Execution Report of 21 days (29th July to 19th August 2021)

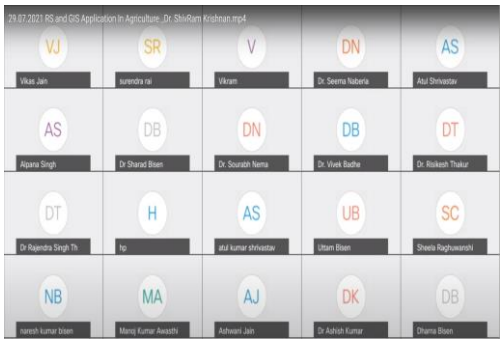
Hands on Training on Remote Sensing and GIS Using QGIS

A 21 days "Hands on Training on Remote Sensing and GIS Using QGIS" was organised from 29th July to 19th August 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 (43) participants includes 34 Assistant professor, 3 Associate professor, 3 Professor and 3 technical staff. The detailed schedule of 21 days training programme is as under:

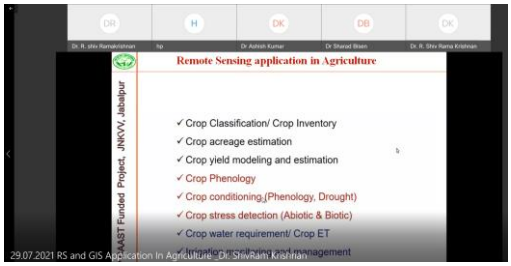
Date	Time	Topic	Training Instructor
29/07/2021	10.30AM-11.00 AM 11.00 AM-12.00PM 12.00 PM- 1.30 PM 2.30 PM-5.30 PM	Inauguration Pre-Training Test Introduction to Remote Sensing and applications in Agriculture. Specialized learning Videos	Dr. R. Shivramakrishanan
30/07/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Satellites, Sensors, and Resolution Visual Interpretation of Satellite Imagery. Specialized learning Videos	Dr.Sourabh Nema
31/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Different Geoportals (Earth explorer, Bhuvan, Copernicus ESA etc.). Specialized learning Introduction to GIS Specialized learning Videos	Dr. N. R. Patel
2/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Introduction of QGIS open-source software. Downloading & Installation of QGIS Software Overview	Dr. P. S. Pawar
03/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Georeferencing of Map. Generation of vector features such as Point, Line and Polygon.	Dr. P. S. Pawar
04/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Features (Point, Line and Polygon) digitization, filling data in attribute table and area calculation.	Dr. P. S. Pawar
05/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Downloading of Landsat-8 satellite dataset and about bands information.	Dr.UmakantRawat

06/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Layer stacking of different bands and clipping of Area of Interest (AOI)	Dr.UmakantRawat
07/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Layer stacking of bands and clipping of Area of Interest (AOI).	Dr.UmakantRawat
09/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Band combinations for agriculture applications using False Colour Composite (FCC).	Dr.UmakantRawat
10/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Introduction in QGIS and Pre-Processing of Landsat 8 using SCP	Dr.UmakantRawat
11/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Region of Interest (ROI) and Creating Training Dataset	Er. Ankit Yadav
12/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Introduction of Classification Supervised classification using Minimum distance algorithm	Er. Ankit Yadav
13/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Supervised classification using Minimum distance algorithm	Er. Ankit Yadav
14/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Area Calculation of LU/LC classified data	Er. Ankit Yadav
16/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Map Layout Creation	Er. Ankit Yadav
17/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Presentation by Participants on LU/LC (as prepared during exercise)	Dr UmakantRawat Dr. P. S. Pawar Er. Ankit Yadav
18/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Presentation by Participants on LU/LC (as prepared during exercise)	Dr UmakantRawat Dr. P. S. Pawar Er. Ankit Yadav
19/08/2021	10.30AM-1.30 PM 2.30 PM-5.30 PM	Post Training Assessment &Valedictory Function	Dr. R.K. Nema Dr.M.K.Awasthi Dr UmakantRawat Dr. P. S. Pawar Er. Ankit Yadav

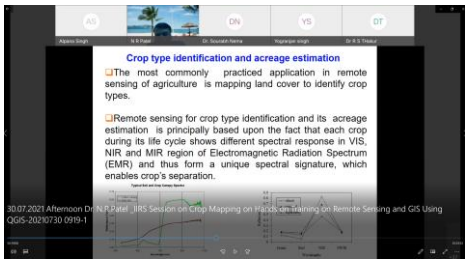
Execution of 21 days (29th July to 19th August 2021) online training

Inaugural function	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.   21 days online training inaugural function
pre assessment test	The pre assessment test was conducted for assessing the knowledge of the participant about the remote sensing and GIS before the training starts.
Technical staff	In the training program, Dr. N. R. Patel (Scientist, IIRS Dehradun), Dr. Manish K. Nema, (Scientist-D, National Institute of Hydrology, Roorkee) and NAHEP project member Dr. Sourbh Nema, Dr. P. S. Pawar, Dr. Umakant Rawat and Er. Ankit Yadav provided training to participants.
Objective	The main aim of this training was to initiate participants to use RS and GIS software, especially concerning the following domains: • Introduction to Remote Sensing and its applications in Agriculture. • Availability of remote sensing data at various online platforms. • Download and installation of QGIS software. • Learning how to use QGIS software. • Processing and analysis of geographic information using QGIS software. • Processing and analysis of satellite image using QGIS software.
Programme summary	During this training program following aspects were covered: **Part A: Introduction to Remote Sensing and its applications in Agriculture.** Dr. R. Shivramakrishanan, presented the theoretical background of remote sensing application in various disciplines of Agriculture with examples. 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 "Crop discrimination and acreage estimation using remote sensing data" conducted by Dr. N. R. Patel, Agri. and Soil department, IIRS, Dehradun.



(a)



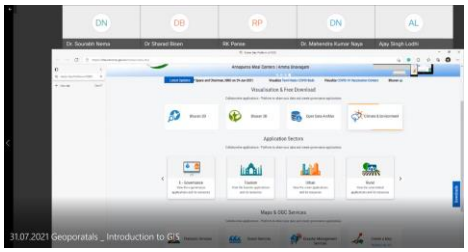
(b)

a) Application of RS and GIS in Agriculture. b)Crop type identification and acreage Estimation

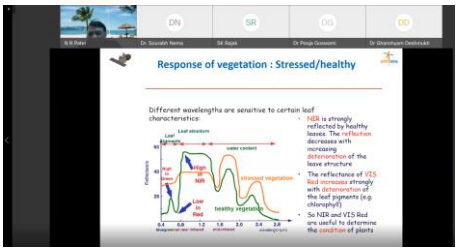
Part B: Satellites, Sensors and Resolution. Visual Interpretation of Satellite Imagery, Different Geoportals and introduction to GIS.

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 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.



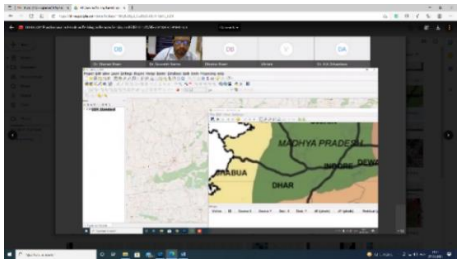
Introduction to Bhuvan geoportal



Response of vegetation to different wavelength

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.



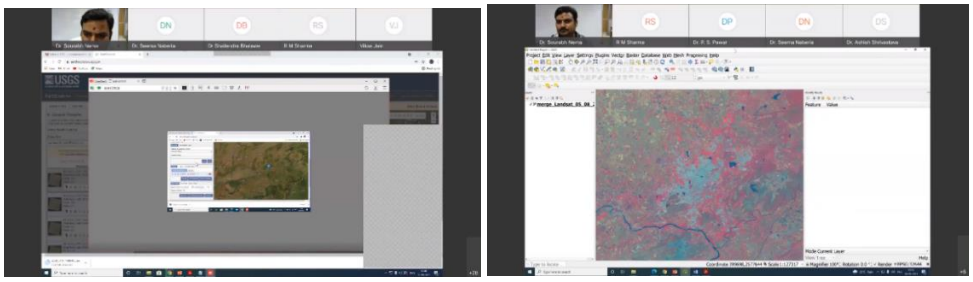
Georeferencing of map

Digitization of vector feature

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

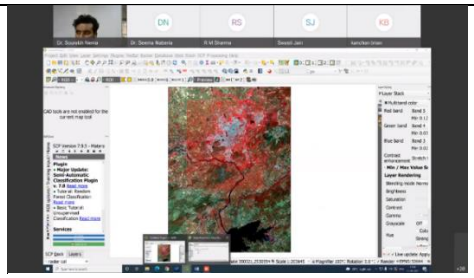
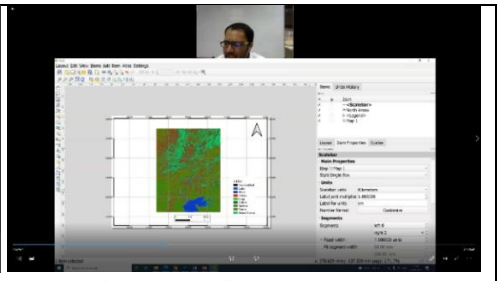
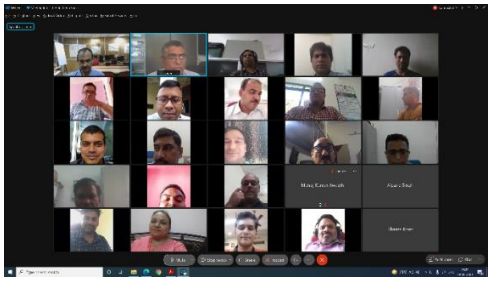
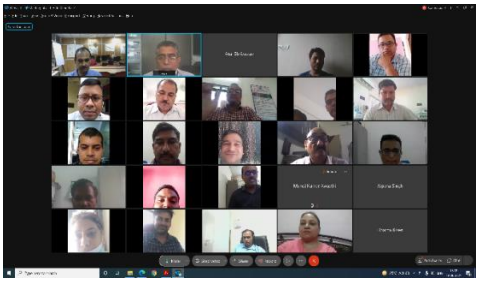
themselves as user of USGS earth explorer. The training instructor demonstrate the process of downloading Landsat-8 satellite data for the area of interest from USGS earth explorer. All the participants downloaded Landsat-8 satellite image from USGS earth explorer for the area of interest. Participants 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 "Role of Remote sensing and GIS in watershed management" by Dr. Manish K. Nema, Scientist-D, National Institute of Hydrology, Roorkee.



Downloading of satellite data from USGS Earth Explorer and formation of FCC in QGIS interface

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.

	  Preparation of training data set using SCP plug-in and preparing a map layout 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.
Post Training Assessment	The post training assessment test was conducted for evaluating the training programs in terms of knowledge improvement of the participants.
Valedictory Function	The valedictory function of the 21 days online training programme entitled "Hands on Training on Remote Sensing and GIS Using QGIS" (29th July to 19th August 2021) was held on 19th August 2021at 10.30 A.M. to felicitate the participants on their successful completion of the online training program.   Valedictory function

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

Annexure 1: Registered Participants

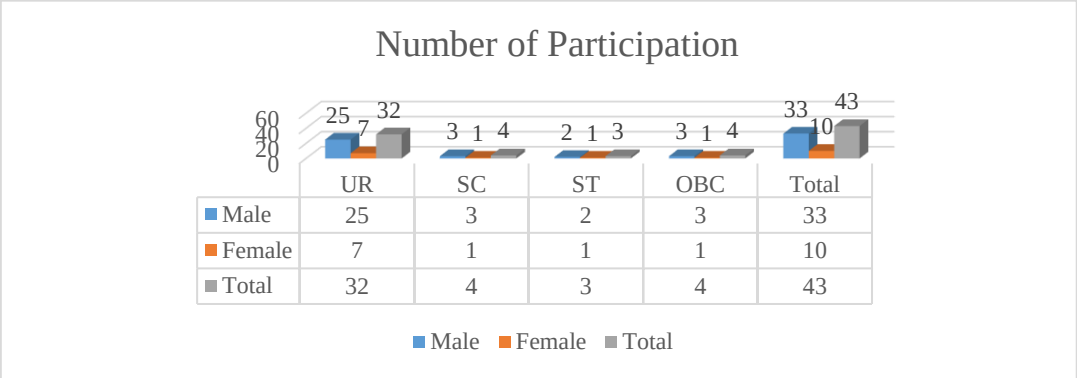
List of the participants:

Sr. No.	Name	Department	Place	Email Address	Mobile No.
1	Dr. Ashish Kumar	Plant Pathology	College of Agriculture, Jabalpur	ashishashish2612@gmail.com	9981113633
2	Dr. Dhananjay Manchakrao Kadam	Farm Machinery and Power Engineering	College of Agricultural Engineering, Jabalpur	dmk.agricos@gmail.com	7566277599
3	Dr. Amit Kumar Jha	Agronomy	College Of Agriculture, Jabalpur	jhaamitjnkvv@gmail.com	9479869854
4	Dr. Atul Kumar Shrivastava	Agronomy	College of Agriculture Balaghat	atuls_1975@rediffmail.com	9826345023
5	Dr. Dhananjay Kathal	Plant Pathology	College of Agriculture Powarkheda Hoshangabad	dkathal@jnkvv.org	9406543623
6	Dr. Gaurav Mahajan	Agronomy	AICRP on Maize, Zonal Agricultural Research Station, Chhindwara	gauravmahajan79@gmail.com	9479648234
7	Dr. Mahendra Kumar Nayak	Entomology	JNKVV, College of Agriculture, Tikamgarh (MP)	mknayak.tkg@gmail.com	9425451466
8	Dr. R K Panse	Entomology	College of Agriculture Balaghat	rkpanseento@gmail.com	9806145992
9	Dr. Rajendra Singh Thakur	Food Science and Technology	College of Agriculture, Jabalpur	rsthakur@jnkvv.org	9179391442
10	Dr. Rita Kapil Narvariya	Agricultural economics and farm management	College of agriculture Powarkheda Hoshangabad	reeta689@gmail.com	7000354828
11	Dr. Shailendra Bhalawe	Agroforestry	College of Agriculture Balaghat	sbhalawe@jnkvv.org	8120629084
12	Dr. Suneel Kumar Rajak	Dr Suneel Kumar Rajak	Agriculture college Balaghat	suneeldamohcoa@gmail.com	9424999321
13	Dr. Surendra Kumar Rai	Extension Education	College of Agriculture Balghat	surendrarai@jnkvv.org	8878705599
14	Dr. Yogranjan Singh	Biotechnology	College of Agriculture, Tikamgarh	yogranjan@gmail.com	8878705599
15	Dr. (Mrs.) Seema Naberia	Extension Education	College of Agriculture, JNKVV Jabalpur (M.P.)	seemanaberia@jnkvv.org	9425325641

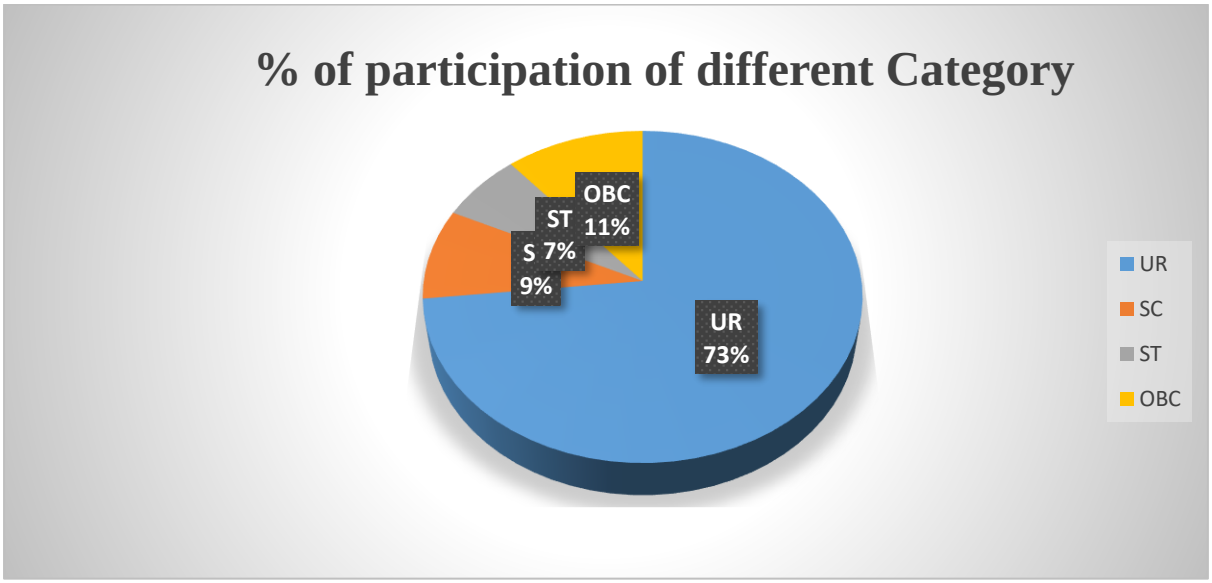
16	Dr. Ajay Kumar Srivastava	Physics & Agrometeorology	College of Agriculture, JNKVV, Tikamgarh (M.P.)	ajay_weather@yahoo.com	9977387203
17	Dr. Ajay Singh Lodhi	Soil and Water Engineering	College of Agriculture, Balaghat	ajaydswe@jnkvv.org	9548759089
18	Dr. Alpana Singh	Food Science and Technology	College of Agriculture,JNKVV, Jabalpur	alpana_singh12@rediffmail.com	9826342202
19	Dr. Amita Sharma	Plant Breeding and Genetics	College of Agriculture Balaghat JNKVV JABALPUR	amita85.22@gmail.com	7259789130
20	Dr. Ashish Shrivastava	Plant Pathology	College of Agriculture, Ganjbasoda	ashishshrivastava1971@gmail.com	9993188783
21	Dr. Ashwani Kumar Jain	Plant Pathology	JNKVV, College of Agriculture, Rewa	akjagcrewa@gmail.com	9425846414
22	Dr. Birendra Swaroop Dwivedi	Soil Science	College of Agriculture, JNKVV, Jabalpur	bsd_75@rediffmail.com	9407360791
23	Dr. Devendra Kumar Verma	Post Harvest Process and Food Engineering	College of Agricultural Engineering, JNKVV Jabalpur	devendra902@gmail.com	9826423699
24	Dr. Dharna Bisen	Entomology	College of Agriculture Balaghat JNKVV, Jabalpur	dharna.bisen@gmail.com	9405713101
25	Dr. Lalit Mohan Bal	Post Harvest Process & Food Engineering	College of Agriculture, Tikamgarh, Madhya Pradesh-472001	lalit.bal@gmail.com	8962164160
26	Dr. Naresh Kumar Bisen	Genetics and Plant Breeding	College of Agriculture, Balaghat, M.P.	bisen_nk@yahoo.co.in	9424866714
27	Dr. Neha Sharma	Entomology	COLLEGE OF AGRICULTURE,POWERKHEDA	nehasharma@jnkvv.org	8839937590
28	Dr. Pooja Goswami	Agronomy	College of Agriculture Balaghat, JNKVV Jabalpur	agropooja17@gmail.com	7089062217
29	Dr. Pradeep Mishra	Department of Mathematics and Statistics	College of Agriculture, Powarkheda , JNKVV, India	pradeepjnkvv@gmail.com	9560073489
30	Dr. Rajmohan Sharma	Genetics and Plant Breeding	Ganjbasoda	rmsharma@jnkvv.org	9425384561
31	Dr. Risikesh Thakur	Soil Science	JNKVV-College of Agriculture, Balaghat	drrkthakur28@gmail.com	9977537272

32	Dr. Somanath Sarvade	Agroforestry	College of Agriculture Balaghat	somanath553@gmail.com	8989851720
33	Dr. Vikas Jain	Agronomy	College of Agriculture, Powarkheda	vikasjain@jnkvv.org	9340921581
34	Dr. Vikram Singh Gaur	Agriculture Biotechnology	College of Agriculture, Balaghat	vsgaur@jnkvv.org	9425846414
35	Dr. Vivek Badhe	Computer Science	College of Agriculture Balaghat	vivekbadhe@jnkvv.org	9424685734
36	Dr. Anil Mishra	Business studies/Humanities	College of Agriculture Tikamgarh M.P.	doctoranil97@rediffmail.com	9425452065
37	Dr. Ghanshyam Deshmukh	Soil and Water Engineering	College of Agriculture Balaghat	gshyam1234@jnkvv.org	9424645910
38	Dr. Sharad Bisen	Horticulture	CoA , Balaghat	bisensharad@gmail.com	9479494666
39	Dr. Kanchan Singh Bhan	Horticulture	COA,JNKVV Jabalpur	ksingh18@gmail.com	8305499127
40	Dr. Rajendra Prasad Dongre	Forestry	Department of Forestry JNKVV Jabalpur	rajendradongre1979@gmail.com	7999889308
41	Sheela Raghuwanshi	Extension Education	College of Agriculture, Tikamgarh	raghuwanshi.sheela96@gmail.com	7999147500
42	Dr. Uttam Kumar Bisen	Genetics and Plant Breeding	College of Agriculture Balaghat	uk_bisen@rediffmail.com	9424999321
43	Vijay Kumar Yadav	Plant Pathology	College of Agriculture, Jabalpur	vijaypatho@gmail.com	8770867088

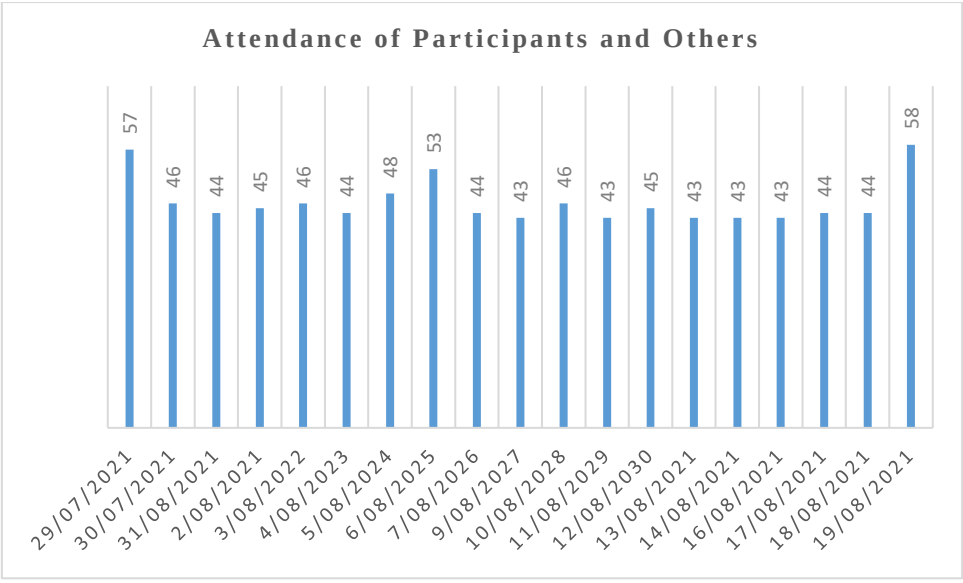
Annexure 2: Category wise distribution of participants



	UR	SC	ST	OBC	Total
Male	25	3	2	3	33
Female	7	1	1	1	10
Total	32	4	3	4	43



Attendance of participants and others



Annexure 3: 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 81.1 percent, varying in the range of (10-25) marks. In the mid training assessment, the average marks secured by all the participants were 89.3 percent. Similarly, in the post-assessment of training, there was a significant improvement seen, as an average, 94.67 percent of marks were obtained by all the participants with marks varying in the range of 18-25 for the total 43 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.