ICAR-National Agricultural Higher Education Project

Project Report (up to December 31, 2023)

Component 1b: Centres for Advanced Agricultural Science and Technology (CAAST)
Name of the AU: **Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani Dist.: Parbhani 431402, Maharashtra State (India)**

Project Title: **Centre of Excellence: Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs.**

Name of the AU: Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S.) 431402, INDIA
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Executive summary

Name of the AU: Vasantrao Naik Marathwada Krishi Vidyapeeth, (VNMKV) Parbhani.

Project Title: Centre of Excellence: Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs. [DFSRDA]

Executive Summary:

NAHEP-CAAST Project established at VNMKV-Parbhani MS India during **2019-2023** in the vision of digital tools and technologies to be developed by establishment of laboratory for the human capacity and skill development through trainings, workshops thematic research experimentation activities thoroughly planned to incorporate the expert faculties and scientist of campus and worldwide institutes, universities for digital farming solutions. The DFSRDA project centre introduced three Divisions such as Agri-BOT, Agri-Drone, Agri-AGV by establishment of laboratory facilities and activities performed during project period for human capacity and researcher's practices developed at university campus. The university has developed excellent technical resources with infrastructural facilities. The overall score is that H index increased from 27 **to 42**. NAHEP-VNMKV centre conducted **43**-National & International Trainings with **6143**-benificiaries, **03**-International Workshop with **388**-beneficiaries, Quiz, **04**-Competition with **967**-beneficiaries,**11**-Webinar with **4,645**-beneficiaries and **12,143**-Total no of beneficiaries' researcher students, faculty members, farmers and entrepreneurs. The infrastructural facilities for interdisciplinary faculty scientist participation are created to establish **CDKS**-Climate-based Digital Knowledge Support centre, **SSPN**-Seedling and Seed Processing Nursery centre, **SPM**-Smart Portable Machinery Centre, **FPA**-Food Processing Automation Centre and **IC**-Instrumentation Cell Centre. Each

Digital Farming Solutions (DFS) using Robot (Agri-Bot), Drone (Agri-Drone) and Agri-AGVs can be used for precision and organic agricultural practices as a demand of next generation for agricultural automation systems. Digital technologies about land preparation, sowing, interculture operations like weed removal, spraying, harvesting, post harvesting using field robot, drones (UAV), AGVs for farm operations using sensors-based AI, DL, ML and big data practices which can be optimistic solutions in developing a Decision Support System (DSS). Automation in agriculture using hybrid energy for automated field operational devices and machines are the new research field in agribusiness. The use of sensors using mechatronics system for precision agriculture can be beneficial to develop the low-cost technology-based devices for farmers or researchers. The digital technologies in precision land preparation, grafting, transplanting, pest detection and harvesting technologies are explained and exercised to best fitting purpose with commercialization opportunities at global level attention. The DFSRDA centre of excellence facilitating Robotics, UAVs, AGVs, CAD/CAM/CAE lab, Mechatronics, Hydraulics & Pneumatic Lab, Blended Learning, AR/VR system, digital classrooms and organic field practices for the digital farming society, however some of technologies are explained in this paper which are useful in digital organic farming operations.

DFSRDA centre of Excellence received **17.87** Cr (**100%**) funds out of which **96%** funds utilized as per DPR and budget allocation up to December31, 2023.The centre has been established at Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV) Parbhani MS INIDA and as per Edu-Rank record VNMKV Parbhani ranked **384th** in India, **6445th** in the global in the year **2024** rating, and scored in **47** research topics. Its ranking is based on **3** factors: **research output** (EduRank's index has 845 academic publications and 3,454 citations attributed to the university), **non-academic reputation**, and the **impact of notable alumni.** The centre of excellence created advanced digital technology exposure resources for all interdisciplinary researchers at national and international level as a unique facility in India. The centre will continue to facilitate trainings and academic research facilities. The digital information can be obtained on https://nahep.vnmkv.org.in .

Introduction

Background: Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV)Parbhani MS India is one of four Agricultural Universities in the State of Maharashtra (SAUs). Prior to original Maharashtra Agricultural University, it was established on May 18, 1972 to fulfil the regional aspirations of agrarian growth. It is entrusted with the responsibilities to pro- vide education in agriculture and allied fields, undertake research and facilitate technology transfer in Marathwada region of Maharashtra. The first college of Agriculture was established in this region at Parbhani in 1956 by Hyderabad State Government just before State reorganization. Since then, Parbhani remain as the hub of educational, research and extension activities in Marathwada. The university is Contituted for eight district of Marathwada region such as Chatrapati Sambhaji Nagar (Aurangabad), Parbhani, Hingoli, Osmanabad, Latur, Jalna, Beed and Nanded Districts.

Introduction of the project: Digital Farming practices for precision and productivity enhancement-oriented operations are the present day's need of the nation specifying the focus on agricultural business sector by involving researcher students and faculty scientist of agriculture sciences, engineering and technologies. The opportunity for establishing such a system setup is opened up by National Agricultural, Higher Education Project (NAHEP) introduced by Indian Council of Agricultural Research (ICAR) under sub project Centre of Advanced Agricultural Sciences and Technology (CAAST) 1B with 50:50 contribution;

The project entitled "**Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs (DFSRDA centre)**" was proposed in Year 2018-19 and approved in the year **2019**.The project activities started establishing the infrastructural and capital setup from **Sept2019** ***onwards***. Further as per activities proposed to complete according to year wise plan. However, due to pandemic the proposed plan and activities were extended by one year. The centre of excellence introduces Agri-Bot, Agri-Drone and Agri-AGV divisions in coordination with experts from India and overseas network. The centre also introduces University established scientific 21 faculty groups of different departments from university campus by establishing **5-Portfolios** such as **CDKS, SSPN, SPM, FPA and IC** as a established knowledge of agricultural sciences and technologies to make participative application digital technologies in Agricultural Operations.

The proposal assigned for Digital Farming Solutions (DFS) using Robot (Agri-Bot), Drone (Agri-Drone) and Agri-AGVs can be used for precision agricultural practices as a demand of next generation for agricultural automation systems in India. Digital and custom applications oriented technologies about land preparation, sowing, interculture operations like weed removal, spraying, harvesting, post harvesting using field robot, drones (UAV), AGVs for farm operations using sensors-based AI, DL, ML and big data practices were planed which can be optimistic solutions in developing a Decision Support System (DSS). Automation in agriculture using hybrid energy for automated field operational devices and machines are the new research field in agribusiness. The use of sensors using mechatronics system for precision agriculture can be beneficial to develop the low-cost technology-based devices for farmers or researchers.

The digital technologies in precision land preparation, grafting, transplanting, pest detection and harvesting technologies can be exercised to best fitting purpose with commercialization opportunities at global level attention. The DFSRDA centre of excellence will facilitate the use of Robotics, UAVs, AGVs, CAD/CAM/CAE lab, Mechatronics, Hydraulics & Pneumatic Lab, Blended Learning, AR/VR system, digital classrooms and organic field practices for the digital farming society.

TITLE OF PROJECT: Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs at PARBHANI

Key objectives:

1. To establish an advanced basic engineering hardware and software setup such as Mechatronics, CAD/CAM/CAE, 3D Printers and Instrumentation Laboratories for Agri-bots, Agri-drones and Agri-AGVs.
2. To strengthen the present PG and PhD courses in all disciplines by offering three elective course work such as Robotics, Drones or AGVs and also to Certificate courses
3. To develop case studies / Projects of Agri-bots, Agri-drones, Agri-AGVs applications in agriculture.
4. To enhance the skills of faculty and PG student of VNMKV by academic and thematic research.
5. To establish University and Industry interface for students and faculty at national and international level.

Specific thematic area:

This DFSRDA Centre introduced ***the three*** interdisciplinary ***research divisions*** such as **Agri-bot, Agri-Drone and Agri-AGV** under which ***four applicant portfolios*** and **Instrument cell** *are working for digital farming solutions***.** All these Divisions and Portfolios will be working:

1. Climate-based Digital Knowledge Support Centre. (CDKS)
2. Seed/Seedling Processing and Nursery Automation Centre. (SSPN)
3. Smart Portable Machinery Centre. (SPM)
4. Food Processing Automation Centre. (FPA)
5. Instrumentation Cell (IC)

The Centre of excellence facilitating the following digital technologies and physical resources for researcher faculty and students of agricultural sciences, engineering, food technology, horticultural sciences, biotechnology etc with interdisciplinary research in developing digital farming solutions. This facility will continue to learn and invent new applications for precision agriculture.

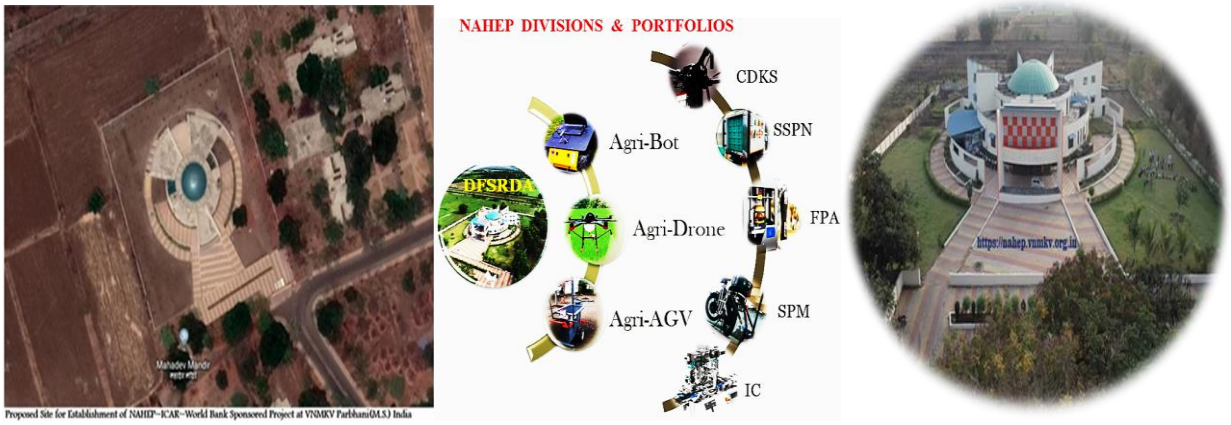


Fig 1. NAHEP-DFSRDA, VNMKV PARBHANI (MS) INDIA Centre

Intended Benefits: The NAHEP-CAAST 1B: Sub project intended a scope of introducing advanced digital technologies with technical support to establish a regular practice for the vision of digital agriculture with precision technologies to handle by researcher students, faculty, farmers and new business entrepreneurs. In this project we introduced Agricultural Robotics (Agri-BoT), Agricultural Drones (Agri-Drone), Agricultural Automated Guided Vehicles (Agri-AGV) like new applicant facilities to beneficiaries by involving agricultural sciences and technologies scientist faculty by introducing CDKS, SSPN, SPM, FPA and IC portfolios as mentioned above. The students and faculty members developed their experiments and published their outcomes.

1. Key activities carried out under the project during the entire period

1.1. Interventions carried out by AU which helped to improved research effectiveness

The details about the interventions carried out to make AU reform ready and led to ICAR accreditation. Please write one paragraph for each intervention and/or activities. The details about the interventions carried out to make AU reform ready and led to ICAR accreditation. Please write one paragraph for each intervention and/or activities.

Key interventions	***Remarks/Photographs***
Establishment of Agri-BOT, Agri-Drone, Agri-AGV Laboratory and Mechatronics, CAD/CAM/CAE Lab, Hydraulic and Pneumatic Lab, Cold Storage, Cold-Van, Smart Onion Storage Silo, Smart Polyhouse and Digital Studio with Blended learning Platform	Since 2019 VNMKV created the advanced digital technology application resource laboratories from which PG-PhD students participating in NAHEP-DFSRDA centre to develop robotic, aerial robotic and smart precision automation technologies in agriculture. More than 300 participative researcher faculty and students from campus and out of campus are involved.
International, National, State and University level workshop, Online/Offline Trainings, Quiz conducted from 2019-2023	**43**-National & International Trainings with **6143**-benificiaries,**03**-International Workshop with **388**-beneficiaries, Quiz, **04**-Competition with **967**-beneficiaries,**11**-Webinar with **4,645**-beneficiaries and **12,143**-Total no of beneficiaries are researcher students, faculty members, farmers and entrepreneurs
Accreditation	VNMKV-Parbhani affiliated and accredited 12 constituent Colleges are in progress to peruse the next accreditation span with digital technology and instruments in laboratory facility by financial support from this project also improved the research contribution. Citations improved from year 2019 to 2023 as 12718 (was 6271), H index 42(was 27), i10 index 341(was 174).
External funded Projects	During year **2019-2023** at VNMKV-Parbhani **2375** (Rs in Lakhs) External funded Projects operational which was **145.35** (Rs in Lakhs) during the year (2018) (2018-19),885.38 (2019-20), 415.76(2020-21), 590.09(2021-22), 483.55 (2022-23)
ISO certifications	The NAHEP-DFSRDA-VNMKV centre participatively achieved Three important ISO certificates ISO 50001:2018; ISO 14001:2015; ISO21001:2018 with financial support.
Internal revenue generation	*A revenue of **Rs 30 lakh** earned in last five year (2018-19 to 2023-24) through sale of products developed after the intervention of NAHEP-CAAST sub-project.*
H index	At present (2023) **42** is the average H index of VNMKV-Parbhani faculties which was **27** during the year (2019)

1.2. How the facilitative units helped to enhance learning outcomes

The details of the facilitative units which helped in enhancing learning outcomes of the students and/or faculties. All facilitative units created in the VNMKV Campus focusing to which are open for the students/faculties and other stakeholders.

Facilitative unit	*Activity/achievement*	*Remarks/Photographs*
All facilitative Units are created at place in the VNMKV Campus Advanced basic engineering hardware and software setup such as ❖**Mechatronics,** ❖**CAD/CAM/CAE,** ❖ **3D Printers and** ❖**Instrumentation Laboratories** **For Three Divisions** ❖ **Agri-bots,** ❖**Agri-drones** ❖ **Agri-AGVs.**	This DFSRDA Centre at one pace with all the three interdisciplinary research **division**s such as **Agri-bot, Agri-Drone and Agri-AGV** under which four applicant portfolios and Instrument cell are working for digital farming solutions. All these Divisions and Portfolios will be working: 1. Climate-based Digital Knowledge Support Centre. (**CDKS**) 2. Seed/Seedling Processing and Nursery Automation Centre. (**SSPN**) 3. Smart Portable Machinery Centre. (**SPM**) 4. Food Processing Automation Centre. (**FPA**) 5. Instrumentation Cell (**IC**) **Mechatronics and Instrumentation Laboratories** established to study the sensors, Cameras and digital tool in precision Agriculture. More than 25 research experiments are taken by PG/PhD students from VNMKV Campus and studies are continued to present research outcomes published in the high impact journals, book series and magazines. **Plant population counter Fruit population counter** **Machine Vision System and 3-D Printing** Facility developed for researcher practitioners to develop the custom components by design manufacturing and testing facilities at centre. **Machine Vision System developed for Agri-Bot, Agri-Drone & Agri-AGVs division research activities.** Camera Sensors are used in Agri-Bot, Agri-Drone and Agri-AGV to look, percept and logically interpret for operational decision in digitization by image processing tools in organic farming. The image sensing and logical interpretation at fast speed to make a quick decision for field operation in time. The use of cameras such as Real-sense, Parrot sequel, spectroradiometer, thermal, zed etc.	**DFSRDA-VNMKV Centre**  **Mechatronics and Instrumentation Laboratory**   

Coordinate Measuring Machine (CMM)
CMM facility is generated for all agricultural operational related farm machinery components, Agri-Bot, Agri-Drone or Agri AGV components measurements for testing and reverse engineering work.
This facility can be used for Farm Machinery or Robot, Drone AGV and digital machinery and tool's technical specification wise dimensional measurements.

Coordinate Measurment Machine

3-D Printer Centre
STRATASYS F-170 Machine for printing different components up to a maximum build area of 10 x 10 x 10 inch (254 x 254 x 254 mm) and a material bay containing one model and one support spool.

3-D Printing Facility

❖ **CAD/CAM/CAE Laboratory:**

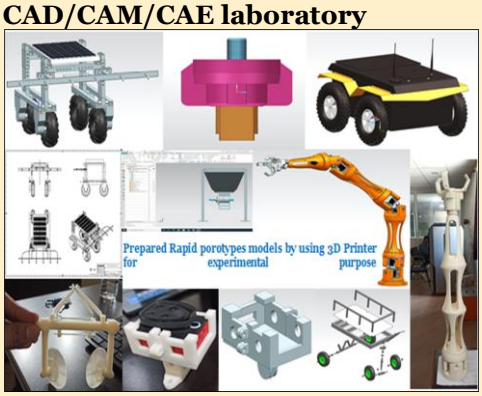
The different types of components used in organic farming practices for automation system of Agri-Bot, Agri-Drone, Agri-AGV are designed in ANSYS, SOLIDWORKS, MATLAB to make confirm of technical specifications of components
The researchers can design and develop the models in CAD/CAM/CAE software established at DFSRDA centre for Computer Aided Engineering Analysis such as structural, CFD, thermal, electromagnetic analysis are done in the ANSYS, Solid-works software in CAD/CAM/CAE laboratory by simulation test rides to derive final design specifications to confirm manufacturing process of the component and once it is 3-D printed the field performance validation is done .The researcher get a comfortable way to make patents and copyrights.

The use of CAD and CAE (Design, Drafting and Engineering Analysis) software for precision and digital agricultural machinery components.

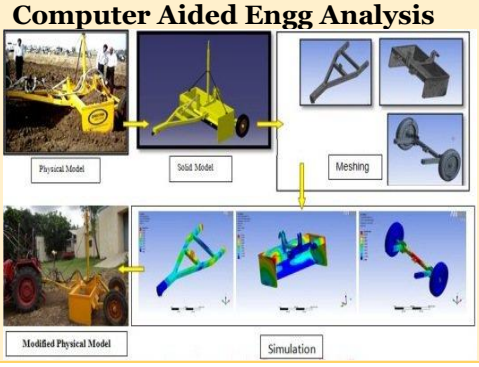
The different types of components used in digital farming practices for automation system of Agri-Bot, Agri-Drone, Agri-AGV are designed in ANSYS, SOLIDWORKS, MATLAB to make confirm of technical specifications of components.

CAD/CAM/CAE Laboratory

CAD-Modeling, CAM, CMM application and CAE-Analysis in CAD/CAM/CAE laboratory



Computer Aided Engg Analysis



❖**Agri-bots,**

Agricultural Robotics for advanced precision farming operational practices are need to popularise and facilitate to involve in digital agriculture mission plan of Govt of India.

Two types of Grafting Robots with Healing Chember facility to produce more than 5000 plants/day production capacity unit is established.

This facility is available for nursery growing farmers, researcher students interested in developing new variety plants by grafting process with cold van and truck transport system.

PG/PhD researcher students and faculty from Botany and horticultural sciences including engineering discipline are involved to participate in obtaining new plants with genetic variance observative practices.

Two Vice Chancellor's involvement in creating two different types of grafting robotics nursery's automation facility found useful to nursery farmers with their involvement in establishing new business facility.

The **healing chamber** practices with all controlling facility equipment created using consumable material to build plant stress management and grafted joint hardening process according to custom requirements.
Further to this a plant transplanter.

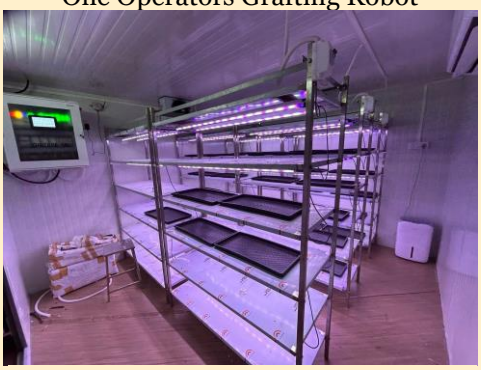
The seedling plants of Cucurbitaceae and Solanaceae exercised with production facility of Brimato plant. Also, a combination of plant up to 3mm to 5mm diameter sizes.

❖Robotic Grafting with Healing Chember Facility after Grafting Process

Single & Double Operative Robots Lab

Two Operators Grafting Robot

One Operators Grafting Robot



Healing Chamber after grafting process

❖**Agri-bots,**

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Agri-Bots: Field Rover Robots for agricultural operations are useful for crop health condition monitoring and different operations such as pest detection and pest management system. The facility of field robots such as Jakal and Husky robots are created. Jakal of 30Kg Payload and Husky to carry 60kg Payload for field operations.

PG/PhD students can take these robots for pest detection and crop health monitoring by attaching camera, spray pumps, sensors kit to collect the data for experimental analysis and crop related online information.

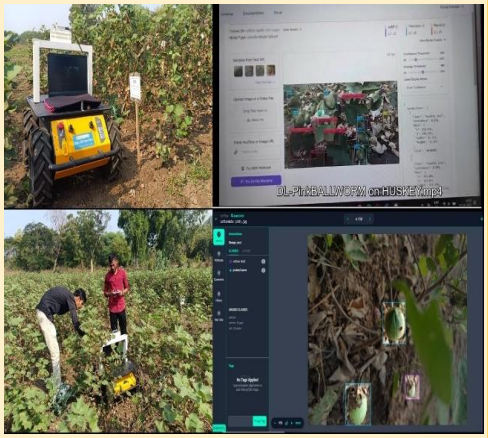
A Researcher can use following DML software on Jakal Husky robots as a experimental setup facility.

1. TensorFlow
2. Faster R-CNN (Region-based Convolutional Neural Network)
3. EfficientDet
4. RetinaNet
5. Mask R-CNN
6. CenterNet
7. DETR
8. Cascade R-CNN
9. SSD
10. FCOS

More than 10 PG/PhD students are working on these Agri-Bots using camera sensors and different field operative equipment’s. in different field crops.

The Deep Machine Learning model using AI -Tools are found easy to grasp by PG-PhD students to takeover different pest detection and pest management system using Field Robot hardware setup and software like YOLOv8 SSD, RetainNet, CenterNet, and Mask R-CNN.for object detection

Agri-Bot for cotton harvesting developed to study a robot-arm design and development for cotton ball picking process. Machine vision-based cotton picking two robot arms developed for experimenting a cotton-picking operation. This is study platform for PG/PhD researcher students. The use of this platform will helpful to identify scope in multiple varieties of cotton harvesting issues and minimize the labor problems. The arm can move in multiple axis of motion for detecting and picking a cotton ball from complex anatomy of cotton plant. The exercise platform is useful for researchers.



Jakal/Husky Agri-Bot with camera

Jackel & Huskey in crop monitoring.

Cotton picking Robot

❖ **Smart Portable Machinery (SPM):**

Two types of transplanters for vegetable plants transplantation process are developed for grafting division.

PG/PhD students of Farm machinery and Power engineering, horticulture can perform experiments with automated system. This facility will continue to exercise and extend its further developments and applications.

Approx.250 seedling/hr. can be transplanted using paper port chain mechanism. This is remote controlled mechanism works up to 100Mtr

Seed Seedling Processing Nursery Automation (SSPN)

The technique of the aerodynamic separation of bulk materials based on the relative density. It is possible to carry out the sowing process using a much lower quantity of seeds (without side grain and weed impurities). In addition, simultaneous ripening (because of high-quality homogeneous seeds) allows the gathering of harvest without losses. In general, the use of good seeds increases the crop yield up to 20–25% minimum. The low level of energy consumption consumes 1.2 kW of electricity (by capacity of 4 t/h) to 37.25 kW of electricity (Capacity of 100 t/h). This facility is created for on field services for farmers

Grain Cleaner, Sorter, Separator and Packaging Machine on Mobile trolley

The machine can actually replace 2–3 types of machines connected in one technological chain. This mechanism can work properly as a single working unit or as a part of a technological line as well.

The low level of energy consumption consumes 1.2 kW of electricity (by capacity of 4 t/h) to 37.25 kW of electricity (productivity of 100 t/h).

❖ **Vegetable Transplanter:**

Automated Vegetable Transplanter

Paper pot Chain Vegetable Transplanter

Grain Cleaner, Sorter, Separator and Packaging Machine on Mobile trolley

❖**Agri-drones**

Agri-Drones (Agri-UAV):
The unmanned Aeiral Vehicle (UAV) also called Agri-Drones are used in agricultural applications such as spraying pesticides, spreading fertilizers, Pest detection and control by using cameras and thermal sensors or spectrographic images in identification or at emergence of pests and diseases, etc., The centre has created facility of 5 spraying drones of 10liter capacity ,one racer drone, two VTOL mapping drones,10 small and micro training purpose drones with simulator software and also Design development and computer aided engineering analysis software lab separately to researcher students. Manufacturing facility using 3D printer Stratasys F170 model cam produce different components of Agri-Drones, Agri-Bots, Agri-AGVs, smart portable machines or irrigation components, devices etc

Unmanned Aerial Vehicle (UAV) or Drones with sensors, cameras attachment and different experiments are procured to establish Agri-Drone Laboratory with professional courses. There are 20 Drones available for training purpose for mapping ,spraying camera or sensors based applications.

PG/PhD students of all Agricultural sciences engineering utilizing this facility. They can perform experiments with automated system. This facility will continue to exercise and extend its further developments and applications.

Agri-Drone Laboratory: facility for researcher students and faculty with AI integrated sensors

No.	Courses Title	Days
1.	Remote pilot training	7
2.	Professional Certificate Course Drone in Agriculture	183
3.	Agriculture drone with RPC	21
4.	Agriculture Mechatronics Sensors	21
5.	Robots in Agriculture	21

Agri-Drones professional certificate courses started for 10th to science graduate and Engineering Students. With funding facilities by State Government.

Field application: for Agricultural cereals, vegetable, spice, orchard plants using 3-D printed drone components

Agri-Unmanned Aerial Vehicle (UAV) Lab

Agri-Drone Laboratory

Field application: for vegetable, spice, orchard plants using 3-D printed drone components

❖ **Agri-AGVs.**

The agricultural Automated Guided Vehicle (AGV) in organic farming practices are commonly used by small and marginal farmers such as automated transplanter, seed drill, sprayers, pest detection and Harvesters etc. The researchers can design and develop the models in CAD/CAM/CAE software established at DFSRDA centre for Computer Aided Engineering Analysis such as structural, CFD, thermal, electromagnetic analysis are done in the ANSYS, Solid-works software in CAD/CAM/CAE laboratory by simulation test rides to derive final design specifications to confirm manufacturing process of the component. A 3-D printed articles can be taken to validate by field performance and get copy rights or patented. The researcher get a comfortable way to make patents and copyrights.

Pneumatic Suction based Cotton Picker

SPM Sub centre

The **Agricultural Automated Guided Vehicle** (**Agri-AGV**) in farming practices are commonly used by small and marginal farmers such as automated transplanter, seed drill, sprayers, pest detection and control system AVG, Harvesters etc.

Agri-AGV introduces three type of cotton picker manual semiautomatic and fully automatic machines
Pneumatic Suction based cotton exercised up to 20kg/hr and collected approx. 600kg cotton from farmer's field. Whereas Robotic arm developed can pickup only 100 kg cotton per day.

Cotton Picker on Electric Vehicle

The operator's efforts minimised by electric vehicle facilitated to operate by seating on electric vehicle. The field performance is more improved by collection of more than 40% cotton collection compared to the manual pulling trolly method.

Mobile operated Smart Sprayer:
The automated organic pesticides/herbicide sprayers of 50 to 75 liter capacity with adjuctable distances of nozzle positions on boomlance operated on andriod mobile tool can be usful to small and magrinal farmers

Mobile Operated Boom Sprayer

Small and marginal farmers can offered with their capacity and custom requirements. A women farmer can also comfortably use this sprayer system for up to 60liter pesticide tank capacity.It can covers @20min/acre speed of operations working on solar charging based battery operative energy .

SPM Sub centre

The scissor lift fabricated on vehicle supported trailer system can lift up to 30 ft height for sprayer manual or automatic operations in pest control system for tall trees. The use of such AGVs with custom ap;licationn design usining sensors calibration and automated mechanism will help in obtaining digital farming solutions.

AGV-Scissor Lift Sprayer -III

SSPN Sub centre

Cold storage and Silo Storage

Processing

The Cold storage facility is created at DFSRDA centre for researchers in VNMKV campus or Farmers on tariff charges basis.
A cold van is also

Room Size External:15*15*10 feet

Refrigeration capacity: 2Ton

Room Temperature: 2to 8 deg c

Power consumption: 4kw/h

Cold Storage of 2Ton Capacity (up to 2°)

Refrigerated trucks are uniquely designed trucks for transporting perishable goods such as fruits, vegetables, seafood, meat, etc. and pharmaceutical products. These types of products are chilled or frozen for preservation during shipment.
A refrigerated van is exactly how it sounds, it's a van that contains the same properties as a refrigerator. These kinds of vans are used to transport items that need to stay at a certain temperature - a good example of this is foods that need to
stay cold to keep them fresh.

Cold Van transport facility

Knowledge partner:

IIT-Bombay Knowledge Partnership:

This facility has been created for researcher students of IIT Bombay and VNMKV students under the knowledge partnership to continue their research in developing optimum temperature control. Every year students will continue to do research in this infrastructure and obtain digital solutions. IIT Bombay CITARA department team will work as Knowledge partner.

IIT-Kharagpur Knowledge Partnership:

A **3 weeks** (6th June to 25th June 2022) hands on training on "Computer Aided Design and Simulation
of Agri-Machines using SolidWorks" was conducted to the students of VNMKV at IIT Kharagpur
by Prof. Rajendra Machavaram. The total No of participants were 21 (Female-10, Male-11).

A **2 weeks** (6th June to 17th June 2022) hands on training on "Digital Image Processing and Computer
Vision for Crop Health Monitoring" was conducted to the students of VNMKV at IIT Kharagpur by
Prof. M. Bhattacharya. The total No of participants were 52(Female-20, Male-32).

As a part of the **Academic activities** a total of 2000 under graduates from IIT Kgp and 200 researcher students from VNMKV were trained on
"Agricultural drone for Spray Applications" during the Autumn and spring Semester 2022-2023 at
IIT Kharagpur.

❖ **Smart Onion Storage silo**

Unmanned Ground Vehicle for Agricultural operations

Agricultural spraying Drone(12 Litres)

Drone with Multispectral camera

Hp Work stations Z2 tower

Agricultural Spraying Drone(12 Litres)

Hp Workstation Zbook

SMART POLY-HOUSE with smart irrigation system and Hydroponic Structure for various valued crops.

The smart polyhouse with smart irrigation, fertigation and sensors-based temperature and health condition monitoring system with 2000 lit water tank capacity with organic and in-organic treatments.

Smart Polyhouse Structure with sensors and automated temperature control system.


Facility developed for VNMKV researchers




Smart Poly-House with Hydroponic System

The Hydroponic system facility has been created for researchers and farmer's practices.

Water Efficiency: Uses up to 90% less water than traditional farming.

Space Efficiency: Ideal for urban areas with limited space.
Year-Round Production: Enables continuous growing regardless of weather.

Reduced Pesticides: Fewer chemicals needed due to controlled environments.

Higher Yields: Plants grow faster and produce more.

The Solar Power plant with IoT tool has been facilitated for all Research labs and entire DFSRDA Centre. If excess energy generated or ideal time the power can be transferred to PG/PhD Boys hostel and Faculty Quarters

Solar Power Plant 26KW Capacity


3-D Food Product extruder facility is established under Food Processing Automation (FPA)centre.
PG/PhD students from food technology and agricultural engineering can exercise their value aided product design and manufacturing using custom design by software testing and 3D printed pilot performance of extruded products.

3-D Food Extruder

3-D Food Printer facility for value aided ingredient addition in food product development for researcher students and faculty members of campus also to develop the new startup business.
Researcher students and faculty members from College of Food Technology and Agricultural Process Engineering department VNMKV campus are practicing on it with formulation of new food products development experiments.
This will continue to use for researchers interested in using Sensors, IoT tools for precision and digital technology applications.

3-D Food Printers with advanced Digital tools for value addition to food products

Smart Solar Dryer with IoT tool developed for Farmers startup entrepreurship. TULSI, TOMATO, ONION, POTATO, CHILLI, like SPICES etc or perishable vegetables can be dried at custom temperature using IoT based controller.

capacity of 4-5 kg of material

Fan: Exhaust Fan is used for maintaining the inside temperature of dryer below certain level. **Humidity Sensor:** This sensor is used to measure the humidity of air or determines the amount of water vapor present in dryer. **Temperature Sensor:** The temperature sensor is used to measure the temperature inside the dryer. **LCD Display:** The LCD Display is used to display the temperature and humidity values of dryer. Display uses the I2C model to communicate with controller and minimizes the wiring. **Solar Charge Controller:** we use solar charge controller to keep the battery away from over charging by regulating the voltage and current coming from the solar panel to the battery. **Solar Panel:** solar panel is used to charge the battery used in dryer. We charge the battery using solar power through solar charge controller. **Controller Switch:** It is the push button switch used to on and off the controller power supply.

❖ **Smart Solar Dryer**

SOLAR DRYER at custom temperature using IoT based controller

NAHEP-DFSRDA VNMKV centre Digital Technologies

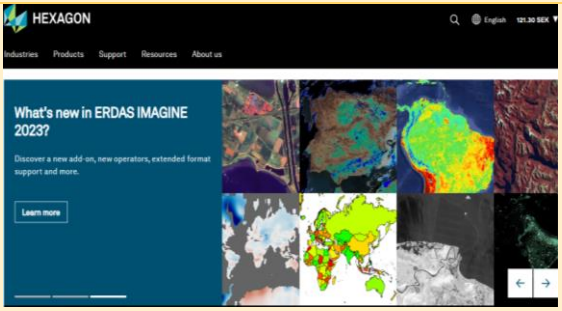
1.3. Out-of-box initiatives undertaken by the AU

The details on out-of-box initiatives undertaken by the AU in one-two paragraph.

Out-of-box initiative	*Activity/achievement*	*Remarks/Photographs*
Webinar series of 13 lectures during COVID-19 pandemic period ***(****Dr. Megha Pradeep Jagtap****)***	During the critical COVID-19 pandemic period, all was locked down except Agriculture, therefore taking in consideration of essentiality of agricultural advisory services to farmers and for judicial use of agricultural chemicals online webinars were arranged on every Saturday from 25th July 2020 till 23rd September 2020. Using such digital online platform for the extension services to farmers was an out of box initiative which helped in sustaining environment safety with stability in production. These recordings are available for users on university YouTube channel.	1. https://www.youtube.com/watch?v=MRg_SzaCweI&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=1 2. https://www.youtube.com/watch?v=km2cIDBgSnY&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=2 3. https://www.youtube.com/watch?v=HB4aLiTsWd8&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=3 4. https://www.youtube.com/watch?v=NA3-ha32LbM&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=4 5. https://www.youtube.com/watch?v=-eOFfPdvIl8&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=5 6. https://www.youtube.com/watch?v=Kati3WRKcsE&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=6 7. https://www.youtube.com/watch?v=3EA-96CyG6Y&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=7 8. https://www.youtube.com/watch?v=7_pFmrUCV48&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=8 9. https://www.youtube.com/watch?v=gI4mYJOJ8Pc&list=PLJNaWraPOn2HS1w-JbfpsrmdrhLhPAKaj&index=10
Disinfection Box *designed and developed in collaboration with swaraj Industries Aurangabad due severe situation during Project implementation period as employees and members of NAHEP centre were frequently visiting NAHEP-VNMKV Centre* *(COVID-19 Pandemic period)*	*The virus is destroyed in this box with the help of UV rays. It consists tubes with a light beam capacity of 100 to 280 mm; these rays help to kill 85 percent of the virus.* *This disinfection box is available in 15 to 30 liters capacity. Size of 15 lit box has 380 mm Width 250 mm Height and depth of 225 mm, while for 30 liters Width is 480 mm, 265 mm. height and depth of 380 mm. These boxes can be used on 220-230 V AC power supply. Using this box various seed bags, small tools, daily use items for women farmers as well as fruits, vegetables, flowers, mobiles, purses, electrical items, glassware, masks, clothes etc. can disinfect by placing items in the box. These sterilization boxes are available in different sizes.*	

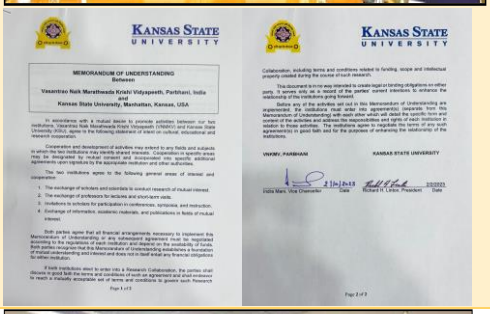
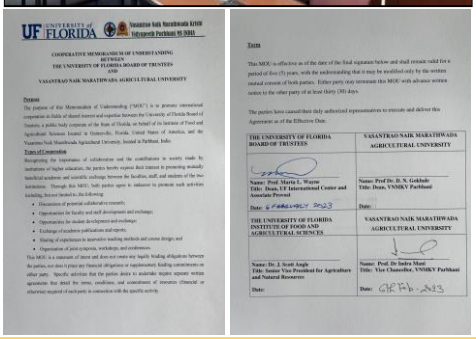
Regular Training of women Farmers *for applications of digital technologies in agriculture* *new business startups for women famers*	*Increase in knowledge about digital technologies and different ways to entrepreneurship* *Hands on solar dryer training*	 
Demonstration of Spraying drones *in Farmers field*	*For awareness of application of drones* *Farmers awareness for Sprayer Drone Applications* *Custom hiring services by Company collaboration* *Drone yatra Program*	

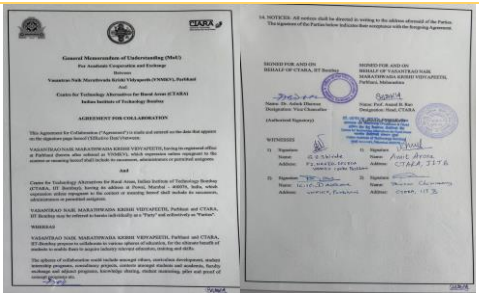
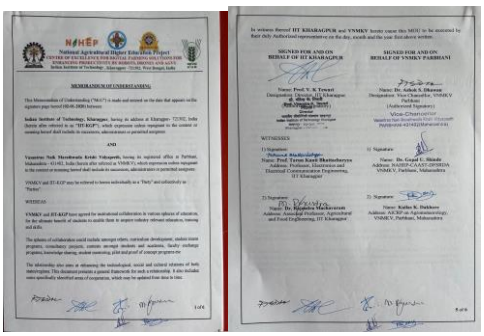
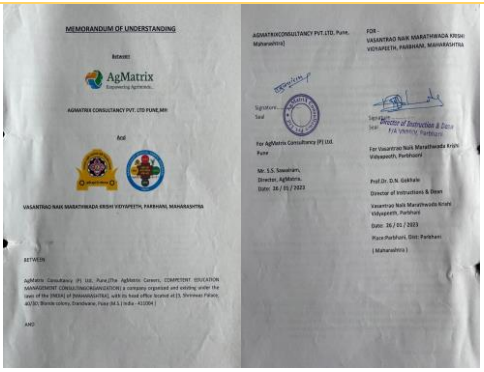
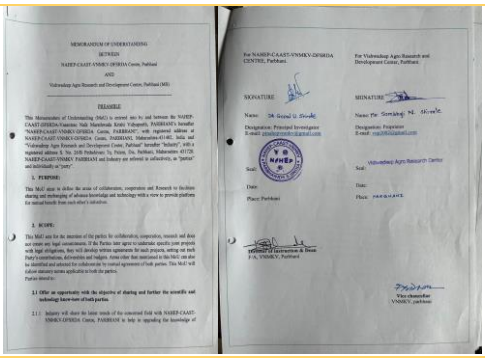
		
Demonstrations of Agricultural Drones *to Students*	*Agricultural Drones were exhibited to Researcher students of in-campus and off-campus students* *The awareness of Drone applications in agriculture for UG/PG/PhD students by taking their demonstration camp at NAHEP centre and field were conducted.* *The impact of this out of box activities is that they are selecting their research project.*	 
Placements activities Cell *programs with collaborated companies and foreign universities for further PG, PhD and Post Doc Courses* *Also, For job and internship assignments*	*Placements for Agriculture students at NAHEP-DFSRDA VNMKV Centre Parbhani*	

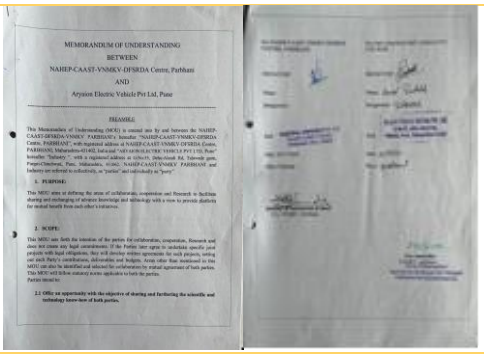
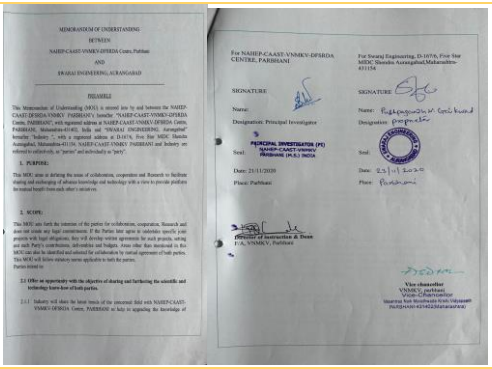
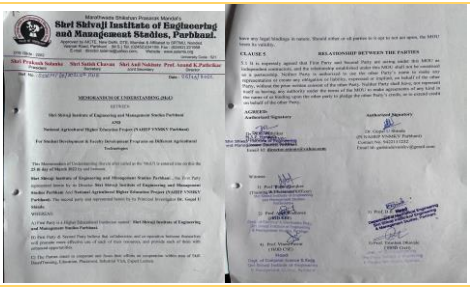
21 days hands-on training on Drone basics and Application of drone in Agriculture: Convener Dr. G.U. Shinde Dr. V. K. Ingle	Organized **21** days hands-on training on Drone basics and Application of drone in Agriculture from @**8**th Nov – 08 Dec 2023 TOTAL 40 students trained in this training.	
Erdase RS/GIS Software imagine Remote sensing data processing software	Geoinformatics lab established and Erdase imagine Remote sensing data processing software was purchased.	
AR/VR systems for Blended learning to Campus Students		
Conducted online hybrid mode webinar for the new entrepreneurs *(Dr. Dr. Bharat S. Agarkar Associate Professor College of Food Technology)*	**Participation of new entrepreneurs for Maharashtra**	 
Drone technology Demonstration *(Dr. V.K. Ingle)*	*20 Drone demonstrations Conducted to farmers for Spraying application support as a precision agricultural automation activity.* See the all-activities information in ANNEXURE –2.5 b)	

Collaborations with industry and other HEIs for bringing relevancy

1.4. The details on relevant collaboration with industry /international Universities

Collaborations	*Activity/achievement/purpose*	*Remarks/Photographs*
Kansas State University, USA	The two institutions agree to following general areas of interest and cooperation: 1. The exchange of scholars and scientists to conduct research of mutual interest. 2. The exchange of professors for lectures and short-term visits. 3. Invitation to scholars for participation in conference, symposia and instruction. Exchange of information, academicmaterials and publications in field of mutual interest.	 
University of Florida, USA	Through this MOU, both parties agreeto following points: 1. Discussion of potential collaborativeresearch 2. Opportunities for faculty and staff development and exchange 3. Opportunities for student development and exchange. 4. Exchange of academic publicationsand reports. 5. Sharing experience in innovative teaching methods and course design Organization of joint symposia,workshops and conference.	 
Washington State University, USA	For conducting the P.G. and Ph.D.Research work	*https://nahep.vnmkv.org.in/#*
Universität Politecnica de Valencia pain	Collaborative research work of PG and Ph.D. students.	*https://nahep.vnmkv.org.in/#*
Belarusian State University of Informatics and Radio electronics	For conducting the P.G. and Ph.D.Research work	*https://nahep.vnmkv.org.in/#*

Indian Institute of Technology Bombay (CTARA)	The following areas of cooperation have been identified under this agreement 1. Faculty development Programme 2. Student exchange program 3. Joint research projects 4. Coordinated graduate degree Programme 5. Joint academic activities and event	 *https://nahep.unmkv.org.in/#*
Indian Institute of Technology Kharagpur	Through this MOU, both parties agree to following points: 1. The researcher faculty members will work together and act as student advisory members in thematic research and extension programs 2. Under student internship exchange program, students of both parties can do their internship work. 3. Under the faculty exchange program both the parties will make their mutual concern for participating activities and its completion. Faculty members can work as a visiting faculty/adjunct faculty by mutual exchange as per departmental and institute norms.	 *https://nahep.unmkv.org.in/#*
AgMatrix Consultancy PVT. LTD Pune, MH NAHEP	The following points have been identified under this agreement 1. Providing/coordinating Academic/Technical and soft skills training services to the staff and students 2. Avail the infrastructure facilities toconduct seminar and workshops 3. Assisteach other in eventmanagement 4.Collaborate and supplement utilization of resource and facilities	
Vishwa deep Agro-Research and Development Center, Parbhani	The following areas of cooperation have been identified under this agreement - 1. Both parties will explore way to offer internship to students in industry 2. Industry will share the latest trends of concerned field with NAHEP to help in upgrade the knowledge of nahep staff, Core team members and PG/Ph.D. students.	

Aryaion Electric Vehicle Pvt. Ltd, Pune	The following areas of cooperation have been identified under this agreement – Industry will share the latest trends of the concerned field with NAHEP- CAAST-VNMKV-DFSRDA Centre, PARBHANI to help in upgrading the knowledge of NAHEP Staff, Core Team Faculty members and PG/Ph.D. students, in order to upgrade skills & improve employability.	
Swaraj Engineering, Aurangabad	The following areas of cooperation have been identified under this agreement 1. Both parties will explore way to offer internship to students in industry Industry will provide valuable inputs to NAHEP – CAAST – VNMKV - DFSRDA Centre, PARBHANI to enhance teaching methodology and suitably modified it to cater to the employability need of the students.	
Scape E recycler Pvt. Ltd	*For awareness and adapting Waste management system*	
Robo-Mac Green Robot Machinery Pvt.Ltd, Bangalore	For manufacturing of AGVs, and digital faming solutions	*https://nahep.vnmkv.org.in/#*
ASAP Agri-tech LLP, Nashik	For manufacturing of AGVs, and digital faming solutions	
Shri Shivaji Institute of Engineering and Management Studies, Parbhani	The following areas of cooperation have been identified under this agreement: 1.Industrial Training & Visits 2. Guest lectures 3.Placement of Trained students	
CSMSS college, Aurangabad	For conducting the P.G. and Ph.D. Research work	*https://nahep.vnmkv.org.in/#*
Groundzero Aerospace LLP	Both Groundzero Aerospace LLP and Vasantrao Naik Marathwada Krishi Vidyapeeth, PARBHANI signed MOU for formation of a Remote Pilot Training Organization and Train the Pilots for RPAS under the Name of VMKV and GZA as the training partner.	

2. Achievements made through CAAST under NAHEP

2.1. Output-outcome monitoring

S. N.	Particulars	Apr'2018 to Dec'2023	
		Target	Achievement
1.	% increase in number of technologies commercialized	15	25
2.	% increase in faculty research effectiveness	30	60
3.	Number of direct beneficiaries of the project	8000	12143
4.	Number of female beneficiaries	4000	6000
5.	% increase in JRF / SRF / ARS	12	15
6.	% increase in number of students who were admitted in foreign universities	10	5
7.	% increase in PG student placements	10	20
8.	Number of industry- sponsored projects and positions in cutting-e VNdge areas of agri-science	33	25
9.	Number of faculty training programmes (national) undertaken by AU	21	40
10.	Number of faculty training programmes (international) undertaken by AU	21	25
11.	Number of student training programmes (national) undertaken by AU	15	40
12.	Number of student training programmes (international) undertaken by AU	21	55

Observation

The centre of excellence for Digital Farming Solutions (DFS) for productivity enhancement by Robot, Drone and AGV applications is one of national policy agenda for which this centre has become a prestigious model to study and implement the digital agriculture with different automation system

1. There is an increase in research effectiveness and up skill of digital technologies related to use of Drones, Bots and AGV's in agriculture among PG Students and faculties up to 30% more than targeted by AU.
2. More than 25% Students and faculties showing interest in taking their research experiments in digital technology applications which were traditionally being practiced for their precision outcome and high impact research publications. They are also exposed to participate or secure a job in various industries.
3. More than twelve Agri-Entrepreneurs natured through the NAHEP-CAAST-DFSRDA-VNMKV sub-project.
4. The benefit of engaging researcher students and faculties through online and offline program such as webinar, seminar, conferences, workshops, quiz and competitions in digital technologies such as Agri-Bot, Agri-Drone, Agri-AGVs, Smart portable machinery, Smart technologies in Agriculture. 43 trainings for students and researcher faculties and their proceedings of.
5. There is an 15% increase in the number of students qualifying JRF / SRF / ARS / NET/GATE & other competitive exams till 2023 Because of agricultural research scientist ASRB New Delhi, VNMKV rank is improved.
6. In last five years (2019 to 2023-24) a total of 05 students of VNMKV Parbhani are admitted in foreign universities.
7. In VNMKV Parbhani, 20-30% increase in placements of PG students during the DFSRDA project by collaboration with industries.
8. During the project DFSRDA-VNMKV-Parbhani, overall achievements and ranking has been increased in each and every targeted activity completion is more than targeted at stating of project.

2.2. Knowledge Management Collaterals

I. Knowledge Collaterals	Apr'2018 to Dec'2023
1. Publications	210
2. Research Articles	50
3. Annual Reports	04
4. Books/Book Chapters	20/30
5. Success Stories	6
6. Newsletter	01
7. Magazines	01
8. Blogs	03
<Please provide the details of the Knowledge Management Collaterals with detailed list of authors, title, publication period, URL links etc., in Annexure>	

II. Mobile and Web Applications	Apr'2018 to Dec'2023
1. Mobile Applications Developed	12
2. Web Applications Developed	02
<Please provide the details of the applications (along with URL links) with List of documents, authors, publication period in Annexure>	

III. Number of IPR (Intellectual Property Rights) Registered/Obtained	Apr'2018 to Dec'2023
1. Copyrights	01
2. Patents	_
3. Others	01
<Please provide the details of the Knowledge Management Collaterals with List of documents, authors, publication period in Annexure>	

IV. Dissemination and Outreach	Apr'2018 to Dec'2023
1. No. of Posts on social media	More than 300
2. No. of Posts on Newspaper	More than 300
3. No. of Posts on Magazines	More than 30
4. No. of Unique Promotional or Outreach Collaterals	
<Please provide the details of the Knowledge Management Collaterals with List of documents, authors, publication period in Annexure->	

2.3. Capacity building programs to improve the research effectiveness Knowledge Management Collaterals

1. International trainings for students and faculties

Subject areas (please check in annexture)	*Host institutes, period of training*	*Output of the training*
Students (Nos.)		
26	1. Asian Institute of Technology, Thailand	*Short training and short visits were benefited to all students for* *1. Publication of High NAAS rating papers,* *2. Selection of Experimental task during their project* *3. Publications of Book and Book chapters* *4. Getting foreign fellowship during research period* *5. Further education communication* *6. Paper presented and published in international conferences with high impact publishers like Elsevier, Nature, Springer.* *7. Human resource development,* *8. exploration of interdisciplinary research work.* *9. International research group network became strong*
4	2. Universitat Politènica de València, Spain	
5	3. University of Debrecen, Hungary	
1	4. Belgium	
5	5. University of Campinas, Brazil	
13	6. Universiti Putra Malaysia (UPM)	
1	7. Western Sydney University, Australia	
Total: 55	**Total Countries 07 ;** *The details of their training completion report with photographs are attached herewith in Appendix*	
Faculty (in Nos.)		
1	Kansas State University, Kansas, USA	*Short training and short visits were benefited to all Faculty members for* *1. Publication of High NAAS rating papers,* *2. Selection of Experimental task during their student's project* *3. Publications of Book and Book chapters.* *4. Getting foreign fellowship during research period* *5. Further education communication* *6. Paper presented and published in international conferences with high impact publishers like Elsevier, Nature, Springer.* *7. Human resource development,* *8. exploration of interdisciplinary research work.* *9. International research group network became strong for student and faculty researcher chain* *10. Mutual Visiting Faculty membership and collaborative partners.*
2	University of Florida, USA	
1	Asian Institute of Technology, Thailand	
5	Western Sydney University, Australia	
10	University of Putra, Malaysia	
1	Polytechnic University of Valencia, Spain	
3	University of Campinas, Brazil	
2	University of Debrecen, Hungary	
<Please check the list of beneficiaries along with training details in Annexure->		

2. National trainings for students and faculties

(*The list of trainings of for* students and faculties with their details are mentioned *in Annexure*)

Subject areas	*Period of training, total beneficiaries*	*Output of the training*
Students : ***Digital Technology Applications in Precision Agriculture*** ***List of Students and their training details are enclosed here with in Annexure-***	***One*** *Days to* ***21 Days*** *Total Beneficiaries:*	1. *Research experiment selection* 2. *Research publications* 3. *Future courses and studies selections in foreign universities* 4. *Book chapter publications*
Faculty: ***Digital Technology Applications in Precision Agriculture*** ***List of Students and their training details are enclosed here with in Annexure-***	***One*** *Days to* ***21 Days*** *Total Beneficiaries:*	1. *Research experiment selection for future students and department* 2. *Research publications* 3. *Future courses and studies selections in collaboration with foreign Faculty experts* 4. *Book/Book chapter publications*
<Please check the list of trainings in Annexure>		

2.4. Input and activity monitoring

	Capital	Revenue
Total funds sanctioned during 2018-2023 by PIU (INR Lakhs)	**544.33**	**1243.42**
Total funds received till December 31, 2023 (Cumulative) (INR Lakhs)	**544.33**	**1243.42**
Total expenditure up to December 31, 2023 (INR Lakhs)	**544.33**	**1201.84**

Input / Activity indicator	Sub- head / category	Apr'2018 to Dec'2023 Expenditure / input in INR lakhs		Activity elaboration
		Utilization	Planned	
Goods and equipment	Equipment, Plant & Machinery	**219.42**	**219.42**	**All these activities done as per DPR of this project as establishment of Agri-Drones, bots, AGV's lab and other objective activities mentioned in Annexure below.**
	Office equipment	**8.2**	**8.2**	
	Laboratory equipment	**176.9**	**176.9**	
	Furniture & fixtures	**16.64**	**16.64**	
	Computers and Peripherals	**19.17**	**19.17**	
	Books and Journals	**16.6**	**16.6**	
Civil works	Minor repair and renovation work	**87.4**	**87.4**	
Human capacity building	National level training			
	International level training	**62.4**	**62.4**	
	Short visit/ seminars	**12.48**	**12.48**	
	Meetings and workshops	**8.73**	**8.73**	
Consultancy	National level consultancies	**87.39**	**87.39**	
Recurrent cost / Miscellaneous	Travel	**12.46**	**12.46**	
	Contractual services	**222.30**	**222.30**	
	Operational costs	**745.09**	**786.66**	
	Institutional charges	**51.00**	**51.00**	
Total		**1746.17**	**1787.75**	

Sr. N.	Project Objectives	Activities		Outcome
		Target	Achievement	
1	To establish an advanced basic engineering hardware and software setup such as Mechatronics, CAD/CAM/CAE, 3D Printer and Instrumentation Laboratories for Agri-bots, Agri-drones and Agri-AGVs.	Establishment of Mechatronics, CAD/CAM/CAE, 3D Printers and Instrumentation Laboratories for Agri bots, Agri-drones and Agri-AGVs.	Established all Laboratories with additional AR-VR, Agri-Diksha, Hydraulic Pneumatic Lab, mobile seed processing unit	Completed with further advancement activities Such as Sensor Lab, Agri-Diksha, Smart classroom, SPM Workshop, FPA Lab etc. Beneficiaries: 1448
2	To strengthen the present PG and Ph.D courses in all disciplines by offering three elective course work such as Robotics , Drones, AGVs Certificate courses and digital technologies,	42 Elective courses	48 Elective courses in PG/Ph.D. syllabus	Improved research activity of PG/Ph.D students and Faculty. Beneficiaries: 297
3	To develop case studies / Projects of Agri-bots, Agri-drones, Agri-AGVs applications in agriculture.	Inclusion of digital agriculture technology practices in PG/Ph.D. student and faculty research work.	50 student research work completed and 25 student research work ongoing	26 student completed international training. Still plan to end 25 Students for international training.
4	To enhance the skills of faculty and PG student of VNMKV by academic and thematic research.	**50** National/ International/Webinars/ Trainings/ Workshop/ Quiz competitions	**52** National/ International/Webinars/ Trainings/ Workshop/ Quiz competitions.	• 26 Student completed international trainings • 11338 total no. of beneficiaries in National/ International/Webinars/ Trainings/ Workshop/ Quiz competitions. • 02 faculty members completed international trainings. • (03) faculty members (09) Staff send to hands on trainings at IITs, Foreign Institutes and Universities.
5	To establish University and Industry interface for students and faculty at national and international level.	• MOU between 4 International universities • MOU between 2 IIT's • MOU between 1 Institute MOU between 12 Industries	28 Completed total MOU's	Students and faculty members send to hands on trainings at IITs, Foreign Institutes and Universities • During hands on training, technology collaboration, research experimentation and exchange of technology between National & International Institute/ University/ Industries was conducted to continue the interface for researcher students and faculty members

Observation

1. Ten Mobile Applications & one Portal developed
2. Total beneficiaries (% Female/SC/ST): **12,143** (45%, 27% & 28%)
3. Number of technologies developed: 21
4. Increase in H-Index (faculty effectiveness): 46.00% (2023-24)
5. Increase in PG placement rate: 2 % (A total of 1012 students got placement till 2023-24)
6. Increase in number of scientific entrepreneurship established/developed: 12 (till 2023-24)
7. Number of external funded project implemented after NAHEP intervention: 95(till 2023-24)
8. Number of technologies transferred to industry/other institutions: 26 (till 2023-24)
9. Increased rank of AU/institution in ICAR/NIRF/QS ranking: 42nd (2020-2021) to 31st (2021-22) ICAR Rank
10. A total of 164 Students secured SHODH Award for pursuing Ph.D. degree programme (Scheme-Developing-High-Quality-Research)
11. Generated internal revenue through NAHEP interventions: Rs. 30.52 Lakhs (till 2023)

Three existing units of CAAST bestowed with ISO certifications namely Quality Management System ISO 9001:2015 & Safety Management System ISO 22000:2018 related PHT, seed Processing Units and Scientific Utilization of agricultural Products.

2.5. NAHEP outreach and other unique initiatives undertaken

a) Case studies/success stories developed under NAHEP

(establishment of own enterprise by beneficiary student/high-impact research carried-out by AU under NAHEP/enhanced students learning outcomes due to establishment of modern facilities under NAHEP etc.)

1. **CBROZ**
2. **Vishwadeep Krishi Udyog- Pethshivni Tq. Palam Dist. Parbhani**
3. **Vishakarma AgroIndustries Singnapur, Tq. Dist. Parbhani.**
4. **Durbeen design work Pvt.Ltd**
5. **Solar Dryer -SunVeg by Energy Guru**
6. **Proven Pvt. Ltd**

1. CBROZ:

CBROZ Innovations Private Limited made a 3d food extruder machine (Chakali making machine) with the collaboration of NAHEP-VNMKV Parbhani and NAHEP-VNMKV-Parbhani took different hands-on trainings on 3D food extruder for women, students and farmer and make them entrepreneur.

Output: CBROZ create entrepreneurship to women and for its own by selling these machines.

Impact: 5 lakhs to 6lakhs yearly turnover of CBROZ through NAHEP-VNMKV-Parbhani.

2. Vishwadeep Krishi Udyog- Pethshivni Tq. Palam Dist. Parbhani:

The following listed agricultural implements, tools and equipments have been produced and sold in mutual coordination with VNMKV faculty experts. The Vishwadeep Krishi Udyog started in at pethshivni village The solar operated agricultural implements such as weeder (07), Sprayers (21), Augers (05) 5Hp-small tractors (25 orders), chaff cutters cum grinders (50), Cotton pickers (10 orders),
Tractor- tailed smart implements and bullock operated implements (3900).

Mr. Sambhaji Shirale enhance in their entrepreneurship as Vishwdeep Udyog from 2019 with the technical help and Collaboration with NAHEP-VNMKV-Parbhani for making around 28 digital farm equipment. NAHEP-VNMKV-Parbhani took Farmer trainings related this equipment.
Output: Around 3000 to 3500 farmer purchased this equipment.
Impact: Vishwadeep Udyog having 40lakhs turnover per year.

3. Vishakarma AgroIndustries Singnapur, Tq. Dist. Parbhani:





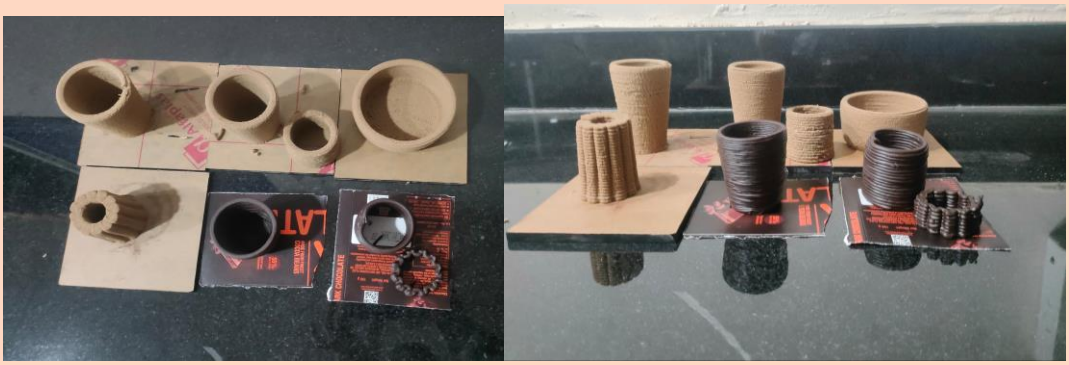

The Vishwakarma agro engineering started since 1984 at village Singnapur, Dist. Parbhani. The rural craftman kalsaitkar brothers struggled to develop this workshop and developed a small industry by procuring a scrap from State transport corporation for manufacturing an agricultural equipment.

At 2019 their annual sales of seedcum Fertihoe is 200, seed drill cum plough is 200 to 300, small accessories of agricultural implements are 500.Turmeric processing equipment such as cooker 10 units /year, turmeric drum polisher 5 and annual turnover is around 30lakhs.Vishwakarma Argo engineering enhances their entrepreneurship with collaboration with NAHEP-VNMKV-Parbhani from 2019 to till now. They developed their farm equipment.

Output: This company gives training to the students and modified their product with the guidance of the expert of NAHEP-VNMKV-Parbhani and yearly they sell up to 500 equipment.

Impact: After the selling of these model's company improves their revenue. And 60Lakhs-70 Lakhs yearly turnover.

4. **Durbin Pvt.Ltd:**



Durbin enhance in their marketing of 3d-food printer by giving trainings to NAHEP-VNMKV-Parbhani students and by doing changes in their product as per suggestions of the NAHEP-VNMKV-Parbhani experts.

Output: This company gives training to the students and modified their product with the guidance of the expert of NAHEP-VNMKV-Parbhani.

Impact: After the selling of these model's company improves their revenue.

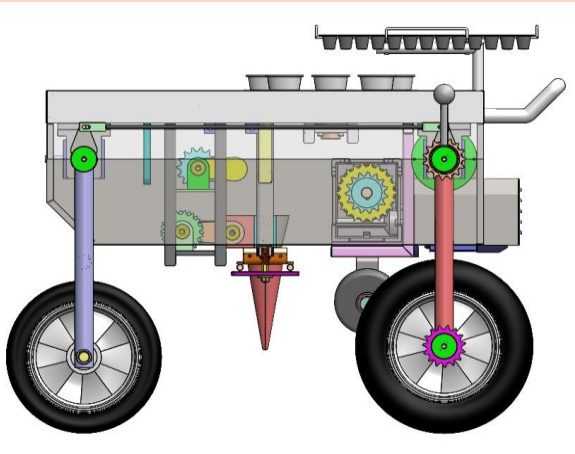
5. SunVeg:

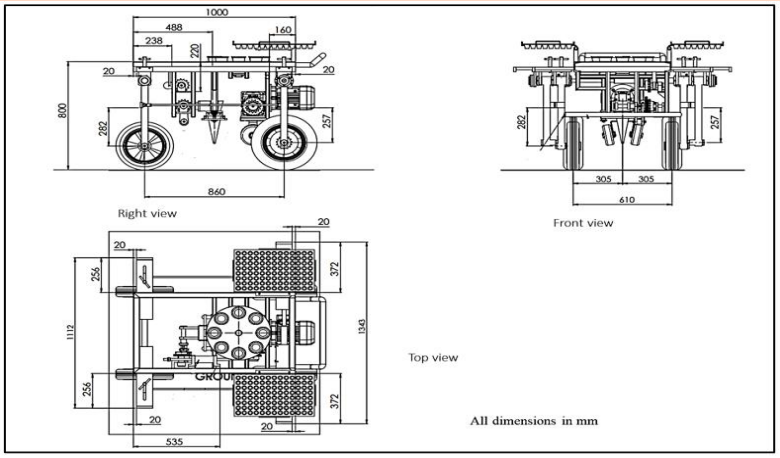
SunVeg enhance in their marketing of Solar dryer by giving trainings to NAHEP-VNMKV-Parbhani students and ATMA women and by doing changes in their product as per suggestions of the NAHEP-VNMKV-Parbhani experts.

Output: This company gives training to the students and modified their product with the guidance of the expert of NAHEP-VNMKV-Parbhani.

Impact: After the selling of these model's company improves their revenue.

6. Proven:(Vegetable Transplanter)





Automatic Vegetable Transplanter Student research project (Success story)

Table1. Technical Specifications:

Sr.No.	Parameter	Value
1.	Power source	: AC current
2.	Number of rows	: One
3.	Method of transplnting	: Transplanting on flat bed
4.	Type of feeding	: Feeding tray
5.	Plant-to-plant spacing	: 450 mm
6.	Number of operator	: One
7.	Overall length	: 1000 mm
8.	Overall width	: 1343 mm
9.	Overall height	: 800 mm
10.	Overall weight	: 60 kg

Features:

1. Automatic furrow opening, seedling placement, and soil surface covering in a single pass.
2. Potential to reduce labor dependency.
3. Minimal maintenance requirements.
4. Light weight and easily transportable by wheel.
5. Suitable for operation in medium- to heavy-soil conditions.
6. Uniformity in crop pattern with perfect placement of plant with automatic transplanting operation
7. User-friendly and comfortable for operator
8. Cost of operation can be affordable for small and marginal farmers.

The grafted plants produced by robots are transplanted to field for its yield performance and genetic observations by using vegetable transplanter useful to farmers. The developed technology will be exercised for different grafted plants and its transplantation automation by researcher students, faculty and further to farmers and new startups in agribusiness. The developed technology or recommendations
are the new attractions to youth farmers who are taking keen interest and initiative in digital farming application. This developed machine can transplant 1000 plants /hr and robust design to sustain in any type of soil field for vegetable and medicinal plant transplantation. The developed Agri-AGV machine is economically viable and can work on photovoltaic /electric energy or fuel engine system.

Output: This company helps the students to make automatic Vegetable transplanter and cotton-picking machine with the guidance of the expert of NAHEP-VNMKV-Parbhani.

Impact: After the selling of these model's company improves their revenue.

b) Knowledge management and outreach initiatives (development of collaterals, newsletter, social media outreach activities, creation of website, experiential learning workshop, exposure visits
(provide the details of the documents/articles/reports/modules/social media outreach/ website creation/experiential learning workshop/exposure visits etc. developed under NAHEP along with the suitable photograph of the cover-page and web-link (if available) – brief summary, cover page,

Sr.No	Category of the collateral	Brief summary	Snapshot/cover page	Weblink (if any)

<Annexture 2.5 b): The list exposure visits made under NAHEP along with the suitable Photograph>

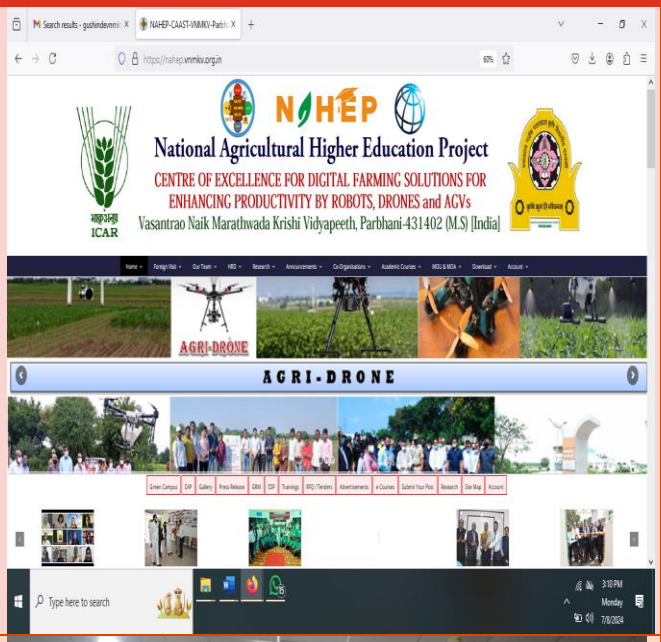
c) Unique initiatives undertaken

1. Digital infrastructure
(development of digital/smart classroom, virtual reality facility, digital library system, other digital education and administrative infrastructure, Agri Diksha, AMS implementation etc.)
Virtual Reality Facility: The NAHEP-DFSRDA-VNMKV-Parbhani has received 6 AR/VR kits. The hands on training on AR/VR kits are going on in VNMKV Parbhani.

Agri-Diksha and Virtual Classroom: A virtual class has been setup DFSRDA-VNMKV-Parbhani funded by ICAR. The classroom has seating capacity of 40 students. The virtual Classroom has been connected with high fiber optic connectivity with LAN and Wi-Fi connectivity.

Smart Classroom: Three Smart classroom equipped with LED, interactive board, and plugs for the individual students on the benches for computers.

2. Digital initiatives:
(Organizing trainings through online, conducting online examinations, administering attendance, developing of web applications, e-learning modules etc.

Sr.No.	Category of the collateral	Digital initiative	Practice before introduction of the initiative	Practice after introduction of the initiative
1	NAHEP web portal	The web-por developed by Agricultural engineering alumina students of t campus and started a business of Web content developmen		https://nahep.vnmkv.org.in After successful trai ning student Mr Shreyas Khakal graduate students of campus developed website and started business of website and software development.
2	e-learning platform (digital classroom)	At NAHEP - VNMKV Parbhani four digital Classroom with		e-Learning platform facilitates the different learning program by inspiration of Hon. DDG Education Dr R. C. Agrawal ICAR New Delhi to learn advanced digital courses and hands-on practicing at DFSRDA VNMKV Centre Parbhani

3. Potential impact of the intervention:

S. N.	Particulars	Apr'2018 to Dec'2023	
		Target	Achievement
1.	% increase in number of technologies commercialized	15	25
2.	% increase in faculty research effectiveness	30	60
3.	Number of direct beneficiaries of the project in Thousand	8	12.143
4.	Number of female beneficiaries in Thousand	4	6
5.	% increase in JRF / SRF / ARS	12	15
6.	% increase in number of students who were admitted in foreign universities	10	5
7.	% increase in PG student placements	10	20
8.	Number of industry- sponsored projects and positions in cutting-e VNdge areas of agri-science	33	25
9.	Number of faculty training programmes (national) undertaken by AU	21	40
10.	Number of faculty training programmes (international) undertaken by AU	21	25

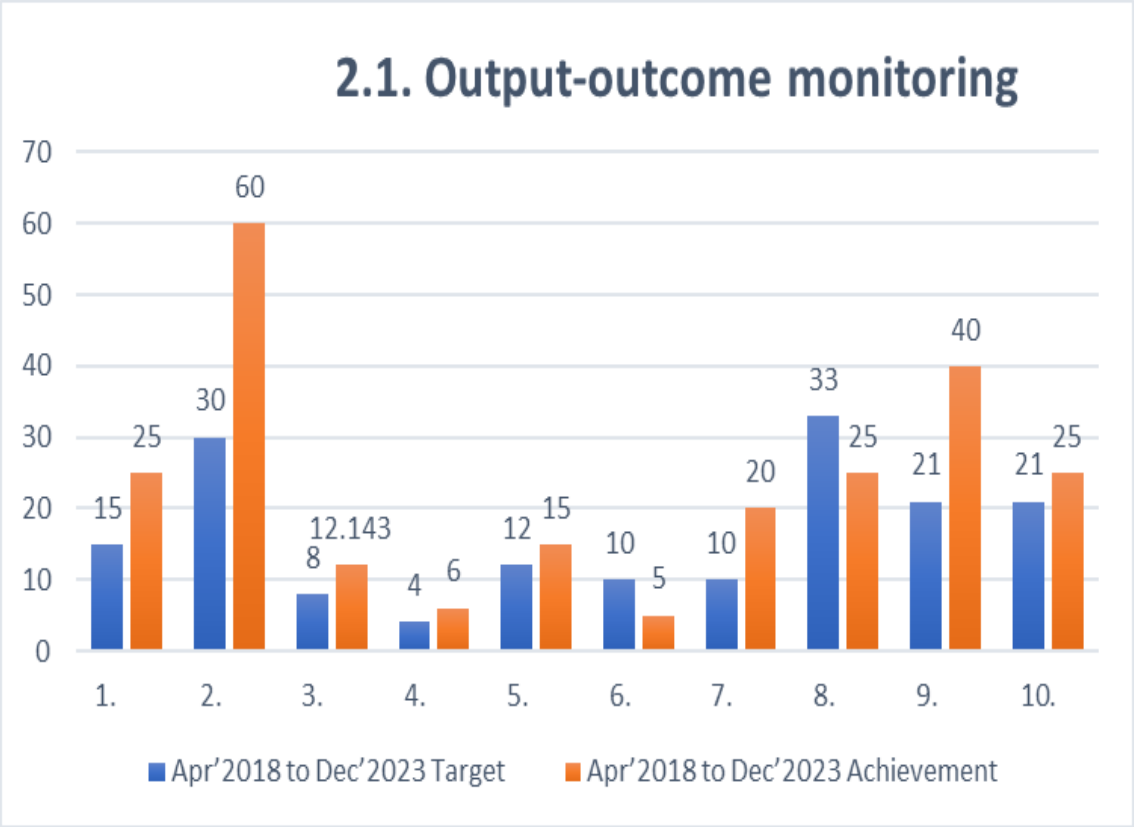


Chart: Observations from 2.1. Output-outcome monitoring

4. Challenges faced and lessons learned while implementing the project at AU:

Challenges	
1	Faced technical issue with vendors material supply due to lock down restrictions.
2	As the Students are not allowed in the campus and restrictions in the travelling Human Capacity building activities and extension activities are restricted but we are trying to complete the activities through virtual platforms.
3	Managing all procurement activities within time deadlines.
4	Documentation of each and every activity.
5	Interdisciplinary technologies training arrangements national and international.
6	Marketing of revenue generation by trainings and certified course.
7	Maintenance of all infrastructure, instruments and labs after trainings and accessed by researchers
Lessons learned	
1	How to do all procurements in time deadline with objectives.
2	Done all documentation in particular format for each and every activity.
3	How to plan Interdisciplinary technologies training arrangements national and international.
4	Well planned Marketing of revenue generation by trainings and certified course.
5	Proper Maintenance of Labs by log entries

5. Sustainability Plan

5.1. Sustainability plan of the AU

- *Does the AU have any sustainability plan for the interventions undertaken in NAHEP? (Yes / No)?* __**Yes**

If yes, details thereof?

Sr. No.	**Sustainable resources and facilities with regular services plan**
1.	Scheduled Hands-On-Training at NAHEP-DFSRDA-VNMKV centre will continue to run with every yearly Calendar for researcher students, faculty, farmers and entrepreneurs in digital agriculture (with fees structure range From Rs 3000/- to 30000/-) Training areas: Drone Basics and Applications of Drone in Agriculture; Mechatronics in Precision Agriculture; CAD/CAM/CAE in Precision Agriculture, Agri-Bots, Agri-AGVs etc.
2.	RPTO centre for Remote Pilot Certificate by DGCA (RPC Fees up to Rs.40,000.00)
3.	Custom hiring centre for Spraying Drone, Grafting Robot, AGV's services to farmers. (on Hr basis or Acre land basis)
4.	Professional Certificate Course on "Drones, Robots and AGV's in Agriculture" **6months course**
5.	90MT Capacity -Smart Onion Storage services for Farmers, researchers, and students on rental tariff
6.	2Ton cold storage for

Annexture of Sustainability Plan:

New pilot courses added/ upgraded

Sr No.	**Course**	**Duration In Days**	**Intake**
1	Professional Certificate Course on "Drones, Robots and AGV's in Agriculture"	**180**	**40**
2	Drone Basics and Applications of Drone in Agriculture	**21**	**40**
3	Mechatronics in Precision Agriculture	**15**	**40**
4	CAD/CAM/CAE in Precision Agriculture	**21**	**40**

Scheduled Hands-On-Training at NAHEP-DFSRDA-VNMKV DFSRDA: Centre of Excellence of Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs

•

Course No.	Scheduled Training name/ 3 Batch size (40) Scheduled from 1 Aug to 30 Dec, 2023	Duration (In Weeks/ Vacancy)
DFSRDA-1	Basics of Drones and Applications of drones in agriculture with Hands on Micro category drone flying training	TWO
DFSRDA-2	IoT based Agricultural Application	Two
DFSRDA-3	Agri-Bot Hardware & Software	Three
DFSRDA-4	Remote Sensing, GIS Basics	Two
DFSRDA-5	CDKS	Two
DFSRDA-6	Agriculture Sensors AWS, Soil sensor and NPK	Two
DFSRDA-7	Smart Polyhouse & SMART FARMING	Three
DFSRDA-8	Vertical gardening, hydroponics & aeroponics	Two
DFSRDA-9	Advanced Digital Technologies in Food Processing	Two
DFSRDA-10	CAD/ CAM solid works	Four
DFSRDA-11	Automation in precision agriculture	Two
DFSRDA-12	Solidworks practices on model creation and simulation	Two
DFSRDA-13	Python Programming in Agriculture Automation	Three
DFSRDA-14	MATLAB	Two
DFSRDA-15	ANSYS	Three
DFSRDA-16	Farm vehicle automation and Robotics	Two
DFSRDA-17	Agriculture & Industrial Automation	Four
DFSRDA-18	AI-ML	Four
DFSRDA-19	Innovative Applications of Renewable Energy Technologies for Agricultural	Four
DFSRDA-20	Smart Sensor for Precision Agriculture	One
DFSRDA-21	Advanced Vegetable Robotic grafting technology	Two

5.2. Sustainability plan for improving internal revenue generation through facilities and infrastructure created under the project

1.	Agri-drones Division: Agri-Drones Lab- 20 Nos of drones, 5-Spraying Drones, Simulator Lab, Mechatronics Lab.
2.	RPTO centre (Process in progress): Small and medium Category RPTO centre
3.	Agri-Bot Division: Grafting Robots-2, Healing chamber, Jackle and Hasky robots, CMM, 3D-Scanner, CAD/CAE Lab, 3D Printer.
4.	Agri-AGV's: Cold storage Van, Cold Storage, Cotton picking Machine, Vegetable transplanter, Tractor, Scissor Lift.
5.	New facilities:
6.	Automated Solar Drying system
7.	Mobile Seed cleaning, grading, sorting and packaging system
8.	Digital Onion Storage Silo System
9.	Smart Hydroponic System
10.	IoT Based Smart Irrigation system
11.	AI based Agri-bot pest detection system
12.	Smart vegetable transplanting system
13.	3-D Food Printing Mechanism
14.	Digital Media Centre
15.	Hands on Digital Technology Development for agriculture by Tools and kits in Laboratory

5.3. Name of Vice Chancellors(s) during project duration and contributions each PI, Co-PI and team along with their photographs

Sr. No.	Core Team Members	Gender	Designation in AU and contact details (email, mobile)	Role in project (PI/Co-PI/RA/SRF etc.)	Major contribution/output
1.	Dr. A. S. Dhawan	Male	Vice Chancellor (2019-May 2022) vcvnmkv@gmail.com	Head of University Level Decisions	• According necessary approvals, Monitoring and facilitating smooth implementation of NAHEP CAAST project activities and • Overall administration and control of NAHEP, CAAST, VNMKV Project for plan, approvals with participation as Head at University and National /International Level. • Dr Indra Mani visited USA Universities for MoU and Future collaborative activities plan with KSU, UFL, WSU, Nebraska USA Universities
2.	Dr. Indra Mani	Male	Vice Chancellor (25th July 2022.to till Date vcvnmkv@gmail.com	Head of University Level Decisions	
3.	Dr. G. U. Shinde	Male	Associate Professor Dept. of Farm Machinery and Power Engineering CAET VNMKV Parbhani gushindevnmkv@gmail.com pivnmkv@gmail.com	Principal Investigator (PI)	• Project execution, Overall administration and control of NAHEP, CAAST, VNMKV Project with participation. • Supervising and facilitating smooth execution of NAHEP CAAST project activities • Guidance for product development and waste utilization. • Attended international training at UFL-USA for 3Months under J-1 Visa
4.	Dr. D. N. Gokhale	Male	Director of Instructions and Dean VNMKV Parbhani	University level coordination and project activities execution	• Overall University level NAHEP-CAAST Project activities execution as a Education Head of University, • Overall activities and events' s execution decisions.
5.	Dr. U.M Khodke	Male	Associate Dean and DI, Principle CAET Parbhani and Director of Instructions and Dean(F/A) VNMKV Parbhani	• Procurement Chairman (Capital) • **CO-PI**(CDKS) • Director of Instructions and Dean(F/A) VNMKV Parbhani	• Worked as a Co-PI(CDKS), • Procurement Chairman of Fixed items activities controlling officer. • Overall Technical guidance for procurement plan and execution as senior most faculty and • Overall University level NAHEP-CAAST Project activities execution as a Education Head of University, • Overall activities and events' s execution decisions

6.	Dr. D.R. Kadam	Male	Associate Professor Entomology and Registrar of VNMKV PARBHANI	•Core Team Member •Procurement Chairman (Operational Cost)	• Procurement Chairman of Fixed and STEP-Bank activities controlling officer. • Overall Technical guidance for procurement plan and execution as senior most faculty and • Overall University level NAHEP-CAAST Project activities execution as a Head of Administration of University as a Registrar for administrative policy decisions. • Overall activities and events' s execution decisions
7.	Dr. R.P. Kadam	Male	Nodal Officer and Professor of Extension Education Department	Nodal Officer Procurement officer **Co-PI**(SSPN)	• Worked as a Co-PI (SSPN), • Digital Extension activities from project objectives and Nursery automation • Procurement Officer of Capital items and STEP-Bank activities controlling officer. • Overall University level NAHEP-CAAST Project activities execution as a Education Head of University. • Attended international Visits at UPM Maleshiya
8.	Dr. K. K. Dakhore.	Male	Core team Member and Co-PI-CDKS portfolio	Core Team Member **Co-PI**: Climate-based Decision Knowledge Support Centre (CDKS)	• Worked as a Co-PI (CDKS), • Procurement activities related to CDKS portfolio. • Overall University level NAHEP-CAAST Project activities execution as a Education Head of University, • All activities related to Climate-based Decision Knowledge Support Centre. • DSS, RS/GIS Climate based farmer's support digital tools development • Co-ordination with IIT-Knowledge Partners. • Attended international training at UFL-USA for 3Months under J-1 Visa
9.	Dr. D. D. Tekale.	Male	Professor Dept. of Farm Machinery and Power Engineering CAET VNMKV Parbhani	**Co PI**: Smart Portable Machinery (SPM) Centre Finance secretory, NAHEP-DFSRDA VNMKV PARBHANI	•Worked as a Co-PI (SPM), •Procurement activities related to SPM portfolio. •Smart Farm Machinery Design and Development •Overall University level NAHEP-CAAST Project activities execution as a Finance secretory of Project •Developed Cotton Picker Machine and guidance to researcher students. •Conducted trainings and student's research experimental activities at national and international level

10.	Er. S. N. Pawar	Male	Assistant Professor (Agril-Engg) SWCE Deptt	**Co-PI:** Smart Portable Machinery (SPM)	•Worked as a Co-PI (SPM), •Procurement activities related to SPM portfolio. •Development of smart irrigation system in digital farm development activities •Conducted online/offline trainings and workshop •Attended international Visits at UPM Maleshiya
11.	Dr. G. S. Pawar	Female	Associate Professor Plant Physiology CoA VNMKV Parbhani	**Co-PI:** Seedling and Seed Processing Nursery Centre (SSPN)	• Worked as a Co-PI (SSPN), • Procurement activities related to SSPN portfolio. • Seedling and seed Processing automation activities • Developed Mobile Seed Processing Automation Unit for Farmer's Services • Developed Healing chamber for grafted plant growth and Plant biotic abiotic stress management. • Conducted trainings and student's research experimental activities at national and international level • Attended international Visits at Western Sydney University, Australia
12.	Dr. B. S. Agarkar	Male	Associate Professor Department of Food Engineering College of Food Technology, VNMKV, Parbhani	**Co-PI**: Food Processing Nursery Automation Centre (FPA)	• Worked as a Co-PI (FPA), • Procurement activities related to FPA portfolio. • Food Processing Automation activities • Developed Solar Food Dryer and 3-D Food Printers Unit for Researcher students and Farmer's Services • Overall University level NAHEP-CAAST Project activities execution •Attended international Visits at University of Debrecen, Hungary

13.	Er. D. V. Patil	Male	Assistant Professor Department of Farm Machinery and Power Engineering CAET VNMKV Parbhani	**Division Head (DH)** Agri-Bots Division	•Worked as a Division Head for Agri-Bot Division •Worked as Procurement secretary for project capital and operational cost. •Worked in Smart Farm Machinery Design and Development. •Worked as a Placement officer of NAHEP-CAAST Project contractual staff employee recruitment activities. •Developed Cotton Picker Machine and guidance to researcher students. •Conducted trainings and student's research experimental activities at national and international level •Attended international Visits at Kansas State University USA
14.	Dr. Vishal Keshavrao Ingle	Male	Assistant Professor Department of Irrigation and Drainage Engineering, College of Agricultural Engineering, V.N.M.K.V., Parbhani, 431 402 Mob.09900931214	**Division Head (DH)** Agri-Drone Division	•Worked as a Division Head for Agri-Drone Division •Worked as Procurement member for Drone division associated project activities under capital and operational cost. •Worked as a Placement officer of NAHEP-CAAST Project contractual staff employee recruitment activities. •Developed Drone design and Development •Conducted trainings and student's research experimental activities at national and international level •Attended international Visits at UPM Maleshiya
15.	Dr. R. V. Shinde	Male	Associate Professor BSCT College of Agricultural Engineering, V.N.M.K.V., Parbhani, 431 402	**Division Head (DH)** Agri-AGV Division	•Worked as a Division Head for Agri-AGV Division •Worked as Procurement member for AGV division associated project activities under capital and operational cost. •Developed sensors laboratory and Automated Farm Machinery automation system and IoT tools in precision agriculture. • Conducted trainings and student's research experimental activities at national and international level •Attended international training at UPV-Spain for Agri-Bots and Agri-AGV research activity

16.	Dr. B.V. Asewar	Male	Professor and Head, Department of Agronomy, VNMKV, Parbhani-431402, Maharashtra, INDIA. Email: asewarbv2007@gmail.com, hodagro@mkv.ac.in Tel.(O) 02452-222687	Core Team member and **Nodal officer**, EAP	•Worked as a Nodal Officer (Equity Action Plan) ESP •Executed Equity Action Plan Activities as per approved Plan from PIU NAHEP Delhi •Conducted trainings and experimental work under Equity Action Plan for week Human Resources •Attended international Visit as a J-1 scholar to Kansas State University USA •Organized International Workshop under NAHEP VNMKV Project Activity •Attended international Visits at Kansas State University USA
17.	Dr. Megha P. Jagtap (Suryawanshi)	Female	Assistant Professor (Agronomy), COA, Parbhani. VNMKV, Parbhani. 431402 Maharashtra jagtapmeghaa@gmail.com No.917588571055, 9834989581	Nodal Officer (ESP) and as a Core Team Member	•Worked as a Nodal Officer (Equity Action Plan) ESP •Executed Equity Action Plan Activities as per approved Plan from PIU NAHEP Delhi •Conducted trainings and experimental work under Equity Action Plan for week Human Resources •Attended international Visit to UWA Australia •Green University Award and Green Campus activities •Waste Management System in University Campus
18.	Dr.Veena S. Bhalerao	Female	Associate Professor College of Community Science VNMKV Parbhani		•Worked as a education In-charge for training, Workshop, Online courses and offline course. •Participated as organizing member of trainings, workshops and conferences •Anchoring for various trainings, workshops and conferences programs of NAHEP-CAAST VNMKV Project activities •Attended international Visit to AIT Bangkok Thailand
19.	Dr. M.S. Pendke	Male	Assistant Professor Soil and water conservation	Core team member CDKS	•As a core team member and participated in online training, Workshop during pandemic.

20.	Dr. P.H. Vaidya	Male	Professor Soil Science Agril. Chemistry	Core Team member CDKS	•Worked as a core team member and participated in online training, Workshop during pandemic. •Conducted students research experiments RS/GIS •Attended international Visits at UPM Maleshiya
21.	Dr. S.S. Phulari	Male	Assistant Professor Computer Science	Core Team member CDKS	•Worked as a core team member and participated in online training, Workshop during pandemic.
22.	Dr. V.N. Shinde	Male	Assistant Professor Horticulture	Core Team member SSPN, FPA	•Unable to participate due to transfer of job location
23.	Dr. S.R. Garud	Male	Assistant Professor Post harvest technology	Core Team member SSPN, FPA	•Worked as a Co-PI (FPA), •Procurement activities related to FPA portfolio. • Conducted online/offline trainings and workshop •Unable to participate last year of project due to transfer of job location
24.	Dr. R.B. Kshirsagar	Male	Professor Food technology	Core Team member FPA	•Worked as a core team member and participated in online training, Workshop during pandemic. •Conducted students research experiments

2.5 b) Knowledge management and outreach initiatives (development of collaterals, newsletter, social media outreach activities, creation of website, experiential learning workshop, exposure visits:

Demonstration of Drones purchased by NAHEP center at VNMKV Parbhani in presence of Hon. Vice chancellor Dr. A. S. Dhawan and Co-Pi members and NAHEP Staff. **Date: 28 August, 2020**

Geospatial mapping & Spray testing by drones at NAHEP CAAAST VNMKV Centre **by Technical Staff of NAHEP Centre. Date: 16th October, 2020**

पुण्य नगरी

शेतीकामात ड्रोन कॅमेरे, इलेक्ट्रिक बाइक

आदमपूर (नांदेड) : शेतीकामामध्ये अत्याधुनिक तंत्रज्ञानाचा वापर केल्यास वेळेची बचत व शारीरिक कष्ट कमी होऊन उत्पादन वाढीस मदत होईल, यासाठी शेतकऱ्यांनी शेतीकामामध्ये डिजिटल तंत्रज्ञानाचा वापर करावा असे आवाहन नाहेप व मराठवाडा कृषी विद्यापीठातील प्रमुख अन्वेषक डॉ.गोपाल शिंदे यांनी केले. यावेळी जिल्हा परिषदेचे मुख्य कार्यकारी अधिकारी श्रीमती वर्षा ठाकूर यांची प्रमुख उपस्थिती होती.

बिलोली तालुक्यातील सगरोळी येथील कृषी विज्ञान केंद्रातर्फे आयोजीत कृषी तंत्रज्ञान सप्ताहाच्या तिसऱ्या दिवशी बुधवार (ता.१७) रोजी महिला व पुरुष शेतकऱ्यांची लक्षणीय उपस्थिती होती. ड्रोनद्वारे फवारणी व पिकांची पाहणी तर कॅमेऱ्याच्या माध्यमातून सर्व्हे, मोजनी, नकाशा तयार करण्यास मदत होते. इलेक्ट्रिक बाईकचा वापर मल्चिंग, कोळपणी, पेरणी, फवारणी व मालवाहतुकीसाठी होतो. हे सर्व एका व्यक्तीच्या माध्यमातून होत असल्याने मनुष्यबळाची बचत होते.

हे प्रत्यक्ष प्रात्यक्षिक शेतकऱ्यांनी अनुभवले. ड्रोनची माहिती व प्रात्याक्षिके नरेंद्र खत्री, अभियंता

विश्वप्रताप जाधव, मारुती रणेर यांनी तर इलेक्ट्रिक बाईकची अमोल बुडुख, अमोल वाडकर व जितेंद्र आडे यांनी माहिती दिली. दीर्घ आयुष्यासाठी सेंद्रिय शेती गरजेची असून जमिनीमधील जैव विविधता टिकून ठेवणे अत्यंत आवश्यक आहे. यासाठी शेतीमध्ये गोठ्यातील शेण, मलमूत्र व टाकाऊ काडीकचऱ्यापासून तयार केलेला खत शेतीसाठी वापरल्यास जमिनीचे आरोग्य अबाधित राहून कमी खर्चातून जास्त उत्पन्न मिळेल असे बीड येथील कृषी भूषण शिवराम घोडके यांनी सांगितले.

NAHEP Staff members participated in Krishived Exhibition 2021 organized by KVK, Sagroli, Nanded, Mahratta, India with Aryaion Electric Vehicle, Pune Date**: 18th February, 2021**

Drone Training for NAHEP Staff by Ayaan Automation Date: 26/10/2021

Drone mapping by using DJI Phantom at VNMKV, Parbhani Date: 2/12/2021

A expert talk given by Dr. Gopal U. Shinde, Principal Investigator, NAHEP-CAAST DFSRDA, VNMKV, Parbhani at NSS Camp organized by College of Agriculture, Parbhani on **"Use of Robots, Drone AGVs and Artificial Intelligence in Agriculture"** Date: 29th March, 2022

मौजे सायाळा खटिंग येथे रासेयोचे विशेष शिबीराचे आयोजन

देशाच्या स्वातंत्र्याचे अमृत महोत्सवी वर्ष आणि वसंतराव नाईक मराठवाडा कृषि विद्यापीठाच्या स्थापनेचे सुवर्ण महोत्सवी वर्षाचे औजित्य साधुन परभणी कृषि महाविद्यालयाच्या राष्ट्रीय सेवा योजनेच्या वतीने मौजे सायाळा खटिंग येथे विशेष शिबीराचे आयोजन करण्यात आले असुन दिनाक २८ मार्च रोजी शिबीराचे उदघाटन प्राचार्य डॉ सय्यद ईस्माईल यांच्या हस्ते करण्यात आले. कार्यक्रमास प्रमुख पाहुणे म्हणुन सरपंच्या श्रीमती वत्सलाताई काळे या होत्या तर शिक्षण प्रभारी डॉ रणजित चव्हाण, नाहेप प्रकल्पाचे मुख्य अन्वेषक डॉ गोपाल शिंदे, श्री तुकाराम काळे, कार्यक्रमाधिकारी डॉ प्रविण कापसे, डॉ मधुकर खळगे, डॉ अनुराधा लाठ आदींची प्रमुख उपस्थिती होती.

अध्यक्षीय भाषणात डॉ सय्यद ईस्माईल म्हणाले की, राष्ट्रीय सेवा योजनेच्या माध्यमातुन सामाजिक बांधिलकी म्हणुन कृषिच्या विद्यार्थ्यांनी समाजाची व शेतकरी बांधवाची सेवा करावी. कृषि विद्यार्थ्यांनी पदवी अभ्यासक्रमात प्राप्त केलेल्या शास्त्रीय ज्ञानाचा शेतकरी बांधवामध्ये प्रसार करावा. विद्यार्थ्यांनाही शेतकरी बांधवाकडुन शेतीविषयक अनेक बाबी शिकण्यासारख्या आहेत. शिबिराच्या माध्यमातुन विचाराची देवाण घेवाण झाली पाहिजे, असे ते म्हणाले.

डॉ गोपाल शिंदे यांनी यंत्रमानव, ड्रोन आणि कृत्रिम बुध्दीमत्ताचा शेती क्षेत्रात वापराबाबत माहिती देतानी सांगितले की येणारे युग हे डिजिटल शेतीचे युग असुन याकरिता कुशल मनुष्यबळाची आवश्यकता लागणार आहेत. यात कृषिचे विद्यार्थी मोलाची भुमिका बजावु शकतात. डिजिटल शेतीच्या माध्यमातुन कृषि पदवीधराना रोजगाराच्या अनेक संधी प्राप्त होणार आहेत, असे सांगुन ड्रोन तंत्रज्ञानाचे प्रात्याक्षिकाव्दारे मार्गदर्शन केले.

रासेयोचे हे विद्यार्थ्यातील समाज सेवेची आवड करणारे व्यासपीठ असल्याचे आपल्या मनोगतात डॉ रणजित चव्हाण म्हणाले.

कार्यक्रमाचे प्रास्ताविक डॉ प्रविण कापसे यांनी केले. सुत्रसंचालन स्वयंसेवक प्रदयुम्न जागिलवाड यांनी केले तर आभार डॉ अनुराधा लाठ यांनी मानले. कार्यक्रम यशस्वीतेसाठी रोसेयोचे स्वयंसेवकांनी परिश्रम घेतले.

Dr. S. B. Dodke, HOD, Soil Science & Agricultural Chemistry, Dr. Rajesh Dopavkar, Assistant Professor, Dapoli and Dr. Sagar More, Assistant Professor, Dapoli visited at NAHEP-CAAST-DRSRDA, Parbhani center. Date : 20th June, 2022


Progressive farmers form Solapur visited at NAHEP-CAAST-DFSRDA, VNMKV, Parbhani centre. Date: 05th July, 202

Er. Ajit kharjul delivered Spraying drone with new spraying nozzles and drone flight demonstration on NAHEP-CAAST-DFSRDA, VNMKV, Parbhani field with information of how to operate drone, maintain drone and battery properly. Date: 10th September, 2022


Drone flight training and practice schedule is planned and stared at 16/09/2022. First day of scheduled practice with team member Er. Shraddha muley, RA (Agri-Drone), Dr. Shivaraj shinde, JRF (CDKS), Er. Pornima Rathode, JRF (FPA), NAHEP-CAAST-DFSRDA, VNMKV, Parbhani.

Date: 15th September, 2022


NAHEP-CAAST-DFSRDA participated in **"रब्बी शेतकरी मेळावा"** on the occasion of **Marathwada Liberation Day** organized by Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. Date: 17th September, 2022



Agricultural Department Farmer visited from Vashim @NAEHP-CAAST-DFSRDA, VNMKV, Parbhani centre.
Date: 20th September, 2022

RAWE students Drone training and demonstration in @NAEHP-CAAST-DFSRDA, VNMKV, Parbhani centre.
Date: 21st September, 2022

NAEHP-CASST-DFSRDA participated in Rabbi Shetkari Melva 2022 @ATIC Centre, VNMKV, Parbhani.
Date: 24th September, 2022

Training to State Agricultural Departmental Employee on Advance Agricultural Drone Technique @ NAHEP-CAAST-DFSRDA, VNMKV, Parbhani centre.
Date: 30th September, 2022

Er. Shradha Mule, Research Associate (Agri-drone) and Er. Vishwpratap Jadhav, Junior Engineer, NAHEP-CAAST-DFSRDA, VNMKV, Parbhani are participated in one-week Training Programme on “Drone for Precision Agriculture” organized by NAHEP-CAAST-CSAWM, MPKV, Rahuri Date: 10th October, 2022 to14th October, 2022

Spraying of pre-emergence, weedicide with the help of spraying drone @NAHEP, VNMKV, Parbhani field.
Date: 31st October, 2022

Spraying drone testing @NAHEP, VNMVK, Parbhani farm. Date: 01st November, 2022

NAEHP-CAAST-DFSRDA, VNMKV, Parbhani participated in State level Agricultural Exhibition @KVK, Aurangabad Date: 17th November, 2022

NAHEP-CAAST-DFSRDA, VNMKV, Parbhani participated in "राज्यस्तरीय सिल्लोड कृषि महोत्सव" Date: 01st January to 05th January, 2022

Visit cum Demonstration of Different advanced technologies for Navodaya Vidyalaya, Parbhani students @NAEHP-CAAST-DFSRDA, VNMKV, Parbhani centre.

Date: 30th November, 2022

NAHEP-CAAST-DFSRDA, VNMKV, Parbhani participated in "राज्यस्तरीय सिल्लोड कृषि महोत्सव" Date: 01st January to 05th January, 2022




NAHEP-CAAST-DFSRDA, VNMKV, Parbhani participated in state level Agri Exhibition "**कृषि संजिवनी महोत्सव"** Date: 23rd February, 2023

NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized One Day training on **"Demonstration of Spraying Drone"** date: 30th March, 2023



परभणी : जिल्ह्यातील पिंगळी (ता. परभणी) येथे कृषी ड्रोनचे प्रात्यक्षिकाचे उद्घाटन कुलगुरू डॉ. इंद्र मणी मिश्रा यांच्या हस्ते करण्यात आले. या वेळी उपस्थित मान्यवर

कारेगाव, पिंगळी येथे कृषी ड्रोनचे प्रात्यक्षिक

परभणी : वसंतराव नाईक मराठवाडा कृषी विद्यापीठातील राष्ट्रीय कृषी उच्च शिक्षण प्रकल्प (नाहेप) आणि नवी दिल्ली येथील आयओटेक यांच्यातर्फे गुरुवारी (ता. ३०) परभणीतील कारेगाव आणि पिंगळी येथे कृषी ड्रोनचे प्रात्यक्षिक सादर करण्यात आले.

राष्ट्रीय कृषी उच्च शिक्षण प्रकल्प (नाहेप) अंतर्गत मराठवाड्यातील शेतकऱ्यांच्या शेतावर कृषी ड्रोनची प्रात्यक्षिके नियोजित केली आहेत. गुरुवारी (ता. ३०) कारेगाव आणि पिंगळी येथे या प्रात्याक्षिकांचे उद्घाटन कुलगुरू डॉ. इंद्र मणी यांच्या हस्ते करण्यात आले. कारेगाव येथील कृषिभूषण सोपानराव अवचार तर पिंगळी येथील प्रगतशील शेतकरी अमन खुराणा यांच्या शेतावर कृषी ड्रोनची प्रात्यक्षिक आयोजित करण्यात आले होते. कृषी अभियांत्रिकी महाविद्यालयाचे सहयोगी अधिष्ठाता डॉ. यू. एम. खोडके, नाहेप प्रकल्पाचे मुख्य संशोधक डॉ. गोपाळ शिंदे, डॉ. के. के. डाखोरे, डॉ. व्ही. के. इंगळे, प्रा. दतात्रय पाटील आदी प्रमुख उपस्थिती होती. आयओटेकचे तंत्रज्ञ राहुल मगदुम, अभियंता अंजिक्य यांनी ही प्रात्यक्षिके सादर केले. डॉ. इंद्र मणी म्हणाले, की भविष्यात कृषी क्षेत्रात ड्रोनचा वापर मोठ्या प्रमाणात होणार आहे. हे तंत्रज्ञान मराठवाड्यातील जास्तीत जास्त शेतकऱ्यांच्या बांधावर पोहोचविण्याकरिता कृषी विद्यापीठ प्रयत्नशील आहे. डॉ. व्ही. के. इंगळे, इंजि. दत्ता पाटील, इंजि. श्रद्धा मुळे, डॉ. अनिकेत वाईकर, डॉ. श्वेता सोळंके, इंजि. अंजिक्य ब्रह्मनाथकर, डॉ. शिवराज शिंदे यांनी पुढाकार घेतला.

पुण्यनगरी

पहावयास मिळत आहे.

कारेगाव, पिंगळी येथे कृषि ड्रोनचे प्रात्यक्षिके

परभणी / प्रतिनिधी

येथील वसंतराव नाईक मराठवाडा कृषि विद्यापीठातील राष्ट्रीय कृषि उच्च शिक्षण प्रकल्प (नाहेप) व आयओटेक, नवी दिल्ली यांच्या संयुक्त विद्यमाने कृषि अभियांत्रिकी अंतर्गत मराठवाड्यातील शेतकऱ्यांच्या शेतावर कृषि ड्रोनची प्रात्यक्षिके नियोजित करण्यात आली आहेत. या नियोजनानुसार गुरूवारी (दि.३०) तालुक्यातील कारेगाव आणि पिंगळी येथे कृषि ड्रोनचे प्रात्याक्षिके घेण्यात आली.

प्रात्याक्षिक कार्यक्रमाचे उद्घाटन कुलगुरु डॉ. इन्द्र मणि यांच्या हस्ते करण्यात आले. यावेळी कृषिभूषण सोपान अवचार व प्रगतशील शेतकरी खुराणा यांच्या शेतावर कृषि ड्रोनची प्रात्यक्षिक आयोजित करण्यात आले होते. यावेळी कृषि अभियांत्रिकी महाविद्यालयाचे सहयोगी अधिष्ठाता डॉ. यू. एम. खोडके, नाहेप प्रकल्पाचे मुख्य अन्वेषक डॉ. गोपाळ शिंदे, डॉ. के. के. डाखोरे, डॉ. व्ही. के. इंगळे, प्रा. दत्तात्रय पाटील आदींची प्रमुख उपस्थिती होती. आयओटेकचे तंत्रज्ञ राहुल मगदुम व इंजि. अंजिक्य यांनी ही प्रात्यक्षिके दाखविले. यावेळी कुलगुरू डॉ. इन्द्र मणि यांनी भविष्यात कृषि क्षेत्रात ड्रोनचा वापर मोठ्या प्रमाणात होणार असून ड्रोन तंत्रज्ञान मराठवाडयातील जास्तीत जास्त शेतकऱ्यांच्या बांधावर पोहोचविण्याकरिता परभणी कृषि विद्यापीठ प्रयत्नशील असल्याचे सांगितले. यावेळी डॉ.यू. एम. खोडके यांनी कृषि अभियांत्रिकी अंतर्गत कृषि ड्रोन प्रकल्पाची माहिती दिली. डॉ.गोपाळ शिंदे यांनी कृषि ड्रोन तंत्रज्ञानाची माहिती दिली. प्रात्याक्षिक कार्यक्रम यशस्वीतेसाठी डॉ. व्ही. के. इंगळे, इंजि. दत्ता पाटील, इंजि. श्रध्दा मुळे, डॉ. अनिकेत वाईकर, डॉ. श्वेता सोळंके, इंजि. अंजिक्य ब्रम्हनाथकर, डॉ. शिवराज शिंदे, इंजि.पौर्णिमा राठोड, इंजि. तेजस्विनी कुमावत, इंजि. संजीवनी कानवटे, मारोती रणेर, गंगाधर जाधव यांनी पुढाकार घेतला.

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NAHEP-CAAST-DFSRDA, VNMKV, Parbhani participated in "शासन आपल्या दारी" at VNMKV, Parbhani

Date: 27th Auguest, 2023



20/09/2023






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Dr. B.V.Asewar, M.Sc.(Agri),

Core Team member and Nodal officer, EAP

Report of activities organized as Nodal Officer EAP and Core Team Member, NAHEP CAAST DFSRDA

• Organized Brain Stroming session on NAHEP CAAST DFSRDA Project in Department of Agronomy on November, 2019

• Organized one-week online training programme on climate resilient technologies for rainfed agriculture during June 11-15, 2020. The 120 Faculties and 332 students participated online training programme.

• Organized three days online training programme on Personality development and life skills during March 3-5, 2021. The 15 faculties and 71 students participated in training programme

• Organized online tutorial classes for Preparing JRF/SRF/ NET/ ARS Exams and other competitive exams in Agriculture during March 26-27, 2021. The 100 students participated in online tutorial classes and more than 1100 participated in Youtube live.

• Organized online training programme on Integrated weed management and efficient use of herbicide during March 23-25, 2021. The 25 faculties and 95 students participated in training programme.

• Organized demonstration on NPK sensors in Agronomy Department

• Planned experiments on use of drone for herbicide application for weed management in wheat, soybean, safflower.

• Organized training programme on Gender Equality and Challenges during July 4-6, 2023

• Organized four days training programme on Scientific Writing and Language Competency during September 5-8, 2023.

• Organized two days training programme on Advances in Weed Management under changing climate scenario during October 28-29, 2023.

• Organized International Workshop on Climate Smart Agriculture for food security and sustainability during December 26-27, 2023. Total 78 students and 28 faculty members were participated in this International workshop. Dr Prakash Kumar Jha, Mississipi State University, USA, Dr Ajay Sharda, Kansas State University, Manhattan, USA and Dr Santosh Kumar Pitala, Nebraska State University, Lincoln, USA delivered experts in International workshop.

• Organized 5 days training programme on Climate Smart Digital Agriculture with collaboration with MANAGE, Hyderabad during December,26-30, 2023. Fifteen faculty members of from various colleges of VNMKV participated in training programme.

• M.Sc (Agri) theses completed with digital objective under NAHEP CAAST DFSRDA

1. Response of different little millet (Panicum sumatrense L) varieties to fertilizer levels.

2. Comparative studies of knapsack, boom and drone sprayer for weed management in Soybean (Glycine max L).

3. Comparative studies on herbicide spray through drone, knapsack and boom sprayer for weed control in Safflower (Carthamus tinctorius L.)

4. Effect of fertilizer levels on growth and yield of Turmeric (Curcuma longa L.) + Sweet corn (Zea mays saccharata L.) intercropping system.

5.4. Details of visits of PIU-NAHEP officials at your AU along with photographs (provide list):

Sr.No.	Name and Designation of PIU-NAHEP Officials	Activity/Event Details	Month-Year
1.	Prof. Dr. P.K. Ghosh NC-CAAST ICAR Delhi	Inaugural function of NAHEP-VNMKV Centre	Sept-2019
2.	Prof. Dr. Prabhat Kumar	Inaugural function of NAHEP-VNMKV Centre	Sept-2019
3.	Sri Bhagatsingh Koshiyari	Inauguration of Central Laboratories Facilities in Agri Bots, Agri Drone, Agri AGV Divisions	August 2021
4.	Prof. Dr. R. C. Agrawal	Inauguration of different Laboratories and Facilities created at NAHEP VNMKV centre Parbhani	April 2022
5.	Prof. Dr. Anuradha Agrawal	Visit to Exhibition Stall during international conference on blended learning	

INNAGURATION Of CENTRE OF EXCELLENCE: DFSRDA Centre on 4th Sept-2019 By PIU-NAHEP Officials at Vasantrao Naik Marathwada Krishi Vidyapeeth, PARBHANI MS. INDIA:

Inauguration of NAHEP-DFSRDA Centre on 4th Sept.2019 by NC-CAAST-Dr P. K. Ghosh, NC -IG Dr. Prabhat Kumar, Dr. V. K. Tiwari IIT-Kgp, Hon.VC Dr A. S. Dhawan, Prof. Amit Arora IIT Bombay and NAHEP-VNMKV Team.

Inauguration pooja for Seedling and Seed Processing Nursery Automation centre activities start during establishment of NAHEP-DFSRDA Centre on 4th Sept.2019 by NC-CAAST-Dr P. K. Ghosh, NC -IG Dr. Prabhat Kumar, Dr. V. K. Tiwari IIT-Kgp, Hon.VC Dr A. S. Dhawan, Prof. Amit Arora IIT Bombay and NAHEP-VNMKV Team.

Agri-Drone and VNMKV developed technologies demonstration organized during the Inauguration of NAHEP-DFSRDA Centre on 4th Sept.2019.Dr P. K. Ghosh, Dr. Prabhat Kumar, Dr. V. K. Tiwari IIT-Kgp, Hon.VC Dr A. S Dhawan and NAHEP-VNMKV Team on 4th Sept 2019

Inauguration ceremony in Auditorium of NAHEP-DFSRDA Centre on 4th Sept.2019 by NC-CAAST-Dr P. K. Ghosh, NC -IG Dr. Prabhat Kumar, Dr. V. K. Tiwari IIT-Kgp, Hon.VC Dr A. S. Dhawan, Prof. Amit Arora IIT Bombay and NAHEP-VNMKV Team.

Inauguration pooja for Seedling and Seed Processing Nursery Automation centre activities start during establishment of NAHEP-DFSRDA Centre on 4th Sept.2019 by NC-CAAST-Dr P. K. Ghosh, NC -IG Dr. Prabhat Kumar, Dr. V. K. Tiwari IIT-Kgp, Hon.VC Dr A. S. Dhawan, Prof. Amit Arora IIT Bombay and NAHEP-VNMKV Team.

Technical discussion about development plan of project during the Inauguration of NAHEP-DFSRDA Centre on 4th Sept.2019. Dr. P. K. Ghosh, Dr. Prabhat Kumar, Dr. V. K. Tiwari IIT-Kgp, Hon.VC Dr A. S. Dhawan and NAHEP-VNMKV Team on 4th Sept 2019

Visit of Hon. Governor Bhagat Singh Koshiyari at NAHEP-CAAST-DFSRDA, VNMKV, Parbhani MS INDIA on 7th August 2021(Y-2020-2021)

	
Welcome of Hon. Governor at NAHEP Centre	Demonstration of automatic Solar Powered Sprayer on IOT Application
	
Demonstration of Drones	Inauguration of Agri-bot, AgriAGV lab
	
Demonstation of Grafting Robot	nteraction with PI about technology of grafting robot

	
Inauguration of apps developed at NAHEP	Hon. Governer Inaugurating Agri-bots, Agri-AGV and Agri-Drone Labs
	
Welcome of Hon. Governor by Hon. Vice Chancellor and Principal Investigator at NAHEP	Remote control operated digital lamp lighting by Hon. Governor
	
Release of Book, Leaflet and Brochures	Hon. Governor interaction with faculty and PG/Ph.D. Students

Hon. Governor with PG/Ph.D. Students of VNMKV, Parbhani

NAHEP Principal Investigator and Core Team Members with Industrialists, Suppliers and Agri-Entrepreneurs

Hon. Governor with VNMKV Faculty and NAHEP Staff

PIU Officials Visit of National Director Prof. Dr. R.C. Agrawal to CENTRE OF EXCELLENCE: DFSRDA Centre Vasantrao Naik Marathwada Krishi Vidyapeeth, PARBHANI MS. INDIA during Year 2020-2021:


Inauguration ceremony in Auditorium of NAHEP-DFSRDA Centre on 4th Sept.2019 by NC-CAAST-Dr P. K. Ghosh, NC - IG Dr. Prabhat Kumar, Dr. V. K. Tiwari IIT-Kgp, Hon.VC Dr A. S. Dhawan, Prof. Amit Arora IIT Bombay and NAHEP-VNMKV Team.



National Coordinator's Visit at NAHEP-VNMKV STALL for International Conference at NASC COMPLES

Visit of Hon ND-NAHEP, NC -NAHEP, ICAR Delhi ,World-Bank representatives and Scientist visits to International Blended Learning Conference 2022.

Blended Learning Workshop with IASRI-ICAR Team Delhi at NAHEP-DFSRDA, VNMKV Delhi

FOREIGNER's VISIT

Training on Grafting Robot

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AGRICULTURAL DRONES
(AGRI-DRONES)
CENTRE OF EXCELLENCE : DIGITAL FARMING SOLUTIONS FOR
ENHANCING PRODUCTIVITY BY ROBOTS, DRONES AND AGVs
WELCOME
AGRICULTURAL ROBOTICS
(AGRIBOTS)

HARRISON DRONE manufacturing company Visit at USA by Researcher faculty of VNMKV centre during Dec2022

Round table discussion with world-Bank Team about NAHEP-CAAST, DFSRDA VNMKV Centre Parbhani

International Training Annexure

International trainings undertaken for students: -

Sr. No.	Name	ende r	Caste	Department	Research Guide	Research Topic	Visiting University
1.	Leona Gurrala	F	GEN	Ph.D. (Plant Pathology)	Dr. K.T. Apet	Exploration of potential actinomycetes against pythium ophiodermatid fitzip associated with rhizome rot of turmeric	Asian Institute of Technology, Thailand
2.	Patil Nikhil Mahadev	M	GEN	Ph.D. (Soil Science)	Dr. P.H. Vaidya	Assessment of Soil and Ground Water Quality for Development Decision Support System by Using Remote Sending and GIS for Hingoli District of Maharashtra	Asian Institute of Technology, Thailand
3.	Shubham Bhanudas Girdekar	M	OBC	Ph.D. (Soil Science)	Dr. P.H. Vaidya	Assessment of soil and ground water quality of Jalna District by using Remote Sensing and GIS technique for sustainable agricultural resource planning and management	Asian Institute of Technology, Thailand
4.	Anshul Singh	M	EWS Centra PwD(OI)	M.Tech (Food Technology)	Dr. Kailash S. Gadhe	Study and development of plant protein-based meat	Asian Institute of Technology, Thailand
5.	Anjali Sharma	F	OBC	M.Sc. Entomology	Dr. M.M. Sonkamble	Studies on sunflower pollinators & efficacy of biopesticides against major insect pests of sunflower	Asian Institute of Technology, Thailand
6.	Tadavi Sameer Abbas	M	ST	M.Sc. (Extension Education)	Dr. R.P. Kadam	Use of social media as a source of market information by the farmers	Asian Institute of Technology, Thailand
7.	Anjali Jayguru Meshram	F	SC	M.Sc. (Extension Education)	Dr. M.I. Khalge	Opinion & utilization of weather based agro advisory services through mobile among the farmers	Asian Institute of Technology, Thailand
8.	Kadam Ganesh Ramrao	M	GEN	M.tech (Food Technology)	Dr. V.S. Pawar	FY students no title decided	Asian Institute of Technology, Thailand
9.	Harkal Anil Dnyanesh war	M	GEN	Ph.D. (Farm Machinery & Power Engineering)	Dr. S.N. Solanki	Design and development of self-propelled multipurpose machinery for different farm operations	Asian Institute of Technology, Thailand
10.	Achyut Balaji Pillewad	M	SBC	M.Sc. Botany	Dr. H.V.Kalpande	Genetic Variability an Association Studies for Morpho-physiological Traits in Induced Mutations of Rabi Sorghum	Asian Institute of Technology, Thailand
11.	Sushama Arjun Mane	F	GEN	M. Sc. (Human Development and Family Studies)	Dr. Veena Bhalerao	Development of Advisory and Hybrid Mode Digital Technology for Reducing Reproductive and General Health Issues of Female Sugarcane Cutters	Asian Institute of Technology, Thailand
12.	Mr. Vipul Shantaram Chaudhari	M	OBC	M.Tech in Irrigation and Drainage Engineering	Dr. S. D. Vikhe	RS & GIS and case study on Groundwater Potential Zone	Asian Institute of Technology, Thailand
13.	Ms. Harsha Bansi Pawar	F	OPEN	M.Tech in Irrigation and Drainage Engineering	Dr.V. K. Ingle	RS & GIS and case study on Geospatial Mapping	Asian Institute of Technology, Thailand

14.	Ms. Vidya Digambarrao Khating	F	OPEN	M.Tech in Soil & Conservation Engineering	Dr. S. D. Payal	RS & GIS and case study on Morphometric characteristic LULC map	Asian Institute of Technology, Thailand
15.	Mr. Karnraj Chakrapani Dhavan	M	OPEN	M.Sc. in Agricultural Meteorology	Dr. M. P. Jagtap	RS & GIS and case study on crop stress detection on satellite image	Asian Institute of Technology, Thailand
16.	Ms. Shweta Sampatrao Shinde	F	OPEN	M.Tech in Farm Machinery and Power Engineering	Dr. P. A. Munde	Survey of Farm Mechanization	Asian Institute of Technology, Thailand
17.	Mr. Akash Munjabhau Mane	M	OBC	M.Tech in Soil and Water Conservation Engineering	M. R. More	RS & GIS and case study on Geo-Morphometric analysis	Asian Institute of Technology, Thailand
18.	Mr. Sagar Devidas Patil	M	OBC	M.Tech in Processing and Food Engineering	Dr. S. R. Garud	CFD Analysis	Asian Institute of Technology, Thailand
19.	Anushree R K	F	OPEN	Food Science and Nutrition	Dr. T. N. Khan	Food Processing case studies on Millet processing and nutritional evaluation	Asian Institute of Technology, Thailand
20.	Mr. Swapnil Samptrao Wagmare	M	SC	AHDS (Dairy Science)	Dr. S. G. Narwade	Dairy science Case studies on Indigenous Fruit	Asian Institute of Technology, Thailand
21.	Mr. Priti Babasaheb Bhosale	F	OPEN	M. Tech (Food Processing Technology)	Dr. V. S. Pawar	Food Processing case studies on Millet processing and product development	Asian Institute of Technology, Thailand
22.	Ms. Tejaswini Dnyaneshwar Warik	F	OPEN	M.Sc Agril. Botany (Plant Physiology)	Dr. G. S. Pawar	Plant Physiological Case studies on Evaluation of flooding stress	Asian Institute of Technology, Thailand
23.	Ms. Snehal Manohar Gambhire	F	OPEN	M.Sc Agril. Botany (Plant Physiology)	Dr. D. G. Dalvi	Plant Physiological case studies on biostimulator Efficacy	Asian Institute of Technology, Thailand
24.	Ms. Aboli Rameshwar Bhatlawande	F	OPEN	M. Tech (Food Processing Technology)	Dr. P. U. Ghatge	Food Processing case study on processing and packaging millet	Asian Institute of Technology, Thailand
25.	Nikita Dilip Dapurkar	F	OBC	Ph.D. Horticulture (Fruit Science)	Dr. V. V. Bhagat	Non-destructive quality assessment of fresh fruit and robotics and automation in post-harvest handling of fruit	Universitat Politecnica De Valencia, Spain
26.	Neha Mahendra Arolkar	F	OBC	Ph.D. Horticulture (Vegetable Science)	Dr. G. M. Waghmare	Non-destructive quality assessment of fresh fruit and robotics, automation in post-harvest handling of fruit	Universitat Politecnica De Valencia, Spain
27.	Sangram Sanjay Wandhekar	M	OBC	Ph.D. (Food Tech)	Dr. R. B. Kshirsagar	Exploration of Fruit Processing Waste for Preparation of Eco-Friendly and Biodegradable Tableware.	University of Debrecen, Hungary
28.	Prasad Shridharrao Gangakhedkar	M	GEN	Ph.D. (Food Tech)	Dr. H. W. Deshpande	Development of Probiotics Minimally Processed Fruits and Vegetables as Snack Food.	University of Debrecen, Hungary
29.	Vaibhav Prakash Jadhav	M	OBC	M.Tech (Food Tech)	Dr. R. B. Kshirsagar	Effect on storage stability of pearl millet flour by the application of thermal, non-	University of Debrecen, Hungary

						thermal and active packaging technology.	
30.	Vidhya Wadmare	F	SC	Ph.D. (Food Tech)	Dr. K. S. Gadhe	process technology of liquid jaggery	University of Campinas, Brazil
31.	Chaitanya Girhepunje	M	OBC	M.Tech (Food Tech)	Dr. K. S. Gadhe	Spirulina value addition	University of Campinas, Brazil
32.	Shital Chavanke	F	OBC	M.Tech (Food Tech)	Dr. A.A.Joshi	Process standardization of Karonda	University of Campinas, Brazil
33.	Aishwarya Mujmule	F	SC	M.Tech (Food Tech)	Dr. S.K. Sadawarte	Millet based pasta	University of Campinas, Brazil
34.	Pawar A.D.	M	GEN	Ph.D. Agronomy	Dr. D.M. Gokhale	Application of remote sensing and GIS in agricultural for precision nutrient management, slow-release fertilizers, digital tools for soil and plant analysis. Training and handling of NPK sensors for analysis of nutrient uptake in plant	Universiti Putra Malaysia (UPM)
35.	Bagal S. K.	M	GEN	M.Sc. Agronomy	Dr. A.K. Gore	Analysis and impact of climate friendly smart technologies & efficient use of digital tools in precision nutrient management.	Universiti Putra Malaysia (UPM)
36.	Halge S. S.	M	OBC	Ph.D. Agronomy	Dr. B.V. Asewar	Precision nutrient management for sustainable agriculture. Control-release fertilizers-preparation methods and study of release pattern. NPK data recording system for digital soil test kit and methods. Training and handling of Digital Agriculture tools to understand nutrient uptake in plant.	Universiti Putra Malaysia (UPM)
37.	Bhogil Y. K.	M	GEN	Ph.D. (Irrigation & Drainage Engineering)	Dr. U.M. Khodke	This project engaged with Emerging Technologies such as GIS and Remote Sensing, Identification of Groundwater Potential Zones of Godavari-Purna Basin using Remote Sensing and Geographical Information System.	Universiti Putra Malaysia (UPM)
38.	Pawar S. N.	M	ST	Ph.D. (SWCE).	Prof. B.W. Bhuibhar	The project engaged with Emerging Technologies such as GIS and Remote Sensing, Digital tool. Soil and Water Assessment Tools	Universiti Putra Malaysia (UPM)
39.	Ms. Ashwini Vilas Pawar	F	GEN	Ph.D. Agril. (Plant Physiology)	Dr. G.S. Pawar	Marker- assisted pyramiding of ask2, floury2 and dzr1 genes for enhancement of methionine in maize and characterization of pyramided lines for yield, seed vigour and physiological traits.	Western Sydney University, Australia
40.	Buddhabhushan D. Wankhade	M	SC	Ph. D. Soil Science	Dr. Syed Ismail	As per Climate-based digital knowledge-support system (CDKS) RS and GIS for precision nutrient management, Advance technology of Soil and plant Analysis and Digital Microbiology	University of Sao Paulo, Brazil

41.	Rahul Sitaram Salve	M	SC	Ph. D. Plant Protection Entomology	Dr. P. S. Naharkar	To study the performance of digital technology on agricultural and Advance technology of entomology, DNA barcoding and Molecular work on pest management. Spectrophotometer, Data Collection, Image, Robot Technology	Universiti Putra Malaysia (UPM)
42.	Mohini Munjaji Bhondave	F	Open	M. Sc. Plant Protection Entomology	Dr. S. S. Dhurgude	To study remote sensing application in survey & surveillance of snails, use of drone technology for spraying against snails in field	Universiti Putra Malaysia (UPM)
43.	Aishwarya Sanjay Kale	F	OBC	Ph. D. Plant Protection Entomology	Dr. P. R. Zanwar	To study remote sensing application in survey & surveillance of snails, use of drone technology for spraying against snails in field	Universiti Putra Malaysia (UPM)
44.	Mahadev Parmeshwar Gadekar	M	OBC	M. Sc. Plant Protection Entomology	Dr. P. R. Zanwar	To study remote sensing application in survey & surveillance of snails, use of drone technology for spraying against snails in field	Universiti Putra Malaysia (UPM)
45.	Kakade Omkar Dattaram	M	GEN	M.Tech (Agril. Engg.), Department of Farm Machinery & Power Engineering	Dr. G.U. Shinde	Design and development of automatic vegetable transplanter	Universitat Politènica de València, Spain
46.	Bhalerao Sushant Raju	M	SC	M.Tech (Agril. Engg.), Department of Farm Machinery & Power Engineering	Dr. G.U. Shinde	Performance evaluation of field robot for detection of pink bollworm in Bt cotton field	Universitat Politènica de València, Spain
47.	Mr. M. P. Gadekar	M	OBC	M.Sc., Department of Entomology, VNMKV, Parbhani	Dr. P. R. Zanwar	Evaluation of ready-mix insecticides against Giant African Snail	Universiti Putra Malaysia
48.	Ms. M. M. Bhondave	F	GEN	M.Sc., Department of Entomology, VNMKV, Parbhani	Dr. S. S.Dhurgude	Ecofriendly Management of Giant African Snail	Universiti Putra Malaysia
49.	Mr. R. S. Salve	M	SC	Ph.D., Department of Entomology, VNMKV, Parbhani	Dr. P. S. Neharkar	Monitoring of Major insect pests of *BT* cotton and their management with biorationals	Universiti Putra Malaysia
50.	Ms. A. S. Kale	F	OBC	M.Sc., Department of Entomology, VNMKV, Parbhani	Dr. P. R. Zanwar	Studies on Integrated Management of Giant African snail (*Achatina fulica*) in soybean ecosystem	Universiti Putra Malaysia

51.	Mr. R. E. Kamble	M	SC	Ph.D. (Food Tech), VNMKV, Parbhani	Dr. K.S. Gadhe	Studies of development of process for preparation of unripe green banana (resistant starch) flour based functional food products	University of Debrecen, Hungary
52.	Ms. P. K. Rath	F	GEN	Ph.D. (Agril. Eco.), VNMKV, Parbhani	Dr. D.S. Perke	Digital tools for economic analysis and econometric modelling in food processing industries	University of Debrecen, Hungary
53.	Mr. Pramod Ramchandra Sagar	M		Ph.D. (Agril.Engg)		Abiotic Biotic Stress	Belgium
54.	Mr. Kalbande Dashrathrao	M	GEN	Ph.D. (Agril.Engg Scolar)	Dr. Indra Mani	Agri-Bots,RS/GIS,AI,DML in Precision Farming Operations	Kansas State University Manhattan USA
55.	Mr. Dattatray Vishwanath Patil	M		Ph.D. (Agril.Engg Scolar)	Dr. Indra Mani	Agri-Bots,RS/GIS,AI,DML in Precision Farming Operations	Kansas State University Manhattan USA

National and international trainings undertaken for faculty upgradation

Sr. No.	Name	Gender	Caste	Department	*Research Guide*	*Research Topic*
1.	Dr. Indra Mani	M	GEN	Vice-Chancellor, VNMKV, Parbhani	Foreign Visit for MoU of NAHEP, VNMKV Parbhani Centre with KANSAS University, University of Florida and Washington State University USA from February 2023 under international visit program	Kansas State University, Kansas, USA
2.	Dr. G. U. Shinde	M	GEN	Principal Investigator, NAHEP, VNMKV, Parbhani	Agriculture Robotics, Agriculture Drone, Agriculture AGVs, Farm Machinery.	University of Florida, USA
3.	Dr. K. K. Dakhore	M	GEN	CO-PI, NAHEP, Parbhani	RS/GIS based Remote sensing by Agri Drones	University of Florida, USA
4.	Dr. Veena Bhalerao	F	GEN	Associate Professor (Human Development and Family Studies)	Development of Advisory and Hybrid Mode Digital Technology for Reproductive and General Health Issues of Female Sugarcane Cutters	Asian Institute of Technology, Thailand
5.	Dr. B. V. Asewar	M	GEN	Professor and Head Agronomy, COA, VNMKV, Parbhani	Precision Agriculture	Kansas State University Manhattan USA
6.	Dr. A. A. Bharose	M	GEN	Associate Professor, Vilasrao Deshmukh College of Agricultural Biotechnology, Latur	To understand sensors related to biotechnology and horticulture. To understand grafting robot technology used in tissue culture and horticulture.	Western Sydney University, Australia
7.	Dr. P. H. Vaidya	M	OBC	Head, Dept. of Soil Science, VNMKV, Parbhani	Web GIS-based decision support system for site/soil specific nutrient/soil management for sustainable agriculture. Drone application in soil mapping, training and handling of geospatial tools in precision agriculture to understand nutrient stress in plant and site-specific nutrient diagnosis.	University of Putra, Malaysia
8.	Dr. V. K. Ingle	M	SC	Assistant Professor of Irrigation and Drainage Engineering, VNMKV, Parbhani	Application of geoinformatics in agricultural for precision agriculture, soil water resources management, drone application for crop health and irrigation planning. Soil and water conservation engineering.	University of Putra, Malaysia

9.	Dr. R. P. Kadam	M	GEN	Professor and Head, Department of Agriculture Extension Education, VNMKV, Parbhani	Participative digital extension for precision agriculture.	University of Putra, Malaysia
10.	Dr. P.S. Kapse	M	OBC	Associate Professor, Agril. Extn. Education, CoA, VNMKV, Parbhani	Participative digital extension for precision agriculture.	University of Putra, Malaysia
11.	Dr. G. S. Pawar	F	GEN	Associate Professor, Department of Agricultural Botany, VNMKV, Parbhani	Precision crop management. Biotic and abiotic stress management. AI-based crop growth monitoring through digital technologies.	Western Sydney University, Australia
12.	Dr. S. U. Pawar	F	GEN	Assistant Professor, Department of Agronomy, VNMKV, Parbhani	Precision weed management, AI-based weed detection and site-specific weed control, crop health management through digital technologies.	University of Putra, Malaysia
13.	Dr. M. P. Jagtap	F	GEN	Assistant professor Department of Agronomy, VNMKV, Parbhani	Remote Sensing & GIS, Advancement in Food Technology, Biotic & abiotic stress management and Google Earth Engine etc.	Western Sydney University, Australia
14.	Dr. R. B. Kshirsagar	M	OBC	Professor, Head, Associate Dean & Principal College of Food technology, VNMKV, Parbhani.	Food Engineering, Food Processing and value addition, spices process, fruit and vegetable processing and value addition by digital technology applications	University of Campinas, Brazil
15.	Dr. K. S. Gadhe	M	SC	Associate Professor, College of food technology, VNMKV, Parbhani.	Food biochemistry and nutrition, wheat milling and baking technology, nutraceutical and specialty food by digital technology applications	University of Campinas, Brazil
16.	Dr. D. D. Patait	M	GEN	Assistant Professor, Cotton Research Scheme, VNMKV, Parbhani.	AI application for use of poly herbal molluscicidal extracts and attractants in snail management & robots for mechanical collection of snails	University of Putra, Malaysia
17.	Dr. J. D. Deshmukh	M	GEN	Assistant Professor, Dept. of Agricultural Botany, VNMKV, Parbhani.	Use of sensors to characterize plant morphology, biochemical and molecular biology traits in response to the altered light environment under novel glasshouse films.	Western Sydney University, Australia
18.	Dr. C.V. Ambadkar	M	OBC	Associate Professor, Dept. of Plant Pathology, VNMKV, Parbhani	Use of sensors to characterize plant disease detection through AI tools, digital and Molecular techniques	Western Sydney University, Australia

19.	Dr. V. S. Khandare	M	SC	Professor, Department of Horticulture, VNMKV, Parbhani	Horticultural farm operation automation, Agricultural robotics for orchard plants and Digital technology for horticulture. Post harvest Technology of horticultural crops	Universidad Polytechnic University of Valencia, Spain
20.	Dr. R. V. Shinde	M	GEN	Assistant Professor Physics, CAET, Parbhani	Spectroscopic Techniques, Image analysis, Agri-Bots, Vine-Bots	Universidad Polytechnic University of Valencia, Spain
21.	Dr. S.D. Payal	M	SC	Assistant Professor, Department of Soil & Water Conservation, CAET, VNMKV, Parbhani	Watershed Planning by using Remote Sensing and GIS. Digital tools and technologies applications in soil and water conservation engineering.	University of Putra, Malaysia
22.	Dr. S.S. Phulari	M	OBC	Assistant Professor, (Computer Science), Dept. of Agricultural Engineering, CoA, VNMKV, Parbhani	Data mining, AI, Image Processing, 3D printing.	University of Putra, Malaysia
23.	Dr. P.U. Ghadge	M	GEN	Assistant Professor, Dept. of Food Chemistry and Nutrition, VNMKV, Parbhani	Analytical studies of agricultural commodities, Food Processing and Food Product development	University of Campinas, Brazil
24.	Dr. A.S. Lohakare	M	OBC	Assistant Professor, (Horticulture), College of Horticulture, VNMKV, Parbhani	Horticultural farm operation automation Agricultural robotics for orchard plants Digital technology for horticulture	University of Putra, Malaysia
25.	Dr. P.H. Gourkhede	F	SC	Assistant Professor, Dryland Agriculture Research Station, VNMKV, Parbhani	Dryland Agriculture Planning by using Remote Sensing and GIS. Digital tools and technologies applications in soil and water conservation engineering.	University of Putra, Malaysia
26.	Dr. B.S. Agarkar	M	OBC	Associate Professor, Dept. of Food Engineering, College of Food technology, VNMKV, Parbhani.	Use of Dehydration technology and food product development	University of Debrecen, Hungary
27.	Dr. A.A. Joshi	F	GEN	Assistant Professor Department of Food Process Technology, College of Food Technology, VNMKV, Parbhani	Used of AI in food processing and product development.	University of Debrecen, Hungary

ANENEXURE

List of National and International Trainings Workshops, Webinars, Quiz and Conferen during year 2020-2023.

Following are the list and details of National, International Trainings Workshops, Webinars, Quiz Conferences during year 2020-2023 at NAHEP VNMKV PARBHANI.

National & International Trainings

Sr No	National & International Events (training)	No. of participants	Duration
1	Two-week e-Training organized by ER. D. V. Pail (Core Team member) on "Basic Practices of Ansys 2020RI for Agricultural Researcher"	170	12 May, 2020 to 29 May, 2020
2	One day e-Training is organised by Er. D. V. Patil (Core Team member) on, "Aerial grasping Application for Agriculture Researchers- An Overview by UAV".	72	23 May, 2020
3	One Week Online training on "Recent Trends in Academic Writing" organized by Dr. Santosh Kadam VNMKV Parbhani.	424	20 May, 2020 to 24 May, 2020
4	One Week Online training organized by Dr. K.K Dakhore Core Team member on "Recent Advances and Instrumentation in Agriculture Meteorology (CDKS Portfolio)"	457	26 May, 2020 to 02 June, 2020
5	One-week International online training program is organized by Dr. Bharose Achyut on "Biotechnology: It's Application in Modern Agriculture"	480	04 June, 2020 – 08 June, 2020
6	One-week online Training Programme organized by Dr. Vaidya P. H. on "Application of Remote Sensing & GIS In Digital Agriculture".	340	04 June, 2020 to 08 June, 2020
7	One-week online Training Programme on "COVID 19 Pandemic: Impact and Strategies in Agriculture Education" was organized by Dr. Veena Bhalerao Core Team member.	403	09 June, 2020 to 13 June, 2020
8	Dr. B.V. Asewar HOD Agronomy organized one-week online training program on "Climate resilient technology for Rainfed Agriculture".	336	11 June, 2020 to 15 June, 2020
9	Er. D. V. Patil Core Team member organized one-week International online training on "Present & Futuristic trends in Agriculture mechanization".	339	18 June, 2020 to 23 June, 2020
10	One day online-training program on "Power of Digital manufacturing for new product development- 3D printing"organized by Dr. V.K.Ingle.	323	25 June, 2020
11	Dr. G. S. Pawar Core Team member organized one-week International online training on "Recent Physio – Molecular Digital tools in Abiotic Stress Management for crop modelling".	480	29 June, 2020 to 03 July, 2020
12	As a part of MoU joint activity done with IIT Kharagpur. Organized a two week online short-term course on "Application of Digital Technologies in Agriculture"	86	13 July, 2020 to 24 July, 2020
13	Inuguration of Joint activity of IIT Bombay with NAHEP CAAST, VNMKV in which Three weeks online short term course to NHEP CAAST student and faculties on "Application Of Digital Technologies Of Smart Agriculture"	52	10 Aug, 2020 to 28 Aug, 2020
14	One-Week Hands on Training on "Application of Remote Sensing & GIS In	45	04 June, 2020

	Digital Agriculture" jointly organized by NAHEP VNMKV and IIT Bombay		to 08 June, 2020
15	Three Days Online Short-Term Training to NAHEP-CAAST-VNMKV Students on "Personality Development and Life Skills" was organized by CAAST-DFSRDA, VNMKV Centre.	86	03 March, 2021 to 05 March, 2021
16	NAHEP-CAAST-VNMKV-DFSRDA Centre, Parbhani or organized online Two-Week Online Training Programme on "Advanced Hydraulic and Pneumatic Technologies for Agriculture"	15	24 May, 2021 to 04 June, 2021
17	NAHEP-CAAST VNMKV, Parbhani Organizing National level online hands on four-week Training on "Applications of Computer Aided Engineering in Agriculture"	100	07 June, 2021 to 03 July, 2021
18	NAHEP-CAAST VNMKV, Parbhani Organizing Two Week Online Course Programme on "Rapid Prototyping and Reverse Engineering By 3d Scanner And 3d Printer in Agriculture"	30	07 June, 2021 to 18 June, 2021
19	NAHEP-CAAST VNMKV, Parbhani Organizing Eight Weeks Online Workshop on "Embedded Systems and IoT in Agriculture"	66	17 June, 2021 to 07 Aug, 2021
20	NAHEP-CAAST VNMKV, Parbhani Organized Two Week Online Certificate Course on "Food Processing & Automation" in collaboration with Chamber for Advancement of Small & Medium Businesses (CASMB), Mumbai	36	02 Aug, 2021 to 14 Aug, 2021
21	NAHEP-CAAST VNMKV, Parbhani Organized Online/Offline Two-Week Training Programme on "Python programming Application using smart camera in Agriculture"	38	01Sep, 2021 to 10 Sep, 2021
22	NAHEP-CAAST VNMKV, Parbhani Organized Online/Offline Two-Week Training Programme on "Advance Hydroponics & Polyhouse Automation"	85	04 Oct, 2021 to 16 Oct, 021
23	NAHEP-CAAST VNMKV, Parbhani Organized Offline One Month Hands on Training on "Precision Agriculture by Advance Digital Technologies"	156	01 Dec, 2021 to 30 Dec, 2021
24	One Day Brainstorming Workshop Regarding NAHEP Project Activities	75	10 Jan, 2022
25	Four Months Institutional Internship/Training Programme of UG/PG/PHD Students	13	21 Jan 2022 to 21 May 2022
26	Three Days Brainstorming Workshop cum Training on "Smart Tools Application in Agriculture"	46	18 March 2022 to 20 March 2022
27	IIT Kharagpur organized a Two-week training on "Digital Image Processing and Computer Vision for Crop Health Monitoring"	42	06 June, 2022 to 18 June 2022
28	IIT Kharagpur organized a Three-week training on "Computer Aided Design and Simulation of Agri-Machines using Solid Works"	17	06 June 2022 to 25 June 2022
29	Online Workshop organized by NAHEP-CAAST-DFSRDA, VNMKV Parbhani on "Intellectual Property Rights (IPR) & Patents, Design Filing" in association with Rajiv Gandhi National Institute of Intellectual Property Management (RGNIIPM) Government of India, Nagpur (Under National Intellectual Property Awareness Mission)	402	29 August, 2022
30	National Agriculture Higher Education Project Centre of Excellence: Digital Farming Solutions for Enhancing Productivity by Roots, Drones and AGV's (DFSRDA), VNMKV, Parbhani (M. S.) India organized National Training Programme on "Quality Seed Production and Certification of Field Crops"	67	10 Oct, 2022 to 15 Oct, 2022

31	National Agricultural Higher Education Project, Centre of Excellence: Digital Farming Solutions for Enhancing Productivity by Robots, Drone and AGV's (DFSRDA), VMKV, Parbhani (M. S) India organized Two Days Workshop cum Training on "Effective E-Content Development for Education in Agriculture"	57	21 Nov, 2022 to 22 Nov, 2022
32	IIT Bombay originated Residential two-week short-term course training programme for NAHEP Faculty and Researches on "Data Driven Agriculture: Tools and Techniques"	40	10 Dec, 2022 to 23 Dec, 2022
33	National Agricultural Higher Education Project, Centre of Excellence: Digital Farming Solutions for Enhancing Productivity by Robots, Drone and AGV's (DFSRDA), VNMKV, Parbhani (M. S) India in Collaboration with ICAR-IASRI, New Delhi organized Two Days Workshop cum Training on "Academic Management System AMS)"	53	28 Feb, 2023 to 01 March, 2023
34	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani & Helper Robotic South Korea organized Two Days Workshop cum Training on "Advance Vegetable Robotic Grafting Technology in Agriculture"	131	13 March, 2023 to 14 March, 2023
35	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani & KKK Japan organized One Week Workshop cum Training programme on "Advanced Vegetable Japanese Robotic Grafting Technology in Agriculture "	120	20 March, 2023 to 25 March, 2023
36	NAEHP-CAAST-DFSRDA, VNMKV, Parbhani organized one-week Hands on Training of Application of Spraying Drone in Agriculture for All NAHEP core team members and NAEHP Staff members.	30	20 June, 2023 to 26 June, 2023
37	NAEHP-CAAST-DFSRDA, VNMKV, Parbhani organized one day Interaction Session for PG/Ph. D students & faculty members on "Application of Digital Technologies in Agriculture" by Chief Speaker Dr. Rabi Sahoo, Principal Scientist, Division of Agriculture Physics, ICAR-IARI, New Delhi	61	22 June, 2023
38	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized Three days Training programme on "Gender Equality and Challenges "	70	04 July, 2023 to 06 July, 2023
39	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized Four-day's Workshop for Ph. D. Students and Faculties "Scientific Writing & Language Competency"	80	05 Sep, 2023 to 08 Sep, 2023
40	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized two days Training on "Advances in Weed Management under Changing Climate Scenario"	60	28 Oct, 2023 to 29 Oct, 2023
41	Python Programming and Overview of Machine Learning and Robotics (Rohan Inamdar, B. Tech, VIT, Chennai)	44	27 Oct, 2023 to 10 Nov, 2023
42	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized Two Weeks Workshop Cum Hands on Training On "Drone Basics and Applications of Drone in Agriculture"	36	28 Nov, 2023 to 08 Dec, 2023
43	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Workshop on "Climate-Smart Agriculture for Food Security and Sustainability"	80	26 Dec, 2023 to 27 Dec, 2023

National & International Webinars

Sr No	National & International Webinars	No. of participants	Duration
1	One day webinar organized by Dr. Shyam Garud Co-PI (FPA) on **"Enhancing research writing skills of students and scholars: Citations Management" (FPA Portfolio)**	345	08/05/2020
2	One Week webinar on **"Role of Technologies and Automation in Food Processing and Preservation"** (FPA Portfolio) organized by Dr. Shyam Graud Co-PI (FPA),	365	14/5/ 2020 to 19/5/ 2020
3	One day Krushi Parisavad organized by Dr. Kapse sir on **"Soybean Lagwad Technology Parisanvad with Agriculture Minister"**	990	02/06/2020
4	Dr. Veena Bhalerao (Core Team member) organized webinar Series of one week on **"Digital Agriculture Technologies for self-Reliance of farm woman"**	740	6/7/2020 to 10/7/2020
5	State level Weekly Webinar Series organized by Dr. Megha Jagtap & Dr. Dhiraj Kumar Kadam on a **"सुदृढ पर्यावरणसाठी पीक संरक्षक कृषि रसायनाचा संतुलित वापर".**	100	25/07/2020 to Every Saturday till 03/10/2020
6	State level one week webinar series organized by Dr. Rajesh Kshirsagar (core Team Member) on **"डिजिटल तंत्रज्ञानद्वारे कृषी प्राक्रिया उद्योग: उद्योजकांच्या यशोगाथा".**	996	27/07/2020 to 31/07/2020
7	One day webinar on **"मक्यावरील लष्करी अळी जागरूकता व प्रशिक्षण कार्यक्रमाचे आयोजन"**	560	05/08/2020
8	Inauguration of International Seminar (Online) on **"Digital Technologies for smart agricultural: Futuristic plan"**	339	10/08/2020 to 13/08/2020
9	3D printing demonstration and webinar at NAHEP centre.	50	15/08/2020
10	National Agriculture Higher Education Project Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGV's (DFSRDA) & College of Community Science State Level One Day Webinar on **"Advanced Career Opportunities for Entrepreneurship Development in Community Science"**	120	26/11/2020
11	Webinar on **"Adoption of Digital Agriculture for Sustainable Crop Production"** with collaboration university Putra, Malaysia	40	28/11/2022

International Workshop

Sr No	International Workshop	No. of participants	Duration
1	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Workshop on **"Digital Farming Practices by Agri-Bots, Agri-Drones & Agri-AGVs"**	240	13 March 2020 To 15 March 2020
2	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Workshop on **"Advanced Digital Technologies in Agricultural Automation"**	148	14 March 2022 To 16 March 2022
3	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Workshop on "**Climate Smart Agriculture for Food Security and Sustainability**"	111	26-27 December,2023

International Trainings for Faculties and Students

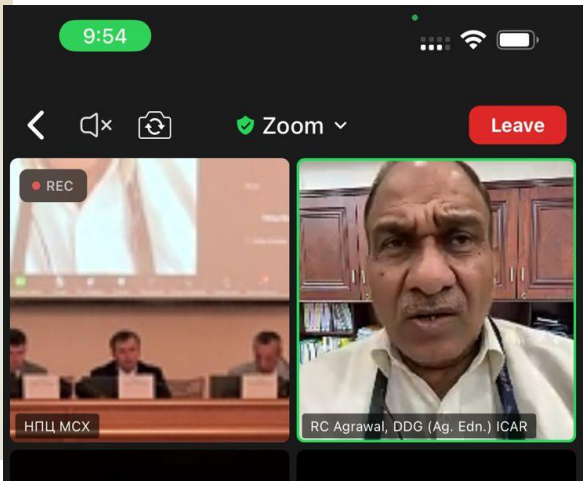
Sr No	International Trainings (Faculty & Students)	No. of participants	Duration
1	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Training on "UAV Application and Remote Sensing in Agriculture" at University of Florida (Dr. G. U. Shinde & Dr. K. K. Dakhore)	02	15 Sep, 2022 To 15 Dec, 2022
2	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Training and Experimental Learning on Digital Technologies and Applications at Geoinformatics Centre, AIT, Bangkok	10	27 Feb, 2023 to 24 March, 2023
3	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Training at Yunus Centre, AIT Bangkok (Miss. Sushma Mane)	01	27 Feb, 2023 to 24 March, 2023
4	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Training at Yunus Centre, AIT Bangkok (Dr. Veena Bhalerao)	01	16 March, 2023 to 24 March, 2023
5	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Training at School of Engineering, AIT, Bangkok	13	01 March, 2023 To 31 March, 2023
6	NAHEP-CAAST-DFSRDA, VNMKV, Parbhani organized International Training at University Polytechnic Valencia, Spain	02	01 March, 2023 To 31 March, 2023

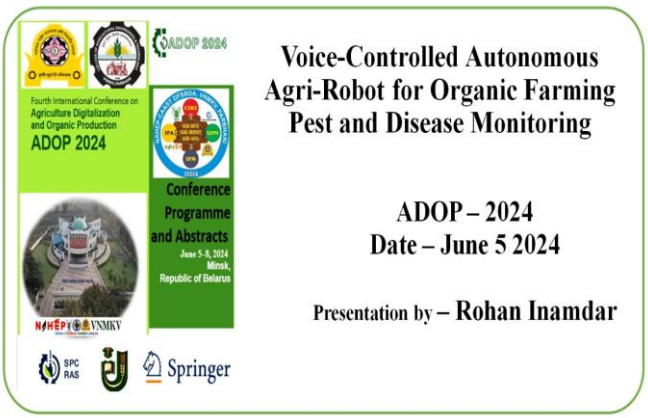
National & International Competition / Quiz/ Easy Writing

Sr No	National & International Competition/ Quiz / Easy Writing	No. of participants	Duration
1	National Agriculture Higher Education Project Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs (DFSRDA) VNMKV, Parbhani (M.S) **"E poster Presentation Competition under CDKS Portfolio on Climate Smart Agriculture"**	**04**	**23/12/2020 TO 31/12/2020**
2	Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGV's NAHEP-CAAST-DFSRDA Organizing A **"Online Quiz Competition 2020 on Food Processing Automation"**	**226**	**23/12/2020**
3	Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGV's (DFSRDA) National Essay Competition On **"Adoption of Digital Technologies by Indian Farmers During and After COVID-19 Pandemic"** On the occasion of National Farmer's Day	**08**	**23/12/2020**
4	Centre Of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGV's NAHEP-CAAST-DFSRDA Organizing a Online Quiz Competition 2022 on **"Vegetable Grafting"**	**729**	**01/02/2022**

Sr. No	Trainings	Total	Beneficiary
1	National & International Trainings	**43**	**6143**
2	International Workshop	**02**	**388**
3	Quiz, Competition	**04**	**967**
3	Webinar	**11**	**4,645**
Total No of Beneficiary		**60**	**12,143**

ADOP-2024: 4th International conference on Agriculture Digitalization And Organic Production ADOP 2024






ADOP 2024

Certificate of Participant

Sushant R. Bhalerao, Francisco Rovira-Mas, Indra Mani, B.V. Asewar, O.D. Kakade, S.V. Muley, and D.V. Samindre

have participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Oral Presentation entitled:

Deep Learning for Pink Bollworm Detection and Management in Organic Cotton Farming Practices

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization" Conference Co-Chair Ph.D.,assistant professor Komlach Dmitry Ivanovich

RUE "SCIENTIFIC AND PRACTICAL CENTER OF THE NATIONAL ACADEMY OF SCIENCES OF BELARUS FOR AGRICULTURAL MECHANIZATION"

Springer


ADOP 2024

Certificate of Participant

Vidhya Baban Wadmare

has participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Oral Presentation entitled:

Organic Farming in the Era of Artificial Intelligence: Towards Sustainable Agriculture and Environmental Resilience

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization" Conference Co-Chair Ph.D.,assistant professor Komlach Dmitry Ivanovich

RUE "SCIENTIFIC AND PRACTICAL CENTER OF THE NATIONAL ACADEMY OF SCIENCES OF BELARUS FOR AGRICULTURAL MECHANIZATION"

Springer


ADOP 2024

Certificate of Participant

Pritam Bhutada

has participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Oral Presentation entitled:

Response of Sorghum Crop Towards Organic Manure under Climate Change

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization" Conference Co-Chair Ph.D.,assistant professor Komlach Dmitry Ivanovich

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ADOP 2024

Certificate of Participant

Sangram Wandhekar, Aboli Bhatlavande, Gopal Shinde, Kshirsagar R.B., Agarkar B.S. and Ghatage P.U.

have participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Oral Presentation entitled:

A look at digitalization of the sustainable organic food supply chain

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization" Conference Co-Chair Ph.D.,assistant professor Komlach Dmitry Ivanovich

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ADOP 2024

Certificate of Participant

Tekale Dayanand Devidasrao

has participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Oral Presentation entitled:

Smart Portable Machinery for Organic Farming

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization"
Conference Co-Chair
Ph.D.,assistant professor
Komlach Dmitry Ivanovich

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ADOP 2024

Certificate of Participant

Pritam Bhutada

has participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Oral Presentation entitled:

Study on Nutrient Management in Upland Rice Intercropping System in Rainfed Region of Maharashtra

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization"
Conference Co-Chair
Ph.D.,assistant professor
Komlach Dmitry Ivanovich

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Certificate of Participant

Pratyush Kumari Rath, Digambar Perke, Dheeraj Pathrikar, and Buddhabhushan Wankhade

have participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Oral Presentation entitled:

Ag-IoT: Empowering Sustainable and Economic Organic Agriculture

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization"
Conference Co-Chair
Ph.D.,assistant professor
Komlach Dmitry Ivanovich

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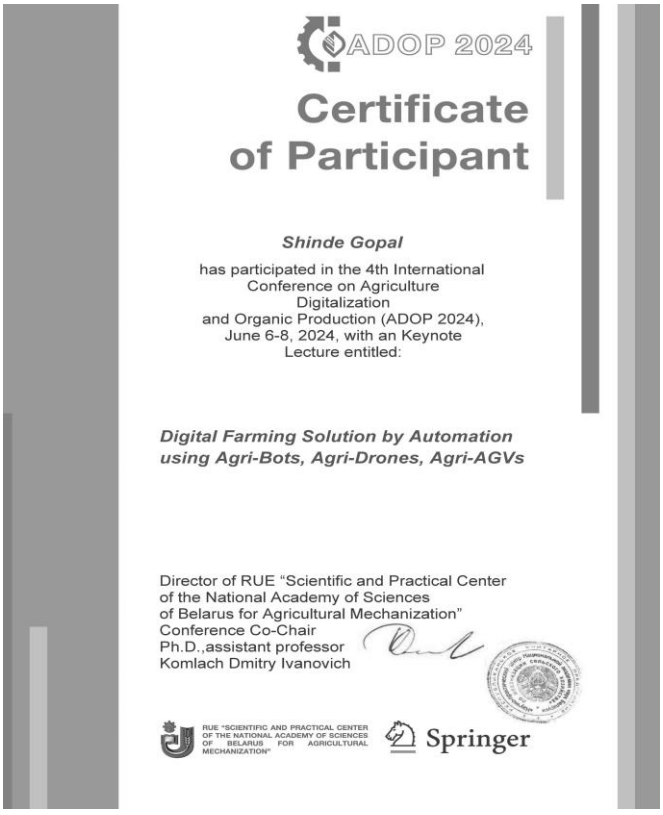
ADOP 2024

Certificate of Participant

Shinde Gopal

has participated in the 4th International Conference on Agriculture Digitalization and Organic Production (ADOP 2024), June 6-8, 2024, with an Keynote Lecture entitled:

Digital Farming Solution by Automation using Agri-Bots, Agri-Drones, Agri-AGVs

Director of RUE "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization"
Conference Co-Chair
Ph.D.,assistant professor
Komlach Dmitry Ivanovich

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