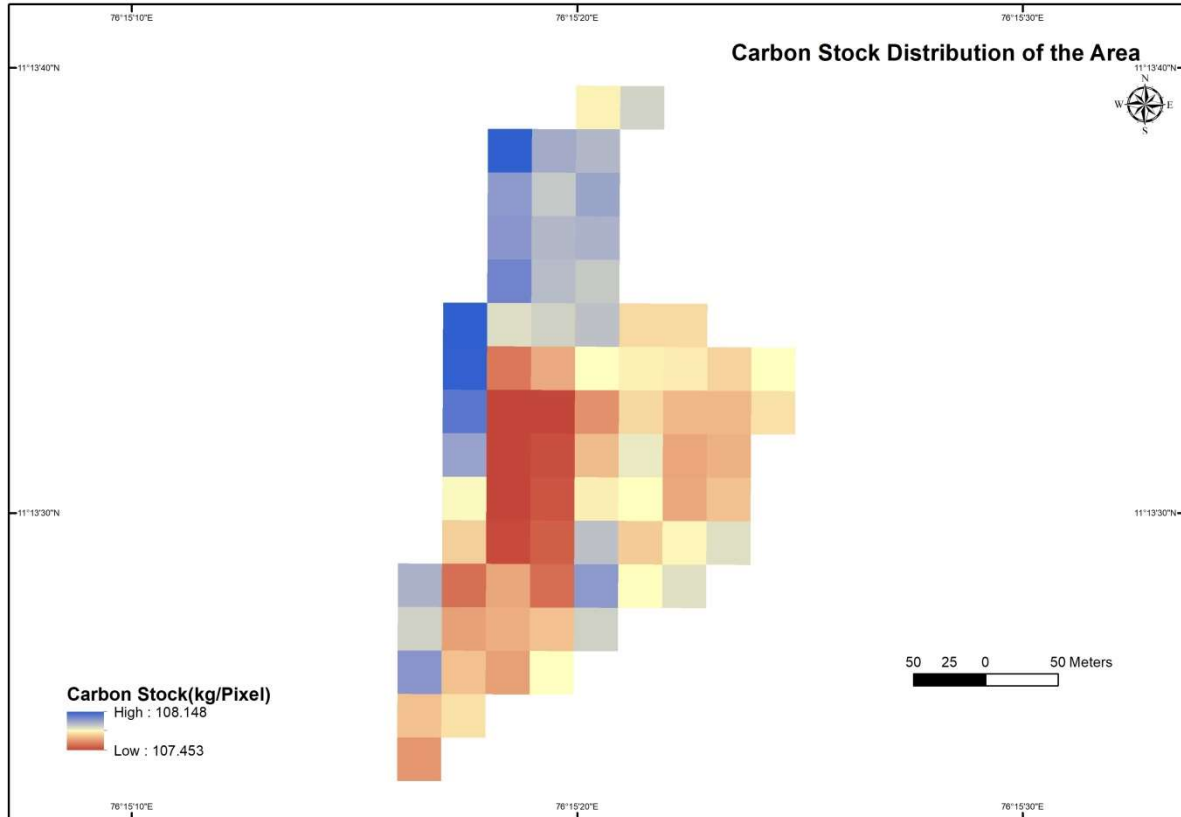


Figure.3 Distribution of carbon dioxide in the Campus

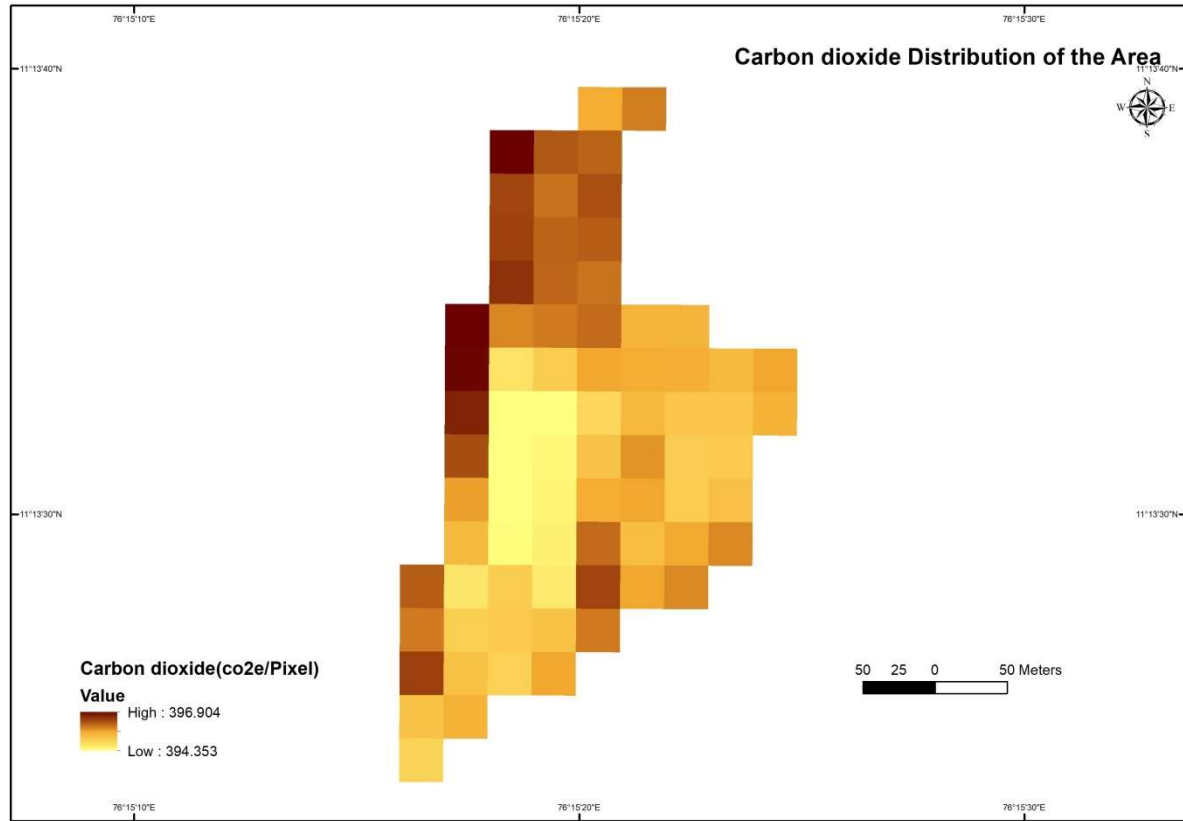


Figure.4 Distribution of Above Ground Biomass (AGB) in the Campus

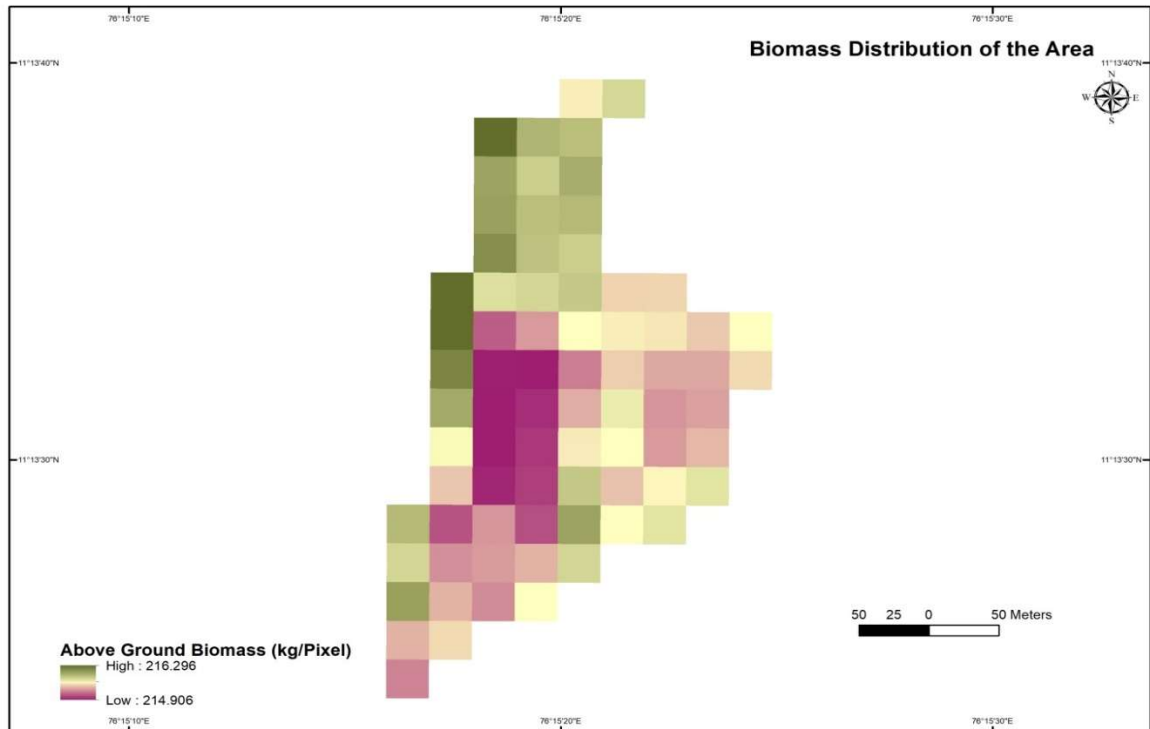
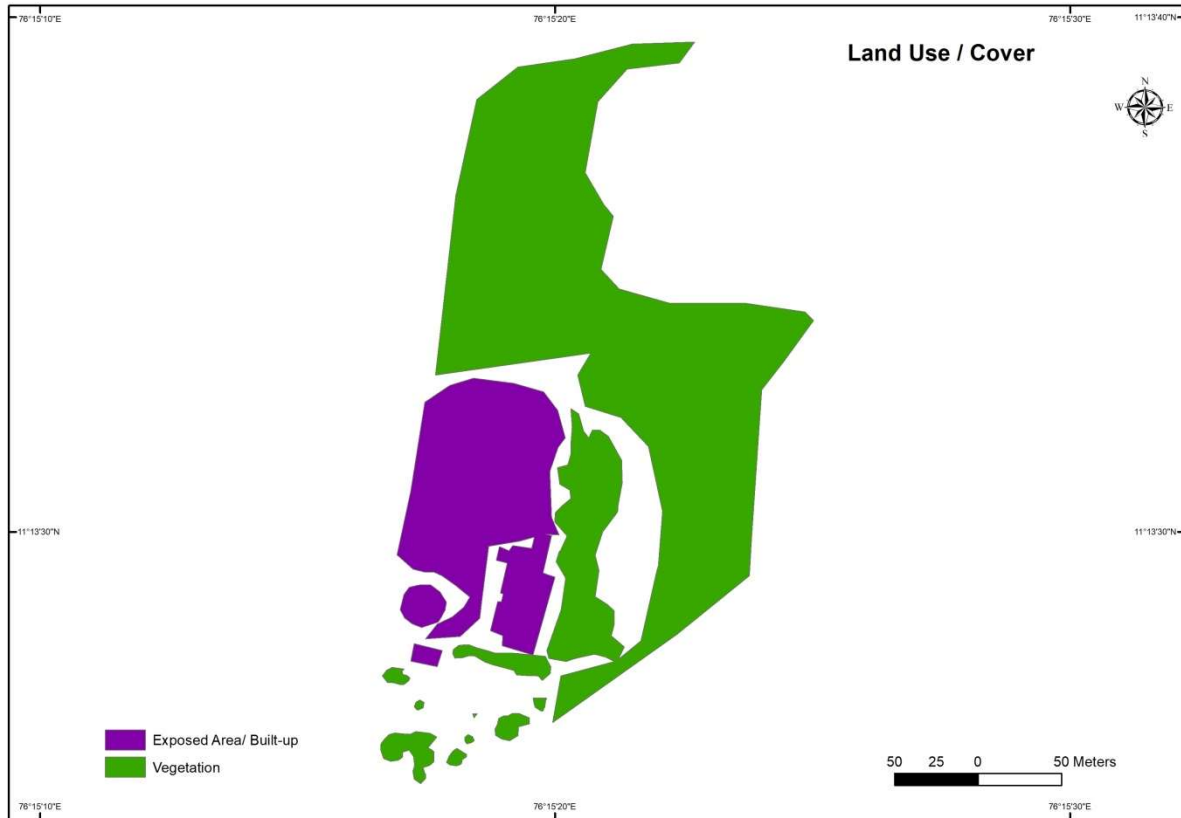


Figure.5 Land Use Land Change Status of the Campus



---

## Bio Sketch of Authors

---

Dr. Anoop Das, is an Assistant Professor and Head at Centre for Conservation Ecology & Department of Zoology, at M.E.S Mampad College, India. He serves as a Visiting Professor at the Leshan Normal University, China. He has written 76 publications in various national and international journals and has bagged more than 29 national and international grants/awards. He is a Member of IUCN/SSC – South Asian Invertebrate Specialist Group since 2016. He had carried out related field research works in United States of America, United Kingdom, South Korea, Germany, Austria, Czech Republic, China, Malaysia, Singapore, Thailand, Philippines, Indonesia and Sri Lanka.

Dr. Sumith Satheendran has a PhD degree in GIS from a reputed University in, Kerala. He is a member of Several organizations both national and international. He has 14 international publications and 20 conference papers to his credit. He has been in the field of GIS for the past 12 years.

Dr. R Dhanya is a faculty of Environmental Studies at Thunjath Ezhuthachan Malayalam University and she had completed several trainings in Environmental Studies from India and abroad. She has been appointed as the Country representative for UNEP Eco-peace Leadership Program of South Korea. She holds a Masters from the Pondicherry University. Dr. R Dhanya is with an experience of Twenty years in the related field.