Decoding Forests Through Codes and GIS

Forest Research Institute (FRI), Dehradun is a premier research institute that implements research projects, provides advisory and consultancies, and conducts impact assessment studies in the field of forestry and the environment. The main objective of FRI is to impart education in such branches of forestry and environment as it may deem fit and to provide for research and the advancement of and dissemination of knowledge in the forestry and environment. In a constantly changing world, FRI has been able to strike a balance between using the conventional approaches in forestry research and implementing modern technologies - remote sensing and GIS. Today, GIS technology has become an integral part of almost all fields. In the forest sector, remote sensing and GIS are complementary tools that have largely impacted forestry research in the recent past. GIS tools have made it easy to monitor forest health, forest fires, create inventories of forestry data, and also analyze ecological parameters pertaining to forests.

Research

The GIS center at Forest Research Institute in the past has undertaken multifarious projects related to forestry and its allied branches. The center is credited for assessing the vulnerability of Indian forests to climate change as a part of the 3rd National Communication to UNFCC. The center has mapped the extent of forest lands in Uttarakhand fringe villages and evaluates the urban riparian zones in Uttarakhand using a combination of tools and software including ArcGIS. The ArcGIS software was used for the identification of fringe villages using the primary layers of villages developed by the Survey of India (SOI). One kilometer buffer zone was created around the forest cover layers that were overlaid upon the SOI layer to extract forest fringe villages of India.

Presently, the center is focused on using codes, models, and GIS tools to delineate the impacts of Invasive Alien Plant (IAP) species on Indian forests and develop a standardized method for mapping IAP species. The center is also involved in research that aims at the Geospatial mapping of Rare Endangered and Threatened species and other important Non-Wood Forest Product species found in tribal areas of Uttarakhand. A web-based GIS platform is also being developed by the center to support the biodiversity information system. One of the major disciplines of research involves the use of information technology by the center to develop forest informatics-related tools and products to support forestry research. The center is working to develop a forest vegetation model that can be used to test the probable impacts of climate change on the forest ecosystem. The center has successfully compiled and tested the existing

models used worldwide like JULES, LPJ, IBIS, and at the same time, it endeavors to develop models of Indian origin.

In the last few years, there has been a phenomenal growth and rise in the adoption of GIS across sectors. Integrating it with other emerging technologies such as IoT, ML, AI, etc. - the importance of GIS will grow exponentially in the near future. With such rapid advancement in GIS technology adoption across diverse sectors, there is a need to create more GIS education infrastructure for skilling students. The Forest Research Institute (FRI) is renowned for its commitment towards capacity building in GIS and our association with Esri India has further encouraged us to ingrain critical thinking and innovation in our students to help 'prepare the employees of tomorrow'.

The GIS Centre in FRI is in charge of educating the students of the postgraduate courses in Forestry and Environment Management at Forest Research Institute (Deemed to be) University about the fundamentals of Remote Sensing and GIS. The center also has the provision for interested students to gain in-depth knowledge about advanced methods in GIS and its applications in forestry research through various elective courses. The students are provided hands-on training through the state-of-the-art laboratory along with a research-oriented perspective and are equipped with the necessary skill to find high-end jobs in the field.

Teaching and Training

A weeklong training program on the "Application of Remote Sensing GIS (RS-GIS) in Forest Resource Assessment" is organized by the center every year. The training program aims to equip the participants to use tools of RS-GIS and GPS. Participants are provided enough exposure for the hands-on exercise to make them handle licensed ArcGIS and ERDAS. The program equips participants to test and apply the tools of RS-GIS for developing essential maps for various disciplines of research and developmental projects. The program is aimed at mid-career professionals, students, and researchers involved in using RS-GIS and have no prior exposure to RS-GIS tools. To date, more than 100 professionals have been trained to the customized training program to use RS-GIS in their professional careers. Participants who attend the training belong to prestigious organizations and institutes of India such as IIM, IIT, Wildlife Institute of India, NEERI, IUCN, IMD, etc.