



# VIT<sup>®</sup>

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

## SDG 15 Life on Land

### Annual Report 2018-19

15 LIFE ON LAND



Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss



Vellore Institute of Technology

Vellore – 632014

Tamil Nadu, India

[www.vit.ac.in](http://www.vit.ac.in)

## Report of VIT-Vellore Campus

### GOAL 15: Life on Land ...

Protection, restoration and promotion of sustainable use of terrestrial ecosystems, is one of the prime sustainability goal across the world. Second focal area is sustainable management of forests, fight desertification, reversal of land degradation and stopping the biodiversity loss. In these directions following concrete actions have been taken by Vellore Institute of Technology (VIT) namely,

- Species Environmental Niche Distribution Modeling for Panthera Tigris and Royal Bengal Tiger, India, using machine learning algorithms was conducted.
- In VIT's neighbouring state Telangana, VIT faculty has conducted spatial distribution of land use/ land cover analysis in Hanamkonda taluk as well as in Chennai region.
- Landscape changes and sustainable development policy in a developing area using the chirrakunta rurban cluster data was studied.
- An Urban land cover mapping and change detection analysis using high resolution sentinel-2A data is another research project undertaken by VIT. In another work remote sensing and GIS techniques were used to assess and predict land use changes in local Vellore district, Tamil Nadu, India
- Estimation of land use and land cover change relationship with Normalized Difference Vegetation Index (NDVI) different method and Land Surface Temperature (LST) was studied. Additionally a comparative study of NDVI and SAVI vegetation indices in neighbouring Anantapur district semi-arid areas was conducted.
- Another work aims to Identify runoff harvesting sites over the pennar Basin, Andhra Pradesh using SCS-CN method
- Another project focuses on seismic hazard assessment and land use analysis of Mangalore City, Karnataka, India.
- Morphometric analysis for identification of groundwater recharge zones: A case study of Neyyar river basin was designed.

- Relationship between surface temperature and land cover types using thermal infrared band and NDVI for local Vellore District, Tamil Nadu, India was extensively studied. Another NDVI based study to assess agriculture biomass and vegetation damage due to Hudhud cyclone, using Landsat-8 satellite imagery, was conducted to support the local community affected by the cyclone and better manage the damages due to natural disasters.
- An evaluation study of microclimates and assessment of thermal comfort of Panthera leo in the Masai Mara National Reserve, Kenya was conducted.
- Flood forecasting model: A Semi-distributed Flood Forecasting Model for the Nagavali River using space inputs was developed. In another project, a novel coastal reservoir strategy to enhance India's freshwater storage by impounding river flood waters was conducted.
- Analysis of Ocean color monitor data: Distributed computing model of multispectral time series data analysis for chlorophyll concentration determination using ocean color monitor-2 data
- As coconut is a high volume local produce in the southern india region, techno-economic assessment of coconut biodiesel as a potential alternative fuel for compression ignition engines is one of the innovative project undertaken by VIT faculty.
- A study of Crop phenology and soil moisture applications of SCATSAT-1, was conducted.
- Identification of dengue risk zone using a geo-medical study on Madurai city was designed and executed.
- Investment in agro photovoltaics: Efficient solutions from Switzerland is currently being studied.
- Another case study involved Impact assessment of watershed management on land use/land cover change using RS and GIS.
- Advanced computational techniques like Genetic algorithm-based feature selection, for classification of land cover changes using combined LANDSAT and ENVISAT images, was conducted. We also developed a soft computation model for identification of landslide factors.

- Trophic transfer potential of two different crystalline phases of  $\text{TiO}_2$  NPs from *Chlorella* sp. to *Ceriodaphnia dubia*
- Gene-centric metagenome analysis reveals diversity of *Pseudomonas aeruginosa* biofilm gene orthologs in fresh water ecosystem
- A number of computational models were developed namely a) for assessment of carbon storage and erosion using invest model in Visakhapatnam district, Andhra Pradesh b) for comparison and extraction of watershed using Arcswat and Arc hydro from high resolution digital elevation model c) for trajectory study of urban growth and its socioeconomic impact on a rapidly emerging megacity
- One of the project was focussed on fusion of thermal and rgb images for border security surveillance.
- Study and evaluation of carbon sequestration using remote sensing and GIS: A review on various techniques
- Antibiotic potency of extract from streptomycetes isolated from terrestrial soil of Amirthi forest, India
- Toxicity, accumulation, and trophic transfer of chemically and biologically synthesized nano zero valent iron in a two species freshwater food chain was conducted.
- No effort can be complete if we do not support and increase the awareness in the local community. As we are located in a region where silk weaving is a one of the major industry. A study was directed towards studying the silk weavers' problems linking to water, air pollution and soil conservation. The major objectives of the study were to understand the demographic profile and silk related factors of the respondents from the study area and to know about their environmental awareness and responsibilities among silk weavers in the study area.

VIT mission is to work extensively in the current SDG and is ever looking for making a difference and devise ways for judicious use of natural resources.

- - -

## Report of VIT-Chennai Campus

### PREAMBLE

Anthropogenic activities disturb the ecosystem by deforestation, urbanisation, and pollution in the atmosphere. There is a need to preserve, conserve and make sustainable use of natural resources. This requires immediate attention to maintain the balance of the earth. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

### CONSERVATION OF ENVIRONMENT

Environmental Law has been included in the curriculum. As the outcome of the course, the students will be able to find out the existing loopholes in the system of environment protection and suggest reforms. They understand in depth knowledge of the specialist area of environmental law and associated disciplinary areas, the ability to understand and appreciate the changes and reforms taking place at the international level towards environment protection and also practical understanding as to how pollution control board, National Bio diversity authority and other environmental related authorities work. Water pollution & Marine Environment, Air Pollution, Noise Pollution & Climate Change, Environmental Protection, Forests and Wild Life, Biodiversity & Wetlands, Contemporary environmental concerns, Environment and Good Governance has been included in the curriculum under Environmental Law. Various lectures has been organised for the awareness.

### LAWS FOR SUSTAINABLE USE OF NATURAL RESOURCES

Environmental Law has been included in the curriculum to teach the students the need for protecting air, water, forests, wild life and environment as a whole from pollution; the reforms brought out by various international and national legal framework and judicial pronouncements; the doctrines propounded and its implications.



## RESEARCH ON SUSTAINABLE DEVELOPMENT

Various national and International Conferences on Energy and Environment: Global Challenges (ICEE-2018), International Conference on Multidisciplinary Approaches to Island Studies, and International Conference on Urban agriculture land, food, people agriculture and city: A geographical perspective has been attended by the faculties and researchers of VIT. DST-SERB Sponsored 2<sup>nd</sup> International Conference on Sustainable Environment & Energy (ICSEE'19). Field visit has been made in Arignar Anna Zoological Park, Chennai, Guindy National Park, Chennai, Vedanthangal Bird Sanctuary to understand and study about the life and ecosystems. The lecture on Origin of Life: an environmentalists Perspective and Environmental Impact Assessment - Case Studies has been arranged by VIT.

- - -