

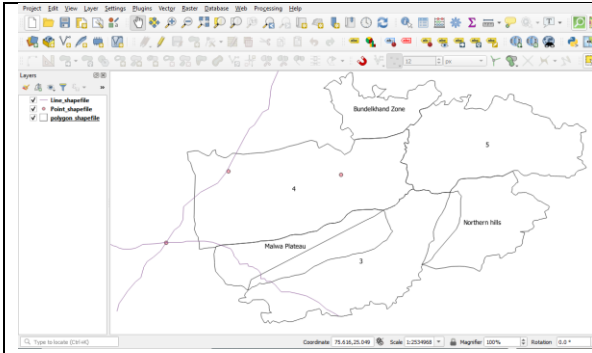
## Basics fundamental application of Remote Sensing & GIS

21 days “Basic fundamental applications of Remote Sensing and GIS” was organized from 16th December 2021 to 13<sup>th</sup> January 2022 for PG & PhD students of different agriculture universities of India. The learning objective of this training was to introduce the participants to for basic principle of RS & GIS as well as to use RS and GIS software for Satellite Image processing. The 21 days training covered the topics: - a) Introduction to Remote Sensing and its applications in Agriculture. b) Satellites, Sensors & Resolution, Visual Interpretation of Satellite Imagery, Different Geoportals. c) Introduction, acquiring and installation of QGIS software, Georeferencing of map and generation of vector features. d) Acquiring satellite data, basics of image, bands information, band combination, FCC formation and clipping of Area of Interest (AOI) in QGIS environment. e) Pre-Processing of Landsat 8 using SCP plugin, Creating training dataset, Satellite image classification, LULC area calculation and map layout creation, DEM Data processing for drainage and watershed delineation as well as preparation of thematic maps (Table 1). The training was attended by 34 participants (Table 2 and Table 3) includes 19 PhD students and 15 MTech Students.

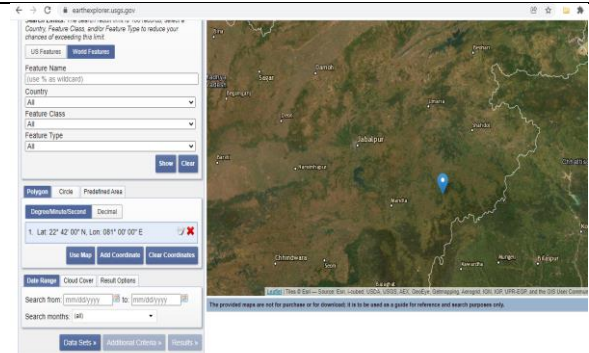
**Table 1: Table 1: Detailed Training schedule (16<sup>th</sup> Dec 2021 – 13<sup>th</sup> Jan 2022)**

Date	Topic
16/12/2021	Basics of Remote Sensing and its application in agriculture Pre-Training Assessment Test
17/12/2021	Satellites, Sensors, and Resolution & Visual Interpretation of Satellite Imagery
20/12/2021	Different Geoportals (Earth explorer, Bhuvan, Copernicus ESA, etc.). Introduction to GIS, Basics of Digital Image processing
21/12/2021	Introduction of QGIS open-source software. Downloading & Installation of QGIS Software, Special lecture on Spectral reflectance signatures and spectral indices of vegetation and soils
22/12/2021	QGIS Software Overview, Special Lecture on Open data sources for agriculture
23/12/2021	Georeferencing of Map. Generation of vector features such as Point, Line, and Polygon)

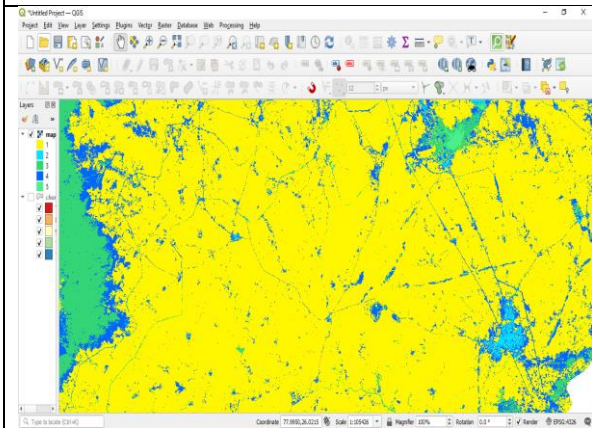
24/12/2021	Features (Point, Line, and Polygon) digitization, filling data in the attribute table and area calculation. Special lecture on Spectral reflectance signatures and spectral indices of vegetation and soils
27/12/2021	Downloading of Landsat-8 satellite dataset and about bands information.
28/12/2021	Layer stacking of different bands and clipping of Area of Interest (AOI)
29/12/2021	Band combinations for agriculture applications using False Colour Composite (FCC).Special Lecture on Crop acreage estimation and crop inventory
30/12/2021	Introduction in QGIS and Pre-Processing of Landsat 8 using SCP Special Lecture on Digital Image processing for agriculture
31/12/2021	Region of Interest (ROI) and Creating Training Dataset
03/01/2022	Introduction of Classification, Supervised classification using Minimum distance algorithm
04/01/2022	Introduction of Classification, Supervised classification using Minimum distance algorithm
05/01/2022	Supervised classification using Minimum distance algorithm
06/01/2022	Area Calculation of LU/LC classified data Special Lecture on RS applications for crop health and drought monitoring
07/01/2022	Map Layout Creation, Special Lecture on RS Applications for monitoring of crop residue burning
10/01/2022	DEM data processing (Drainage/ Watershed Delineation)
11/1/2022	DEM data processing (Drainage/ Watershed Delineation)
12/01/2022	DEM data processing (Elevation, Slope, Aspect, Contour map preparation) & external thematic maps using WMS layers
13/01/2022	Special Lecture on Microwave RS in agriculture, Presentation by Participants Post Training Assessment & Valedictory Function



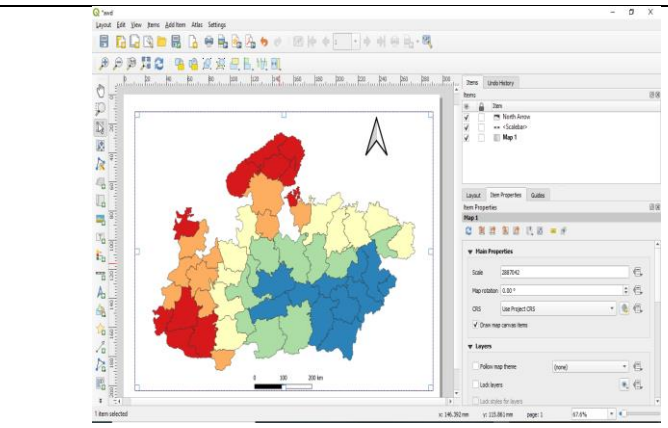
Creation of Vector Features



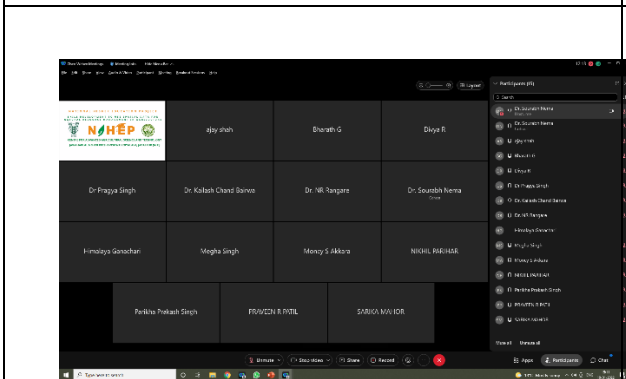
Downloading of Landsat-8 satellite dataset



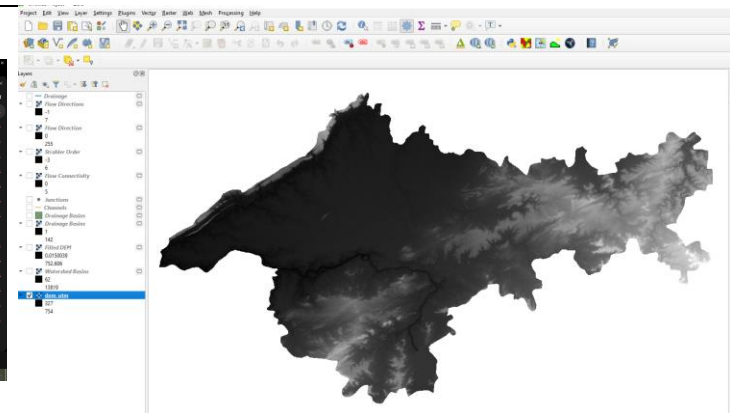
LULC classification



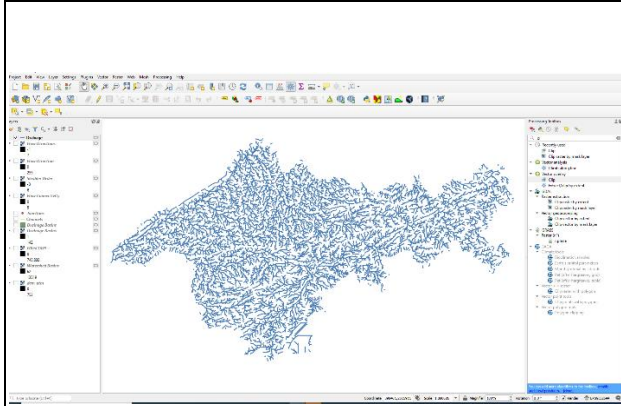
Map Layout Creation



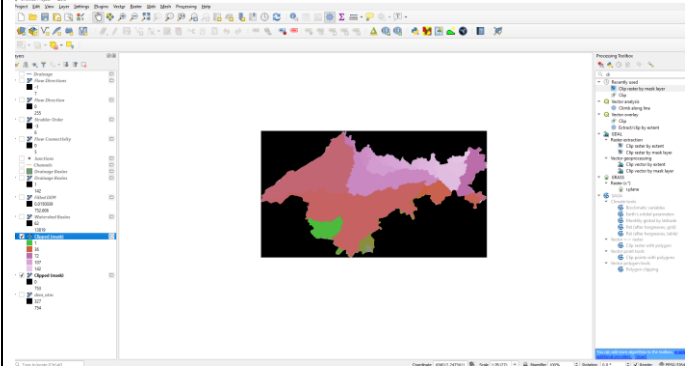
Training



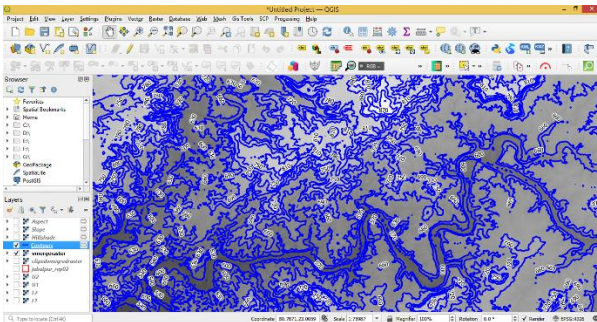
DEM of Study area



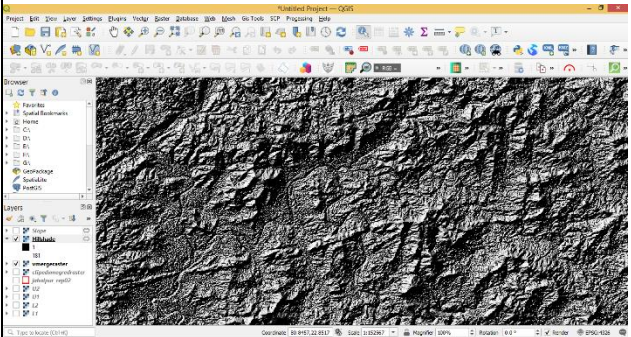
Drainage map



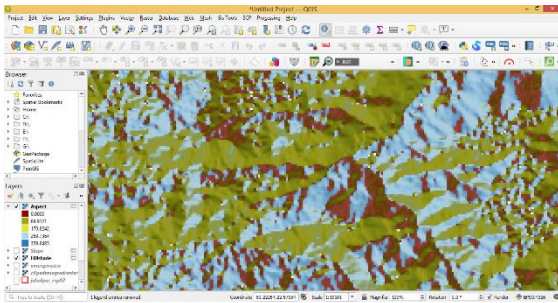
Watershed Delineation



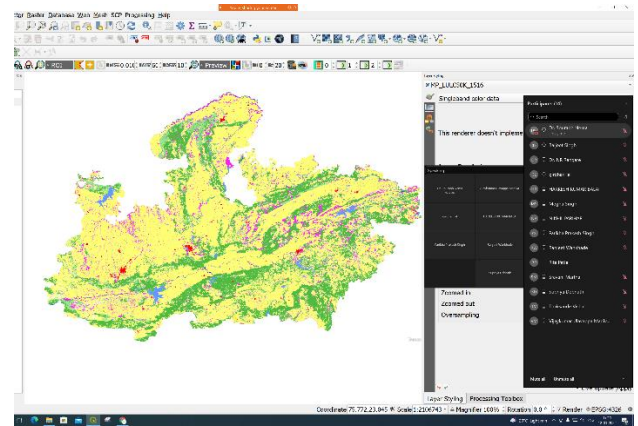
Contour Map



Hillshade map

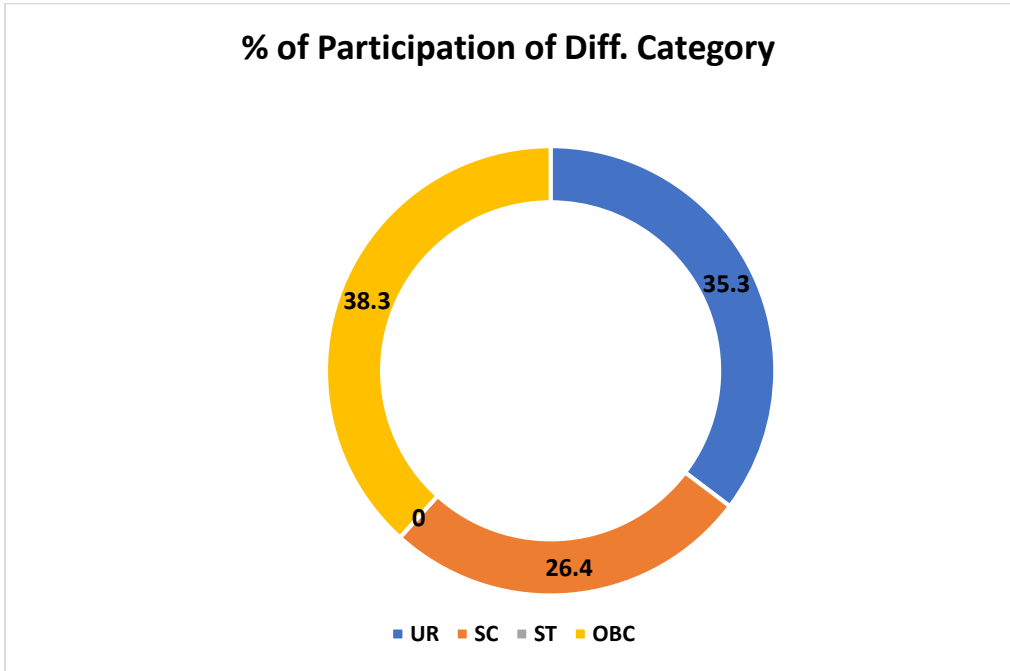
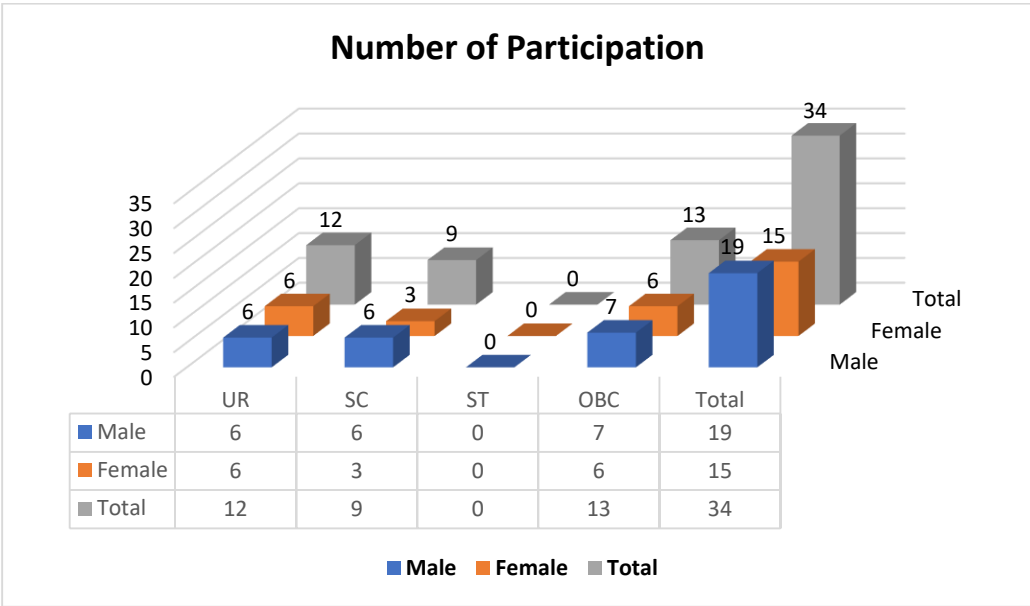


Aspect Map



LULC MAP from WMS layer

Basic fundamental applications of Remote Sensing and GIS									
Number of Participation					% of participation of diff. Category				
Gender	UR	SC	ST	OBC	Total	UR	SC	ST	OBC
Male	06	06	0	07	19	31.6	31.6	0	36.8
Female	06	03	0	06	15	40	20	0	40
Total	12	09	0	13	34	35.3	26.4	0	38.3



**Performance Evaluation:**

In order to expose the participants to maximum functionality of QGIS software, the training covered as many tool as possible through hands-on activities. The training also featured several guest speakers from IIRS, Dehradun, like Dr. Suresh, Dr. P. S. Tiwari, Dr. D. Haldar, and Dr. N. R. Patel. Daily attendance of 38 registered participants was varying from minimum of 28 to maximum 46. To assess the awareness level of participants as well as to evaluate the effectiveness of the 21-day RS & GIS training using QGIS, performance was evaluated prior to training and post-training. In the pre-training test, average marks obtained by participants were about 79 percent, varying in the range of 8 to 25 marks. The post-assessment indicated an improvement i.e. on an average 88 percent of marks were obtained by the participants varying in the range of 14-25 marks.

**Feedback from participants:**

All participants were asked to respond online related to training, learning experience, knowledge before and after the training and application of RS & GIS. There were feedbacks of participants indicates the following:

- Training provides very interesting elements for those participants who are willing to learn everything related to GIS.
- The quality of material and presentation was good.
- Great experience, interactions with scientist having expertise in Remote sensing & GIS
- Quality and patience of instructors who were very willing to repeat the content and clear doubts as per the requirements of trainees.

**They learned:**

- How to access the remote sensing data and used for Agricultural application.
- Downloading, installation and working with QGIS software, digitization, attribute filling and satellite image processing.
- Processing and analysis of geographic information using QGIS.
- Processing and analysis of satellite images using QGIS.
- A good exposure to the latest technology GIS and Remote sensing.

