

Workshop on

Google Earth Engine, IoT, and Drones for Precision Agriculture and Advanced Technologies for Climate Smart Agriculture

26-27 March, 2023



Organizing by

**Centre for Advanced Agricultural Science and Technology
for Climate Smart Agriculture and Water Management
Mahatma Phule Krishi Vidyapeeth, Rahuri
413 722 Ahmednagar, Maharashtra (IN)**



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Preamble

Agricultural sector contributes 18% to India's Gross Domestic Product and is a major source of livelihood for about 60% of the population. But the economic productivity of Indian agriculture sector is low compared to many other countries and hence there is a need to enhance productivity and input use efficiency. Several factors contribute to low productivity and efficiency including excessive or improper use of inputs (water, nutrients and chemicals), inappropriate land use and crop planning and monitoring, climate change and climate variability.

Thus, there is a growing need of using the inputs for agriculture with precision by considering the spatial and temporal variability of various elements of agriculture system, including, land, water, soil, weather and crops for enhancing the economic productivity, input use efficiency, environmental sustainability; and adapting to and mitigating the impact of climate change. This calls for real time monitoring, management and application of the resources and inputs. Hence, Indian agriculture needs to be transformed from the traditional to precision and smart agriculture. The application of digital technologies has the major role for this transformation. The digital technologies that can be used for precision application of inputs in agriculture are sensors, drones, robotics, IoT, AI & ML and geoinformatics including RS, GIS and GEE. All these technologies are not alternative to each other but complements each other.

Further the digital technologies themselves have been introduced recently in various sectors of development and considering the benefits of adoption of the digital technologies in those sectors, the digital technologies are now also being explored for agriculture sector. As per the initial considerations, it is envisaged that the digital technologies have the potential to revolutionise the future agriculture. Thus, there is a need to include the digital technologies in the academic and research programmes of Agri based education system and research mechanism, to explore their potentialities.

Keeping this in view, the faculties and scientists of the Mahatma Phule Krishi Vidyapeeth, Rahuri enhanced their capacities and capabilities to enable themselves to develop the precision and smart technologies using various digital techniques stated above; and also further make the students, faculties and scientists and other stakeholders to understand the strength of these technologies for precision and climate smart agriculture, by undergoing **International Training and Exposure visits at Geo-informatics Centre, Asian Institute of Technology, Thailand; University of Wisconsin, USA and University of Tsukuba, Japan** under the ICAR-National Agricultural Higher Education Project-Centre for Advanced Agricultural Science and Technology on Climate Smart Agriculture and Water Management. In order to share the learnings while participating in these training programmes and exposure visits and deliberate on the use of digital technologies for agriculture with the faculties and scientists at the beginner level and students, two days' Workshop on **"Google Earth Engine, IoT, and Drones for Precision Agriculture and Advanced Technologies for Climate Smart Agriculture"** has been scheduled on 26-27 March, 2023 in hybrid mode at CAAST-CSAWM, Central Campus, Mahatma Phule Krishi Vidyapeeth Rahuri.



Objectives

1. To share the learnings from the participation of the faculties and scientists during International Training Programmes and Exposure visits to the faculties and scientists at the beginner level.
2. To explore the possibilities of designing the course curriculum in blended learning framework for digital technologies in agriculture.
3. To deliberate on the use of digital tools for the development of the precision and smart agriculture technologies.
4. To provide the opportunities to the students and scientists and faculties at the beginner level to interact with the trained human resources on digital technologies.

Themes

- Sensors and Internet of Things (IoT)
- Unmanned Aerial Vehicle/ Drone
- Hyperspectral imaging applications
- Geo-informatics (GIS, RS and GEE)
- Computer Simulation Modelling
- Education and research programmes for digital agriculture

Mode of conduct: Hybrid (on-campus and online)

- **Venue for on-campus mode:** Seminar Hall, Dr. A. S. College of Agril. Engg. and Tech., Central Campus, MPKV, Rahuri 413722, Ahmednagar (MH)
- **Platform for online mode:** Zoom (the details will be communicated upon Registration)

Who can participate?

- Students, beginner level faculties and scientists of MPKV, Rahuri (on campus or online mode)
- Students, scientists and faculties of other Universities (online mode)

Registration for participation in Conference

- No. of seats: Limited for both on-campus and on-line modes. "First come first served" protocol will be observed till the specified number of candidates have been registered.
- Registration Fee: Free
- Procedure

On campus: Interested candidates should visit following link to apply and register for the Workshop

Link: <https://bit.ly/3Yl84wp>

On line: Interested candidates should visit following link to apply and register for the Workshop

Link: <http://bit.ly/41KVDgm>

Accommodation and travel

- The accommodation for the out-station (i.e. other than those residing at Central Campus) candidates registered for the participation in on-campus mode will be provided at the Central Campus, MPKV, Rahuri as per the details provided during the online registration.
- The travel expenses will be reimbursed to the out-station participants (i.e. other than those residing at Central Campus) as per the prevailing rules and regulations.



Day 1: 26 March 2023

1000-1120 Technical Session-I: Capacity building for the advanced technologies: Empowering SAUs by ICAR-NAHEP

1. The opportunities provided by ICAR-NAHEP for enabling the SAUs to develop the international academic and research collaboration: Dr. S.D. Gorantiwar, **Director of Research and PI, CAAST-CSAWM, MPKV Rahuri**
2. Encouraging and enabling the SAUs to develop academic and research collaborations with International Academic Institutions and Universities: Dr. R.C. Agrawal, **Deputy Director General (Edn) & National Director, NAHEP, ICAR, New Delhi**
3. Benefits of ICAR-NAHEP initiatives of enhancing the SAUs capacity of adoption of advanced technologies by way of international collaboration: Dr. P.G.Patil, **Vice Chancellor, MPKV, Rahuri**
4. Discussion: Role of SAUs to contribute to the National Education Policy by way of International collaboration

1120-1130 Networking tea

1130-1300 Technical Session-II: Smart Technologies

1. Smart farm: enhancing productivity, efficiency, and environmental sustainability and sharing Kubota Farm experience: Dr. S.D. Masalkar, **Associate Dean, College of Agriculture, Pune**
2. Smart Irrigation Management: Alleviating the risk due to weather variability and climate change and sharing Royal Irrigation Department, Thailand experience: Dr. D.D. Pawar, **Associate Dean, Dr. A.S. College of Agril. Engg., MPKV, Rahuri**
3. One District One Product: Enhancing the profitability of the farmers by making them Smart Seller and sharing the experiences of OTOP of Thailand: Dr. B.D. Bhakare, **Associate Dean, Post Graduate Institute, MPKV, Rahuri**
4. Interaction with the participants

1300-1400 Lunch Break

1400-1530 Technical Session-III: Sensors and IoTs for crop production system: Concept and potentials

1. Smart sensing system for smart agriculture: Dr. Sangram Dhumal, **Associate Professor (Horticulture), College of Agriculture, Kolhapur Campus, MPKV Rahuri**
2. IoT enabled weather monitoring system for precision agriculture: Dr. R.P. Andhale, **Associate Professor (Agronomy), MPKV, Rahuri**
3. Sensors and IoTs for Post-Harvest Management: Dr. V.P. Kad, **Associate Professor, Deptt. of Agril. Process Engineering, MPKV Rahuri**

1530-1700 Technical Session-IV: Drones and IoTs for crop production system: Applications and adoption

1. IoTs for smart livestock management: Dr. S.H. Mane, **Assistant Professor Deptt. of AH&DS, College of Agriculture, Pune**
2. IoTs for making Integrated Farming System smart: Dr. U.S. Surve, **Professor, Deptt. of Agronomy, MPKV, Rahuri**
3. Drone technologies for mapping and spraying: Dr. S.M. Nalawade, **Head, Deptt. of FMPE, MPKV Rahuri**

Contd...

Day 2: 27 March 2023

0930-1100 Technical Session-V: Geo-informatics for smart agriculture and water management

1. Q-GIS for precision and climate smart agriculture: concept, potential and application: Dr. M.S. Mane, **Head, Deptt. of Irrigation and Water Management, MPKV Rahuri**
2. Google Earth Engine (GEE) for smart natural resource management: concept, potential and application: Dr. S.K. Dingre, **Associate Professor, Department of Irrigation & Drainage Engineering, MPKV, Rahuri**
3. Computer simulation modelling for the land applications of agricultural machinery: Dr. Avdhoot Walunj, **Asstt. Prof., Mechanical Engineering, Dept. of FMPE, MPKV, Rahuri**

1100-1115 Networking tea

1115-1215 Technical Session-VI: Hyperspectral imaging for agriculture

1. Multispectral and hyperspectral imaging applications in agriculture: Dr. S.A. Kadam, **Associate Professor, Deptt. of Agril. Engineering, MPKV, Rahuri**
2. Agro-ecological zonation for climate smart agriculture: Dr. P.L. Kulwal, **Prof., Deptt. of Agril. Biotechnology, MPKV, Rahuri**

1215-1300 Technical Session-VII: Interactions

Deliberations and discussion on how the students and faculties and scientists at beginner level can make use of these technologies for their academic and research programmes

1300-1430 Lunch Break

1430-1700 Technical Session-VIII: Wayforward

1. Networking with various Departments and Centres of AIT and other Organisations in Thailand on collaborative efforts for using advanced technologies for climate smart and precision agriculture: Dr. M.G. Shinde, **Co-PI, CAAST-CSAWM and Professor of Soil and Water Cons. Engg, Dept. of Agril. Engineering, MPKV, Rahuri**
2. AIT and MPKV: Capacity building efforts for making agriculture futuristic: Dr. Manzul Kumar Hazarika, **Director, Geo-informatics Centre, Asian Institute of Technology, Bangkok, Thailand**
3. Enabling ecosystem in SAU for international collaboration: Dr. U.D. Chavan, **Dean and Director of Instructions, MPKV, Rahuri**
4. Blended learning opportunities for agriculture education system: Dr. Anuradha Agrawal, **National Coordinator, CAAST, ICAR-NAHEP, New Delhi**
5. Closing discussion facilitated by Dr. S.D. Gorantiwar, **Director of Research and PI, CAAST-CSAWM, MPKV, Rahuri**

Patrons

Dr. R.C. Agrawal, Deputy Director General (Edn.) & National Director, NAHEP, ICAR, New Delhi

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ICAR- National Agricultural Higher Education Project (NAHEP)

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