aesa Sharing, learning and networking for innovation Blog 145: May 2021 Agricultural Extension in South Asia

NAHEP: BUILDING ENTREPRENEURSHIP CAPABILITIES AND CREATING IMPACT


National Agricultural Higher Education Project (NAHEP) is designed to strengthen the National Agricultural Education system in India with the overall objective of providing more relevant and high-quality education to agriculture university students. In this blog, Dr Hema Tripathi and Dr RC Agrawal discuss the key features of NAHEP and reflect on its progress.

CONTEXT

In India, the demand for a skilled workforce with industry orientation has increased significantly in both public and private sectors. Building and inculcating relevant skill sets in agriculture university graduates through higher education that is imbued with superior quality has always been a major challenge at the global level, including in India. In this context, most of the agriculture-dominated countries are making constant efforts to enhance quality, standards, and earn recognition for their agricultural higher education system. Several countries, including China, Japan, Korea, Germany, Taiwan, and Russia have made these changes in their systems of agricultural education. It is, therefore, imperative for India as well to prepare the ICAR-Agriculture University (AU) system to face challenges posed by the changing agricultural and economic environment and respond appropriately so as to take full advantage of advances in frontier sciences and technologies. The National Agricultural Higher Education Programme (NAHEP) implemented by ICAR (Box 1) with a total project cost of USD 165 Million (INR 1100 Cr approximately)[1], on a 50:50 cost sharing basis between Government of India (GoI) and World Bank (WB), is an attempt in this direction. The financial details are presented in Box 2.

Students participating in an International Training under NAHEP

[1] 1 USD = INR 64.47 as on June 1, 2017

Box 1: National Agricultural Higher Education Project (NAHEP)

This programme aims to promote efficiency and competitiveness through changes in the working mechanisms of agricultural universities, raising the teaching and research standards through improved research and teaching infrastructure along with enhanced faculty competency and commitment, thus making agricultural education more attractive to talented students. It is envisaged that improved Agricultural University (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 shall contribute to the achievement of the overall programme objective. NAHEP was approved in October 2017, and subsequently the loan agreement was signed in the same month. The project commenced operation effectively from November 2017. As the Project Appraisal Document (PAD) of the National Agricultural Higher Education Project (NAHEP), World Bank (2017), clearly states, "The needs of the agricultural sector resonate with other sectors, i.e., highly trained workforce and relevant cutting-edge research. Two World Bank Global Practices – Agriculture and Education – are collaborating on the proposed NAHEP to ensure that the AU reform process benefits from innovations in both sectors across India and internationally. Through strategic priority interventions at the Central and State levels, NAHEP would have far-reaching and long-term impacts on agricultural higher education in India." As the project is jointly financed by the World Bank and ICAR, timely strategic inputs for effective implementation of projects are continuously being provided by both the funding partners.

Box 2: Project Cost and financing pattern (in USD Million)

Name of the component	Total	Share of Budget by component
1. Support to Agricultural Universities	**146.4**	**89%**
1a. Institutional Development Plans	**69.4**	**42%**
1b. Centres for Advanced Agricultural Science and Technology	**46.2**	**28%**
1c. Innovation Grants	**30.8**	**19%**
2. Investment in ICAR in Agricultural Higher Education	**10.4**	**6%**
3. Project Management and Learning	**8**	**5%**
Front-end Fee	**0.2**	-
Total	**165**	**100%**

PROJECT IMPLEMENTATION: GOVERNANCE MECHANISM

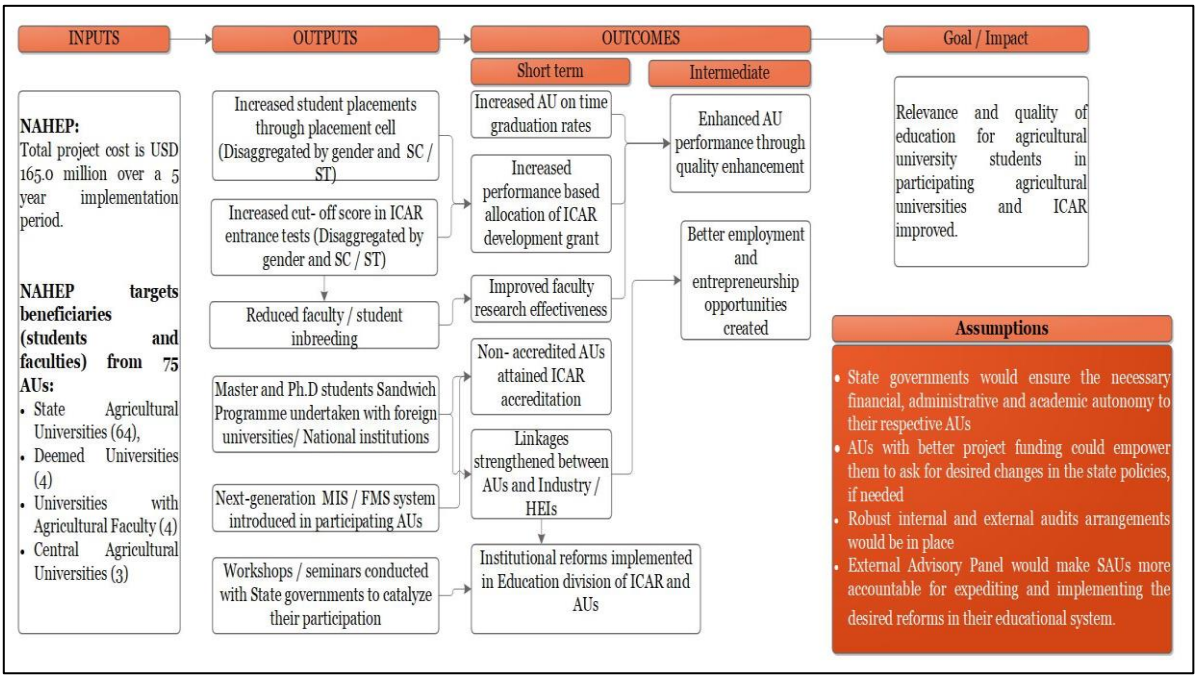
During the inception stage, several key documents like Project Implementation Plan, Expenditure Finance Committee (EFC) document, Procurement Plan and Guidelines, Financial Management Software (FMS) manual, and other project relevant documents were developed. The Education Division of ICAR is implementing NAHEP. The governing structure of NAHEP (Box 3) is comprised of National Steering Committee (NSC), Project Management Committee (PMC), Agricultural Higher Education Programme Committee (AHEPC) and Project Implementation Unit (PIU).

Box 3: NAHEP Governance Structure

Stakeholders	Roles and responsibility
National Steering Committee (NSC)	• The Steering Committee headed by the Director General, ICAR, is the apex body of NAHEP, providing strategic and policy guidance to the project.
Project Management Committee (PMC)	• The Director General, ICAR, chairs the PMC and has direct executive responsibilities for sanctioning/endorsing the proposed sub-projects and overseeing the effective and efficient implementation of the entire project, resource management and usage, and M&E activities.
Agricultural Higher Education Programme Committee (AHEPC)	• The members of the AHEPC are being proposed by the Project Implementation Unit (PIU) and approved by the PMC. This committee is responsible for awarding sub-projects and their effective and efficient implementation. Totally 58 projects viz., 18 under Institutional Development Plan (IDP), 16 under Centre for Advanced Agricultural Science and Technology (CAAST), and 24 under Innovation Grants (IG), have been approved and awarded till date.
Project Implementation Unit (PIU)	• The Project Implementation Unit (PIU) is responsible for overall project implementation, coordination and facilitation under the guidance and supervision of the Project Management Committee (PMC). The PIU has been established within the Education Division of ICAR and is led by the National Director (ND).
Partner AUs	• Partner AUs are awarded with the NAHEP sub-project, and governance at AU level is responsible for implementing the sub-project at AU level. National Coordinators of the different components are responsible for providing guidance to these partner AUs in effective implementation process.

WHAT AND HOW NAHEP INTENDS TO ACHIEVE PROJECT DEVELOPMENT OBJECTIVE (PDO)?

The programme logic or the theory of change (ToC) of NAHEP is presented in Figure 1.



Source: NAHEP (2019-20)

Figure 1. Representation of Theory of Change (ToC) for NAHEP

SELECT ACHIEVEMENTS AGAINST THE PDO (Till date)

NAHEP led to:

- Setting up of 16 Centres for Advanced Agricultural Science and Technology around different thematic areas;
- Transfer of 127 technologies to industry / private sector / national / international organizations;
- 144 – the number of industry-sponsored projects and positions in cutting edge areas received by partner AUs;
- More than 100 new facilitative units have been established to enable academic and research infrastructure (IIIC - Industry Institution Interaction Cell / start up cell / incubation cell / experiential learning unit / placement cell, etc.);
- 125 MoUs signed with industry for knowledge exchange programmes / internships / short term training programmes by partner AUs.

Due to such a large number of establishments under the project, partner AUs have been able to improve the quality of education, enhance the learning outcomes of students, upgrade the skill sets of faculties, and also provide modern technologies to farmers. Over and above all this, due to continuous adoption of digital technologies and ICT tools it has become very convenient to disseminate information to the beneficiaries very effectively and in a timely way. In due course of time, outcome and impact of the project will become more evident and learnings from such project would motivate other AUs to adopt similar initiatives so as to improve the quality and relevance of agricultural higher education.

The impact of NAHEP on Agricultural Education is also contributing to the achievement of several Sustainable Development Goals (SDGs) promoted by the United Nations (Table 1).

INITIATIVES TO PROMOTE ENTREPRENEURSHIP THROUGH NAHEP

International Trainings

Since inception, NAHEP has been encouraging and supporting students and faculties of partner AUs to visit the international HEIs (Higher Education Institutes), learn the emerging areas of science and technologies in agriculture, and share the rich experiences gained during the training for betterment of the Indian agricultural ecosystem. So far, eight partner AUs have established linkages with 28 HEIs such as Western Sydney University, Australia; Oklahoma State University, USA; International Training Center on pig husbandry, Philippines; and others, across 11 countries and supported 282 students for international training on entrepreneurship capacity development.

Table 1: Contribution of NAHEP towards SDGs

SDG	Activity	Output	Action Plan
Quality Education (SDG 4)	Organised over 2,000 skill development trainings on vocational, entrepreneurship, technical themes in agriculture, communication, etc.	• 2 students from Junagadh Agriculture University (JAU), Junagadh, have established their own start-up; • 2 students of Assam Agriculture University (AAU), Jorhat, made a profit of INR 12,000 from breeding Magur fish.	ICAR-Agricultural Education Division (AED) initiative to attract young talents: Organising 'Agricultural Education Fair' to attract Higher Secondary Education (HSE) students under the aegis of NAHEP partner AUs.
Decent Work & Economic Growth (SDG 8)	Programmes organized mainly under NAHEP enabled students to become entrepreneurs. It supports current market needs and enables students to become 'Job Creators' rather than 'Job Seekers'.	• 3 students of JAU, Junagadh, placed in Amnex Infotech Pvt. Ltd; • Outcome-focused trainings conducted under NAHEP – IDP helped students to get employed after graduation.	NAHEP will continuously improve the issues of unemployment, particularly for rural youth by improving employment opportunities and through entrepreneurship capabilities programmes.
Industry Innovation & Infrastructure (SDG 9)	• Established 3D printing lab at TANUVAS, Chennai, to demonstrate the anatomy of animals/birds; • Established AI lab at JAU, Junagadh, to get students acquainted with advanced technologies.	The key outputs envisaged through establishment of such facilitative Centres: increase in student placement rates, increase in timely graduation rates, improvement in research effectiveness of faculty.	Establishing new facilitative Centres with a focus on emerging areas of agriculture and allied sectors ultimately helps to improve academic excellence.
Climate Action (SDG 13)	NAHEP interventions target AU curricula reform so as to internalize climate change and resilience in current & future course content, and tie this with experiential learning, and for students to discover practical applications.	Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, has MoUs with institutes such as IWMI, Colombo; National Institute of Abiotic Stress Management (NIASM),Baramati; and Watershed Organisation Trust (WOTR), Pune, to collaborate for understanding industry and research needs on Climate Smart Agriculture.	NAHEP will focus upon education, awareness-raising, and human and institutional capacity building on climate change mitigation, adaptation, impact reduction and early warning.
Affordable and Clean Energy (SDG 7)	Bidhan Chandra Krishi Viswavidyalaya (BCKV), West Bengal, under NAHEP has developed solar-operated irrigation system. The technology is currently being used in high value crops with zero use of electricity and ensures high water use efficiency (WUE).	This innovation promotes the conservation of energy and supports achievement under the SDG indicator 7.2 – 'Increase substantially the share of renewable energy in the global energy mix'.	To ensure affordable, reliable and sustainable energy, NAHEP is promoting AUs to focus on such thematic areas for development of research and academic excellence.

Box 4: Two students of JAU, Junagadh, established their own start-up during final year of under graduation

In addition to national level trainings and seminars, visits to foreign universities under NAHEP have been organized for students with the aim of providing exposure in innovative areas of science and technologies. One of the key outcomes envisaged through these trainings is to build the entrepreneurial spirit among students around innovative and cutting-edge technologies in agriculture. Moreover, industry visits and skill development programmes have also been extensively organized to understand the current market needs and make the students ready as **Job Creators** rather than **Job Seekers.**

"Through our regular course work, we have gained domain knowledge on apiculture but the art of running a business came to us only through various training programmes conducted at the University through IDP-NAHEP."

Entrepreneur, (Madhav Organic Honey) and alumni of JAU, Junagadh

Creation of Facilitative Units and Capacity Building Initiatives

Project awarded AUs have established fully equipped facilitative centres to improve the academic, research and teaching effectiveness of faculties and students. These facilitative centres support by encouraging students to develop entrepreneurship / intrapreneurship / project management skills by organising entrepreneurship development programmes, expert guest lectures from international faculties, alumni meets, industry exposure visits, and in-plant trainings. In addition, establishment of Industry-Institute-Interaction Cells, Placement cells and Incubation cells helped to promote employability and entrepreneurship skills among students.

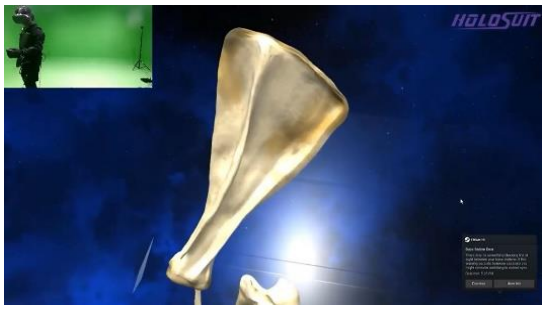
NAHEP-IDP facilitative unit at G. B. Pant University of Agriculture & Technology, Pantnagar

Box 5: Trainings of NAHEP helped AU students to qualify for the entrance exams of higher education

Acharya NG Ranga Agrculture University (ANGRAU), Guntur, received the NAHEP project in 2018 and multiple activities have been conducted by IDP-ANGRAU so far. Activities such as skill development programmes, international trainings, workshops and advanced methods of teaching have encouraged students to make significant achievements in the ICAR-AIEEA entrance exam conducted for Masters' programme, JRF, SRF and NET in the agricultural education field. Some of the successes helped ANGRAU, Guntur, to get recognition in the ICAR All India Entrance Examination for Admission (AIEEA).

University has received ICAR's AIEEA-PG-2018 award on 31 January 2019. This award is the result of students' efforts, especially those attained through the facilities created and trainings imparted under ICAR-NAHEP.

Digital Initiatives

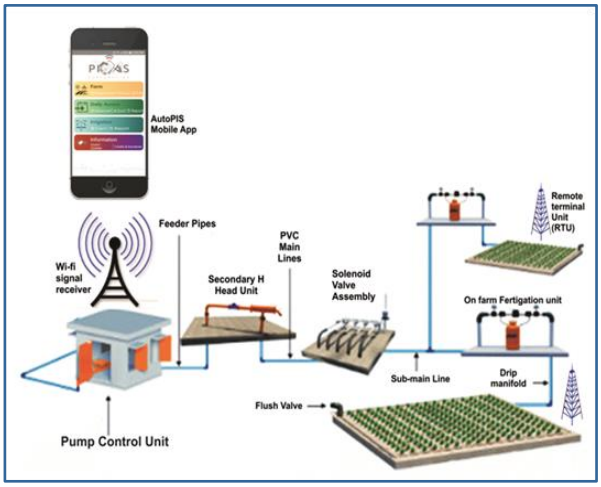


Virtual Reality facility established by TANUVAS, Chennai, under NAHEP.

The aim of these initiatives is to widen the reach of the teaching faculty so that they can provide global level scholarship to their students. This improves the quality of education and helps the students to develop their skill sets in order to meet the needs of new age industries. Solutions, such as developing digital infrastructure, mobile and web-based applications, Academic Management System, Alumni Portal, e-Courses etc., around emerging areas of agriculture have been playing an instrumental role in promoting entrepreneurship capabilities in agriculture and allied sectors through NAHEP. Significant digital initiatives worth noticing from NAHEP are as follows:

- Digitization of classrooms and improved teaching methods using digital aids, and e-modules to enhance teaching and learning outcomes;
- Establishing Virtual / Augmented Reality facilities to provide simulated experience of real world happenings to students;
- Established Artificial Intelligence lab / promoted IoT based sub projects with the objective of building future-ready entrepreneurs in areas such as AI, robotics, drones, agricultural sensors, CAD designing & simulation, and precision agriculture;
- Developed ~20 mobile applications and eight web-based applications in emerging areas of agriculture and allied sectors.

Box 6: Auto Phule Irrigation Scheduler (Auto PIS) developed by MPKV, Rahuri, focusing on Climate Smart Agriculture



In order to determine the exact water requirement of a specified crop, the 'Phule Irrigation Scheduler (PIS)' mobile application was developed to estimate the water requirement of a specified crop grown on a specified soil by simulating crop growth parameters, such as crop coefficient that takes into consideration the crop characteristics influencing the crop water requirement. Furthermore, by integrating other information on soil, location of farm, irrigation system, the precise irrigation water requirement and time of application for which the pump is to be operated is estimated.

After adoption of Auto PIS technology farmers can apply precise amounts of water in their fields, which saves on electricity, water and labour costs. This ultimately increases crop productivity and contributes to better soil health.

MONITORING AND EVALUATION (M&E)

The PIU-NAHEP appointed PricewaterhouseCoopers Pvt Ltd. (PwCPL) as M&E consultant to plan and execute day-to-day M&E activities, leading to an organized and objective implementation of different components and sub-components. The contracting and onboarding of the M&E consultant was

completed by October 2018, followed by development of framework and design of the M&E system of NAHEP. This was achieved through primary interactions, secondary research through detailed analysis, and review of internal documents. The major activities and achievements under this included M&E initiation activities, baseline finalization activities, Project Monitoring and Tracking System (PMTS) and Project Monitoring and Evaluation (PME) related activities. Documentation of NAHEP learnings and other need-based technical support to PIU were also made available under the M&E component of NAHEP.

After formulation of indicators of NAHEP Results Framework, the M&E team developed a web-based application - Project Monitoring and Tracking System (PMTS) - a mode to monitor and track the progress on these indicators on the basis of predefined frequency for each indicator. This online application is giving support by collecting the information in time through partner AUs. Due to this, the Project Implementation Unit (PIU) of NAHEP has been able to report good progress to the World Bank and other stakeholders as and when required.

Project Monitoring and Tracking System (PMTS)

CHALLENGES AND LEARNINGS

During the commencement of this project, there were a lot of hurdles with regard to procurement and finance related aspects. Over a period a seamless mechanism developed by the PIU has been followed and all sub-projects are being effectively implemented across the country. Since the beginning of the project, challenges at each stakeholder level are being addressed in a timely manner, particularly during the nationwide lockdown. Timely review meetings, capacity building activities, handholding webinars, M&E clinic, along with well-timed internal reviews and communication with partner AUs played a significant role in effective implementation of the project. Apart from this there has been continuous follow-ups with partner AUs in expediting overall progress at desired / targeted levels. Since the project is still in the implementing phase and trying to effectively manage under the guidance of various advisory and external expert committees, the lessons learnt will be more evident in due course of time.

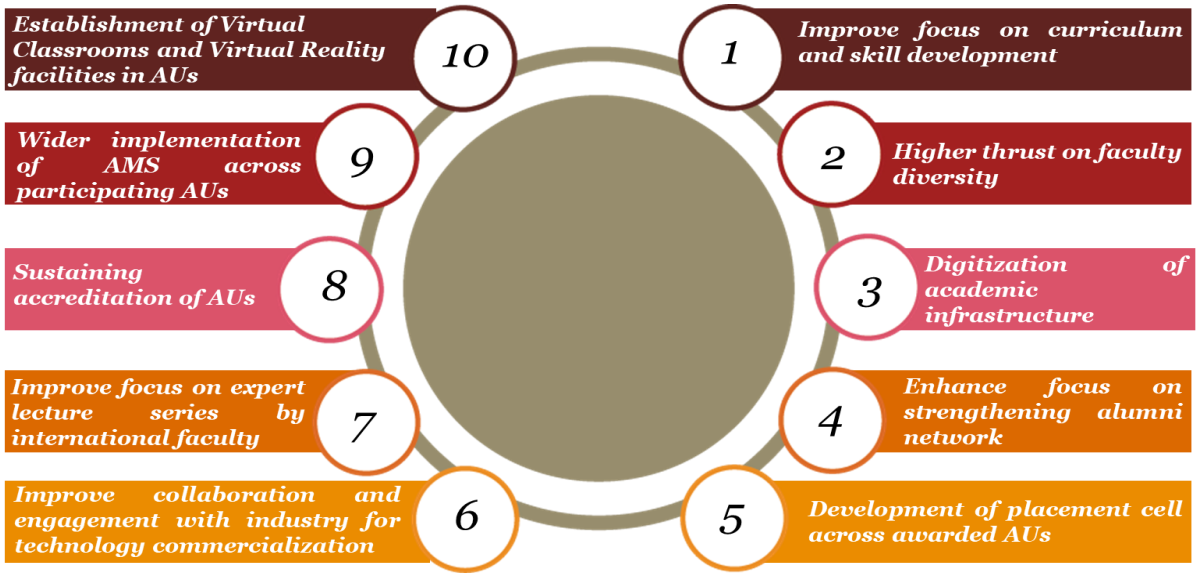


Figure2. Focus or target areas of NAHEP for Current FY 2021-22

FOCUSSED AREAS PLANNED UNDER NAHEP FOR 2021-22

PIU has outlined the key focus or target areas under different components of NAHEP, which form the basis for outcome-focused achievements during FY21-22 (Figure 2).

CONCLUSION

NAHEP is implemented across 58 AUs from the ICAR-AU System to improve the quality and relevance of higher education in agriculture. It is anticipated that improvement in education would enhance the skills of students and create better job opportunities for them whereas upgradation of faculties would bring more relevance into the agricultural education and research system. Ultimately better skills can definitely enhance the overall productivity of agriculture and allied sectors. It is further envisaged that NAHEP interventions and outcome-focused activities will evolve, scale up and bring more entrepreneurial minds into the ICAR-AU system with a sustainable vision.

REFERENCE

NAHEP. Annual Report - 2019-2020. New Delhi: ICAR.
https://nahep.icar.gov.in/pdf/NAHEPAnnualReport2019-20.pdf

Dr Hema Tripathi, National Coordinator - M&E, NAHEP, and Nodal Officer- Social and Environment Safeguard (National Agricultural Higher Education Project), ICAR (Email: hematripathi1@gmail.com)

Dr RC Agrawal, Deputy Director General - Agricultural Education Division of ICAR; & National Director - National Agricultural Higher Education Project, ICAR.