Summer School In Geospatial Science & Technology (Level 2)

Theme: Geospatial Science and Technology Applications in Agriculture

5 June to 25 June 2024

Organized by

Centre for Water and Geospatial Studies, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

सत्यमेव जयते
Department of Science & Technology
Govt. of India

Supported by

National Geospatial Program, Department of Science & Technology, Government of India, New Delhi

Principal Investigator

Dr. S. Pazhanivelan, Director, Centre for Water and Geospatial Studies,
Tamil Nadu Agricultural University, Coimbatore
Tamil Nadu, India

Summer/Winter School Capacity Building Program in Geospatial Science and Technology

Recently knowledge has been identified as the most important driving factor for India's sustainable economic growth. India has adopted a new information regime for sustainable economic growth through its 'Digital India' program to support good governance, sustainable development goals and empowerment of its citizens. Over the last three decades, the widespread adoption of geospatial technologies into various sectors have proven to be an effective enabler to meet these challenges. The capacity building program initiatives of the National Geospatial Program (NGP) erstwhile Natural Resource Data Management System (NRDMS) Department of Science and Technology, Government of India to develop national capacity for geospatial science and technology development through diverse programs in collaboration with various partner organizations. The three week program is being conducted at three levels, Level 1 (Standard), Level 1 (Spatial thinking) and Level 2. In addition there is a three day Geo Innovation Challenge Program. The objective of the program is to build knowledge and various levels of governance in collaboration with academia and user agencies and foster innovation.

Level 2 Summer / Winter School In Geospatial Science and Technology

This three week program is a theme specific advanced training being implemented by eight institutions across the country. A one week online refresher session will be held prior to the commencement of the three week program. The 21-day summer/winter school in Geospatial Science and Technology (Level 2) supported by the National Geospatial Program (NGP) of the Department of Science and Technology, Government of India focuses on developing knowledge and capacity building in geospatial technologies through the use of geospatial software.

About the National Geospatial Program of the Department of Science and Technology, Government of India

In the heart of India's technological advancement lies the National Geospatial Programme (NGP) of the Department of Science and Technology, Government of India. The Geospatial Capacity Building Program initiated in 2010 has over the years flourished, fostering capacities in geospatial science, technology, solutions, and entrepreneurship. Its transformative journey initiated with a modest ambition has evolved into a robust program, igniting minds and expanding horizons.

For a decade, the Geospatial Capacity Building Program under DST has been a cornerstone, conducting 166 comprehensive three-week programs conducted as Summer and Winter Schools in Geospatial Technologies at a basic (Level 1) and advanced level (Level 2). The 2024 cycle includes a 11 three week Level 1-(Standard) programs, 4 three week Level 1-(Spatial Thinking) programs, 8 Level 2-(Advanced) three week programs and 7 Geo Innovation Challenge Programs being conducted by various Universities across India selected through a stringent process by the DST.

The sessions at these programs comprise classroom, lab, fieldwork, and mini-projects. Central to this success is a structured curriculum and the advocacy of open-source software. The dedicated portal, https://dst-iget.in, is a reservoir of learning materials, connecting educators, professionals, and scientists, and catalyzing India's geospatial domain. The NGP-DST's geospatial capacity building program is coordinated nationally by the Bharati Vidyapeeth Deemed University, Department of Geoinformatics, Institute of Environment Education and Research, Pune.

The Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu is one of the selected institutions for conducting the Level 2 Program.

Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu

The Tamil Nadu Agricultural University (TNAU) is a leading agro-technology provider of India and its graduates are recognized throughout the world. It offers various undergraduate, post graduate and doctoral programs in 18 constituent colleges distributed all over Tamil Nadu. TNAU has 40 research stations and 15 Farm science centres (KVK) for outreach. It is one of the centres of excellence in agriculture education and research in India. TNAU has developed innovations and Technologies in Agriculture and made marvellous achievements in biotechnology, bioinformatics, nanotechnology, geoinformatics, climate resilient agriculture and smart farming to augment agricultural production. Centre for Water and Geospatial Studies of the University is involved in water resource monitoring, developing tank information system, automated irrigation models, spatial estimation of soil moisture and evapo-transpiration and precision water management technologies.

Department of Remote Sensing and GIS, Centre for Water and Geospatial Studies

The Department of Remote Sensing and GIS, Centre for Water and Geospatial Studies, Tamil Nadu Agricultural University, Coimbatore, was established as a separate department in 2010 with scientists of various disciplines for broader application of remote sensing and GIS techniques in the areas related to agriculture with the mandate to teach applications of Remote Sensing and Geographic Information System in agriculture to the students and research scholars, generate and assemble geospatial data on natural resources, provide geospatial data on natural resources for the research teams and extension personnel and to support Human Resource Development in various agricultural applications of Remote Sensing and Geographic Information System in the agricultural

sector. The applications in the themes viz., Soil, Land, Water and Climate are carried out to support the farming community, policymakers and other stakeholders.

Tamil Nadu Agricultural University, Coimbatore , Tamilnadu

Who can apply?

- Faculty members, scientists, technologists, researchers from academia, national institutions of research, smart city cells, municipal corporations and other government departments are eligible to apply.
- Personnel from non government organizations (NGO)
- School Teachers
- Only 2-3 seats are reserved for research scholars. Only candidates who have a high degree of experience with geospatial technologies should apply for these advanced programs.

No basics will be covered in the Level 2 program. Candidates who have no knowledge of geospatial technologies should apply for the Level 1 program.

How to apply?

- Interested candidates should fill the online application form through the web link available on http://dst-iget.in. Kindly keep a digital copy of your photograph, LinkedIn Id / ORCID Id / Researchgate Id / Google Scholar Id (atleast one is needed) and deputation letter (format available on http://dst-iget.in website) handy while filling in the form.
- Selected candidates will be informed by mail.
- For any further queries after application write to dst.iget@bharatividyapeeth.edu or call on +91- 7559288803
- Address all queries regarding the program **once selected** to the PI, *Dr. S. Pazhanivelan, directorwtc@tnau.ac.in, rsgis@tnau.ac.in, +919047599446*

Theme of the Summer School: Geospatial Technologies in Agriculture

Realizing the utility of remote sensing and GIS techniques, Tamil Nadu Agricultural University implemented various schemes on 'Remote Sensing for Agricultural Applications' in 1990. The training programme on "Geospatial Technologies in Agriculture"(Level 2) will be organized by the Department of Remote Sensing and GIS, Centre for Water and Geospatial Studies, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu with the objectives to build capacities in Geospatial Science and Technology Applications in Agriculture through a comprehensive hands-on approach using open-source Software, to demonstrate the application of geospatial techniques for efficient planning and to create awareness among different user groups on the potential of various geospatial technologies and Promote networking of government, academic, research and industrial organizations targeting faculty of colleges and universities, State and central government officials and Personnel from research institutions pan India.

The training program focuses on

- Introduction to geospatial information – Spatial data analysis - Exposure to open source tools for analysing SAR data
- Geospatial Applications – Digital soil mapping - automated irrigation - Sustainable Agriculture and climate studies - Land degradation
- Crop mapping and monitoring - Disaster management - Insurances
- Drone applications in agriculture - IoT solutions - Digital Agricultural and Smart farming

Important Information

Last date for registration: **15 May 2024**
Date of intimation of selection: 18 May 2024
Date of online orientation program: **27th May 2024**
Dates of the program: **5 to 25 June 2024**

Mode of conduct: Offline
No. of seats: 25
Registration Fees: Nil

Principal Investigator: Dr. S. Pazhanivelan, Director, Centre for Water and Geospatial Studies, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India
Email: directorwtc@tnau.ac.in, rsgis@tnau.ac.in
Phone: +919047599446

For any queries contact

Dr. S. Pazhanivelan, directorwtc@tnau.ac.in, rsgis@tnau.ac.in, +919047599446 .

Address

Centre for Water and Geospatial Studies, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu

Certificate

Certificate of participation will be awarded to each participant only after attending the full course

Travel and Lodging

Each participant will be reimbursed with 3 AC train fare. Lodging and boarding on a double sharing basis will be provided by the host institution.

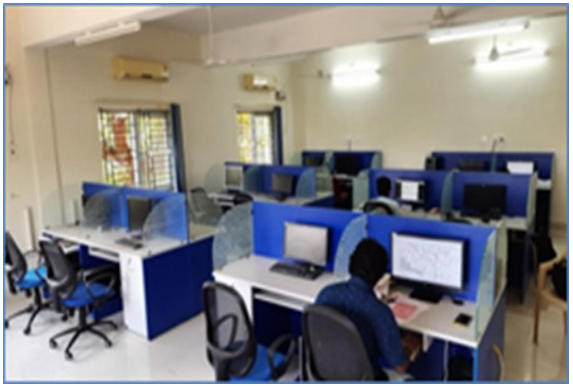
Infrastructure and Facilities

Laboratory

Realizing the utility of remote sensing and GIS techniques, Tamil Nadu Agricultural University implemented various schemes on 'Remote Sensing for Agricultural Applications' in 1990. The Department of Remote Sensing is well equipped with Photo and visual interpretation facilities (light table, stereoscope and large format enlarger), Digital Image Processing & GIS lab with workstations installed with ArcGIS lab kit, ArcGIS server edition, Mapscape, eCognition, ERDAS, IDRISI and Geomedia RLL, cartographic equipment, ground truth collection equipment like survey grade and navigation GPS handsets, multispectral ground truth radiometer and VIS_NIR Hyperspectral spectroradiometer, server for Internet map services using ARCGIS IMS, Remote Sensing and GIS teaching and training laboratory, multimedia projector and analytical laboratory equipped for soil, water and plant analysis.

A well-established infrastructure facility is available at the Department of Remote Sensing and GIS, CWGS, Tamil Nadu Agricultural University, to conduct advanced training for officials and students. An exclusive computer lab to accommodate more than 30 people at a time with high-end systems to do GIS work is available. A well-equipped classroom to handle theory sessions with audio and video systems and a good ambience are available to provide a comfortable learning environment.

GIS Lab



Remote Sensing Lab

Classroom

Guest House

Deputation Letter (Format) for DST Summer/Winter School/ Geoinnovation Program 2024-25 (Prospective participant must submit this on the letterhead of the respective institution where they are working)

This is to state that Dr./Mr./Ms. _____working at _____(name of the institute) as _____ (Designation), since _____ (year) is being deputed/nominated to_____(program name in detail) from ----------(date, month, year) to---------- (date, month, year) . He/she will be relieved from his/her duties during this period.

Signature and Seal (Head of the Institute)

Program Schedule for 21 Days Summer School in Geospatial Science and Technology (Level 2)
Theme: Geospatial Science and Technology Applications in Agriculture
5 to 25 June 2024

Date	Morning Session		Tea Break	Morning Session	Lunch Break	Afternoon Session
	9.30 – 10.30 AM	10.30 – 11.30 AM	11.30 – 11.45 AM	11.45 AM – 12.45 PM	12.45 – 2.00 PM	2.00 PM – 5.00 PM
DAY 1 5/06/2024	Registration	Inauguration with special lecture	Tea Break	Geospatial technology applications in Agriculture – An Overview (T) **Speaker:** *S. Pazhanivelan, Director, CWGS, TNAU*	Lunch Break	Revisit and experience basic tools on Image Processing and interpretation with open source software's (P) **Speaker:** *Dr. R. Kumaraperumal, Associate Professor, RSGIS, TNAU*
DAY 2 6/06/2024	An overview of freely available satellite data (T) **Speaker:** *Dr. K.P. Ragunath, Associate Professor, CWGS, TNAU*	Introduction to the processing of Microwave and Hyperspectral Data (T) **Speaker:** *Dr. Mohammed Ahmed, Scientist, RRSC South, Bangalore*		Recent Advances in Multispectral and Microwave Remote Sensing Applications in Agriculture (T) **Speaker:** *Dr. Mohammed Ahmed, Scientist, RRSC South, Bangalore*		Downloading and processing Sentinel 1 SAR satellite datasets using SNAP tool (P) **Speaker:** *Dr. Mohammed Ahmed, Scientist, RRSC South, Bangalore*
DAY 3 7/06/2024	Recent Advances in Hyperspectral and LIDAR remote sensing applications in Agriculture (T) **Speaker:** *Dr. A.M. Ramiya, Scientist, IISST, Trivendram*	Advances in Digital Image classification approaches (T) **Speaker:** *Dr. Balaji Kannan, Professor & Head, Physical Sciences, TNAU*		Object based classification techniques for High resolution satellite and Drone images (T) **Speaker:** Dr. *K.P. Ragunath, Associate Professor, CWGS, TNAU*		Multi-temporal feature extraction from time series SAR data (P) **Speaker:** *Dr. S. Pazhanivelan, Director, CWGS, TNAU*
DAY 4 8/06/2024	Global crop land mapping using open source datasets (T)	Crop signatures and discrimination using time series satellite imageries (T)		Recent advances in Crop mapping and crop suitability analysis (T)		Extraction of crop signatures of Agriculture and Horticulture using Sentinel 1A (P)

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	9.30 – 10.30 AM	**10.30 – 11.30 AM**	**11.30 – 11.45 AM**	**11.45 AM – 12.45 PM**	**12.45 – 2.00 PM**	**2.00 PM – 5.00 PM**
	Speaker: *Dr. Murali Krishna Gumma, Principal Scientist, ICRISAT*	**Speaker:** *Dr. S. Pazhanivelan, Director, CWGS, TNAU*		**Speaker:** *Dr.K.P. Ragunath, Associate Professor, CWGS, TNAU*		**Speaker:** *Dr. S. Pazhanivelan, Director, CWGS, TNAU*
DAY 5 9/06/2024	Assessing progress of planting and crop establishment using optical and microwave data (T) **Speaker:** *Dr. Bimal Bhattacharya, Group Director SAC, ISRO*	Retrieving bio-physical parameters from satellite imageries (T) **Speaker:** *Dr. Bimal Bhattacharya, Group Director SAC, ISRO*		Spatial analysis of crop condition/health using spectral indices (T) **Speaker:** *Dr. P. Kannan, Associate Professor, CWGS, TNAU*		Crop area extraction from Sentinel 1A using SNAP tool (P) **Speaker:** *Dr. P. Kannan, Associate Professor, CWGS, TNAU*
DAY 6 10/06/2024	Spectral indices for crop yield estimation (T) **Speaker:** *Dr. D. Muthumanickam, Professor & Head, RSGIS, TNAU*	Agromet models for crop yield estimation (T) **Speaker:** *Dr. Vinay Kumar Sehgal, Principal Scientist, IARI*		Crop growth models and yield simulations (T) **Speaker:** *Dr. Vinay Kumar Sehgal, Principal Scientist, IARI*		Spatial estimation of crop yield using semi-physical approach in QGIS (P) **Speaker:** *Dr. S. Pazhanivelan, Director, CWGS, TNAU*
DAY 7 11/06/2024	Interfaces to integrate spatial datasets for yield simulations (T) **Speaker:** *Dr. M. Deiveegan, Crop modeller, IRRI*	Integrating crop growth models with remote sensing products (T) **Speaker:** *Dr. S. Pazhanivelan, Director, CWGS, TNAU*		Assessing yield Gaps using geospatial technologies (T) **Speaker:** *Mr. Amit, Semantics*		Spatial rice yield estimation integrating DSSAT models with satellite derived products (P) **Speaker:** *Dr. M. Deiveegan, Crop modeller, IRRI*
DAY 8 12/06/2024	Need for Soil Moisture Estimation at spatial scale (T) **Speaker:** *Dr. P. Kannan, Associate Professor, CWGS, TNAU*	Network Sensors for soil moisture estimation (T) **Speaker:** *Dr. R. Jagadeeswaran, Professor, RSGIS, TNAU*		Spatial estimation of soil moisture for irrigation planning (T) **Speaker:** *Dr. K. Chandrasekar, Head (Applications), NRSC, Hyderabad*		Soil Moisture estimation using SAR satellite datasets (P) **Speaker:** *Dr. K. Chandrasekar, Head (Applications), NRSC, Hyderabad*

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DAY 9 13/06/2024	Geospatial technologies for Evapotranspiration (ET) estimation (T) **Speaker:** *Dr. K. Chandrasekar, Head (Applications), NRSC, Hyderabad*	Assessing Length of growing period using remote sensing products in rainfed areas for effective crop planning (T) **Speaker:** *Dr. K.P. Ragunath, Associate Professor, CWGS, TNAU*		Automated irrigation models and approaches (T) **Speaker:** *Dr. S. Pazhanivelan, Director, CWGS, TNAU*		Estimation of ET for precise irrigation planning (P) **Speaker:** *Dr. K. Chandrasekar, Head (Applications), NRSC, Hyderabad*
DAY 10 14/06/2024	High Resolution Digital Soil Mapping for Agro Technology Transfer (T) **Speaker:** *Dr. R. Kumaraperumal, Associate Professor, RSGIS, TNAU*	Machine learning and deep learning tools for Digital Soil Mapping (T) **Speaker:** *Dr. R. Kumaraperumal, Associate Professor, RSGIS, TNAU*		Generating environmental covariates from remote sensing products (T) **Speaker:** *Dr. R. Kumaraperumal, Associate Professor, RSGIS, TNAU*		Digital soil mapping using decision tree approach (P) **Speaker:** *Dr. R. Kumaraperumal, Associate Professor, RSGIS, TNAU*
DAY 11 15/06/2024	Soil nutrient mapping using soil health card information (T) **Speaker:** *Dr. S Rama Subramoniam, Scientist, RRSC South, Bangalore*	Spatial variability analysis of soil nutrients for precision agriculture (T) **Speaker:** *Dr. S Rama Subramoniam, Scientist, RRSC South, Bangalore*		Mobile based soil information system (T) **Speaker:** *Dr.K.P. Ragunath, Associate Professor, CWGS, TNAU*		Generation of spatial variability map for soil nutrients using geostatistical approach (P) **Speaker:** *Dr.P. Kannan, Associate Professor, CWGS, TNAU*
DAY 12 16/06/2024	Field Visit (Creating database on training dataset Utilizing ODK (Open Data Kit) for Field Surveys)			Field Visit		Field Visit

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DAY 13 17/06/2024	Introduction to Vedas, Bhuvan portals and Open-source software (T) **Speaker:** *Dr. R. Kumaraperumal, Associate Professor, RSGIS, TNAU*	Raster and Vector data analysis using python (T) **Speaker:** *Dr. K.P. Ragunath, Associate Professor, CWGS, TNAU*		Introduction to Google Earth Engine and its applications in Agriculture (T) **Speaker:** *Dr. K.P. Ragunath, Associate Professor, CWGS, TNAU*		Time series analysis of spectral indices using python programming (P) **Speaker:** *Dr. K.P. Ragunath, Associate Professor, CWGS, TNAU*
DAY 14 18/06/2024	Digital tools for plant moisture and nutrient Detection (T) **Speaker:** *Dr. M. Selvakumar, Professor, CWGS, TNAU*	AI and Big data analytics in Agriculture (T) Dr. Geetha Srikanth, Associate Professor, **Speaker:** *Amrita Centre of Excellence Amrita Vishwa Vidyapeetham*		Spatial Models for Pest and Disease forewarning (T) **Speaker:** *Dr. Senthil, Associate Professor, Pathology, ACRC, TNAU*		AI based crop stress detection – pest, disease and weeds (P) **Speaker:** *Dr. C. Karthikeyan, Professor, Pathology, TNAU*
DAY 15 19/06/2024	Image segmentation and deep learning tools for weed detection (T) **Speaker:** *Dr. Muthukumar Bagavathiannan, Associate Professor, Texas A & M University, USA*	Mobile applications and IoT solutions integrating geospatial datasets in agriculture (T) **Speaker:** *Dr. M. Raju, Professor, CWGS, TNAU*		GIS platform for Integrating financing and farming activities with supply chain infrastructure (T) **Speaker:** *Dr. K. M. Shivakumar, Professor (Agrl. Economics), TNAU, Coimbatore*		Big data spatial analytics for Domestic and Export Market Intelligence – TNAU Experience (P) **Speaker:** *Dr. K. M. Shivakumar, Professor (Agrl. Economics), TNAU, Coimbatore*
DAY 16 20/06/2024	Weather forecasting and crop specific agro-advisories (T) **Speaker:** *Dr. Sathyamoorthy, Professor & Head, ACRC, TNAU*	Geospatial technologies for climate smart agriculture (T) **Speaker:** *Dr. S. Kokilavani, Associate Professor, ACRC, TNAU*		Robotics in Agriculture (T) ***Speaker:*** *Dr. Sai Sundarkrishna, Professor, Amrita Centre of Excellence Amrita Vishwa Vidyapeetham*		Retrieving actionable intelligence for farming decisions and e-governance from Spatial Agriculture data platform (T) **Speaker:** *Dr. Balaji Kannan, Professor & Head, Physical Sciences, TNAU*

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DAY 17 21/06/2024	Flood and Cyclone damage assessment (T) **Speaker:** *Dr.R. Jagadeeswaran, Professor, RSGIS, TNAU*	Monitoring progress of Drought and assessing impact (T) **Speaker:** Dr. D. *Muthumanickam, Professor & Head, RSGIS, TNAU*		Remote Sensing and Drone applications in Crop insurances and lending solutions (T) **Speaker:** *Dr. Manoj Kumar Yadav, Sr. Advisor, GIZ*		Agriculture Drought assessment using MODIS data (P) **Speaker:** *Dr. D. Muthumanickam, Professor & Head, RSGIS, TNAU*
DAY 18 22/06/2024	Drone applications in Agriculture (T) **Speaker:** *Dr. R.Raja, Principle Scientist, CICR, Coimbatore*	Exposure to mapping Drones (P) **Speaker:** *Dr. R.Kumaraperumal, Associate Professor, RSGIS, TNAU*		Exposure to mapping Drones (P) Dr. R.Kumaraperumal, Associate Professor, RSGIS, TNAU		Fuel operated Spraying Drone demonstration(P) **Speaker:** *Dr. R.Kumaraperumal, Associate Professor, RSGIS, TNAU*
DAY 19 23/06/2024	Project work			Project Work		Project Work
DAY 20 24/06/2024	Project Work			Project Work		Project Work
DAY 21 25/06/2024	Project Presentation			Project Presentation		Feedback and Valedictory