ICAR-National Agricultural Higher Education Project

Final Project Report

Component1 1c: Innovation Grants (IG)

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

"Capacity Building and Skill Development in Renewable Energy "

Executive summary

Name of the AU: Dr. PDKV, Akola

Project Title: National Agricultural Higher Education Project (Innovation Grant)
"Capacity Building and Skill Development in Renewable Energy"

Executive Summary:

In green energy initiate and to reduce greenhouse gas emission renewable energy plays a very important role. Keeping in view the objective to develop skill as well as capacity building of students and faculties the various activities like Brain storming workshop , Industry -institute meet, National /International trainings for faculty, National /International conference, Sensitization workshop, Start-up India Maharashtra-yatra boot camp, Faculty development program with an intention to increase teaching effectiveness, Faculty development program on enhancing efficiency and effectiveness to develop entrepreneurship ecosystem, In-plant training and summer training for students, Personality development program for student with an intention to ignite young minds, Four days national workshop for students on personality and leadership development, Two-weeks training for student on preparation of competitive examinations like AIEEA/AICE/ICAR, Expert lecture series for student, Dr. PDKV Alumni Meet, CAET Golden Jubilee Alumni meet were organized to enlace the skills of the students and faculties. In covid situation the programs were organised in online mode.

The various activities were organized for the faculty as well as for the students. These activities have arranged with the main emphasis on capacity building and skill development in renewable energy. During these programs for student's various renewable energy-based prototypes, its use and necessity, its design development were discussed at length and online demonstration of the systems were shown wherever necessary. Hence the awareness, was created about the renewable energy technology-based entrepreneurship and its utilization in agriculture and for domestic sector. The participants from various disciplines of agricultural science were participated in the various training from all over the country. The concept of entrepreneurship opportunities and development in renewables as well as in agriculture has been percolated in students through faculty members.

Introduction

NAHEP is designed to strengthen the national agricultural education system in India with overall objective to provide more relevant and high-quality education to agricultural university students. This programme will promote efficiency and competiveness through changes in working mechanism of agricultural universities, raising the teaching and research standards through improved research and teaching infrastructure and enhanced faculty competency and commitments, and making agricultural education more attractive to talented students. There are four key components under NAHEP, namely; Institutional Development Plan (IDP), Centres for Advanced Agricultural Sciences and Technology (CAAST), ICAR to support excellence in agricultural universities (AUs), and ICAR Innovation Grants to AUs. It is envisaged that improved AU performance through quality enhancement, better employment and entrepreneurship opportunities created for agriculture graduates, non-accredited AUs attaining ICAR accreditation, and institutional reforms implemented in education division of ICAR and AUs under these components together shall contribute to the achievement of the overall program objective.

The capacity building and skill learning are the key tools to develop the inter-exchangeable knowledge into the practical. Skill development is more than just getting learners to "do something." Experiential learning occurs when carefully chosen experiences are supported by reflection, critical analysis and synthesis. Experiences are structured to require the student to take initiative, make decisions and be accountable for results. Throughout the experiential learning process, the student is actively engaged in posing questions, investigating, experimenting, being curious, and solving problems, assuming responsibility, being creative and constructing meaning. The in-hand practical capacity of the students in relation to improve the knowledge and to orient with the good entrepreneurship, the skill development in the renewable energy may open the new way of business in coming age.

The project of ICAR-NAHEP under innovation grant have been sanctioned to PDKV, Akola entitled "Capacity building and skill development in renewable energy". The skill development in the subject of the renewable energy and its utilization for the domestic and the agro-based industries has wide scope for growth and to generate the self-employment. The energy sources wise skill learning approaches and the employment opportunities for the undergraduate and post graduate students will be available through the capacity building. Many of courses in course-curricula are the practical based and needs state of art practical and training facilities. This project helps in the development of practical knowledge and knowhow of the students for the better employment generation and creating the awareness of the entrepreneurship.

The objectives of the NAHEP -IG at Dr. PDKV, Akola;

i) To enhance the knowledge and inculcate the skill of students to take initiative, make decisions and be accountable for results
ii) To provide modern atmosphere for exchange of knowledge to students from design to product development stage
iii) To create state-of-art modern infrastructure facilities to enhance the teaching-learning and skill development process
iv) To establish linkage between industries and alumni's for better placement opportunities for students
v) To up-grade the skill and knowledge of faculties and to generate revenue for self-sustaining of programme in future

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

1.1. Interventions carried out to make AU reform ready and led to ICAR accreditation

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

Key interventions	*Remarks/Photographs*
Modification of three laboratories and one -conference room *Solar energy lab., Advance bio-energy lab., Renewable energy fabrication lab., NAHEP -CAET conference room.* ***Solar energy lab*** *The flooring, colouring, sliding facility to window PVC ceiling and electrification etc. were done. Also, this laboratory consists of newly purchased instruments, equipment's such as Solar Lantern Trainer, Solar Energy Trainer, Solar Power Lab, Solar Simulator Lab, Portable Power Analyzer, Precision Pyranometer, Solar PV Module Analyzer, LED Lighting Testing System, Solar Power Generation System, Solar Hot Air System Trainer, Sunshine Recorder, Experimental Solar Simulation Trainer, Digital Lux Meter etc.* ***Advance bio-energy Lab*** *The flooring, colouring, sliding facility to window and electrification etc. were done. Also, this laboratory consists of newly purchased instruments, equipment's such as Fuel Cell Trainer, Bio Energy Trainer, PH Meter Various Ranges, Digital Hot Air Oven, Muffle Furnace, Bomb Calorimeter, Pulverizing, Grinding & High-Capacity Mixture Machine, Tachometer, Hot Wire Anemometer etc.* ***Renewable energy fabrication Lab*** *The flooring, colouring, sliding facility to window and electrification etc. were done. Also, this laboratory consists of newly purchased equipment's such as Welding Machines, Pipe Cutter Machine, Hacksaw Machine, Radial Drill Machines, Shaping Machines, Hydraulic Pipe Bending Machine, Hydraulic Angle Cutter, Portable Grinder Machines, Cordless Hand Drill Machines, Plasma Cutting Machine, Portable Drilling Machines, Solar Dryer Trainer, Workshop Tools Kit etc.* **NAHEP -CAET conference room** After renovation, the sitting capacity of the conference room is increased. The conference room is equipped Smart LCD Projector, PA System etc.	  **Solar Energy Lab**   **Renewable Energy Fabrication Lab**

Advanced Bioenergy Lab

Conference Hall

Solar dryers & cut models of biogas plant for skill development

Solar tunnel dryer of size 18×3.75 m with UV sheet, Solar tunnel dryer of size 12×3.75 m with PVC sheet, Solar -biomass hybrid drying system were installed and cut models of biogas plant like modified Janata, Deenbandhu & KVIC were created for skill development activities

Solar energy experimentation lab.

This laboratory is on open terrace of college building and renewable energy technologies like Solar sheffler collector with distillation unit, Solar cabinet dryer of natural convention, solar wind hybrid system, off- grid solar power plant (3 kW) were installed through NAHEP (IG), Dr. PDKV, Akola.

Biogas based electricity generation plant

The biogas-based electricity generation system developed under NAHEP at University Dairy, Dr. PDKV, Akola. The biogas of 50 m^3 run successfully & electricity is being supplied to dairy barn and PG students are conducting experiments on scrubbing of biogas for power generation. This developed system is useful for the conducting practical's and enhancing skill of the students and faculties.

1.2. How the facilitative units helped to enhance learning outcomes

Please provide the details of the facilitative units which helped in enhancing learning outcomes of the students and/or faculties. Please note that we may not need to mention all facilitative units created in the AU here, but focus on those which are open for the students/faculties and other stakeholders.

Facilitative unit	Activity/achievement	Remarks/Photographs
Modification of three laboratories and one - conference room, Solar dryers & cut models of biogas plant for skill development, Solar energy experimentation lab., Biogas based electricity generation plant	*Students from all four state agricultural universities of Maharashtra participated in the In –plant training of four month duration organized by NAHEP (IG), Dr. PDKV, Akola. The state of art facilities developed under NAHEP were provided for student's hands on training. The students were gone through the actual practical's of fabrication of renewable energy technologies like solar light insect trap, practical's of making value added product from agro-produce with the help of*	*Practical classes during summer training*  

	solar based technologies, practical's were conducted for students on various instruments equipment's available, Also, students get trained on biogas based electricity generation system and solar energy conservation.	*Practical classes during In-plant training*        

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

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

Out-of-box initiative	Activity/achievement	Remarks/Photographs
Conservation of solar energy	*Under green initiative 195 kW solar power plant generate green energy which saved INR 16-17 Lakh (Approximate) per annum. It is estimated that this power plant will generate 2,76,900 unit per annum. Also, installation of 400 Kw solar power plant is in progress which will save INR 45 Lakh per annum.*	 CAET, Akola  Tissue culture Lab  Raigad Hostel  Rukmini Hostel

		 Savitri Hostel  Shetkari Sadan
Incubation foundation to support Agri-startups	*PDKV Research & Incubation Foundation* *MSInS, Govt. of Maharashtra has sanctioned PDKV Research & Incubation Foundation for the duration five years from 2018-19 with grants of INR 5 Crore. The letter of intent was given by Hon'ble Governor of the state Mr. C. Vidyasagar Rao with Hon'ble Chief Minister of the state Mr. Devendra Fadnavis on 03 Oct., 2018. This incubation foundation is working for establishment of facilities to increase start-up in Agri. sector.*	 *The letter of intent for incubation centre was given by Hon'ble Governor of the state Mr. C. Vidyasagar Rao to Dr. M. B. Nagdeve, Dean (Faculty of Agril. Engg.), Dr. PDKV, Akola at Governor House, Mumbai on 03 Oct., 2018.*
Cash prize for Innovation	*The NAHEP (IG) Dr PDKV, Akola has received the THIRD CASH PRIZE of INR 25000/- in INNOVATION IN AGRICULTURE category of Startup India Maharashtra Yatra on 04 Nov., 2018 at Nagpur with the auspicious hands of Hon'ble Mr. Nitinji Gadkari, Minister for road transport and highways, Govt. of India.*	 *Dr. S. R. Kalbande, PI, NAHEP -IG, Dr. PDKV, Akola received cash prize in Innovation in Agriculture in Start-up India Maharashtra yatra on 04 Nov., 2018 at VNIT, Nagpur with the auspicious hands of Hon'ble Mr. Nitinji*

		Gadkari, Minister for road transport and highways, Govt. of India

1.4. Collaborations with industry and other HEIs for bringing relevancy and improving research effectiveness

Please provide the details on relevant collaboration with industry for bringing relevancy and improving research effectiveness in the AU in one-two paragraph.

Collaborations	*Activity/achievement/purpose*	*Remarks/Photographs*
Clean Max Enviro Energy Pvt. Ltd., Mumbai.	*Roof top solar power plant is installed at PDKV, Akola under Department of Unconventional Energy Sources and Electrical Engineering with sponsorship of Clean Max Enviro Energy Pvt. Ltd., Mumbai. This solar power plant of capacity 123.50 kW is installed at roof top of College of Agricultural Engineering and Technology, Akola and 71.5 kW is installed at Department of Agronomy, Akola. Totally 195 kW roof top power generation plant is installed at university campus in Akola.* *This solar power generation plant was inaugurated on 06 July, 2019 with the auspicious hands of Dr. Anilji Bonde, Hon'ble Minister of Agriculture, Maharashtra State. The approximate 2,76,900-unit electricity generation per year will be expected from this solar power plant. Due to this the University will save Rs. 16-17 Lakh per year on electricity bill expenses.*	 *Roof top solar power plant at building of CAET, Akola*  *Inauguration of solar power generation plant on 06 July, 2019*
Mahaurja Pune	*Under green initiative, installation of 400* ***kW Solar PV Power*** *Generation Plant is in progress,* Once operational the project will save **Rs. 45 Lakh** every year. Mahaurja, Pune and e-Urja Infrastructure, Mumbai will bear the expenses of the plant installation. The MoU has been signed between Mahaurja, Pune & Dr. PDKV, Akola on 13th January, 2021.	 *MoU signed on 13 January, 2021*

2. Achievements made through IG under NAHEP

2.1. Output-outcome monitoring

S. N.	Particulars	Apr'2018 to Mar'2022	
		Plan	Achievement
1.	AU accredited with revised norms and standards of ICAR (Yes/No)	N.A.	01
2.	Number of short-term institutional objectives finalised by AU	03	03
3.	Number of long-term institutional objectives finalised by AU	02	02
4.	Number of innovation grants given	N.A.	01
5.	Number of e- enabled learning activities initiated in AU (MOOC platform, virtual labs, video lectures)	Nil	Nil
6.	Number of trainings (national and international) undertaken for faculty upgradation	09	07
7.	Number of international trainings undertaken by faculties under IG comp	03	02
8.	Number of national trainings undertaken by faculties under IG comp	03	04
9.	Number of international trainings undertaken by students under IG comp	Nil	Nil
10.	Number of national trainings undertaken by students under IG comp	06	10
11.	Number of Master and Ph.D students Sandwich Programme undertaken with foreign universities/ National institutions	Nil	Nil
12.	Number of alumni linkages to secure international branding	Nil	Nil
13.	Centre for career development established (yes/no)	Nil	Nil
14.	Number of industry seminars and professional workshops from experts to better prepare students for final placements	11	12
15.	Number of direct beneficiaries of the project	8040	11949
16.	Number of female beneficiaries out of total direct beneficiaries	2412	3743

Observation
Due to covid-19 pandemic the international training could not be arranged as per the targets.

2.2. Knowledge Management Collaterals

I. Knowledge Collaterals	Apr'2018 to Mar'2022
1. Publications	08
2. Research Articles	15
3. Annual Reports	04
4. Books	01
5. Success Stories	11
6. Newsletter (University)	12
7. Magazines	Nil
8. Blogs	15

II. Mobile and Web Applications	Apr'2018 to Mar'2022
1. Mobile Applications Developed	01
2. Web Applications Developed	Nil

III. Number of IPR (Intellectual Property Rights) Registered/Obtained	Apr'2018 to Mar'2022
1. Copyrights	Nil
2. Patents	Nil
3. Others	Nil

IV. Dissemination and Outreach	Apr'2018 to Mar'2022
1. No. of Posts on Social Media	43
2. No. of Posts on Newspaper	74
3. No. of Posts on Magazines	Nil
4. No. of Unique Promotional or Outreach Collaterals	Nil

2.3. Input and activity monitoring

Total funds received during 2018-2022 by PIU (INR Lakhs)	500
Total funds received till 2018-2022 (Cumulative) (INR Lakhs)	500
Total expenditure during the year 2018-2022 (INR Lakhs)	486.85419
Total expenditure till 2018-2022 (Cumulative) (INR Lakhs)	486.85419

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs		Activity elaboration
		Utilization	Planned	
Goods and equipment	Equipment, Plant & Machinery	**00**	**00**	

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
	Office equipment	**4.93287**	**5.00**	The facilities were created for the participants of the various trainings organized by NAHEP. Also, during the other period these facilities are useful for the staff and visitors.
	Laboratory equipment	**59.33420**	**59.94827**	The various laboratory equipment's were purchased to create facility for conducting practicals of participating students / faculties on various renewable energy-based technology during trainings. The practicals and theory classes will help to the students for their skill enhancement in Renewable Energy Sector. Also, these activities in the training will help for the capacity building and upgradation of the participating faculties.
	Furniture & fixtures	**12.99455**	**13.00**	The facilities were created for keeping record i.e. various office files, records, books and instruments were stored in the cupboards and Bookcase. Office tables were purchased for the seating arrangement of contractual persons appointed in NAHEP. E-class room training tables and executive chair are necessary and provide facility for conducting training classes.
	Computers and Peripherals	**8.60173**	**8.60173**	These facilities were created for day-to-day office work of NAHEP, For Report preparation and printing to maintain the office record in soft files as well as in hard copy.
	Books and Journals	**2.47327**	**3.00**	These newly purchased various books will help for enhancing the study material having emphasis on new trend, innovative research and current

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
				scenario in agriculture and agril. Engg. Also, the availability of these books will improve the capability of the students for various examination Preparation. This facility is created for PDKV Students Forum.
Civil works	Minor repair and renovation work	**24.00601**	**24.200**	The necessary facilities for renewable energy gadgets, modules etc. were created. workshop facility is created, modern class room facilities were formed. For conducting various trainings, training room with necessary facility is created. Hence it will help to improve teaching friendly environment.
Human capacity building	National level training	**31.98635**	**32.000**	**National Training** 1. Prospectus of entrepreneurship in agriculture and renewable energy (22 November – 01 December, 2018) 2. Issues of Entrepreneurship in Agriculture and Technology (05 -14 November, 2019) 3. Indian agricultural education system and entrepreneurship scope in 21st century (e-Training) (05-14 August, 2020) 4. Environmental practices and Renewable Energy Utilization (e-Training) (05-14 January, 2021) **Faculty Development Training Program** 5. Faculty Development program with an intention to Increase teaching effectiveness by Smart Series, Banglore (14-15 January, 2019) 6. Enhancing Efficiency and Effectiveness to Develop Entrepreneurship

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
				Ecosystem" by ICAR, NAARM, Hyderabad (11-20, February 2020) **Summer training for students** • Skill development in renewable energy and application in rural sector (1 -30th June, 2018) • Skill development in Renewable Energy Systems (1 -30th June, 2019) • Skill development and entrepreneurship development in renewable energy (e-training) (1 -30th June, 2020) • Skill development and entrepreneurship development in renewables and agro-tech for B.Tech (Agril. Engg.) graduates (e-training) (15 June to 14 July, 2021) **In –plant training for students** • Skill Development and Entrepreneurship Development in Solar energy (01 Jan. to 30 April, 2019) • Capacity Building and Skill Development in Renewable Energy (1 January, 2020 to 30 April, 2020) • Capacity Building and Skill Development in Renewable Energy (1 Jan – 30 April, 2021) • Skill Development and Entrepreneurship Development in Renewable Energy (01 Jan 2022 to 30 April 2022)

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
				Personality Development program (For Student) with an intention to "Ignite young minds" by Smart Series, Banglore, (16-17 January, 2019) **Two-weeks online training for students** Preparation of competitive examinations AIEEA/AICE/ICAR (21-31 July, 2020)
	International level training	**9.35227**	**20.000**	**International Training organized** 1. Capacity Building and Skill Development in Renewable Energy (1-10 January, 2019) **Participation of faculty in International Training** "Japan Agricultural & Education Exchange Program" Organized by NPO solar water green project Japan, at Tokyo, Japan (16 to 22 June, 2019)
	Short visit/ seminars	**29.99743**	**30.000**	**International Conference** 1. Entrepreneurship in Agriculture and Renewable Energy Sector (15-16 March, 2019) **National Conference** 2. Agricultural Engineering:50 Years in Service of Farmers through Agro-Entrepreneurship (29-30 November, 2019) 3. Agricultural Education, Innovation and Research for future livelihood Indian Scenario in 2050 (e-Conference) (28-29 January, 2021)
	Meetings and workshops	**47.73743**	**47.850**	**Brain storming workshop** 1. Employment generation opportunities in Renewable

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs		Activity elaboration
		Utilization	Planned	
				Energy – A Scope in Agricultural Education System (15 Sept., 2018) 2. Role of Agriculture Graduate in 21st Century for sustaining Indian Economy (23 July., 2019) 3. Student empowerment in current scenario of agricultural education (e-workshop) (20 July, 2020) **Industry-Institute Meet** 4. Coping Agricultural Students as an Entrepreneur (14 December, 2018) 5. Innovative start-ups in agricultural sector (e-Meet) (30 July, 2020) 6. Agricultural Innovations and Entrepreneurship for Reforming Indian Agriculture (e-Meet) (12 August, 2021) **Alumni Meet** 7. Dr. PDKV Alumni meet (06 February, 2020) 8. CAET Golden Jubilee Alumni Meet (04 -05 March, 2022) **Four Days National e-Workshop** 9. Personality and Leadership Development Program for Agroneers (22-25 Sept.,2020) 10. **Startup India Maharashtra Yatra-Boot Camp** (With collaboration of Maharashtra State Innovation Society Govt. of Maharashtra) (27 Oct., 2018) **Two days sensitization e-workshop**

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
				11. Startup opportunities for agricultural graduates (23 -24 June, 2021) **Expert Lecture Series 2021-22** 12. A total 10 No. of expert lectures organized in the month of Jan & Feb, 2022
Consultancy	National level consultancies	**0.00**	**0.00**	
Recurrent cost / Miscellaneous	Travel	**9.18225**	**9.50**	Travel cost of the faculties, contractual staff, supporting staff and other officials related to NAHEP work, training, conference, visit at national level etc.
	Contractual services	**109.92303**	**110.40**	The contractual staff appointed at NAHEP, Dr. PDKV, Akola are included RA -01 No. SRF – 03 Nos., JRF – 02 Nos., Technician – 06 Nos., Account Assistant – 01 No., Laboratory Assistant – 02 Nos., The contractual services of the staff are necessary for smooth functioning of the various NAHEP activities and NAHEP office work.
	Operational costs	**136.33280**	**136.50**	It includes following activities • Raw material for fabrication, erection and installation charges of two solar tunnel dryer of different capacities • Raw material for fabrication, erection and installation charges of modified biogas plant for electricity generation • Raw material for fabrication of solar insect trap • Raw material for conduction of skill operation to convert agro-produce in to value added product • Raw material for skill practical of SPV System • The raw material for fabrication of solar biomass

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs		Activity elaboration
		Utilization	Planned	
				hybrid drying system for 100 kg batch • The raw material for fabrication of solar cabinet dryer natural convention and force convention – 100 kg batch • Raw material for fabrication of bio-oil reactor • Raw material for cut models of biogas plants like modified Janata, Deenbandhu, KVIC and traditional and practical purpose • Repair and maintenance of biomass gasifier-based power generation system of 11 KVA with electrical system and batteries and raw materials (biomass) • Repair and maintenance of institutional biogas electrical generation plant of 20 m^3 capacity with gas pipelines, gas engines and other electrical connection and panels • Printing of manual, booklet, essential books etc. • POL, Hiring of Vehicle etc. • Students Innovative Research Project • Preparation of website • Maintenance of water supply sources, pump, piping and electrification • Essential software's were purchased for teaching and research purpose • Renovation of solar tunnel dryer of size 3 x 6 m. i.e., replacement of UV sheet, colouring, providing turbo ventilation, sensors and control panel, fabrication of trolleys & minor civil work etc. • Modification of solar sheffler collector with distillation unit viz. backup with biomass-

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
				based heating unit, with temp sensors, oil separation system etc. • Raw material for fabrication of solar street light • Preparation of architectural display of renewable energy technology at open ventilation space in *Varandha* with partition and flooring matin, lighting, net at corridor of NAHEP seminar hall • AMC of computers & other equipment's in NAHEP • Modification of existing biochar machine in order to increasing effectivity and efficiency • Charges of two daily wages labour appointed in NAHEP for feeding of cow dung and maintenance of 50 m^3 *Biogas based electricity generation plant and* for cleaning of LABs and Office, also helps in research activities, training conducted by NAHEP. • Other expenses for operation of NAHEP
	Institutional charges	**0.00**	**0.00**	
Total		**486.85419***	**500**	

* The total amount of utilization may vary because the amount of utilization under the head of travel & operational cost may vary.

Observation
Due to covid-19 pandemic the international training could not be arranged as per the targets. Hence the utilization is less under this head.

2.4. NAHEP outreach and other unique initiatives undertaken

Please provide the brief progress undertaken against the different categories placed below along with the suitable photographs/links/documents etc. Please note that only significant activities/initiatives are to be incorporated in this document.

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.)

Illustrative: Success story

Agri startup (Vermicompost and butter Mushroom)

Mr. Om Gulhane is an Alumni of College of Agricultural Engineering & Technology, Dr. PDKV, Akola. In the year 2018-19, he has participated in Summer Training, In-plant Training and Industry –Institute Meet organized by NAHEP –IG, Dr. PDKV, Akola. During the industry-institute meet, he inspired by the speech of entrepreneurs on their journey to become entrepreneur. Now, he has his two start-ups i.e. Kamal Agrotech & Vaitulaya Agro Producer Company at his native place At. – Karanja (Lad), Dist.- Washim, Maharashtra State. The main products are vermicompost and button mushroom.

Biomass based air heating system for the thermal application

The biomass-based air heating system is designed and developed under NAHEP and installed at Biomass Experimentation Lab, Dr. PDKV, Akola. The developed system is useful for drying of grains, vegetable and medicinal crops. The system is operating on the controlled mechanism and it helping students to enhance the skill during the practical's and leads towards the entrepreneurship.

Development of battery electric vehicle sprayer

Innovation on Battery electric vehicle sprayer is allotted under Innovative Research. The development of the technology is completed. This is a new concept and beneficial to the farming community by utilizing green energy & it is helpful to reduce dependency on fossile fuels.

Biogas based Electricity Generation Plant

The biogas-based electricity generation system developed under NAHEP at University Dairy, Dr. PDKV, Akola. The biogas of 50 m^3 run successfully & electricity is being supplied to dairy barn and PG students are conducting experiments on scrubbing of biogas for power generation. This developed system is useful for the conducting practical's and enhancing skill of the students and faculties.

Facilities for benefits of the students

Students from all four state agricultural universities of Maharashtra participated in the In –plant training of four month duration organized by NAHEP (IG), Dr. PDKV, Akola. The state of art facilities for student's hands on training are developed. The students were gone through the actual practical's of making value added product from agro-produce with the help of solar based technologies.

Organization of University Alumni Meet

For the first time in Dr. PDKV, Akola the University Alumni Meet is organized by NAHEP (IG), Dr. PDKV, Akola. The alumni of university, students and all faculties 1453 No. have attended the meet. The program was inaugurated at the auspicious hands of Alumnus Hon'ble Shri. Sunil Kedar, Cabinet Minister, Animal Husbandry, Dairy development, Sports and Youth Welfare, Govt. of Maharashtra.

Facility supports to Farmers

Mr. Satish Nanote, a farmer of Ujaleshwar Village, Po. Mahan Tq. Bharshitakli, Dist. Akola (M.S.) has approached for drying of medicinal crop (Shatavari - Asparagus racemosus)as they sell their product by sun drying and getting less product value. The tunnel dryer installed through NAHEP (IG), Dr. PDKV, Akola & the facility provided to farmer to make the value addition for processing of medicinal crop so as lead towards the successful business. Uptill now 03 Tonnes of Shatavari dried by using the solar tunnel dryers.




Organization of CAET Golden Jubilee Alumni Meet


On the eve of golden jubilee year of college of Agricultural Engineering & Technology, Akola. The Alumni meet for CAET, Akola is organized on 04- 05 March, 2022. The Alumni of the college, students and faculties 246 No. have attended the meet. The program was inaugurated at the auspicious hands of Dr. R. B. Sharma, Former National Co-ordinator, NAHEP (IG), ICAR, New Delhi & Senior Technical Consultant, Ministry of Agriculture & Farmers Welfare, Govt. of India. The meet includes experience sharing by Alumni for placement opportunities, industry linages with students, panel discussion on opportunities and challenges for Agricultural Engineers and key note lecture on Entrepreneurship opportunities for Agricultural engineers. In this Alumni meet main emphasis is given on the awareness about entrepreneurship development and its importance in current scenario.

Radhakishan Shanti Malhotra Cash Prize

Dr. S. R. Kalbande, PI, NAHEP (IG) & Head (UCES & EE) has received "Radhakishan Shanti Malhotra Cash Prize" on 05 Feb, 2019 for outstanding research work in the field of Agriculture with the auspicious hands of Hon'ble Mr. Chandrakant Patil, Cabinet Minister for revenue and public works department, Govt. of Maharashtra state with Hon'ble Mr. Sudhir Mungantiwar, Cabinet Minister of finance & planning and forests, Govt. of Maharashtra state.

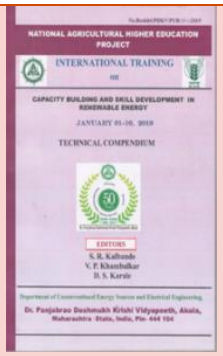
16th State level Energy Conservation Awards 2020-21

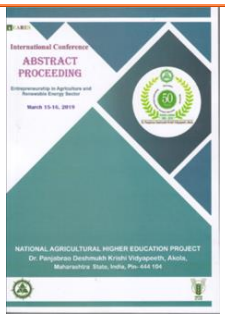
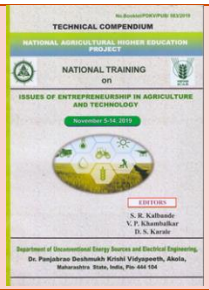
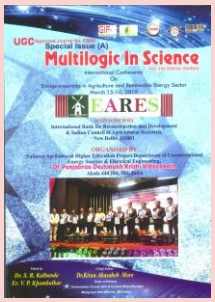
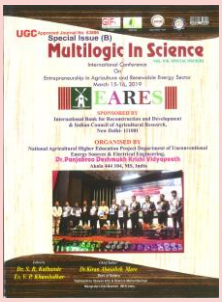
The 16th State Level EC conservation award 2020-21 to PDKV, Akola announced by Maharashtra Energy Development Agency, Pune on 15 Dec.,2021. Under university category, 1st award is given to Dr. PDKV, Akola. The award is given for outstanding work for efficient utilization, management and conservation of energy during the year 2020-21 at main campus of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

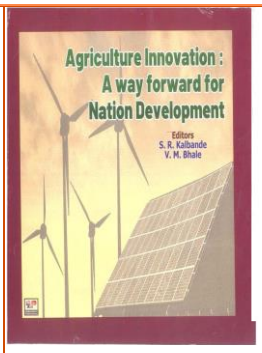
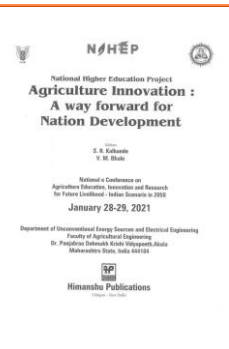
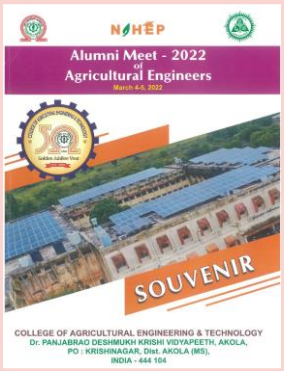
Bhausaheb Mane Krushi Gourav Purskar 2021-22

Dr. S. R. Kalbande, PI, NAHEP -IG, Dr. PDKV, Akola has received Bhausaheb Mane Krushi Gourav Purskar on 09 January, 2022 at College of Agriculture, Umarkhed, Dist.- Yavatmal for outstanding research work in the field of Agriculture during the year 2021-22.

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,

S.N	Category of the collateral	Brief summary	Snapshot/cover page	Weblink (if any)
1	Website	NAHEP (IG), Dr. PDKV, Akola		https://pdkv-nahep.org/
2	Reports (Technical Compendium)	No.Booklet/PDKV/PUB/ 545 /2018, Technical Compendium of National Training on Prospects of Entrepreneurship in Agriculture and Renewable Energy (Duration: 22 November to 01 December, 2018)		
3	Reports (Technical Compendium)	No.Book1et/PDKV/PUB/562/2019, Technical Compendium of International Training on Capacity Building and Skill Development in Renewable Energy (Duration: January 01-10, 2019)		

4	Reports (Technical Compendium)	Book/PDKV/PUB/566/ 2019, Technical Compendium of International Conference on Entrepreneurship in Agriculture and Renewable Energy Sector (March 15-16, 2019)		
5	Reports (Technical Compendium)	No.Booklet/PDKV/PUB/583/2019, Technical Compendium of National Training on Issues of Entrepreneurship in Agriculture and Technology (Duration 05-14 November, 2019)		
6	Reports (Technical Compendium)	No.Booklet/PDKV/PUB/584/2019, Technical Compendium of National Conference on Agricultural Engineering:50 Years in Service of Farmers through Agro-Entrepreneurship (Duration: 29-30 November 2019)		
7	Reports (Research Journal)	Multi logic In Science Journal, Vol VIII, Special Issue A & B, NAHEP ICAR Sponsored International Conference on EARES -2019, at Dr. PDKV, Akola	 	

8	Abstract Book	Abstract book published by Himanshu Publication (ISBN: 978-81-7906-934-9, Edition: 2021) of National e conference on Agriculture Education, Innovation and Research for Future Livelihood - Indian scenario in 2050 (Duration : 28-29 January, 2021)	  
09	Souvenir of Alumni meet-2022 of Agricultural Engineers	No. DEE/PDKV/CAET/Alumni Meet /Booklet/ 666/ 2022	 

c) Unique initiatives undertaken due to <u>Covid-19 disruption</u>

1. Digital infrastructure

(development of digital/smart classroom, virtual reality facility, digital library system, other digital education and administrative infrastructure etc.)

Modernize three laboratories and one conference room equipped with state of art equipment & instruments through fund received in NAHEP (IG), Dr. PDKV, Akola.

2. Digital initiatives:

(organizing trainings through online, conducting online examinations, administering attendance, developing of web applications, e-learning modules etc.

S.N	Category of the collateral	Digital initiative	Practice before introduction of the initiative	Practice after introduction of the initiative
1	Online Trainings	Six trainings, six workshops and one conference were organized through online mode	NAHEP staff- trained for application of various virtual platform. The internet facility is updated as per requirement of virtual platform.	The digital attendance of participants, conduct online exam of trainee, e-certificate distribution as per the attendance and feedback form.

Please provide maximum 5 photographs with high quality (minimum 1-2MB) and label with suitable caption. Attach the photographs separately in the mail.

CAET Golden Jubilee Alumni Meet -2022 organized during 04 -05 March, 2022 at College of Agricultural Engineering & Technology, Dr. PDKV, Akola

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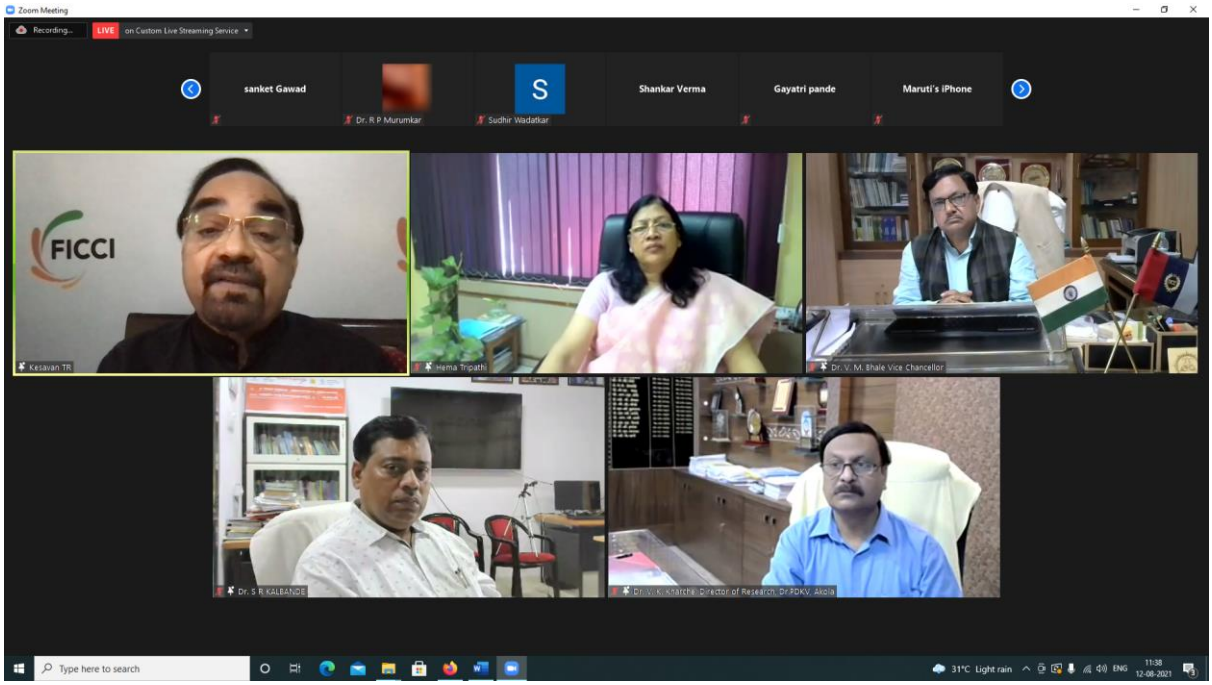
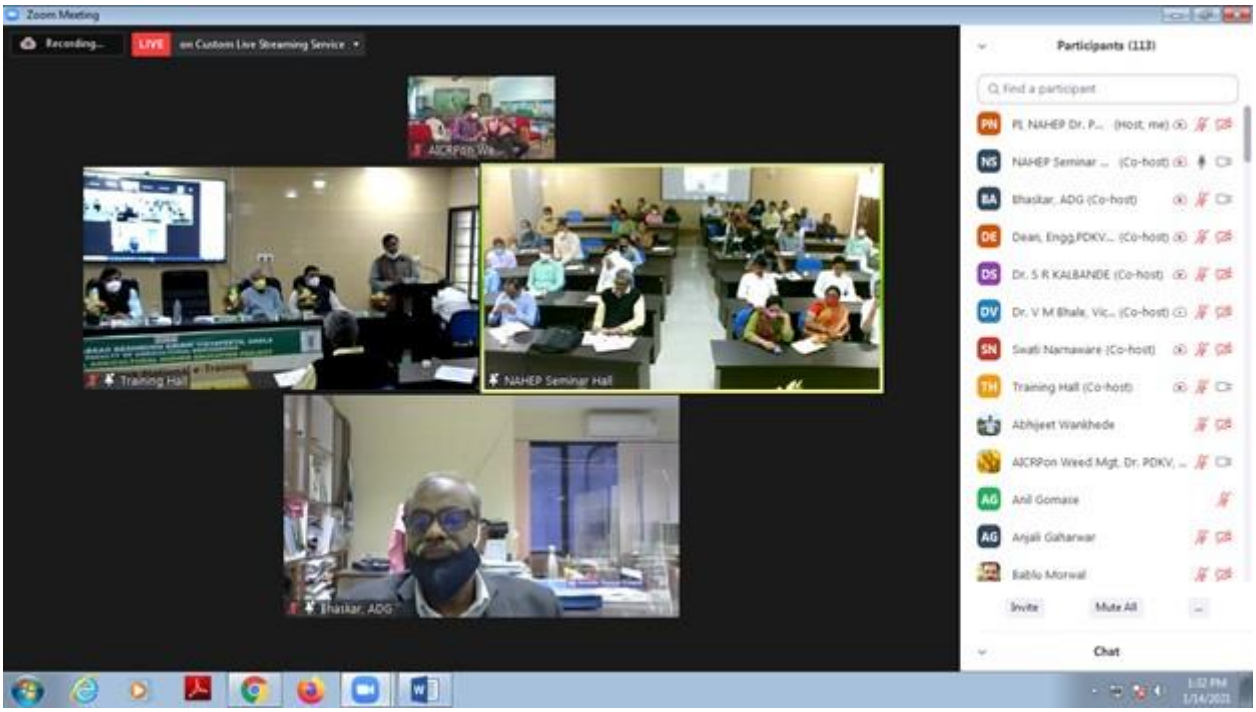


Inaugural program of Industry Institute e-Meet on "Agricultural Innovations and Entrepreneurship for Reforming Indian Agriculture" Organized on 12 August, 2021

Inaugural program of National e-Conference on "Agricultural Education, Innovation and Research for future livelihood Indian Scenario in 2050" organized during 28-29 January, 2021



Valedictory program on 14 January 2021 of National e-Training (Hybrid mode) on "Environmental practices and Renewable Energy Utilization" (Duration: 05-14 January, 2021)

Valedictory program on 14 January 2021 of National e-Training (Hybrid mode) on "Environmental practices and Renewable Energy Utilization" (Duration: 05-14 January, 2021)

3. Potential impact of the intervention:

Observation

Under NAHEP -IG, Dr. PDKV, Akola the solar energy lab., advance bio-energy lab., renewable energy fabrication lab., were renovated and developed by enhancing the renewable energy-based gadgets purchase and installation in the laboratories. One conference room was developed with the advance facilities. Solar tunnel dryers were installed. Cut models of biogas were created. Biogas based electricity generation plant erected and installed at university dairy. In the solar experimentation laboratory situated at roof top of the college building solar sheffler collector with distillation unit, solar wind hybrid system, solar cabinet dryer of natural convection and off-grid solar power plant (3 Kw) were installed. Water facility is created in college campus by creation of borewell, 1 km pipeline from borewell to college. Solar street lights were installed in college campus, various books of Agriculture, Agril. Engg. and renewable energy were purchased. Under innovative research project biomass-based air heating system for thermal application and battery electric vehicle sprayer has been developed both these technologies are needful for agro-sector in the modern era.

By using the various developed facilities under NAHEP-IG, Dr. PDKV, Akola the capacity building and skill development trainings were organized for student. A total 1267 No. of students were trained through four months in-plant trainings & one month summer trainings organized for student. Similarly in industry-institute meets 1734 No. of students participated and in brain storming workshops 1506 No. of students were participated during the four years project tenure. National training programs focused on entrepreneurship opportunities in renewable energy and agro-sector were organized for capacity building of the faculties. A total 1181 No. of faculties were trained through those trainings.

One of the alumni of College of Agricultural Engineering & Technology, Akola participated in the programs organized by NAHEP-IG, Dr. PDKV, Akola in the year 2018-19 such as summer training, in-plant training and industry institute meet. He inspired by the speech of the entrepreneur about their journey to become entrepreneur. Now, he has two Agri-startups at his home town.

Through facilities like solar tunnel dryer students were gone through the practicals of value addition of agro-commodities through solar drying. The facility of solar tunnel dryers made available to support the farmer and one farmer from Akola district utilize the solar tunnel dryers and dried 3 tonnes of medicinal crop i.e. Shatavari (*Asparagus racemoscus*). So, support has been given to Agri-bussiness though value addition of agro-commodity by using solar tunnel dryer.

Besides that, students cleared various top entrance examination and got admission in the top institute of PG, Ph D. courses and business schools. Through the various facilities created, it improved the quality of research and education. Also, the student created Agri-start-up.

The facility of water arrangement created through NAHEP helps to maintain the green cover in college campus. Also, in the college campus through the solar street lights, it creates appealing and modern visual environments that also promote renewable energy sources and conserve energy.

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

Challenges	
1	In earlier period of the project, Implementation of PFMS for NAHEP project in university is very difficult task as the hierarchy formation is not completed at that time. The trained manpower is not available in earlier period.
2	In covid situation some program schedule was postponed & because of the change in schedule re-organization of program on revised schedule is become difficult & challenging
3	In covid situation due to organization of the program in virtual mode, for the practical's /demonstration of the technology, separate videos were created for the various renewable energy technology. Those videos were shown to the participants to cover the practicals classes /technology demonstration part of the training program.
Lessons learned	
1	The training program organized by ICAR related to PFMS were helpful for the smooth functioning and implementation of PFMS for NAHEP project in the university.
2	Virtual program organization needs on time communication with the participants. Also for organization of the virtual program high speed internet facility is most important factor.

5. Sustainability Plan

5.1. Sustainability plan for reform ready interventions for the AU

- *Does the AU has any sustainability for reform ready interventions in future? (Yes / No)*
- *If yes, How the AU is planning to sustain the reform ready interventions in future?*

1	The three laboratories viz. solar energy lab., advance bio energy lab and renewable energy fabrication lab etc. & other facilities developed under NAHEP-IG, Dr. PDKV, Akola. Also, one conference room was renovated. All these facilities will be used for the practical classes, innovative research activities, skill development & capacity building activities of the UG, PG & Ph D. students. The technology extension activities organized for farmers on the renewable energy technologies. The renovated conference room will be useful for the various training program, meetings, seminars, viva-voce of PG & Ph D. students, walk in interview etc. All these facilities will be made available through PDKV Research and Incubation Foundation to support the start-ups in Agro-sector. Efforts will be made for revenue generation through those facilities and maintain & developed the facilities to support the entrepreneurship culture in the university.

5.2. Sustainability plan to continue ICAR accreditation

- *Does the AU has any sustainability plan to continue ICAR accreditation in future? (Yes / No)*
- *If yes, How the AU is planning to sustain the ICAR accreditation in future?*

1	University has established the ICAR, Nodel cell for the smoothing of accreditation process of university and its constituent colleges, similarly it helps for the allocation of ICAR- CA grants under the various heads
2	University has regularly organized the skill & capacity building program for the staffs and students for their skill development
3	University has established the e-learning resources like smart classrooms, e-library, language labs at university main campus and its constituent colleges in the other campuses of the university to achieve the student centralized learning process.
4	University has established PDCF (Panjabrao Deshmukh Competitive Forum) for the upliftment of the student to encourage them for various competitive examination viz., UPSC, MPSC, Banking etc.
5	University will follow all the guidelines of National Agriculture Education Accreditation Board (NAEAB), ICAR, New Delhi to sustain the ICAR accreditation in future