

CDKS Portfolio Report

1. Introduction:

Climate change is one of the most extreme challenges Indian agriculture is facing today and will have to deal with in future. There have been overwhelming and growing scientific evidences to establish that the world is getting warmer due to climate change and such increasing weather variability and worsening extremes will impact the agriculture sector more and more adversely.

Water scarcity in the nation is further aggravating the problem and posing numerous challenges for farmers to carry on agricultural practices smoothly. At this time, when the country is already struggling to provide clean drinking water to its people, how will it arrange water for agriculture to produce food for the growing population? The need of the hour is technology-driven agricultural solutions that can 'produce more with less.'

In order to fulfill the burgeoning demands of food and water by the existing population, and to deploy resources for upcoming generations, much technological advancement are taking place in the agricultural sector. These advancements have been able to release stress from our existing lands, as well as the farmers.

The use of technology in agriculture is not very new. Farming is a highly labor-intensive job, and in order to increase farm efficiency, manage costs, and increase the production of crops, farmers are encouraged to learn the use of technology and adopt it in daily agricultural practices. Some examples include: Sustainable agricultural practices using high-performance tools and equipment; vertical farming; use of AI (Artificial Intelligence); block chain technology; use of drones; and more.

One such technological advancement that is doing wonders in the field of agriculture is precision agriculture. Also known as satellite farming, or site-specific crop management (SSCM), precision agriculture is growing in India, driven by the country's worst water crisis and the need to substantially increase food production.

Precision agriculture is a new way of managing farms, which encompasses observing, measuring and responding to field variability in crops. It is a decision support system (DSS) for managing a farm with the intent of optimizing returns on inputs, and at the same time preserving resources. In simple words, precision agriculture is a farming technique that makes the growing of crops and raising livestock, more accurate and controlled.

This modern-day agricultural practice makes use of information technology and a wide array of equipment such as GPS guidance, sensors, drones, bees, control systems, robotics, autonomous vehicles and hardware, variable rate technology, GPS-based soil sampling, telemetric, and software.

While precision agriculture was started with the aim to increase crop efficiency and ensure profitability, it is also taking sustainability into account by protecting the environment. This has been achieved through big data gathered by technology, which is guiding the present and empowering the future decisions related to farming. It gives precise information on when to grow a crop, the best time to sow seeds, the best time to apply fertilizers or chemicals etc. The core principles of precision agriculture have been around for more than 25 years, but it's only over the past decade that they have become so popular, thanks to technology!

Furthermore, the adoption of mobile devices, increase in IoT, falling prices of sensors, drones and computer chips, access to high-speed internet, low cost and reliable satellites used for positioning and imagery, and inter-connected farm equipment are some of the key technologies, contributing to the increasing trend of precision agriculture. It has also been suggested by some experts that more than 50% of farmers today are using at least one precision farming practice.

Under NAHEP CAAST VNMKV, Parbhani portfolio “Climate based Digital Knowledge Support Centre” has been formulated for PG/Ph.D students and faculties of VNMKV to acquire knowledge about climate change, digital technologies in agriculture, precision farming technologies, IoT tools, app development etc. by using trainings, workshops, research projects etc.

2. Objectives:

As per NAHEP objectives following **sub objectives** are proposed related to CDKS.

1. To establish the laboratories related to Agri bots, Agri drones and Agri AGVs application in CDKS, such as GIS, Remote sensing and Drone data processing software’s in computational lab for climate based digital support centre.
2. To involve PG/ Ph.D. (Agri. Engineering, Agronomy and Soil Science etc.) students in project work, elective courses and certificate courses related to CDKS.
3. To develop case studies, Internet of Things (IoT), Apps and software tools related to CDKS.
4. To conduct training programmes (one week/ two week) related to CDKS.
5. To develop digital tools, equipment’s for students, faculty, farmers and entrepreneurs.
6. To establish national / international level collaborative work/ MOU with IIT Kharagpur, IIT Bombay and Overseas universities related to CDKS.

3. Activities planned under CDKS:

1. **Weed management:** Pre emergence weed control by using Agri Drones for different crops.
2. **Grafting Robots:** Sugarcane planting by using grafting robots.
3. **App Development:** Different apps development for technologies developed by VNMKV.
4. **Sensor Application:** Use of advanced sensors for nutrient management, water management, climate studies etc.
5. **Precision Agriculture technology:** Development of ICT tools for precision agriculture technology.
6. **Surveying and mapping using Drones:** Agriculture field survey and mapping using drones.
7. **Crop health monitoring:** Using Camera, Spectroradiometer, remote sensing, GIS and drones crop health monitoring.

4. List of courses under CDKS:

Following are the elective courses selected for NAHEP-VNMKV Certificate courses with interdisciplinary faculty involvement and enhancement of skills in handling advanced digital devices such as Agribots, Agri-Drones and Agri-AGVs for productivity enhancement.

1. Geo-Informatics in Agri-Drone Navigation
2. Groundwater Digitization by Geospatial Techniques
3. Internet of Things in Precision Agriculture
4. Climate Resilient technologies in Dryland Farming for enhancing productivity through digitization
5. Geo-Informatics for climate smart Agriculture
6. Digitization in Soil, Water and Plant Analysis
7. Decision Support System (DSS) by using geospatial techniques

5. Brain Storming Workshops:

Brain storming workshops for PG/Ph.D students, faculties of VNMKV for participation in NAHEP Project activities were organized by NAHEP team at various departments of VNMKV.



Brainstorming workshop held at VNMKV faculty members and PG/PhD students on dated 03/02/2020 and 6/02/2020 on 11:00 am onwards

6. Activities under CDKS

1. Drone Spraying Demonstration:

Drone spraying demonstration was conducted at Dept. of Agronomy for PG/Ph.D students, faculties of VNMKV for introduction about drone application in agriculture.



Drone spraying demonstration conducted at Dept. of Agronomy, VNMKV, Parbhani on 10/02/2020

2 Planning Meeting:



Meeting regarding activities planning under CDKS portfolio at ADP office, college of Agricultural Engg& Tech. VNMKV, Parbhani under Chairmanship of Dr. U. M. Khodke. Following members were present: 1) Dr. G. U. Shinde, 2) Dr. B. V. Asewar, 3) Dr. P. H. Vaidya, 4) Dr. M. S. Pendke, 5) Prof. S. N. Pawar 6) Dr. V. K. Ingle 7) Dr. K. K. Dakhore 8) Dr. S. S. Phulari 9) Prof D.V. Patil, 10) Dr. A. U. Waikar

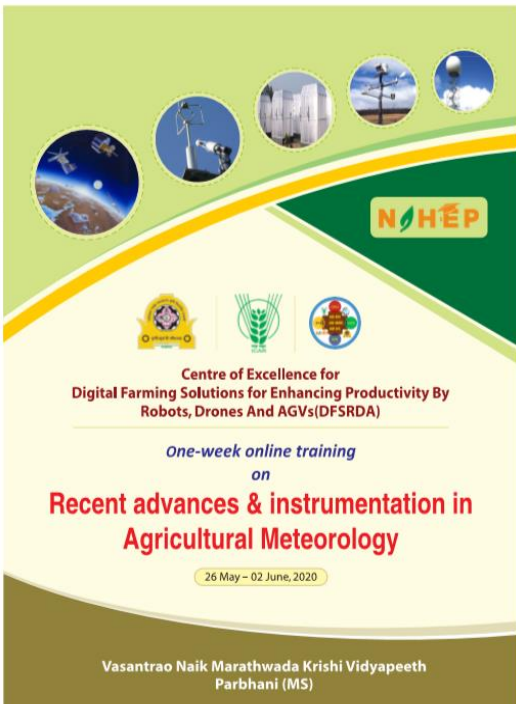
3. Camera applications in agriculture:

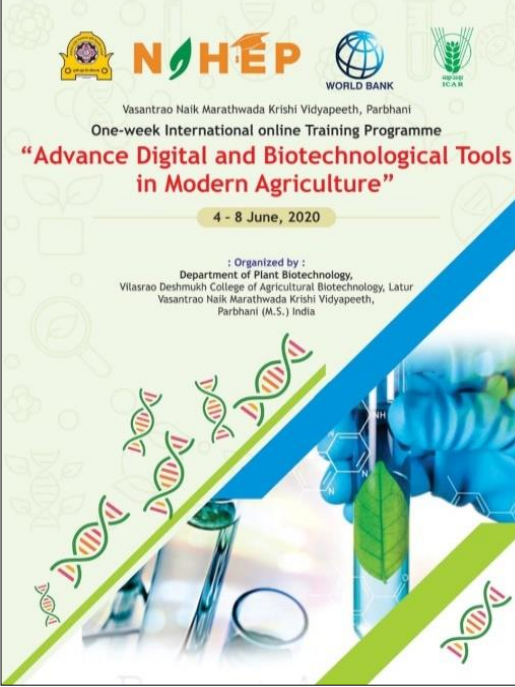
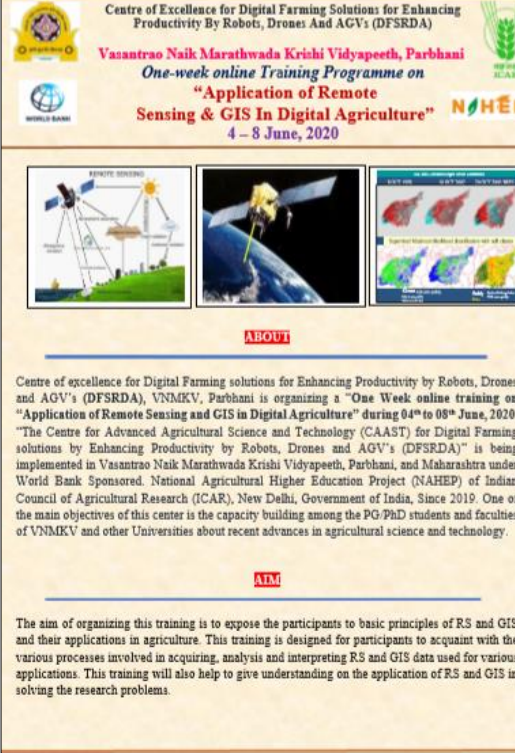
Digital Camera applications were used by PG/Ph.D students of VNMKV in their research work. Digital instruments such as Spectroradiometer, Realsence Camera, Multispectral Camera etc. are useful for crop health monitoring in research purpose. Students are using these digital technologies in their research work.

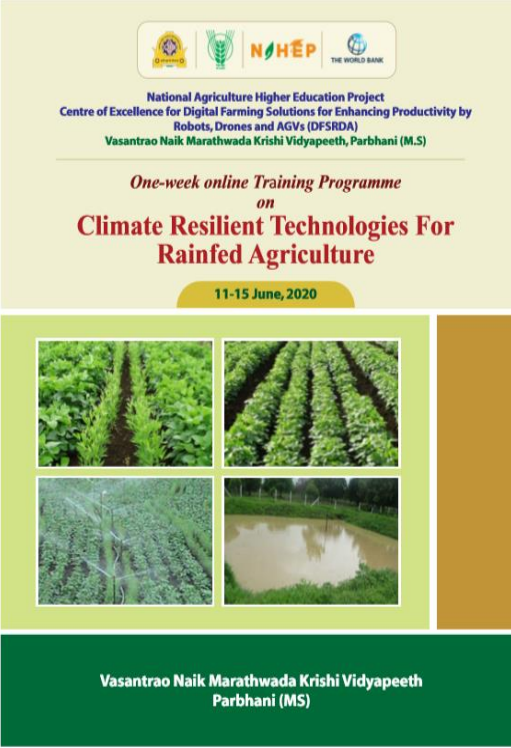
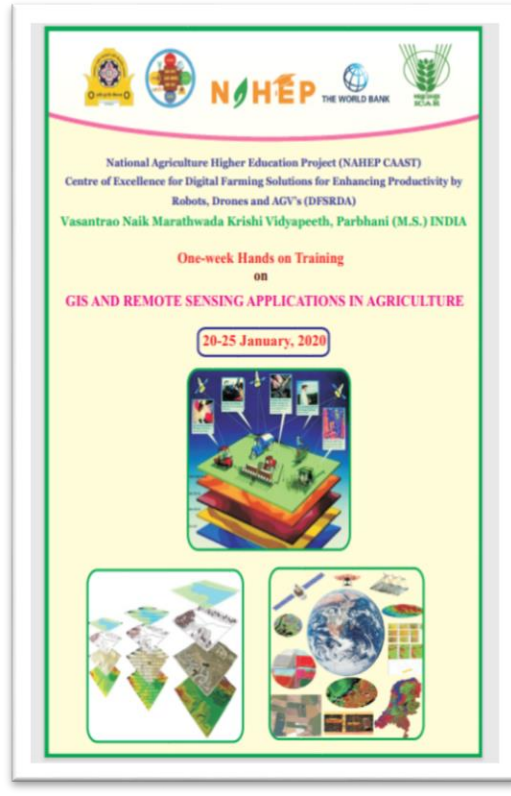


7. Trainings conducted under CDKS

Different training programs (Online/Offline) were conducted for PG/Ph.D students and Faculties of VNMKV under CDKS Portfolio which are listed below. There was huge response from stakeholders for participation in training for knowledge upgradation, skill development etc.

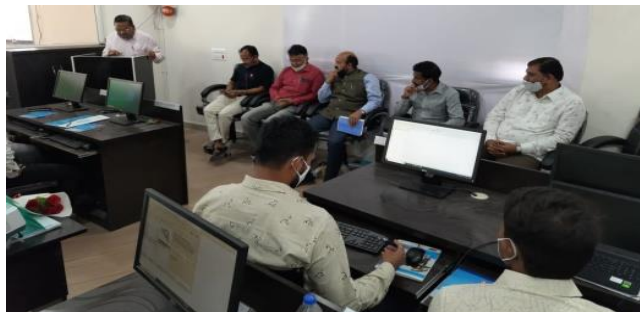
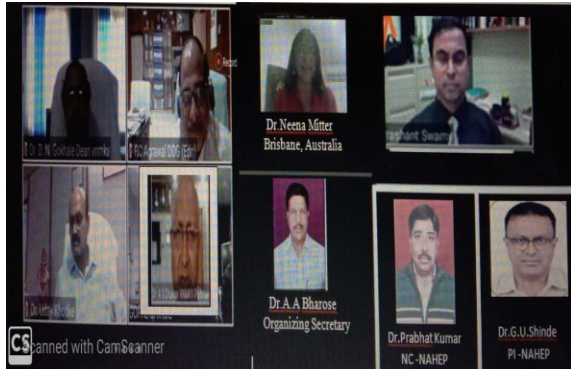
Sr. No.	National & International training	No. of participants	Duration	Activity
1	One Week Online training organized on “Recent Advances and Instrumentation in Agriculture Meteorology (CDKS Portfolio)”	457	26/5/2020 - 02/06/2020	 <p>The poster features a green and yellow color scheme. At the top, there are five circular icons: a satellite, a weather station, a wind turbine, a solar panel, and a weather balloon. Below these is the NHEP logo. The text on the poster includes: 'Centre of Excellence for Digital Farming Solutions for Enhancing Productivity By Robots, Drones And AGVs(DFSRDA)', 'One-week online training on Recent advances & instrumentation in Agricultural Meteorology', '26 May - 02 June, 2020', and 'Vasantao Naik Marathwada Krishi Vidyapeeth Parbhani (MS)'.</p>

2	One Week International online training program is organized on “Biotechnology: It’s Application in Modern Agriculture”	480	04/06/2020 – 08 /06/2020	
3	One-Week online Training Programme organized on “Application of Remote Sensing & GIS In Digital Agriculture”	450	04/06/2020 – 08 /06/2020	 <p>ABOUT</p> <p>Centre of excellence for Digital Farming solutions for Enhancing Productivity by Robots, Drones and AGV's (DFSRDA), VNMKV, Parbhani is organizing a "One Week online training on "Application of Remote Sensing and GIS in Digital Agriculture" during 04th to 08th June, 2020. "The Centre for Advanced Agricultural Science and Technology (CAAST) for Digital Farming solutions by Enhancing Productivity by Robots, Drones and AGV's (DFSRDA)" is being implemented in Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani, and Maharashtra under World Bank Sponsored, National Agricultural Higher Education Project (NAHEP) of Indian Council of Agricultural Research (ICAR), New Delhi, Government of India, Since 2019. One of the main objectives of this center is the capacity building among the PG-PhD students and faculties of VNMKV and other Universities about recent advances in agricultural science and technology.</p> <p>AIM</p> <p>The aim of organizing this training is to expose the participants to basic principles of RS and GIS and their applications in agriculture. This training is designed for participants to acquaint with the various processes involved in acquiring, analysis and interpreting RS and GIS data used for various applications. This training will also help to give understanding on the application of RS and GIS in solving the research problems.</p>

4	One-Week online Training Programme organized on “Climate resilient technology for Rainfed Agriculture”.	452	11/06/2020 - 15/06/2020	
5	One-Week Hands on Training on “GIS and Remote Sensing Applications in Agriculture” jointly organized by NAHEP VNMKV and IIT Bombay	45	20/01/2021- 25/01/2021	

8. Glimpses of Training:

Different training programs were conducted for PG/Ph.D students and Faculties of VNMKV under CDKS Portfolio. There was huge response from stakeholders for participation in training for knowledge upgradation, skill development etc. Some glimpses of trainings are given below:



4. Media Coverage of Trainings:

Training news media coverage are listed below,



कृषि संशोधनासाठी रिमोट सेन्सिंग तंत्रज्ञानाचा उपयोग आवश्यक - डॉ. चिन्नासामी

पुणे, १० ऑक्टोबर - कृषि संशोधनासाठी रिमोट सेन्सिंग तंत्रज्ञानाचा उपयोग आवश्यक आहे. या संदर्भात एक दिवसीय प्रशिक्षण सत्र आयोजित करण्यात आले. या सत्रात डॉ. चिन्नासामी यांनी रिमोट सेन्सिंग तंत्रज्ञानाचा कृषि संशोधनासाठी उपयोग याबाबतचे महत्त्व सादर केले. डॉ. चिन्नासामी यांनी कृषि संशोधनासाठी रिमोट सेन्सिंग तंत्रज्ञानाचा उपयोग याबाबतचे महत्त्व सादर केले. डॉ. चिन्नासामी यांनी कृषि संशोधनासाठी रिमोट सेन्सिंग तंत्रज्ञानाचा उपयोग याबाबतचे महत्त्व सादर केले.

हवामानशास्त्रातील तंत्राचा अवलंब करा

कुलमुरु डॉ. दवण : हवामानशास्त्रातील तंत्राचा अवलंब करा

हवामानशास्त्रातील तंत्राचा अवलंब करा. हवामानशास्त्रातील तंत्राचा अवलंब करा. हवामानशास्त्रातील तंत्राचा अवलंब करा.

जैवतंत्रज्ञानाच्या सातत्यपूर्ण वापरतून राखले जाईल पर्यावरण संतुलन

ऑनलाईन आंतरराष्ट्रीय कार्यशाळा | ऑस्ट्रेलियातील तज्ञांचे मत

लोकमत

यानी नोंदविला प्रशिक्षणगत सहभाग

जैवतंत्रज्ञानाच्या सातत्यपूर्ण वापरतून पर्यावरण संतुलन राखले जाईल. या संदर्भात एक दिवसीय प्रशिक्षण सत्र आयोजित करण्यात आले. या सत्रात डॉ. चिन्नासामी यांनी जैवतंत्रज्ञानाच्या सातत्यपूर्ण वापरतून पर्यावरण संतुलन राखले जाईल याबाबतचे महत्त्व सादर केले.

एकात्मिक शेती पद्धतीचा वापर वाढवा : डॉ. दलवाई

पुणे, १० ऑक्टोबर - एकात्मिक शेती पद्धतीचा वापर वाढवा. एकात्मिक शेती पद्धतीचा वापर वाढवा. एकात्मिक शेती पद्धतीचा वापर वाढवा.

