

## Execution Report of 21 days (25<sup>th</sup> Aug 2021 – 15<sup>th</sup> Sep 2021)

### Hands on Training on Remote Sensing and GIS Using QGIS

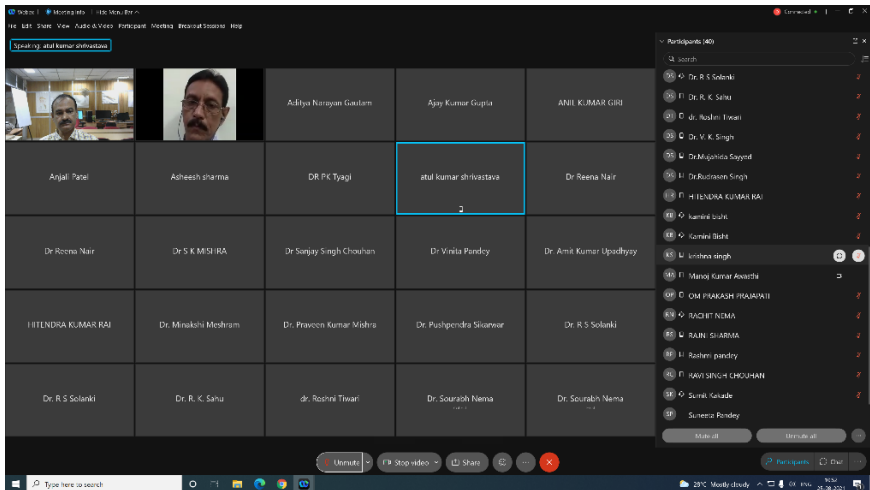
A 21 days “Hands on Training on Remote Sensing and GIS Using QGIS” was organised from 25<sup>th</sup> August to 15<sup>th</sup> September 2021 for faculty from Agriculture colleges i.e. Jabalpur, Tikamgarh, Ganjbasoda, Powarkheda, Balaghat, Rewa and Chhindwara, JNKVV Jabalpur. The training was attended by forty three (40) participants includes 19 Assistant professor, 3 Professor, 6 scientist, 6 technical staff and 6 NAHEP staff. The detailed schedule of 21 days training programme is as under:

| Date       | Time              | Topic  | Faculty  |
|------------|-------------------|--|--|
| 25/08/2021 | 10.30AM-11.00 AM  | Inauguration   | Dr. R. K. Nema<br>Dr. M. K. Awasthi<br>Dr. S. K. Sharma              |
|            | 11.00 AM-12.00PM  | Introduction to Remote Sensing and applications in Agriculture.                                    | Dr. Suresh (IIRS Dehradun)   |
|            | 12.00 PM- 1.30 PM | Pre-Training Test  |  |
|            | 2.30 PM-5.30 PM   | Specialized learning   |  |
| 26/08/2021 | 10.30AM-1.30 PM   | Satellites, Sensors, and Resolution<br>Visual Interpretation of Satellite Imagery                  | Dr. Sourabh Nema.<br><br>Dr. N R Patel<br>(Scientist IIRS, Dehradun) |
|            | 2.30 PM-5.30 PM   | Special Lecture  |  |
| 27/08/2021 | 10.30AM-1.30 PM   | Different Geoportals (Earth explorer, Bhuvan, Copernicus ESA etc.).<br>Introduction to GIS         | Dr. Sourabh Nema<br><br>Dr. N R Patel<br>(IIRS Dehradun)             |
|            | 2.30 PM-5.30 PM   | Special Lecture  |  |
| 28/08/2021 | 10.30AM-1.30 PM   | Introduction of QGIS open-source software.<br>Downloading & Installation of QGIS Software Overview | Dr. P. S. Pawar  |
|            | 2.30 PM-5.30 PM   | Practice Session   |  |
| 31/08/2021 | 10.30AM-1.30 PM   | Georeferencing of Map.<br>Generation of vector features such as Point, Line and Polygon.           | Dr. P. S. Pawar  |
|            | 2.30 PM-5.30 PM   | Practice Session   |  |

|            |                 |  |                  |
|------------|-----------------|--|------------------|
| 01/09/2021 | 10.30AM-1.30 PM | Features (Point, Line and Polygon) digitization, filling data in attribute table and area calculation. | Dr. P. S. Pawar  |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 02/09/2021 | 10.30AM-1.30 PM | Downloading of Landsat-8 satellite dataset and about bands information.                                | Dr Umakant Rawat |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 03/09/2021 | 10.30AM-1.30 PM | Layer stacking of different bands and clipping of Area of Interest (AOI)<br><b>Continue.....</b>       | Dr Umakant Rawat |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 04/09/2021 | 10.30AM-1.30 PM | Layer stacking of bands and clipping of Area of Interest (AOI).  | Dr Umakant Rawat |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 06/09/2021 | 10.30AM-1.30 PM | Band combinations for agriculture applications using False Colour Composite (FCC).                     | Dr Umakant Rawat |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 07/09/2021 | 10.30AM-1.30 PM | Introduction in QGIS and Pre-Processing of Landsat 8 using SCP   | Dr Umakant Rawat |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 08/09/2021 | 10.30AM-1.30 PM | Region of Interest (ROI) and Creating Training Dataset   | Er. Ankit Yadav  |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 09/09/2021 | 10.30AM-1.30 PM | Introduction of Classification, Supervised classification using Minimum distance algorithm             | Er. Ankit Yadav  |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |
| 10/09/2021 | 10.30AM-1.30 PM | Supervised classification using Minimum distance algorithm   | Er. Ankit Yadav  |
|            | 2.30 PM-5.30 PM | Practice Session   |                  |

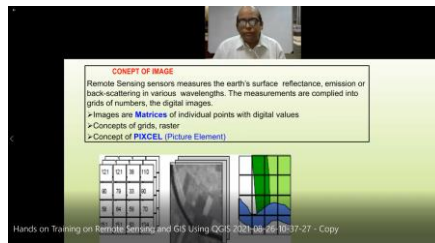
|            |                 |   |   |
|------------|-----------------|---|---|
| 11/09/2021 | 10.30AM-1.30 PM | Area Calculation of LU/LC classified data                                 | Er. Ankit Yadav   |
|            | 2.30 PM-5.30 PM | Practice Session  | Dr. P. Tiwari<br>(Scientist IIRS,<br>Dehradun)  |
| 13/09/2021 | 10.30AM-1.30 PM | Map Layout Creation   | Er. Ankit Yadav   |
|            | 2.30 PM-5.30 PM | Practice Session  |   |
| 14/09/2021 | 10.30AM-1.30 PM | Presentation by Participants<br>on LU/LC (as prepared<br>during exercise) | Dr Umakant Rawat<br>Dr. P. S. Pawar<br>Er. Ankit Yadav  |
|            | 2.30 PM-5.30 PM |   |   |
| 15/09/2021 | 10.30AM-1.30 PM | Post Training Assessment<br>& Valedictory Function                        | Dr. R. K. Nema<br>Dr. M. K. Awasthi<br>Dr. S. K. Sharma<br>Dr Umakant Rawat<br>Dr. P. S. Pawar<br>Er. Ankit Yadav |
|            | 2.30 PM-5.30 PM |   |   |

### Execution of 21 days (25<sup>th</sup> Aug 2021 – 15<sup>th</sup> Sep 2021) online training

|                                   |  |
|-----------------------------------|--|
| <p><b>Inaugural function</b></p>  | <p>Dr S. K. Sharma, training coordinator began the session at 10:30 o'clock by welcoming all participants and explained the aims of this training to them on first day of training program. After that, the coordinator of the training invited all participants to briefly introduce themselves.</p>  <p>21 days online training inaugural function</p> |
| <p><b>pre assessment test</b></p> | <p>The pre assessment test was conducted for assessing the knowledge of the participant about the remote sensing and GIS before the training starts.</p>   |
| <p><b>Technical staff</b></p>     | <p>In the training program, Dr. Suresh (Scientist, IIRS Dehradun), Dr. N. R. Patel (Scientist, IIRS Dehradun), Dr. P. Tiwari (Scientist, IIRS Dehradun)</p>  |

|                          |   |
|--------------------------|---|
|                          | and NAHEP project member Dr. Sourbh Nema, Dr. P. S. Pawar, Dr. Umakant Rawat and Er. Ankit Yadav provided training to participants.   |
| <b>Objective</b>         | <p>The main aim of this training was to initiate participants to use RS and GIS software, especially concerning the following domains:</p> <ul style="list-style-type: none"> <li>• Introduction to Remote Sensing and its applications in Agriculture.</li> <li>• Availability of remote sensing data at various online platforms.</li> <li>• Download and installation of QGIS software.</li> <li>• Learning how to use QGIS software.</li> <li>• Processing and analysis of geographic information using QGIS software.</li> <li>• Processing and analysis of satellite image using QGIS software.</li> </ul>  |
| <b>Programme summary</b> | <p>During this training program following aspects were covered:</p> <p><b>Part A: Introduction to Remote Sensing and its applications in Agriculture.</b></p> <p>This part of training focussed on the application of remote sensing and GIS in Agriculture such as crop classification/crop inventory, crop acreage estimation, crop yield modelling and estimation, crop phenology, crop condition, crop stress detection, crop water requirement, irrigation monitoring and management etc. An expert lecture on “Introduction to remote sensing and applications in Agriculture” conducted by Dr. Suresh, IIRS, Dehradun.</p> <p><b>Part B: Satellites, Sensors and Resolution. Visual Interpretation of Satellite Imagery, Different Geoportals and introduction to GIS.</b></p> <p>The objective of this part of training was to introduce the participants to the principles and concepts of remote sensing and GIS. It covers the topics such as the details of wavelength spectrum, different earth observing satellites and history of earth observing satellites. Types of remote sensing and various sensors used for observing different earth features. The spectral, temporal and radiometric resolutions. The topics such as structure of digital image, types of remote sensing images, hyperspectral remote sensing, visual satellite image interpretation, spectral reflectance curve and element of visual image interpretation was discussed in this session. This part of training helped participants to understand basic of Remote Sensing and visual image</p> |

interpretation. The different geoportals and availability of remote sensing data at various online platforms such as Google Earth, Earth on AWS, NASA Worldview, NOAA, INDIA WRIS, Sentinel Hub, Copernicus Open Access Hub, Bhuvan and USGS Earth Explorer were covered in this part. The basics of GIS covering the topics i.e. components of GIS, elements of GIS based analysis, coordinate systems, scale, resolution, map projection, GIS data types (raster and vector data), GIS software's and how remote sensing and GIS together can be used in various field. The session was concluded with an expert lecture on “Abiotic and biotic stress assessment using remote sensing” conducted by Dr. N. R. Patel, Agri. and Soil department, IIRS, Dehradun.



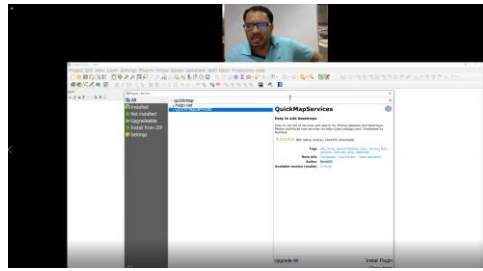
Concept of Image



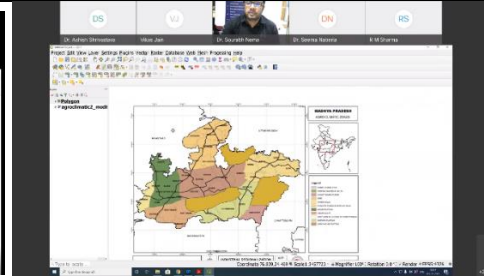
NASA Worldview portal

**Part C: Introduction, acquiring and installation of QGIS software. Georeferencing of map and generation of vector features.**

The objective of this part of training was to introduce the participants to an open-source QGIS software and hands-on QGIS software for georeferencing maps and the generation of vector data. It covered the demonstration of downloading and installation of QGIS software. The participants installed the QGIS software as per the process explained by the training instructor. The different components of the graphical user interface of QGIS software were explained by the training instructor. Participants installed the Quick Map Services and Map Swipe Tool plugins in QGIS. Participants also learned how to bring different web maps in the QGIS interface and used the Map Swipe Tool to swipe the active layer with other layers. Participants also did a hands-on exercise on georeferencing of the map using QGIS and digitized point, line, and polygon features on the georeferenced map as demonstrated by the training instructor.



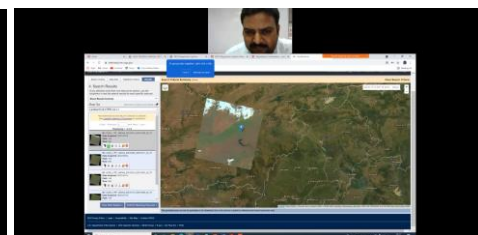
Installation of Plug-in



Digitization of Agroclimatic zone

**Part D: Acquiring satellite data, basics of image, bands information, band combination, FCC formation and clipping of Area of Interest (AOI)**

In this part of training, instructor introduce the participants to USGS earth explorer portal and its different components. Participants registered themselves as user of USGS earth explorer. The training instructor demonstrate the process of downloading Landsat-8 satellite data for the area of interest from USGS earth explorer. All the participants downloaded Landsat-8 satellite image from USGS earth explorer for the area of interest. Participants learned the process of “how to import Landsat-8 satellite image in QGIS interface”. He demonstrated the layer stacking process of different bands of Landsat-8 satellite image using “merge” raster operation of QGIS software and clipping process of the layer stacked image for the Area of Interest (AOI). The session was concluded with an expert lecture on “Applications of remote sensing & GIS in assessment of crop water requirement” by Dr. P. Tiwari (Scientist, IIRS Dehradun).

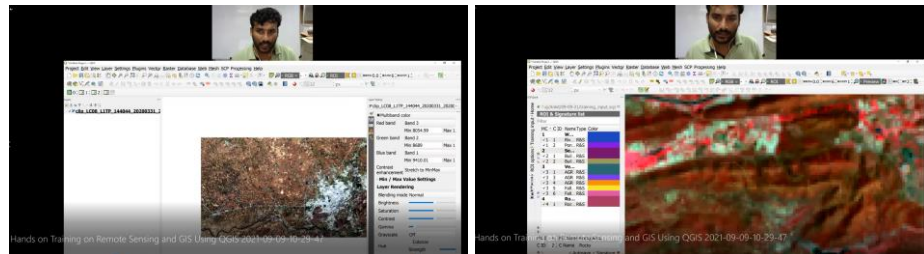


Registration on USGS Earth Explorer and downloading of satellite data from USGS Earth Explorer

**Part E: Pre-Processing of Landsat 8 using SCP plugin. Creating training dataset, Satellite image classification, LULC area calculation and map layout creation**

This part of training focussed ON the installation SCP plugin, pre-processing of Landsat-8 data, creating training dataset, Satellite image classification, LULC area calculation and map layout creation. All the participants installed the SCP plugin in QGIS. The training dataset for

different land use land cover classes using SCP plugin was created by the participants. He demonstrated the land cover mapping using satellite images by executing supervised classification technique using the SCP plug-in. The minimum distance algorithm was used for the land use land cover classification. The area of different classes of classified image were calculated. The session was concluded with various tools and techniques of preparing a layout map, use of appropriate symbology and an exercise to prepare a map layout. The session was concluded with an expert lecture on “Introduction to remote sensing & application in Agriculture” by Dr. P. Tiwari (Scientist, IIRS Dehradun).

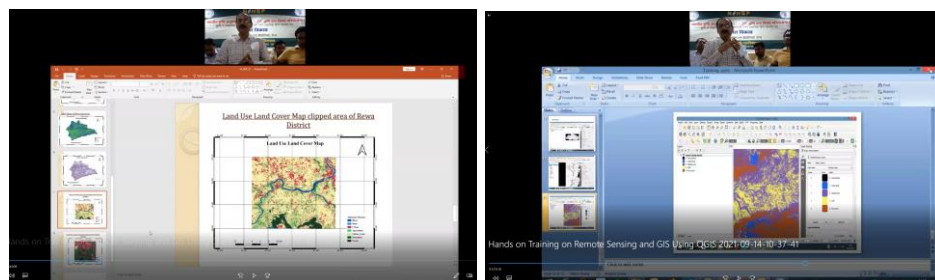


Preparation of virtual stack using SCP plug-in and preparing training dataset

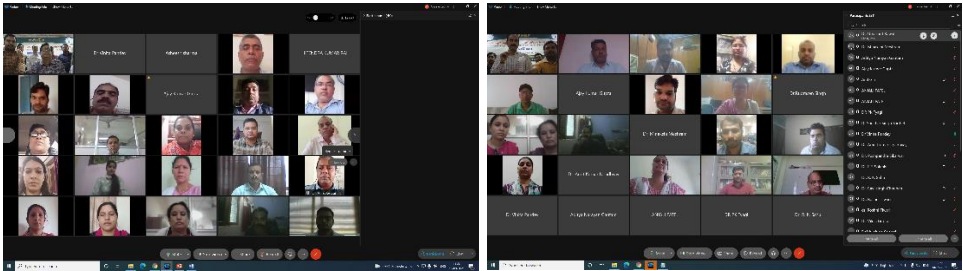
During the entire training period, assessment tests were conducted to evaluate the knowledge of participants about the remote sensing and GIS. The training manuals of each session was provided to all participants in advanced by mail. **The trainer used “AnyDesk” or “TeamViewer” to access remotely computers of participants for solving problems raised by them during the learning process of this entire program.**

**Presentation by the participants**

In this session participants allowed to present the work done during this training and shared their views on the training also suggestions were given to them from NAHEP team.



Presentation by Participants

|                                 |   |
|---------------------------------|---|
| <b>Post Training Assessment</b> | The post training assessment test was conducted for evaluating the training programs in terms of knowledge improvement of the participants.   |
| <b>Valedictory Function</b>     | <p>The valedictory function of the 21 days online training programme entitled “Hands on Training on Remote Sensing and GIS Using QGIS” (25<sup>th</sup> Aug 2021 – 15<sup>th</sup> Sep 2021) was held on 15<sup>th</sup> September 2021 at 10.30 A.M. to felicitate the participants on their successful completion of the online training program.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Valedictory function</p> |

Enclosed Annexures:

- 1: Registered Participants Annexure
- 2: Category wise distribution and attendance report of participants
- 3: Training evaluation



### Annexure 1: Registered Participants

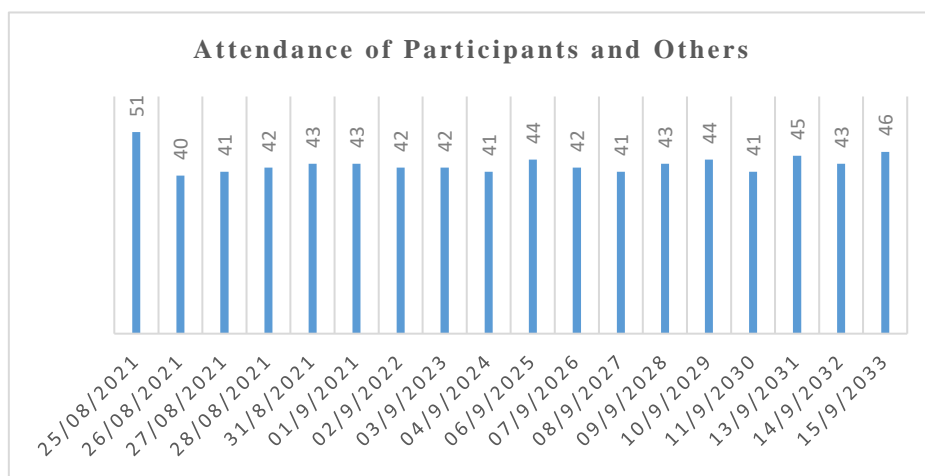
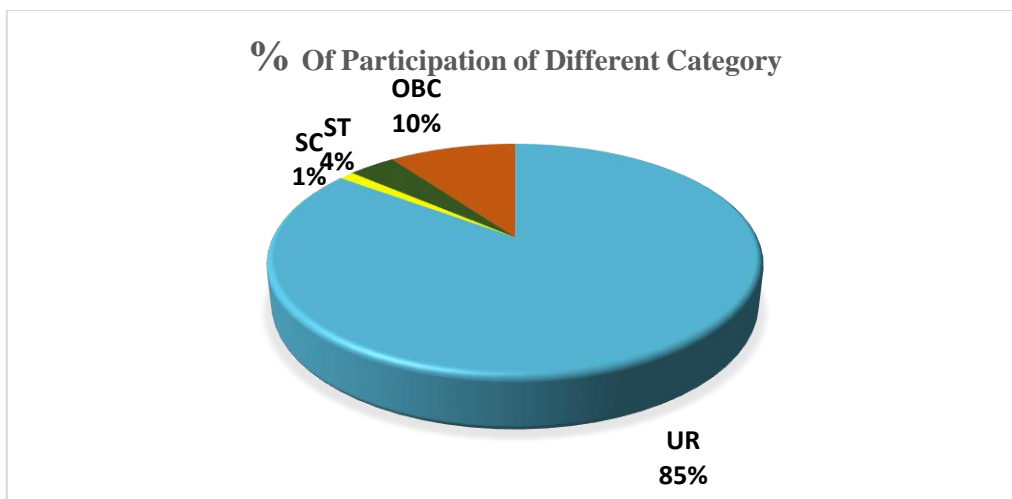
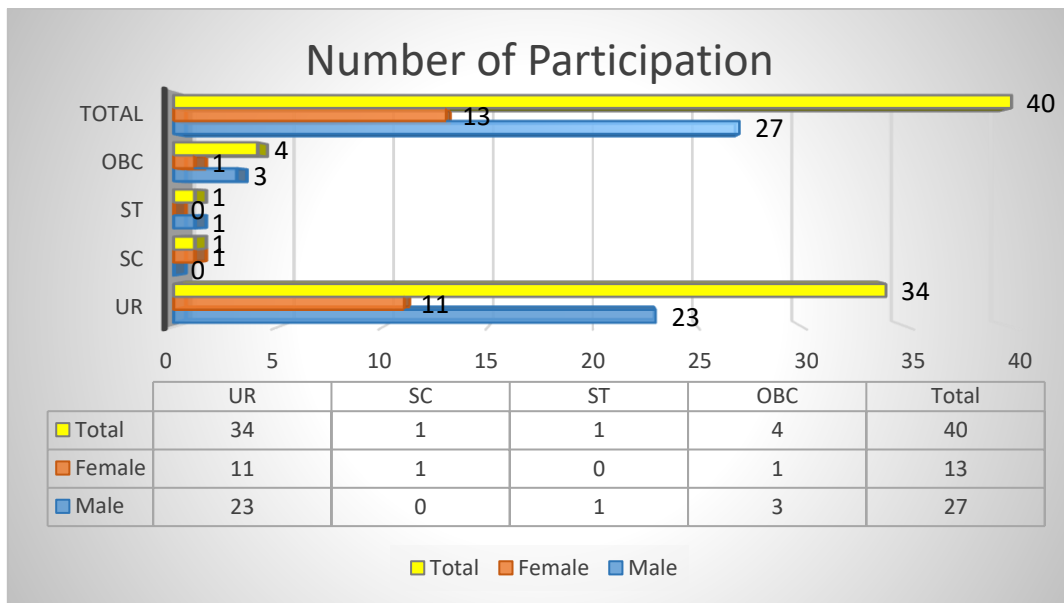
List of the participants:

| Sr. No. | Name                      | Department                                 | Place  | Email Address  | Mobile No. |
|---------|---------------------------|--|--|--|------------|
| 1       | Dr Rajnee Sharma          | Department of Horticulture                 | College of Agriculture Jabalpur JNKVV                                | <a href="mailto:rajnisharma5886@jnkvv.org">rajnisharma5886@jnkvv.org</a> | 9158072679 |
| 2       | Dr. Kamini Bisht          | Department of Extension Education          | College of Agriculture, Jabalpur                                     | bishtkamini@gmail.com  | 7987381633 |
| 3       | Dr Gd Sharma              | Soil Science                               | CoA Powarkheda   | gdsharma@jnkvv.org   | 9926411357 |
| 4       | Dr.Mujahida Sayyed        | Maths & Statistics                         | College of Agriculture,Jnkvv, Ganjbasoda                             | mujahida.sayyed@gmail.com  | 9827597049 |
| 5       | Dr.Rudrasen Singh Raikwar | Plant Breeding and Genetics                | College of Agriculture Tikamgarh                                     | rudrasen_singh@rediffmail.com  | 9424601616 |
| 6       | Dr Reena Nair             | Deptt. of Horticulture                     | College of Agriculture, JNKVV, Jabalpur                              | reena_nair2007@rediffmail.com  | 8839682307 |
| 7       | Dr. Sonam Agrawal         | Agriculture extension                      | College of agriculture Powarkheda                                    | sonam.agri@gmail.com   | 9425410859 |
| 8       | Dr.Rudrasen Singh Raikwar | Plant Breeding and Genetics                | College of Agriculture Tikamgarh, Kundeshwer Road                    | rudrasen_singh@rediffmail.com  | 9424601616 |
| 9       | Dr. Praveen Kumar Mishra  | Agronomy                                   | JNKVV, College of Agriculture- Ganj basoda, District- Vidisha 464221 | mailsonumishra@gmail.com   | 9977651512 |
| 10      | Asheesh Sharma            | Horticulture                               | College of Agriculture, Powarkheda, Hoshangabad, M.P.                | asbhardwaj2113@gmail.com   | 7772882624 |
| 11      | Dr. Roshni Tiwari         | Agricultural Economics and Farm Management | College of Agriculture, JNKVV, Jabalpur                              | tiwari_roshni@rediffmail.com   | 9752352416 |
| 12      | Dr. Sanjay Singh Chouhan  | Soil and Water Conservation Engineering    | JNKVV-College of Agriculture, Powarkheda                             | sanjay0313@gmail.com   | 9300109678 |
| 13      | Dr. Anil Kumar Giri       | Livestock and Poultry Management           | College of Agriculture Balaghat                                      | anilgiri2020@gmail.com   | 7610484402 |
| 14      | Dr. Vijay Kumar Singh     | Department of Horticulture                 | Jnkvv, College of Agriculture, kundeshwar road, Tikamgarh            | vk Singh_singh@rediffmail.com  | 9424601700 |

|    |                           |   |  |                                |            |
|----|---------------------------|---|--|--------------------------------|------------|
| 15 | Dr Vinita Pandey          | CENTRAL LIBRARY   | Jawaharlal Nehru Krishi Vishwa Vidyalaya, Adhartal Krishi Nagar Jabalpur 482004                    | vinita_lib@rediffmail.com      | 9926865060 |
| 16 | Dr. R.K. Sahu             | Soil science  | College of Agriculture, JNKVV, Jabalpur  | rakesh_sahujbp@yahoo.co.in     | 7879157375 |
| 17 | Ravi Singh Chouhan        | Agricultural Economics And Farm Management  | College of agriculture Adhartal Jabalpur   | rsc.aerc@gmail.com             | 9826222684 |
| 18 | Dr. Hitendra Kumar Rai    | Soil Science  | College of Agriculture Jabalpur  | rai.hkr.hitendra@gmail.com     | 9669786678 |
| 19 | Dr. Amit Kumar Upadhyay   | Department of Soil Science  | College of Agriculture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur-482004 (Madhya Pradesh) | upadhyayamit8@gmail.com        | 9407884018 |
| 20 | Dr Chandra Shekhar Pandey | Horticulture  | College of Agriculture, JNKVV, Jabalpur  | shekharptc@gmail.com           | 9479845600 |
| 21 | Dr. S. K. Mishra          | JNKVV, Dryland Horticulture Research and Training Centre, Garhakota, District - Sagar | JNKVV, Dryland Horticulture Research and Training Centre, Garhakota, District - Sagar              | mishradhrtc@gmail.com          | 9174140768 |
| 22 | Dr. Pawan Kumar Tyagi     | Department of Agronomy  | College of Agriculture, Tikamgarh, M.P.  | pktyagi197071@yahoo.com        | 7000829296 |
| 23 | Dr. R. S. Solanki         | Mathematics and Statistics  | College of Agriculture Balaghat, murjhad farm, Waraseoni, Balaghat, M.P. 481331                    | rsolankisolanki_stat@jnkvv.org | 9826026464 |
| 24 | Dr. Pushpendra Sikarwar   | Soil & Water Engineering  | College of Agriculture, Kundeshwar Road, Tikamgarh   | psikarwar@rediffmail.com       | 9826828857 |
| 25 | Vijay Singh Baghel        | Computer Science  | College of Agriculture Tikamgarh   | baghelvijay01@gmail.com        | 9179089599 |
| 26 | Suneeta Pandey            | Plant breeding and genetics   | JNKVV Jabalpur   | suneetagen@jnkvv.org           | 8305879759 |
| 27 | Ajay Kumar Gupta          | Post Harvest Process and Food Engineering   | College of Agricultural Engineering JNKVV Jabalpur   | drakg@jnkvv.org                | 9039126350 |
| 28 | Dr. Mujahida Sayyed       | Maths & Statistics  | College of Agriculture, Jnkvv, Ganjbasoda  | mujahida.sayyed@gmail.com      | 9827597049 |

|    |                               |  |  |                               |            |
|----|-------------------------------|--|--|-------------------------------|------------|
| 29 | Dr. Sanjay Kumar Singh        | Department of Plant Breeding & Genetics    | College of Agriculture, JNKVV, Jabalpur  | sanjayiivr@gmail.com          | 9407884019 |
| 30 | Rashmi Pandey                 | Horticulture                               | Dryland Horticulture Research and training Center, Garhakota.  | pandeyrashmi@jnkvv.org        | 7240879424 |
| 31 | Dr. Vikas Gupta               | DEPARTMENT OF AGRONOMY                     | JNKVV, DHRTC, GARHAKOTA  | guptavikas@jnkvv.org          | 9893016099 |
| 32 | Aditya Narayan Gautam         | Agricultural Economics and Farm management | Colleges of Agriculture Jabalpur M.P.  | angautam76@gmail.com          | 9926120040 |
| 33 | Abhijeet Kumar Dubey          | Physics & Agrometeorology                  | College of Agricultural Engineering  | abhijeet121282@gmail.com      | 9685935564 |
| 34 | R Shiv Ramakrishnan Mudaliyar | Department of Plant Breeding and Genetics  | Seed Technology Research Centre, Department of Plant Breeding and Genetics, College of Agriculture Jawaharlal Nehru Krishi Vishwa Vidyalaya Jabalpur | sramakrishnan@jnkvv.org       | 9174056526 |
| 35 | Rachit Nema                   | Electronics and communication              | COAE JNKVV JABALPUR  | nema.rachit@jnkvv.org         | 9424330655 |
| 36 | Dr. Minakshi Meshram          | Agricultural Extension & Communication     | College of Agricultural Engineering, JNKVV JABALPUR  | minakshimeshram1991@gmail.com | 9907083178 |
| 37 | Sumit Kakade                  | Entomology                                 | College of Agriculture, Jnkvv Jabalapur  | sumithkakde@gmail.com         | 9860213498 |
| 38 | Krishna Singh                 | Computer Science                           | College of agricultural jnkvv jabalpur   | krish7jbp@gmail.com           | 7999414050 |
| 39 | Om Prakash Prajapati          | Horticulture Vegetable Science             | College of Agricultural Engineering JNKVV Jabalpur   | omprakashcoa@gmail.com        | 8462814361 |
| 40 | Anjali Patel                  | Soil and Water Engineering                 | College of Agricultural Engineering JNKVV Jabalpur Madhya Pradesh  | anjali.patel@jnkvv.org        | 8770189513 |

**Annexure 2: Category wise distribution and attendance report of participants**



## Annexure 3: Training Evaluation

### Training Evaluation

To assess the awareness level of participants (i.e. JNKVV university faculties) as well as to evaluate the effectiveness of the 21-day RS & GIS training using QGIS, performance evaluations were carried out. The performance evaluations were done by conducting pre-training, mid training, and post-training assessments. In the pre assessment test, the average marks obtained by participants were about 67.57 percent, varying in the range of (6-24) marks. In the mid training assessment, the average marks secured by all the participants were 69.77 percent. Similarly, in the post-assessment of training, there was a significant improvement seen, as an average, 90.24 percent of marks were obtained by all the participants with marks varying in the range of 16-25 for the total 40 evaluated participants. Assessment results indicated that there had been improvement in awareness and performance in all the participants (i.e., JNKVV faculties) in relevance to Remote Sensing, GIS and their applications.

