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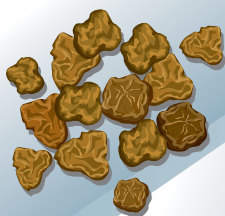
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Women do not need magic to transform our world. They carry all the power they need inside themselves

Gender inequality is not only a pressing moral and social issue but also a critical economic challenge. From agriculture to philanthropy to entrepreneurship, women face unique challenges in their quest to make an impact. And yet, in spite of cultural and systemic hurdles, women continue to rise through the ranks, smashing old paradigms and creating better, sustainable and more inclusive business models.

Empowerment of women is considered to be the most rationale approach adopted by the world, till date. Defined as 'giving power to' or 'creating power within', empowerment is a multidimensional process which includes awareness, confidence building, realisation of self-worth, participation in decision making and equal access to education.

There's something very special about a woman who dominates in the conventional man's world. It takes immense grace, strength, intelligence, fearlessness and... the nerve to say... NO... to be where they are!

Being a proud leader of an **all-women team of Agriculture Today**, I applaud and compliment **WOMEN LEADERS** who have dared to demolish stereotypes to become inspiring success stories of Indian Agriculture. As my tribute to the **International Women's Day**, I also feel delighted in extending my salutations to all confident and evolved **MEN**, who have been the wind under the wings of these extraordinary women.

Happy Reading!

Manula



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THE BLUEPRINT
PROF ARVIND KUMAR





AgHub Agri Innovation Hub

AgHub (a Section 8 Company under Company Act, 2013) is the first of its kind incubator

- Operating in a Hub & Spoke Model
- For supporting Agritech start-ups and entrepreneurs
- In Agriculture, Agribusiness & Rural Livelihoods

Vision

A World Class Agri Innovation Hub that promotes innovations and entrepreneurship in Agri-food systems for a local change with a global impact.

Mission

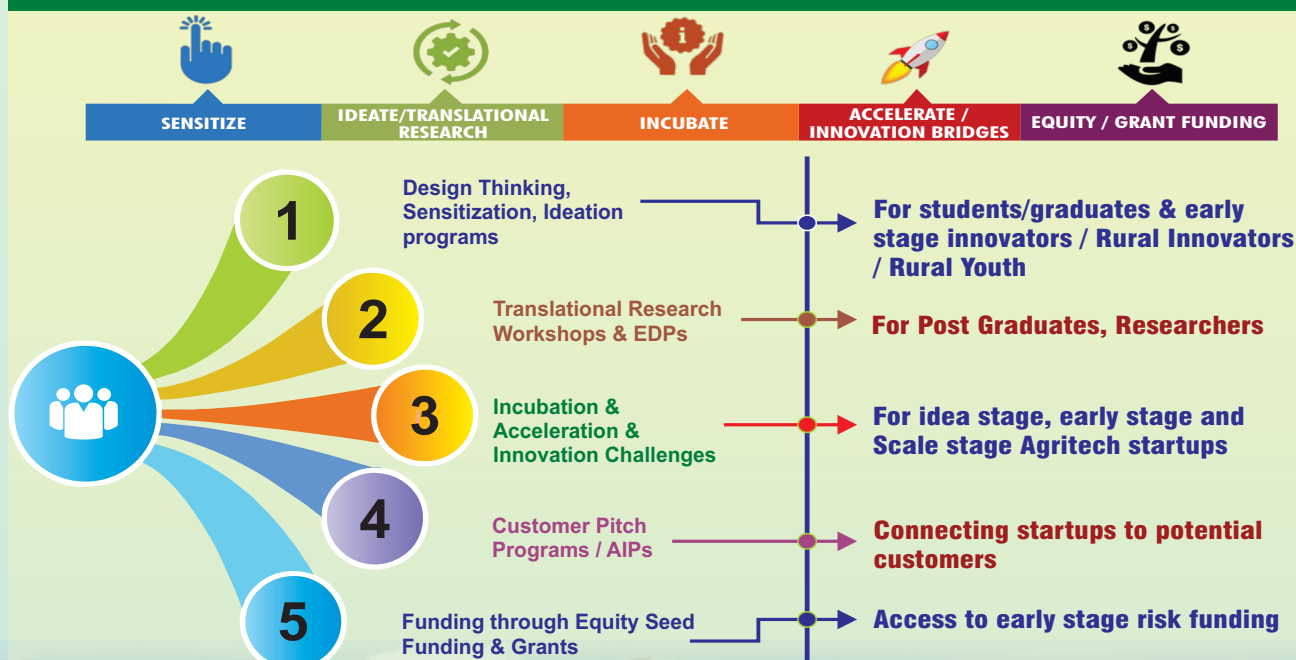
To promote innovations and entrepreneurship in agriculture and rural ecosystem through mentoring, piloting, and facilitating access to market, research and investment.

Objectives

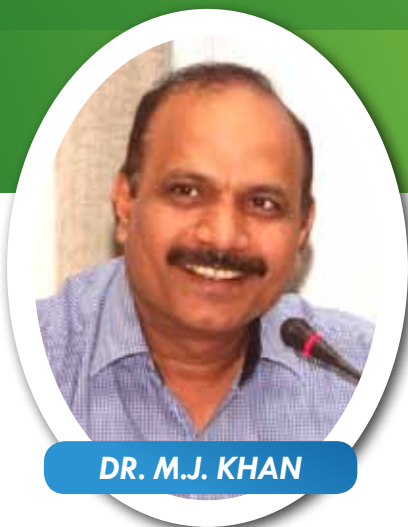
- To nurture early stage agri-startups across the State and India in developing technologies & go to market support.
- To bring a paradigm shift in the research through translational research approach and bring Ph.Ds to mainstream startup ecosystem.
- To build a congenial ecosystem to commercialize the technologies of the University.
- To create a platform for successful immersion of startup technologies to farmers of the State.

Our Approach

Towards Entrepreneurship in Agriculture



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DR. M.J. KHAN

IN EDUCATED WOMEN FARMERS LIES THE FUTURE OF INDIA

India's agrarian sector is diverse when it comes to the crops cultivated, the geography and climate they are raised in, and the technology adopted. We have an equally diverse workforce too – Small scale and marginal farmers, large farmers, tenants, contract farmers, male and female farmers.

Women of the farming sector are although never in the spotlight, though they form nearly 75% of the full-time workers on Indian farms. In rural India, the percentage of women who depend on agriculture for their livelihood is as high as 84%. Women make up about 33% of cultivators and about 47% per cent of agricultural labourers. In South Asian countries, 60% to 80% of the food produced is by the women of the region. They form the back bone of agriculture.

Statistics such as these have never been a catalyst for any palpable change in the approach adopted by the governments towards formulating a policy that espouses the significance of women in farming. Their lives continue to remain in the fringes – toiling in the fields in the shadow of a male relative. Many of the works they engage in is labour-intensive, and most of it is unskilled labour.

Women in agriculture are unaware of their potential. They are unaware of the new developments in the field. Pamphlets, brochures, training modules never reach them. There are no ways to increase their skill set. Also women in India face extreme disadvantage in terms of pay, land rights, and representation in local farmers' organizations.

The reason behind this sorry state of affairs is illiteracy. An estimated 52–75% of Indian women engaged in agriculture are illiterate. This prevents them from venturing into skilled labour sectors. Lack of knowledge makes them work on low wages. In some instances it is as low as 70 percent of men's wage. Sometime their labour is unaccounted and they are unpaid. The lack of employment mobility and education render the majority of women in India vulnerable.

What we need is a formal acknowledgement from the government of the unaccounted labour they contribute. Being an indispensable component of agriculture sector, their role needs to be strengthened. This is possible only by educating them. Educating them will make them aware of the developments in agriculture. They can increase their skill set and hence the way they practise farming. It will make them aware of their rights. Giving women access to education can increase food production by them. Earning extra income will enable them to spend on health care, nutrition, and education for their children—investments that can produce long-term, positive results for farm families.

Empowering women in agriculture is essential if we want to see a bright future for agriculture. That empowerment can only come from education. In educated women farmers lies the future of India.



THE POWER OF A MAN'S INITIATIVE

So often, one hears people despairing. What can one man do, they question. And saying this, they live with the status quo and take no initiative to make the change happen.

In parts of Fazilka district, agricultural produce has been severely impacted over the last few years due to the alarming degree of pollution in the water drains flowing into the area.

Checks made by the Punjab Pollution Control Board had revealed that the pollutants in the water drains in Fazilka are far beyond what can be considered safe for human consumption. The problem was getting aggravated because the discharge of untreated wastewater from various parts of Punjab had been accumulating for the past over five years in Fazilka's – a low lying area.

Vikram Ahuja, an award-winning and progressive farmer of the area, knocked on door after door for the resolution of the problem. Three years ago, he filed a petition before the National Green Tribunal (NGT) regarding the shocking pollution of groundwater in Fazilka. Ahuja informed NGT that sewage of 21 municipalities of Punjab's Malwa belt was flowing through some major drains reaching Fazilka.

On account of severe pollution in these drains, Pakistan had stopped their passage into its territory. As a result, accumulated wastewater within Fazilka was resulting in contamination of groundwater and adverse impact on crops.

After the petition filed by Ahuja, NGT had constituted a monitoring committee headed by Justice Jasbir Singh (retd), which had directed the Punjab government to take remedial steps.

The enquiry conducted by the state established that the drain was blocked at the border, leading to stagnation of groundwater and an overwhelming stink in the area. The matter was taken up by the Centre with the Pakistan government.

Pakistan government's assurance to India to undertake all necessary actions for free flow of Fazilka drain into the Sutlej has come as a huge relief to villages in Fazilka district. The information was recently released by the Ministry of External Affairs (MEA).

In order to ensure the outflow of water into Pakistan, Punjab government shall have to ensure that the Fazilka drain, one of 22 drains where untreated wastewater is discharged by municipalities of the Malwa region, does not carry any pollutants before it merges into Sutlej.

Punjab government is taking up the operation and maintenance of the existing sewage treatment plants so that the sewage water is treated and cleaned at multiple points before it reaches Fazilka. Sewage treatment plants are being provided in towns which don't have them.

The project is still a work in progress, but at least some headway has been made.



RAJNI SHALEEN CHOPRA



Vikram Ahuja

HIGHER AGRICULTURAL EDUCATION IN INDIA

NEP 2020 — MAKING INDIA FUTURE READY

The New Education Policy-2020 (NEP-2020) of India has proposed several changes in the education system of India, including higher agriculture education system. Accordingly, a roadmap to comply with various provisions based on the principles and philosophy of NEP-2020 has been developed. ICAR has been given the responsibility of Professional Standard Setting Body (PSSB) for the Agriculture Education. To align the vision and mandates of the NEP-2020 the higher agricultural education aims to:

1. Increase enrolment of students to higher agricultural education.
2. Making India a global destination for higher agricultural education
3. Rooting Indian agricultural education and research in ancient culture and heritage.

Through the implementation strategies of NEP-2020 developed by ICAR, following goals are being targeted:

- A paradigm shift in education, from 'teaching to learning', and of expanding the reach and opportunities for learning will necessitate going beyond the current initiatives of establishing new central agricultural universities and upgrading the deemed universities as a global destination for agricultural education.

- Agricultural research, education, and extension for development (AREE4D) to be mainstreamed into national policies.

- Scientific projects which may be able to respond faster to societal demands. This may require re-



Agricultural Universities can initiate job driven vocational programmes to build avenues of off-farm work. In order to promote agri-entrepreneurship, the establishment of agribusiness incubation centres at AUs to shall give a boost to start-ups in the agriculture and allied areas

structuring of the organisational model of research units, from rigid ones to flexi-program mode dynamic research consortia led by program leaders on the pattern of international organisations.

- **Integrating Agricultural Education with job creation** - Higher agricultural education and training for capacity building to gain access to employment and self-employment will be necessary. The avenues are plenty in agriculture.

Hence, in addition to awarding formal degrees, Agricultural Universities (AUs) will be required to initiate job driven vocational programmes to build avenues of off-farm work. In order to promote Agri-entrepreneurship, the establishment of agribusiness incubation centres at each of the AUs to shall give a boost to start-ups in the agriculture and allied areas.

- **Global outreach** - Agricultural education is needed to be harmonized with existing and emerging issues related to WTO and free market economies. Worldwide, agriculture is becoming competitive price-wise and its produce acceptable quality-wise. Price and brand equity have become more prominent than before. Indian agriculture is no exception, and its objectives have to align with stakeholders' needs, clients' perspective, peer concerns and market vibes.

- **Strengthening of infrastructure and resources** - The AUs are charged

with complete integration of teaching, research, and extension for holistic rural development. Most of the SAUs have not been able to achieve integration of these functions due to limited physical, financial, and appropriate human resources. In addition to increase government support the universities, through innovative programmes, the AUs will be required to generate their own resources through varied means (consultancy, enrolment of foreign students, sale of seed/ planting material etc.).

• **Innovations in curriculum**

- Inclusion of disciplines viz., nanotechnology, artificial intelligence etc. in the course curriculum along with increased emphasis on secondary agriculture. Enabling environment for effective teaching-learning with national

and global linkages would need to be established. Agricultural Universities are concentrating mainly on formal education while there is also need for non-formal education especially in respect of knowledge and technological empowerment of vast section of work force in rural areas.

• **Attracting and retaining talent**

- As rural and agricultural markets are transforming, with higher demand and prices, more integrated supply chains, greater rural-urban connectivity in many areas and exponential growth in urban markets, new opportunities are emerging for young people to start up and run profitable agribusinesses. This, however, require arrange of skills and knowledge – agricultural, financial.

• **Linkages and collaborations-** Interactions/ collaborations/linkages

with other universities, ICAR institutes and institutions like IITs and IIMs are almost missing which impinges upon the teaching- learning process as well as the academic environment in the institution. It is important to maintain regular university- alumni interface. Greater linkages at national and international levels are required for improving and boarding the quality assurance mechanism and process, faculty and student competence etc.

• **Digital Education** - Improvement and expansion of e-learning platforms to meet the demand for formal/ informal education for capacity building. Address inequalities in digital access, expanding access to affordable and reliable internet connectivity for households and education and training institutions, including through public partnerships.



I love to chat with my college friends, dine out with them and reminisce over the delightful times of our youth

About the AUTHOR

Dr RC Agrawal is Deputy Director General (Agricultural Education), Indian Council of Agricultural Research (ICAR). He can be reached at ddg.edu@icar.gov.in



New areas of specialization in Database Technologies, Cloud Computing, Process Automation, Human Machine Interaction, Block Chain Platforms, Software Application Development, Geo informatics, Artificial Intelligence and Machine Learning, e-commerce and social media specialty, Technical Leadership and Architecture Experience be created in the agricultural universities in a phased manner.

- **Empowering Farm Women:**

Gender is an important dimension that influences opportunities to build and utilize capacities of youth in agriculture. The challenges of reaching young women – who are frequently constrained by heavy household workloads, traditional customs and beliefs, and even constraints on their mobility in some societies – with education and training initiatives, may be – in many cases – greater than those related to reaching young men in many cases.

- **Agricultural Marketing** - The potential returns of capturing the opportunity to engage today's young



people in the challenge of raising agricultural production in terms of food security, poverty reduction, employment generation, as well as peace and political stability – are enormous.

- E-commerce that directly connects producers to consumers is likely to be a new normal and is expected to induce private investment in Agri-tech start-ups connecting farmers

directly to the consumers. These would bring primary processing facilities and branding closer to the farm-gate, provide a big push to rural industrialization, and compel value chain participants to comply with domestic and international food safety standards. Increasing use of tech-based solutions and e-markets would create a new vertically coordinated marketing system, driven by the institutions, such as contract farming, cooperatives, and farmer producer organizations (FPOs).

- Efficient market intelligence, tracking domestic and international demand and supply-side factors should be in place. There is need to tap the global market for surplus crop output, nutria-cereals, fruits and vegetables, industrial crop products, organic and medicinal crop outputs.

Upgradation in the infrastructure and facilities including digital infrastructures such as smart classrooms, adoption of online examination system, development of e-learning modules, learnings through Augmented Reality (AR) and Virtual Reality (VR) are effectively enabling the ICAR AU system to keep up nationally and internationally

Curriculum revision for UG and PG in Agricultural Education

As foremost step for quality improvement of education, the ICAR has periodically been appointing Deans Committees and Broad Subject Matter Area (BSMA) Committees for revision of course curricula in agricultural education of under-graduate and post-graduate programmes respectively. In this series, the Fifth Deans' Committee report was implemented during 2016 by undertaking comprehensive consultations and a bottom-up approach



REORIENTATION OF AGRICULTURE EDUCATION WITH NEP 2020 FOR ACHIEVING NATIONAL PRIORITIES

Incubation Centres are one of the important facilities in most of the Agricultural Universities with the support of Krishi Vigyan Kendras. The facilities include food processing, ornamental fish breeding, seed production, milk processing for various products etc. The emphasis on such centres in the NEP 2020 shall give a boost to open more incubation centres and have linkages with industries making India Atmanirbhar Bharat. Through a suitable system of graded accreditation and graded autonomy, and in a phased manner over a period of 15 years, all HEIs in India will aim to become independent self-governing institutions pursuing innovation and excellence.

Agricultural Universities have sufficient land available for experimentation, demonstration of various trials to farmers, seed production and training. A plan needs to be developed for making AUs to have schemes for the resource generation and convert into self-governing institutions. Most of the AUs have Multidisciplinary Education and Research but needs to attain the highest global standards in quality agriculture education through linkages with global universities and providing platform for research and innovation by setting up more start-up incubation centres, technology development centres, centres in frontier areas of research, greater industry-academic linkages, and interdisciplinary research including humanities and social sciences research.

The Universities need to make provisions of multiple entry and exit system in their undergraduate programs. These reforms shall also help in meeting the challenges of Global Green Economy; Knowledge Economy; Global Zero Hunger Challenge; Sustainable Development Goals, 2030; and International Agriculture and Development Challenge, 2050.

for curriculum development. The Report encompassed various aspects like defining UG degrees to cater the needs of general market and for specialist jobs and uniformity in degree nomenclature and restructuring of UG programmes for increased practical.

The full syllabus for 11 disciplines (Agriculture, Agricultural Engineering, Biotechnology, Community Science (Home Science), Food Nutrition and Dietetics, Dairy Technology, Fisheries, Food Technology, Forestry, Horticulture and Sericulture) is the hallmark of the report. The revision included many new areas like greater emphasis on Agri-entrepreneurship, common courses in all agriculture disciplines, necessary provision to meet the agro-climatic requirements of each zone, Introduction of Information & Communication Technology as a compulsory course, course on Organic Farming, courses on acquaintance to Global Interdependence and International Agriculture. Some new degree programmes like B. Tech (Biotechnology), B.Sc. (Hons) Sericulture, and B.Sc. (Hons) Food Nutrition and Dietetics were also added during the revision.

The BSMA finalized PG courses as per the provisions of NEP 2020 and implemented during 2021. Six volumes

contain the syllabus of Masters and Doctoral programmes of 79 disciplines with the improvement in existing courses and addition of new courses. The BSMA committee revised academic regulations for Masters and Ph.D. programmes after taking the best practices at various global universities and revised curricula of Masters' and Ph.D. disciplines in compliance with various provisions of National Education Policy-2020. The students are given opportunities to select the courses to support their planned research activities, to register for on-line courses and also to pursue internship for development of entrepreneurship during Masters programme. The syllabus has been revised suitably with the view to equip the students to gain knowledge, enhance their employability and skill sets towards entrepreneurship and build themselves to prepare for global competitiveness.

Work On Restructuring Of Courses, Revised Course Curriculum

Keeping in view the implementation of new National Education Policy 2020, ICAR has constituted the Deans Committee during November 2021 to frame curricula and course contents like one year certificate and 2-year diploma and restructuring of all UG programmes

going in Agricultural Universities for increased practical contents. The revised course curriculum shall include the contents related to national priority like use of IoTs, Drones, Climate Resilient Agriculture, Natural Farming, Conservation Agriculture etc. The report is expected to be submitted by the end of the year 2022.

Multiple activities, such as addressing the improvement of related policies, enhancing quality assurance through accreditation, solving lacunae in the common academic regulations and governance, effective curricula delivery systems, faculty competence and student development are being undertaken for attracting talented students. Understanding the situation of curricula delivery in past one year amidst various restrictions imposed due to Covid-19 pandemic, adoption of digital solutions under NAHEP has played important role in Academic Continuity. Upgradation in the infrastructure and facilities including digital infrastructures such as smart classrooms, adoption of online examination system, development of e-learning modules, learnings through Augmented Reality (AR) and Virtual Reality (VR) are effectively enabling the ICAR AU system to keep up nationally and internationally.



**DR POONAM
MALAKONDAIAH**

THE WOMAN OF STEEL

Dr Poonam Malakondaiah, the Special Chief Secretary (Agriculture & Cooperation, Horticulture, Animal Husbandry, Fisheries, Dairy Development, Food Processing, Sugar to the Government of Andhra Pradesh) is a remarkable bureaucrat who has sown seeds of reforms in whichever department she was assigned to. From holding the reins of departments as diverse as education, agriculture, transport, medical health, Panchayati Raj to bringing development in the districts where she was the Collector and District Magistrate, Dr Poonam has fought her way through injustice, corruption and inequity.

Born to Dr Sudama Singh and Urmila Singh on 1st July, 1964 in Shajahanpur, Uttar Pradesh, Dr Poonam was a spirited child who took to extracurricular activities with the same enthusiasm as her studies. Debate, Essay Writing, Sports, Quiz Competition, Painting, Poetry writing, Collage-making – she excelled in whatever she took part in. Over 300 merit certificates that she had won over at School, College, State and National Level speak volumes of her abilities.





The best outgoing Student in class XII, Avila Convent Matriculation Higher Secondary School, Coimbatore; gold medallist in B.Sc Botany (Honours) from Madras University; GOI Merit Scholarship from Ministry of Human Resource Development; Gold Medallist in M.Sc Microbiology from Indian Agriculture Research Institute – she was excellent in her studies as well. At a very young age, her leadership qualities were evident. She was elected as the School Pupil Leader and was also the President of the College Students Union.

“I wanted to be a scientist like my father. My father was an agriculture scientist and was working in ICAR. We had our childhood spread all over India as he used to work in different research stations. We were in Coimbatore for 16 years. At that time he was working in Sugarcane Breeding Research Institute. He was a simple person, hardworking and committed to his responsibilities. My mother was unable to study beyond tenth standard, as women in those days were denied education. But she compensated that with reading. She was

tête-à-tête with *Anjana*



LEADING THE FIGHT FOR THE FARMERS

All through her service years, Dr Poonam has intervened wherever she felt injustice was meted out. Her most successful intervention came while working as the Commissioner of Agriculture in Andhra Pradesh. This time it was the multinational company Monsanto who was taking undue advantage of the cotton farmers.

It was that time when there was widespread distress among cotton farmers. During 2000-2005, many farmers in AP committed suicide bogged down by the loss of cotton crop and the high cost of production. Dr Poonam studied the situation and found that about sixty per cent of the cost of cultivation was attributed to cost of seeds alone. At that time Monsanto Bt seeds used to cost Rs 1850 per 450g packet, while the other seed cost ranged between Rs 450-500. Monsanto argued that Rs 1250 was the technology cost and the rest was for the local seed distributors. On further inquiries it was revealed that the same seed packets were sold at Rs 120 in USA and Rs 43 in China.

“We requested to bring down the costs but they did not relent. We decided to take them to MRTP (Monopolistic Restrictive Trade practices which is now known as Competition Commission). After hearing both the sides, MRTP passed order in the favour of the government and directed Monsanto not to charge more than what is charged in USA. We fixed the rate at Rs 750 – Rs 120 was trade cost and the remaining was the seed company cost. Once Andhra government passed the order, seven other states too passed similar orders within a matter of 7-8 days. Monsanto appealed in Supreme Court, where too, we won the case. This brought down the cost of cultivation. It was a great victory for the farmers of this country. Farmers have been saving Rs 1000 crore every year due to this. The then Chief Minister, Dr YS Rajasekhara Reddy, gave his support for this case even though there was immense pressure from various quarters.”

well versed in Indian and international history. She was highly religious. My parents didn't preach anything to us. We learnt by seeing them in their actions. They were my role models.”

HOW THE TRYST WITH CIVIL SERVICES HAPPENED

Dr Poonam's tryst with civil service was unplanned and arose out of her

roommate's desire to have a company to appear for the exam. She dutifully accompanied her into the exam hall came out with flying colours. With no formal coaching, she cleared all the levels at the very first attempt. “This was most difficult moment for me because I had to choose between IAS and Research. Dr Subba Rao, my Research Guide, was initially not in favour of my



drift towards IAS. But later, when I got through, he advised me to go for the civil services.”

ENSURING LEGAL RIGHTS OF TRIBALS

In 1990-91 her first assignment landed her in Bhadrachalam. Tribals there were being exploited and their land was occupied by outsiders by force. They were fighting a case against the mighty with no formal knowledge of the proceedings of the court. She saw that they were forced to come from their villages on foot to fight their case. They were terrified by the lawyers, the language and the tone of the proceedings. But she had a unique solution to their problem. “I saw their helplessness and the greed of the miscreants and said the court will be conducted in their village only; they need not come to the town. This created a flurry, but Constitution was in my favour, as there was no rule that courts

A straightforward and fiery administrator, Dr Poonam Malakondaiah is a compassionate human being who had always worked for the upliftment of the downtrodden

should not be conducted in village. Thus I began a new practice, hitherto not prevalent anywhere, to benefit the needy.”

THE AKSHAR DEEKSHA PROJECT

Akshar Deeksha is another project that is close to her heart. She believes that literacy stands central to any empowerment programme. While she was the District Collector of West Godavari, a women literacy programme,

was initiated. The pedagogy that was followed couldn't sustain the interest of the participants for long and they started seeing dropouts. Women wanted to learn quick. Dr Poonam invited professors from Telugu University to revise the methodology. A faster quicker approach of

100 day literacy programme was devised and piloted on a Self Help Group (SHG). On evaluation the approach was found to be positive. This was later up scaled to 4000 women SHGs. By the third phase it became a huge movement.

“Awareness campaigns were carried out. Akshar Deeksha rallies were taken out. We had Akshar Deeksha torch being carried over from one village to another, nonstop, day and night. People in the villages would wait for the torch to arrive in the early mornings to



MESSAGE FOR WOMEN'S DAY

"The basic qualities of women are tenderness, love and caring nature. These are not our weaknesses. These are our strengths. We should be proud of that. We should be proud that we are homemakers. It is not a secondary job. Women should be courageous, brave and compassionate. Never ever tolerate injustice. Those of us who are educated, we should help other women in making their lives better. However busy you are, take out some time for yourself. Never lose yourself at any cost. Don't lose your desires, hobbies, likes, dislikes, your time to keep yourself healthy physically and mentally. If you keep yourself fit, you can take care of others."



met our paper needs. Someone else contributed pencils. Women volunteers from Self Help Groups came forward as teachers. They did not charge anything. It became less of a government programme and more of a yagya."

Dr Poonam received The Prime Minister's Award for Women Literacy Programme in West Godavari District.

STERLING INTERVENTIONS IN THE HEALTH SECTOR

During her stint in the health department, she introduced bike ambulances in agency areas where ambulances cannot reach. It had lot of impact on reducing infant mortality and maternal mortality.

Dr Poonam has written three books - Water management in Godavari Delta, Winds of change, Agriculture and Literacy as a tool for Women Empowerment.

A straightforward and fiery administrator, Dr Poonam Malakondaiah is a compassionate human being who had always worked for the upliftment of the downtrodden. Her interventions had transformed the lives of thousands of farmers. She is a real inspiration.

receive it and carry forward. It sort of became an independence movement. People were coming forward to help us in the movement. Under National

Literacy Mission cost of making one person literate per year came to around Rs 87. Ours was just around Rs 18. Deccan Paper mills came forward and

WOMEN IN AGRICULTURE

THE SKY IS THE LIMIT

Importance of women in agriculture is growing day by day. As per Oxfam India report, agriculture employs 80% of economically active women in the country and 33% of the farm workers. About 48% of the self-employed farmers are women.

Migration of men to the towns in search of livelihoods opportunities has been continuously increasing gender diversity in agriculture. Only 14% of the land-owning farmers are women. This indicates a deeper malaise of lack of property rights for women.

Much of the work of women farmers goes unrecognized. Financial independence eludes them in spite of their hard work. While technology and economic activity are pushing women to the front, society is still lagging behind in giving them the status they deserve. Whatever economic activity they undertake is in addition to the household work and looking after the food, health and well being



of the family. Their work is invaluable although a lot of it goes unpaid and is not recognized. No formal income is attributed to their work.

Addressing some of the issues will allow women to have greater share of the value being generated in agriculture. The following are some of the measures that would help empower women in agriculture are:

* Women should have property rights. It is very unfair that they do not have equal inheritance of property and also do not have joint ownership of property with their husbands. This prevents them from accessing collateral based bank credit. Five states (Kerala, Tamil Nadu, Andhra Pradesh, Maharashtra and Karnataka) have implemented laws that give property rights to women. It is important that other states also do the same and restore dignity to women farmers and rural women.

* Digital literacy of women in rural areas, including farmers' wives, should

About the AUTHOR

Mr Ram Kaundinya is Director General, Federation of Seed Industry of India

WOMEN EMPOWERMENT IN RURAL AREAS

Women empowerment in rural areas is particularly difficult due to age old practices, traditions, superstitions and other social structures. This will not be possible unless men are educated about the need for making women farmers prosper. Such a social change has to be brought about through pioneering work by social reformers. This cannot be achieved by legal diktat. Social change takes time. It calls for a committed team of dedicated personnel who will work at the grass root level to bring about this change. Empowerment of rural women farmers will see increased self confidence, self sufficiency and eventually their entry into the social and political space which will be a welcome development.

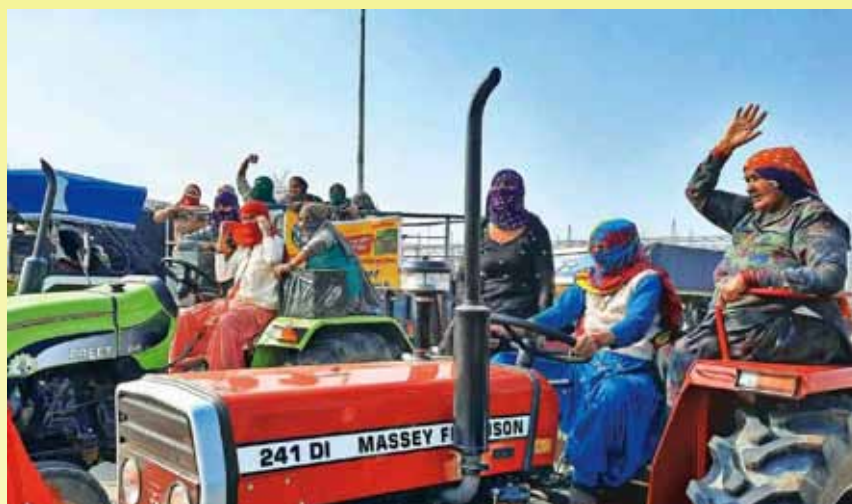
be taken up on priority so that they are not left behind in the digital revolution. If rural women are trained in using digital applications they can complement the efforts of their husbands in accessing markets, credit, insurance and several other enablers which will make the family's income grow.

* There is a need to develop agricultural technologies that suit women farmers. Machinery, plant varieties, irrigation equipment and similar inputs used in agriculture may have to be tweaked to suit women farmers.

* Women led and all women FPOs are to be promoted as a separate category within the 10,000 FPOs target that government has set up to achieve. Women participation is relatively higher in FPOs dealing in dairy, goat rearing, producing perishable products like vegetables and fruits. Collectivisation of women-led economic units like FPOs, Self Help Groups, Cottage industries and others should be promoted with a government and private sector assisted marketing support system. A cluster approach that opens up domestic and export markets for value added products from these production centres should be developed by states. APEDA may have a huge role to play in linking them to export markets.

* Banks may have to develop separate lending norms for women farmers and women led FPOs. RBI developed such special norms for SHGs earlier. It is important to have such norms for FPOs in general and for women led FPOs specifically.

In 2011, Dr MS Swaminathan proposed a Women Farmers' Entitlement Bill in Rajya Sabha in which the following were some of the recommendations



made.

a) Introduce women-only benefits and schemes. Earmark at least 30% of the budget for women beneficiaries in all the ongoing schemes for agriculture.

b) Expand provision of credit to women farmers without collateral under micro finance initiative of NABARD.

c) Improve female land holding patterns by including them in the land records.

d) Train women in modern and sustainable agricultural practices tailored to local conditions through KVKs and State Government departments.

e) Development of women friendly machinery to accelerate farm mechanization.

There is an urgent need to accelerate actions on the above recommendations at the government level and at industry level.

We do not have many woman CEO led companies operating in the field of agricultural inputs or outputs unless she comes from the promoter family. Even at the senior positions in agri corporates

gender diversity is very poor. There are hardly a handful of very senior women executives who report to the CEO in these companies. It is important to review why such a situation prevails in the country. It is also necessary to train women on how to hold positions of power in organizations and manage several relationships efficiently.

In the area of innovation and entrepreneurship in food and agriculture sectors, we see some women entrepreneurs coming forward. Most of them are either technical people or technologists. This is a good trend and it must be encouraged further. GOI may think of providing some special incentives to the start ups being set up by women entrepreneurs.

Rural women have to be encouraged to come out of their zones of comfort and compete in the modern world. A supportive ecosystem has to be developed to enable women to do this.

(My special compliments to the all-women editorial team of Agriculture Today! Keep it up!!)

PROGRESSIVE, INNOVATIVE AND CONSISTENT

AGRICULTURE IN HARYANA BECOMING DIGITALLY ADVANCED

Though Haryana constitutes only 1.4% of the total geographic area of the country, yet it contributes 17% of food grains to the central pool. Therefore, it is regarded as the food bowl of the country. However in recent years the production of major crops has hit a plateau in the state, requiring use of advance technologies. For that purpose, Haryana state is adopting smart farming concepts which are innovative, precise and consistent like use of drones, remote sensing, nano fertilizer applications, crop

verification using geo location of farmer's database for beneficiary's schemes. Timely and reliable statistics about crop management, production and output is considered of great advantage by stakeholders (e.g., national and international authorities, farmers, commercial units, etc.) to ensure sustainable growth of agriculture and our farming community. The Government of Haryana has initiated various schemes for beneficiaries keeping in view the conservation of soil, water and air under the aegis of Agriculture and Farmers Welfare Department.

gies to improve efficiency in agriculture. Committee on Doubling Farmers Income (DFI) in its report has appreciated the role of digital technology, which can play a transformational role in modernizing Indian agriculture.

The possible components of modern management of agriculture are remote sensing, Geographical Information Technology (GIS), data analytics, Artificial Intelligence (AI), Machine Learning (ML), Block Chain and Internet of Things (IoT). These emerging technologies provide the means for precision agriculture, which aids in effective resource utilization.

Emerging Technologies -Way forward

Ministry of Agriculture and Farmers Welfare, GOI is giving a major push to digital agriculture in the country under National e-Governance Plan for Agriculture (NeGPA). Digital agriculture refers to using new and emerging technolo-

Application Of New Technologies

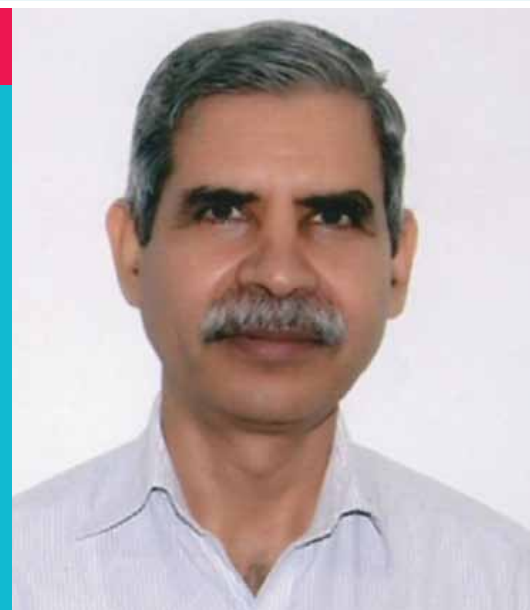
Climate change and industrial development is impacting the land available globally for farming. Hence, effective and sustainable land use is vital. We are using drones to map out an area and cre-



About the AUTHORS

She has headed diverse departments in Haryana government & also served as Senior Advisor, Economic Advisory Council to Prime Minister, Govt of India.

Dr Hardeep Singh, IAS, is Director General, Agriculture and Farmers Welfare Department, Haryana. He has earlier served the state government in various capacities and has also been Director General of Animal Husbandry and Rural Development. He has received various awards and recognitions in civil services at state level



Agriculture Department, Haryana has created an IT Cell/PMU, which is extending IT support to various schemes/ programs of the department and in delivering farmer services. It has also developed a comprehensive online platform 'Meri Fasal Mera Byora' (MFMB) to which other schemes like MPMV, PM (KISAN), Crop Diversification, Bhavantar Bharpai Yojana have been integrated and are being operated through the same portal. To upscale the program and to leverage the potential of the emerging digital technologies, a new scheme titled 'IT and Digital Technology in Agriculture' has been initiated by the department.

ate new insights with the help of remote sensing technology. Drones will be helpful to farmers in optimizing the use of inputs (seed, fertilizers, water), to react more quickly to threats (weeds, pests, fungi), to save time, to improve crop productivity in real time and estimate yield from a field. Drones may also be used to estimate acreage and assess crop damage due to natural disaster.

Meri Fasal Mera Byora (MFMB)

MFMB is a flagship scheme of state government wherein farmers register themselves to sell their crops on MSP and to get benefits of other schemes of Department of Agriculture and Farmers Welfare. This portal has become an umbrella platform for granting almost all benefits, including Mera Pani Meri Virasat, Direct Seeded Rice, Bajra Replacement, Bhavantar Bharpai Yojana and Uttam Beej etc. The portal also has a Grievance redressal mechanism where the aggrieved farmers can register their objections. Since the portal is linked with e-kharid, farmer is paid for sale on MSP directly in his bank account without any middleman.

**fun
FACT**



Dr Hardeep's favourite leisure activities are yoga and jogging

GIS Planning

Geospatial Technologies have emerged as an important tool in mapping, monitoring and management of agricultural resources and infrastructure. A&FW Department, Haryana is implementing various schemes for which spatial planning is being increasingly stressed for effective implementation. Looking into the usefulness and requirement of the RS and GIS facility for spatial planning in the ongoing schemes, it is under consideration to set up GIS labs with required satellite data and GIS layers to be procured from different agencies.

Unified Farmers Database (UFDB)

GOI is increasingly stressing on preparation of farmers database, which will form core of the planning process for various agriculture-related schemes of the centre and state. This data will be integrated with the land records and other data available under various schemes. Farmer database will have a unique ID of each and every farmer, record of his land and the benefits being drawn by the farmer under various central and state government schemes. UFDB will help the Centre and states in effective planning and improving the efficiency of agriculture sector.

Pilot Projects on Digital Technology Applications in

Agriculture

Looking into to increasing use of emerging technologies, pilot projects on applications of advance technologies in agriculture shall be initiated with the help of experts from public or private agencies to develop a Proof of Concept (PoC). If some of these pilots are found successful, they will be up-scaled and operationalized at state level. Some of these projects have been identified.

Crop Diversification Program (CDP)

Crop diversification program is being implemented in the state since 2013-14 through CDP (RKVY) and CDP (State Plan) to promote alternate crops like Maize, Cotton, Pulses and Oil seeds etc. in order to reduce Wheat-Paddy production. The funds under Crop Diversification Program are provided through RKVY and State Plan.

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FACT**



Dr Misra is one of the pivots of the literary circles of Chandigarh and always encourages budding writers and artistes towards excellence



Recently MFMB Team has been awarded the Atal Bihari Vajpayee Good Governance award for outstanding contribution in developing the portal, providing services to the farmers, effective management of the scheme, achieving its objectives and facilitating information

Mera Pani Meri Virasat (MPMV)

In Haryana state during Kharif 2020 a new Crop Diversification Scheme with the name "Mera Pani Meri Virasat" was launched. Farmers were given incentive at the rate of Rs 7000 per acre for replacing paddy with alternate crops like Cotton, Bajra, Kh. Pulses, Maize, horticulture/Vegetables. Under this scheme, an area of about 52,000 acre was diversified and about Rs 31 crores was provided to eligible framers as an incentive in 2021. The incentive was provided through state Plan scheme and directly in the bank account of farmers through DBT.

Farm Mechanization – CHCs

To promote farm mechanization in the state, two major schemes i.e. "Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi" and Sub-Mission on Agricultural Mechanization (SMAM) are being implemented. The main focus of the schemes is to curb the crop residue burning, which results in environmental pollution. Under the schemes, there is provision of providing machines to indi-

Major activities of the scheme

- ❑ Online self-registration of farmers on MFMB Portal;
- ❑ Three layer physical verification of crop sown by the farmers
- ❑ Verification of data from Revenue Department and Satellite data from HARSAC
- ❑ Sharing of data to various stakeholders for procurement of crops and other benefits

vidual farmers on 50% subsidy. Subsidy at the rate of 80% is also being provided for establishment of Custom Hiring Centre to ensure availability of costly machines to small and marginal farmers on nominal rent. A total of 6775 CHCs with 31446 machines have been established. Subsidy to 41331 crop residue management machines have been provided from 2018-19 to 2021-22. To promote ex-situ management of crop residue by making bales, incentive at the rate of 1000 per acre is also provided. As a result, reduction in crop residue burning incidents by 30% has been observed as compared to

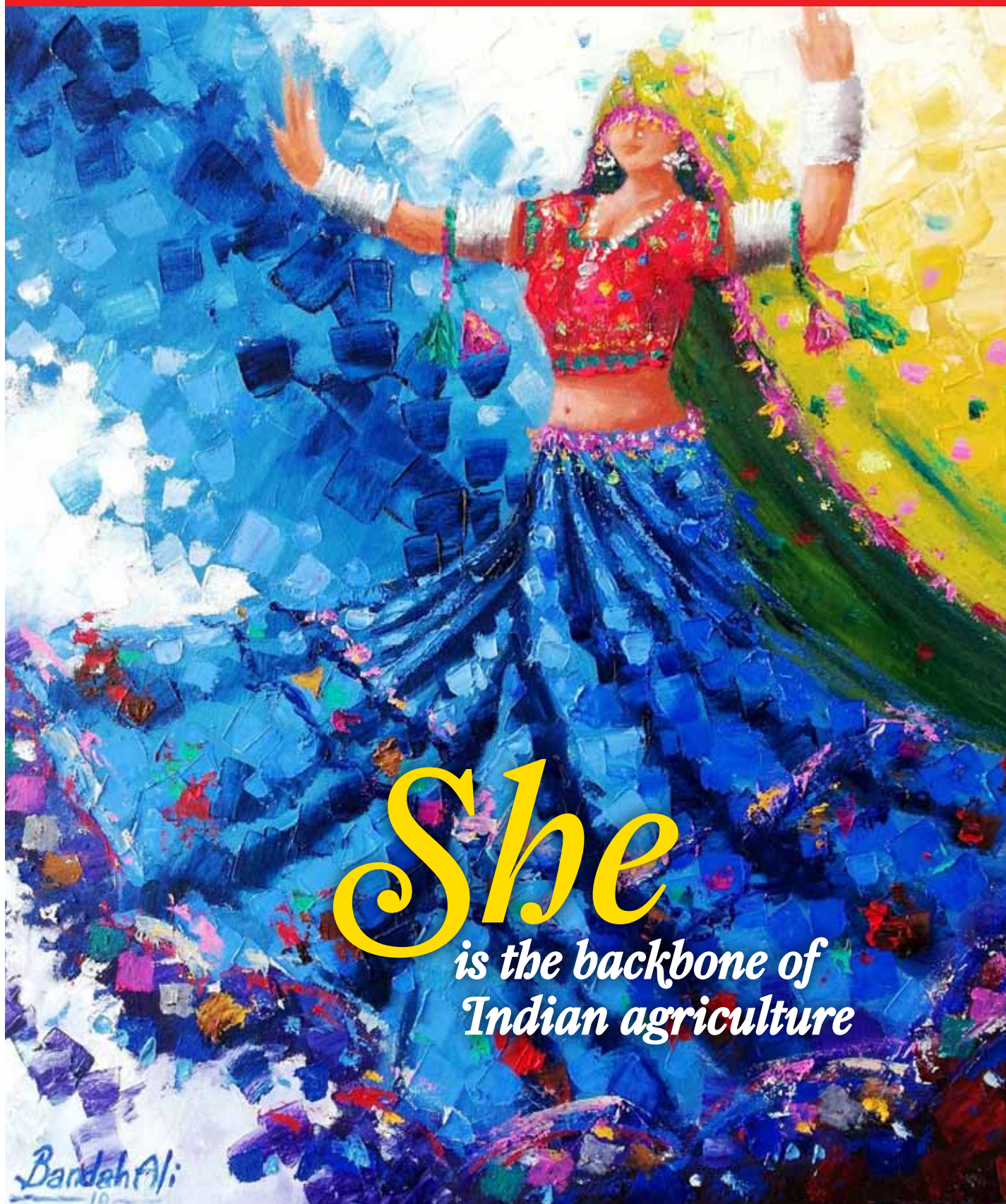
2020.

Agriculture Infrastructure Fund

The role of infrastructure is crucial for agriculture development. It leads to increase in the income of farmers by value addition to farm production. It also reduces losses through better post harvest management of crops. Keeping this in view, AIF was announced by the Hon'ble Finance Minister on 15.05.2020 by allocation of Rs 100,000 Crores under the scheme, which shall be implemented from 2020-21 to 2032-33. Under this scheme, Rs 3900 Crores was allocated to Haryana which will be disbursed over a period of six years (2020-21 to 2025-26).

Eligible activities include post harvest management infrastructure & community farming assets related to primary processing of crops. The loan can be applied through on line portal. Other details of the scheme can be accessed on AIF portal viz. <https://agriinfra.dac.gov.in>. Till date a total 460 applications have been received, out of which sanction of 152 applications aggregates to Rs 152.02 Crores.

*One day she discovered that she was fierce, strong and **full of fire**... And then, even she could not hold herself back because her passion burned brighter than her fears !*



***She**
is the backbone of
Indian agriculture*

AGRI-EDUCATION CHANGING CONTOURS

The contributions of the National and State Agricultural Research, Education and Extension Systems (NAREES) to make our country food-secure have been phenomenal and widely acknowledged. Our premier agricultural institutions remain engaged in the role of building the world's largest network of agri-professionals.

The highly qualified, motivated, and well-trained human resources including agricultural professionals and farmers have been part of our dynamic, forward-looking agri-education system. They played a significant role during

the years of the green revolution. Post that period, NAREES is major contributor of human resources to the government, industry, SME and more recently to the growing number of agritech startup teams.

It is a matter of pride that the share of the agricultural sector in GDP has reached almost 20 per cent for the first time in the last 17 years. This affirmatively signifies the resilience of the agri-community across the national agricultural system. The community ensured the positive growth of 3.4 per cent at constant prices in 2020-21 – the most adverse period of the severe pandemic which impacted all other sectors drastically.

New, Emerging and Transformative Agri-Food System

With the primary responsibility to cater to needs of a nation with over 1.35 billion population and also become a major food-producer country at the global level, NAREES faces major challenges under climate-change impacts and dwindling natural resources. The demand to add

value to surplus yields and build healthy, nutritious wellness driven food products to neo-generation clients with changing lifestyles and higher incomes further add to this list. Consumer demands for transparent processes of food production systems and adhering to new standard operating practices along with statutory regulatory systems are emerging areas.

The constant demand-supply 'tug-of-war' leading to crop failure, lower price realization despite good production, lack of dependable supply chain, major disruptions in trade especially during pandemic. All these are the vulnerabilities in the demand-supply links and possible infusion of technology-driven tools across Agricultural Value Chains (AVC).

The focus must be to convert challenges into opportunities and elevate the agri-food sector from a rural-based survival platform to a rural livelihood-generating modern business enterprise. Hence the future of the agri-food sector is crucial for all stakeholders including policy makers and planners. This dynamic and continuing transformative landscape also needs to build neo-generation human resources. To achieve this, the agri-education sector needs to bring in some major path-breaking innovative approaches.

About the AUTHOR

Dr Praveen Rao Velchala is the founding Vice Chancellor of Professor Jyashankar Telangana State Agricultural University (PJTSAU), Hyderabad. He is currently President, Indian Society of Agronomy, Secretary General, Indian Agricultural Universities Association and International Micro-irrigation Consultant driving precision irrigation technologies





Graphical representation of Neo-generation Farmers of Future

[Source: Prepared by Author; Based on data collected from various sources]

Smart Skills Needed in Future: Technological, Environment & Managerial



Skill-Set Tree of Future Agri-Professionals

[Source: Prepared by Author; Based on data collected from various sources]

Strategizing On Current Trends of Transformation

Farming is getting smarter and more technology driven. Hence, positioning farmers at the center-stage of agri-food value chain, competent tech-aware new generation professionals with strong agricultural knowledge would be in demand. It is important to be cognizant that the new 'client farmer of the future' shall be a technology user with capability and competency for bringing objectivity in his/her decision making.

Therefore, the onus to build appropriate skill sets in human resources streaming out of higher agri-education institutions will be on the education administrators and the institutions. It is widely accepted that agricultural education plays an important role in the

structural support of the agri-food sector. It is the supplier of capable, component human resources, without whom it

fun FACT



Prof Rao is encouraging a large number of AgriTech StartUps involved in AI, Machine learning, Robotics, Drones, Blockchain technology, Sensors, Precision irrigation and Geospatial technologies and validate their products in farmers' fields for enhancing farmers' incomes and sustainability

may be constraining for the very existence of this knowledge-intensive sector.

This sector is a complex, multi-strata, multi-actor driven platform. Its performance must be constantly evaluated. Corrective action be appropriately taken given its crucial role in mitigating hunger, malnutrition and rural poverty. Any agricultural education policy making, needs to be effective based on a clear philosophy on the goals and intricate relationships within the agri-food complex, such as agriculture, nature, food, environment, land use, financing, insurance, and logistics.

Thus, in tune with new NEP of GOI, a formalized convergence platform of technology driven courses with social sciences and business would an ideal proposition. The trained human resources delivered by these platforms can be new 'bridge professionals' and become the new crop of game changers to push identified drivers like technology and agri-business building. This responsibility also entails developing training opportunities for teaching faculty and policy makers for a seamless deployment and integration of the developed convergence platforms into existing educational structure in the country.

Three-Pronged Approach

It is therefore suggested that a three-pronged approach which is people-centric, technology- centric and farmer-centric should be adopted to shape the changing contours of agri-education. Let us hope that history repeats itself with the NAREES continuing to be the main architect of the neo-generation agri-professionals. Ultimately, convergence of agriculture science and emerging technologies with inbuilt business proposition can help elevate the impact of such initiatives. This shall lead to both tangible and intangible much-needed societal benefits. Throughout these initiatives, a major mind-set change to approach the agri-food sector as new livelihood generation business option for all stakeholders including farmers can be achieved.

ROLE OF NI-MSME IN SKILLING AND PROMOTING CLUSTER APPROACH FOR AGRICULTURE DEVELOPMENT

National Institute for MSME (ni-msme), an organization of Ministry of MSME, GOI, is a pioneer institute in the field of MSME. It is playing a major role in providing pro-business environment to foster the progress of MSME towards success and prosperity. The institute assists the government in formulating policies for micro, small and medium enterprises and to help the practicing and potential entrepreneurs through a host of services like training, research, consultancy, information services,

ni-msme's intellectual activities are pursued by its four Schools of Excellence viz., School of Enterprise Development (SED), School of Enterprise Management (SEM), School of Entrepreneurship & Extension (SEE) and School of Enterprise Information & Communication (SEIC)

education and extension.

Set up in 1962, ni-msme has made valuable contributions by creating an impressive record of achievements beyond the Indian shores, enabling other developing countries to get the benefit of the Institute's facilities and expertise. The Institute is associated with prestigious world bodies such as UNIDO, UNDP, UNESCO, ILO, CFTC, UNICEF, DCAC, AARDO and GIZ.

Theme-Focused Centers

The Institute has theme-focused centers like National Resource Centre for Cluster Development (NRCD) to help MSMEs by implementing the Cluster Development Approach. At present, the institute is involved in the



About the AUTHOR

Dr Glory Swarupa is a professional in the field of entrepreneurship and skill development with over 24 years of experience. She has worked with various union ministries namely Coffee Board, Ministry of Commerce & Industry, GOI; Ministry of Environment, Forest & Climate Change, GOI; Ministry of Micro, Small & Medium Enterprises, GOI; Mahatma Gandhi National Council of Rural Education (MGNCRE), Ministry of Education, GOI; National Fisheries Development Board (NFDB), Ministry of Fisheries, GOI and Skill Development University



development of more than 50 rural, artisan, industry clusters across the nation. The institute is supporting KVIC, Coir Board, NBCFDC, NSFDC and various state governments for development of handlooms, handicrafts, food processing and textiles clusters.

The Institute has trained 5,48,815 participants by organizing 16,198 programmes for officials from various ministries of GOI and state governments. ni-msme has also imparted skill training to 1,76,223 educated unemployed youth by conducting 6022 Entrepreneurship & Skill Development Training Programs (ESDPs). The Institute is implementing ITEC Scheme of Ministry of External Affairs, GOI since 1967 and has trained more than 10,585 international executives representing 143 developing countries. ni-msme has also completed more than 947 research and consultancy projects.

The NRCDC was established in 2004. UNIDO has identified it as a Centre of Excellence. The Faculty of NRCDC was trained by UNIDO. Since then, ni-msme has been instrumental in the preparation of several Diagnostic



Study Reports (DSR), Detailed Project Reports (DPR) and establishment of industrial as well as rural clusters across the nation. ni-msme provides mentoring services for prospective and practicing entrepreneurs and also cluster stakeholders in the development of new products, technologies, energy auditing, waste management.

Scheme of Fund for Regeneration of Traditional Industries (SFUURTI) is one of the important schemes of Ministry of MSME. ni-msme is the Nodal Agency for implementation. It has established over 150 clusters in handlooms, handicraft,

rural and agro-food processing sectors, benefitting almost 50,000 rural folks including the farming community.

Initiatives During Pandemic for Agriculture Community

At present, ni-msme is operating 20 agro-food processing clusters in eight states. Important interventions carried out by ni-msme are

- * Identification of potential geographical area with agriculture resource

- * Identification of most active group of farmers with domain product knowledge and skill to form a Special Purpose Vehicle (SPV)

- * Identification of Implementing Agency (IA) preferably a Government entity to monitor day-to-day activities and effective implementation.

- * Identification of a competent Technical Agency (TA) to provide advisory services and help the SPV with production.

Kerala Cluster for Flavoured Coconut Milk and Virgin Coconut Oil:

The cluster was established in Tirur district for the benefit of 750 farmers



with a project cost of Rs 312.88 lakh. Virgin coconut oil, flavoured coconut milk, defatted desiccated coconut and coconut pairings are the major value added products.

Bhatinda Honey Processing Cluster, Punjab: The project cost is Rs 335.32 lakh and the cluster will benefit 975 artisans. The products are Honey, Bee Boxes, Corrugated Boxes, Plastic Pet Bottles, and Plastic Buckets etc.

Jonnada Food Processing Cluster, Andhra Pradesh: A total of 505 women have formed the Special Purpose Vehicle (SPV) to prepare the traditional pickles (Mango, Tomato, Lemon and others) and packaging with a project outlay of Rs 165.81 Lakh.

Lohardaga Honey Processing Cluster, Jharkhand: To process and market Honey Variants and other Honey Products, which benefits 251 tribal populations, SFURTI has sanctioned Rs 187.75 Lakh.

Deomali Millet Processing Cluster, Odisha: A total of 1116 tribals are the cluster beneficiaries. The project cost is Rs 544.42 Lakh. Soup Millet, Cookies, Brownies, Macaroni, Cup-cakes, Millet Kheer, Flour are the main products of the cluster.

Nitte Jackfruit Processing Cluster, Karnataka: Suphala Farmers Producers Company with 536 beneficiaries has formed the SPV. Jackfruit Pulp, Pulp Flour, Vacuum, Fried Chips, Jam, Pickle are the major products. The project cost is Rs 570.9

Set up in 1962, ni-msme has made valuable contributions by creating an impressive record of achievements beyond the Indian shores, enabling other developing countries to get the benefit of the institute's facilities and expertise

Lakh.

L. Kota Sesame Processing Cluster, Andhra Pradesh: The cluster will benefit 1001 women and farmers for processing of Sesame Oil, Chikkis, Oil Cakes etc. with a project cost of Rs 223.59 Lakh.

Pudur Vegetable and Fruit Processing Cluster, Telangana: Total project cost is Rs.470.07 lakh. ni-msme is the Nodal Agency, Society for Innovation and Incubation Development is TA whereas Department of Agriculture, Govt. of Telangana is the IA and Adarsha Farmers Service Cooperative Society Ltd. (AFCS), a cooperative society established in 1976 is the SPV. The proposed project helps 1629 agripreneurs through Cut Fruits,

Dried Fruits & Vegetables, grading, packaging and value addition as well as waste reduction of vegetables and fruits.

Pulivendula Banana Processing Cluster, Andhra Pradesh: The

cluster will help 823 Farmers/FPOs for production of Banana Flour,

Slices, Banana Candles, Stem Juice etc. The MoMSME has sanctioned Rs 393.23 Lakh for implementation of clusters.

In addition to agro/food processing, ni-msme is working with tribals and women groups for development of bamboo clusters.

Mangaon Bamboo Cluster, Maharashtra: A total of 307 persons formed the cluster for processing of bamboo products. The project cost is Rs 194.8 Lakh.

Sakoli Bamboo Cluster, Maharashtra: The project cost is Rs 210.46 Lakh for production of Bamboo Based Products such as Furniture, Handicrafts involving 426 beneficiaries.

Wardha Bamboo Cluster, Maharashtra: 229 tribal farmers have formed into cluster for making furniture items, handicrafts and range of bamboo based products with a project outlay of Rs 175.01 Lakh.

Chandrugonda Bamboo Cluster,





Telangana: It is a tribal cluster with 857 beneficiaries. The products are handicrafts, furniture items and construction materials. The project cost is Rs 340.88 Lakh.

Bundu Bamboo Cluster, Jharkhand: A total of 676 tribals farmers are involved in the cluster for making furniture and bamboo Utility Items. The project cost is Rs 429.35 Lakh.

Women owned cluster: The following two coir clusters are totally managed by rural/tribal women.

Pendur Coir Cluster, Maharashtra: 550 women beneficiaries are extracting of Coir Fiber, Mats, Geo-Textile, Coir

Pith. The project cost is Rs 180.93 Lakh.

Sawanthwadi Coir Cluster, Maharashtra: The cluster products are Coir Fiber Extraction, Mats, Geo-Textile, Coir Pith benefitting 500 women. Project cost is Rs 180.93 Lakh.

The institute was instrumental in organizing skill training programs on Honeybee Keeping as a preferred partner under National Bee & Honey Mission (NBHM) sponsored by Ministry of Agriculture & Farmers Welfare, GOI. The trainings were conducted across Telangana state for the benefit of FPOs/Farmers/SHGs/Tribals/ Rural population. The hands on skills

created awareness and motivated many participants towards apiculture enterprises.

Entrepreneurship Development Programs

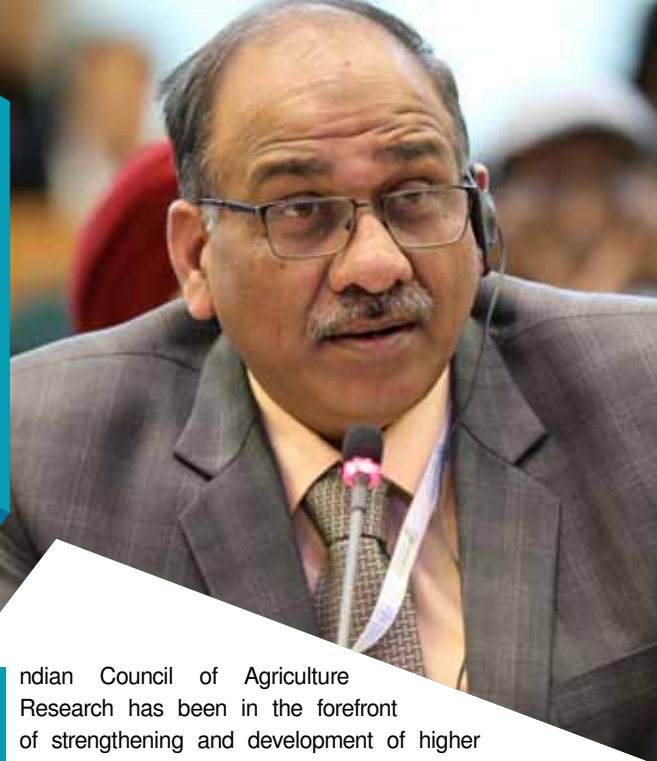
ni-msme has been organizing Entrepreneurship Development Programs (EDP) in Aquaculture & Fisheries for SC community unemployed youth located in coastal districts of Andhra Pradesh, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu, West Bengal and also UTs of Puducherry & Yanam. It is proposed to incubate at least 50 participants out of 750 trained and support them to start a micro enterprise activity in fisheries. The programs are sponsored by National Fisheries Development Board (NFDB), Ministry of Fisheries, GOI.

Besides clusters and skill trainings, ni-msme has conducted a virtual conference on 'Export Promotion of Geographical Indication (GI) Products for Mizoram MSMEs' from January 29 to February 5, 2022. The objective was to create awareness on Intellectual Property Rights and significance of GI to enhance the potential of horticulture & floriculture exports namely Mizo Chili, Mizo Ginger and Anthuriums for MSMEs based in the State of Mizoram. The conference focused on imparting familiarity with the business proposition of GI products and price advantage, to impart techniques/ impart skills of packaging for export-oriented products, to create awareness on export marketing and documentation, and to understand digital marketing opportunities for GI products. A total of 467 participants including International Delegates participated in the conference. The knowledge sessions were delivered by international experts from South America, North America, Europe & South East Asia in addition to 16 Indian specialists.

This institute welcomes partnerships and collaborations for the development of entrepreneurship and promotion of MSMEs.



DR RC AGRAWAL



Indian Council of Agriculture Research has been in the forefront of strengthening and development of higher agricultural education in India. Playing a pivotal role in improving the quality of agricultural education, ICAR therefore requires a stellar leadership. Steering through the multifaceted mandate of teaching, research and outreach activities of ICAR, Dr Rakesh Chandra Agrawal, Deputy Director General (Agricultural Education) has been able to give the much-needed guidance and direction to the reputed organization.

Born on 1 June, 1963, in a small village in Mathura district of Uttar Pradesh, Dr Agrawal was a bright student. He passed his higher secondary and graduation with distinction. Having completed his schooling from Govt. Inter College, Banda and Mathura, he went on to graduate from BSA Degree College, Mathura. Agriculture was his first choice. "It is a prestige for any student to get admission in Indian Agricultural Research Institute, New Delhi. Getting

DISCIPLINING INDIA'S AGRI EDUCATION



fellowship was also a choice. I did my post graduation and PhD in agricultural statistics. My graduation was also in statistics. Indian Agricultural Statistics Research Institute, which is part of IARI for academics, was the most prestigious institute for statistical research. I am grateful to my teacher Dr Roshan Lal Agrawal, Professor, BSA Degree College, Mathura, who as a mentor helped me to come to Delhi for trying admission in IARI, New Delhi,” says Dr Agrawal.

Today he is entrusted with the role of improving the quality of higher education in Agriculture which he is performing with élan. Being the National Director, National Agricultural Higher Education Project (NAHEP), ICAR, he is entrusted with the responsibility of developing resources and mechanism for supporting infrastructure, faculty and student advancement, and providing means for better governance and management of agricultural universities. In his capacity as DDG, Agriculture Education, he is providing the direction for improving the quality of higher education in Agriculture and attracting youths for pursuing careers in Agriculture and allied sectors in 74 Agricultural Universities of the country.

Dr Agrawal is also the National Convenor for the development of Roadmap for the implementation of the National Education Policy-2020 in Agriculture Education. On 28 Sept 2021, it was released by Shri

Narendra Singh Tomar, Minister of Agriculture & Farmers' Welfare, GOI for implementation in all Agricultural Universities.

Dr Agrawal also co-ordinated the revision of the PG/PhD course curriculum along with new academic regulations through 'Broad Subject Matter Area' committee. These recommendations

tête-à-tête with Anjana



AWARDS AND RECOGNITIONS

The meritorious career of Dr Agrawal is bejewelled with prestigious awards and recognitions. He has been conferred with the Rafi Ahmed Kidwai Award (Highest Award for Agriculture Research), Dr. MS Randhawa Award of National Academy of Agricultural Sciences for outstanding contributions in Agricultural Administration; Digital India Award of GOI, conferred by the President; Recognition by Association of Indian Universities for significant contributions in Agricultural Education; Sir Syed Khan Memorial Lifetime Achievement Award by Aligarh Muslim University; Dr BR Barwale National Award for the Excellence in Plant Genetic Resources are a few of them.

Dr Agrawal is a fellow of National Academy of Agricultural Sciences. The FAO elected Dr Agrawal in 2018 to head a Technical Experts Group on Farmers Rights for its implementation in 146 countries. He is presently the Vice-Chair of the Asia Region of the Bureau of International Treaty of Plant Genetic Resources for Food and Agriculture. He has represented the country as part of Indian delegation to more than 20 countries.

Dr Agrawal has published more than 40 research papers in peer reviewed journals, authored 4 books and delivered about 200 invited talks. He has also executed 10 research projects funded by International and National Agencies.

Dr Agrawal's wife, Mrs Lalita Agrawal was a Scientist at Defence Research Development Organization, Ministry of Defence, GOI. She shares his passion for research. His daughters are software engineers and his son is pursuing graduation in Computer Science Engineering from Michigan State University, USA. He attributes his achievements to his mother, who despite having no formal education ensured the best possible education for all her children. He is grateful to his loving family for the constant support all his endeavours.

In 2018, International Treaty of Plant Genetic Resources for Food and Agriculture (ITPGRFA), Food and Agriculture Organization (FAO), the specialized agency of the United Nations, elected Dr Agrawal to head a Technical Experts Group on Farmers Rights for its implementation in 146 countries. He is presently the Vice-Chair of the Asia Region of the Bureau of ITPGRFA.





compliance and promoting adoption and implementation of best practices related to environment safeguards. The awards were conferred by the Prime Minister during 2021.

Contribution to Statistics, Biodiversity Informatics, IPR and PVP

Dr Agrawal has also significantly contributed to the area of Statistics, Biodiversity Informatics and Intellectual Property Rights (IPR) and Plant Variety Protection (PVP). He initiated the Genome Saviour Reward and Recognition of individual farmers for their efforts in varietal conservation and evolution under PPV&FR Act, 2001. Till date about 100 farmers have been honoured with this award. He has helped in registering about 2800 plant varieties which includes 600 farmers' varieties. This registration provides Intellectual Property Rights to farmers and breeders rights to developers of the plant varieties. He had adjudicated more than 40 cases related to plant varieties as per PPV&FR Act, 2001.

Besides this, Dr Agrawal mobilized about 10,000 varieties through special drive from farmers from various agrobiodiversity rich areas for plant varieties protection and conservation in gene bank. He established a network of National Information Sharing Mechanism (NISM) on the implementation of Global Plan of Action for the conservation and sustainable utilization of plant genetic resources for food and agriculture in India.

Dr Agrawal conceptualized and executed a multidisciplinary project titled 'Agroweb- Digital Dissemination System of Indian Agricultural Research (ADDSIAR)'. Several web-based databases and online modules such as plant/fish/animal genetic resources/breeds, crop production/area statistics, notified and released varieties, aquaculture diseases, GIS databases on watersheds, profiles of scientific professionals, examination module to conduct online exams, Market Information System, etc. were developed under this project which are in use by agricultural scientists.

have been implemented from the academic session 2021-22. He initiated studies on Global University Standards for Agricultural Universities and Human Resources requirement in various sectors of Agriculture for the next 20 years so that a decision can be taken for the enhancement of gross enrolment ratio.

Under Dr Agrawal's leadership, 16 Centres for Advance Agricultural Science and Technology (CAAST), multidisciplinary centres for teaching, research and extension on critical and emerging agricultural topics have been established. These centres focus on scientific entrepreneurship, employability

Dr Agrawal is National Convenor for the development of Roadmap for the Implementation of the National Education Policy-2020 in Agriculture Education.

and research effectiveness for the post-graduate and PhD students. He has also established 18 'Institutional Development Plan (IDP)' centres in agricultural universities for learning outcomes and future employment for UG students.

Dr Agrawal initiated the 'Green and Clean Campus Award' for agricultural universities under NAHEP to encourage

KRITAGYA Hackathon, Krish Megh, Agri-Diksha Web Channel

KRITAGYA Hackathon is the brain child of Dr RC Agrawal. It was initiated for agricultural students, faculties and innovators/entrepreneurs and participation by any university/ technical institution nationally. KRITAGYA is an amalgam of three words. KRI for Krishi - Agriculture. TA for Taknik - Technology. GYA for Gyan - Knowledge. The participating students can collaborate with local start-ups and students from technology institutes, and can win up to Rs 5 lakh. Two Hackathons on 'Innovation in Farm Mechanisation' and 'Precision and Economical Animal Farming' have been completed under his guidance.

Krish Megh was an important concept developed by Dr Agrawal. It provides a robust and dynamic platform to meet the growing IT needs of the NARES system with the deployment of critical applications such as Education Portal, Academic Management System, Alumni Portal for agricultural universities, e-Courses of UG and PG level.

Dr Agrawal took keen interest in the development of the Agri-Diksha Web Channel for synchronous online learning in real time and to provide agricultural students with an experience very close to traditional face-to-face teaching.

He undertook the plan to address the misalignment of "teaching supplied and learning demand" and to adopt the best practices available globally. The popularization and revamping of Consortium for e-Resources in Agriculture (CeRA) was the first of its kind for facilitating 24x7 online access of selected journals in agricultural and allied sciences to students and researchers in National Agricultural Research System. It was another major important initiative undertaken by him.



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Agricultural Education

CONVERGENCE, COORDINATION VITAL

I CAR's document on Implementation Strategy for the National Education Policy-2020 in National Agricultural Education System is a very timely and welcome move. To harness the full and expedited benefits of the NEP-2020 and the implementation strategies in agricultural higher education in the country, it is important to address certain basic and known issues which can be addressed through the convergence and coordination of the existing efforts.

1. Education is in the Concurrent list of Constitution of India but agriculture including agricultural education is a State subject. University Grants Commission, as apex statutory body of the Government of India, coordinates, determines and regulates standards of higher education, authorises the recognition to universities and disburses funds to the recognized institutions. Almost, similar function is performed by the ICAR but without the regulatory/statutory powers which is normally vested in the respective state governments. It is hoped that this issues gets resolved with the NEP-2020 implementation.

Further, in a state, all general public universities (usually many) and private universities having agriculture college or faculty are coordinated and

regulated by the Ministry of Education whereas the few agricultural or horticultural universities by the Ministry of Agriculture and a few animal science (Veterinary and/or Fisheries) universities by the Ministry of Animal Husbandry, Dairying and Fisheries. Thus, the growth and quality improvement of higher education in these academic institutions is sectoral, solitary and depends upon the availability of funding/resources for infrastructure and manpower. It is suggested that concerted efforts should be made to bring agricultural education

also, like education in general, in the Concurrent list of Constitution though agriculture per se may remain a state subject. It will bring synergy in policy and efforts in various institutions, and strengthen the center-state coordination in agricultural education that will improve

About the AUTHOR

Dr RK Mittal is Vice Chancellor, Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, UP. Earlier, he was VC of Dr Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar; OSD (International Relations) and Assistant Director General (Education Quality Assurance & Reforms), Indian Council of Agricultural Research, New Delhi. Dr Mittal is the President of Indian Agricultural Universities Association, New Delhi



good governance, structural uniformity, funding support, infrastructure development, faculty recruitment and development, student development, operational autonomy and education quality in the country.

2. Research and education are complementary to each other and imminent for quality improvement of academics and making an institution globally competitive. Presently, Central Agricultural Universities, State Agricultural Universities, ICAR and state agricultural research institutions and some NGOs/private agencies are working mostly in isolation on many aspects common for the region/area. To get the fullest advantage of the expenditure made out of the central and state grants and/or private funding, a policy and mechanism need to be developed for convergence of these efforts with identification of common programme and role of different participants. Alternatively, coordination between them, making them complementary to each other, possibly in cluster mode, will be rewarding so far as research or extension output and their role in improving quality of education is concerned.

3. The Indian university system functions in heterogeneous conditions comprising of regional, locational (metropolitan, urban, tribal), social, linguistic, economical, infrastructural (rich, moderate, poor), and aspirational (international, national and regional) diversities prevailing across the country. These diversities are reflected in the student and teacher composition that influence teaching and research activities

**fun
FACT**



Dr Mittal likes music and is fond of singing

in Indian universities. It is suggested that for the holistic development of agricultural education in the country, these regional disparities should be kept in mind while planning and executing the programmes. Instead of having a uniform strategy for the holistic improvement of quality of education, there should be three tier different and specific strategies for the premium institutions, better performing institutions and under-performing institutions.

4. Greater intra and inter-institutional collaborations including academia-industry partnership, public-private and international (like CGIAR, universities and other institutions in specified areas) partnerships is the requirement of the day. Private partnership should be encouraged so far as increasing access, equity, affordability and quality, all four with accountability.

5. Coordination between centre and state as well as between institutions, functional as well as financial, is required in nurturing young researchers, students exposure visits to Centers of Excellence in India and abroad, institution of post-doctoral fellowships (for both Indians and foreign students) and teaching assistantship, industry people as adjunct faculty, dual/joint degree programs including joint thesis research with best institutions in India or abroad, encouraging faculty for sabbatical leave, inviting foreign faculty on sabbatical/guest faculty etc.

6. Considering the dimensions of the country and diversity of agriculture situations, scientific strength alone cannot meet the gigantic requirement. The massive requirement of para-professionals, as advocated in the NEP-2020 also, calls for new degree, diploma and certificate courses in agricultural mechanization and crop production; soil and water management; flowers, fruits and vegetables growing; processing



Concerted efforts should be made to bring agricultural education in the Concurrent list of Constitution though agriculture per se may remain a state subject. It will bring synergy in policy and efforts in various institutions, and strengthen the center-state coordination in agricultural education



and value addition; food science and technology; application of biotechnology and bioinformatics; organic farming; computer/IT use; supply chain management, animal nutrition and health management and many others. The requirement of such manpower should be first critically assessed sector-wise and accordingly efforts be made where the private sector may also provide technical and financial support.

7. To ensure that the students are job- and industry-ready as also skilled to start their own enterprise, the agricultural universities are following the “Experiential Learning Programs”. ICAR has been promoting and financially supporting the establishment of such programmes in the agricultural universities. Recommending coordination effecting exchange of students between the nearby universities/institutions instead of developing them independently will widen the opportunities of learning.

8. Industry-Academia partnership in applied and development research in agriculture and allied sectors is of vital importance. Industry can benefit the academic institutions through their

Online and digital learning and platforms have tremendous scope to augment regular education. Virtual education creates opportunities for customized learning, any time anywhere and lifelong learning, systems for conducting remote exams, adaptive learning, upgradation of teachers' skills etc

understanding of the real problem to solve, sponsoring or co-sponsoring the research and/or educational pursuits, sharing knowledge and know-how with regard to curriculum development, helping with infrastructure or validating results, and commercial licensing, supporting seed and food material production and their value addition, setting up of market chains etc. which would be an important move towards inculcating entrepreneurship in students.

9. Online and digital learning and platforms have tremendous scope to augment regular education. Virtual education creates opportunities for

customized learning, any time anywhere and lifelong learning, systems for conducting remote exams, adaptive learning, upgradation of teachers' skills etc. With globalization of education and advancement of research, coordination amongst the identified partners/stakeholders will be very important to address the multiple issues related to the education particularly the new science.

10. There is tremendous potential for agri-tech startups to enhance rural livelihoods and reduce costs associated with climatic uncertainties and traditional farming practices. Advancements in technologies which can improve the quality of agricultural produce such as IOT/ analytics for climate intelligence, forecasting solutions, machine learning to identify crop stages, artificial intelligence to reduce crop wastage, soil health monitoring, plant image recognition, geospatial tracking, and sustainable packing etc. can help achieve this goal. Needless to say that in view of the faculty capability and an institutions capacity, this will require coordinated approach of different stakeholders.

Dr. Rajendra Prasad Central Agricultural University

Dr Rajendra Prasad central Agricultural University (Pusa, Bihar) is an institute of National Importance which is marching ahead with its vision of Advancing professional competency for pursuing excellence in education, research and entrepreneurship in relation to agriculture and allied sectors with ethical values to meet the regional, national and global needs and offering specialized services to the farmers for decent livelihood.



Dr Rajendra Prasad central Agricultural University, Pusa is producing exemplary human resources and providing the leadership in Teaching, Research, and Extension related to agriculture and allied sciences under our visionary Vice-Chancellor - Dr. R.C. Srivastava. It achieves the same by:



Dr. R.C. Srivastava
Vice-Chancellor

- Promoting a high-quality learning environment and the creation of an integrated approach that develops an appreciation and understanding of the environmental and socio-economic significance of soil-plant-animal-people interface.
- Shaping agricultural stakeholders into self-sustaining mode through innovation-centric education, cutting edge research, entrepreneurship/ startup skill development, and dissemination of appropriate agricultural technology.
- Nurturing national/ global needs of achieving sustainable food production and safety while mitigating pressure on agricultural land through advanced interventions of research and development.

PROUD MOMENT

- The honorable Prime Minister of India Sri Narendra Modi has inaugurated the new building of "School of Agribusiness & Rural management" and also laid the foundation stone of new facilities- hostels, International Guest house etc. on 10th September 2020.
- The University has the honour to find a place under top ten best among Government University of the country by India Today-MDRA survey, 2020...
- The Knowledge review magazine placed this University among Top 10 Best Institutions in North India in the Year, 2020.
- Nominated as Finalist of Green University of Asia Pacific region award- 2020 by Accreditation Council for Entrepreneurial and Engaged Universities.

An Environment Promoting Growth

It follows an Integrated System of Education comprising Teaching, Research, and Extension and advisory systems which is quite different

from any other university.

Its Under-Graduation degrees are four years technical and professional courses as compared to three years degree at general Universities which includes STUDENT READY (Rural Entrepreneurship Awareness Development Yojana) program for one year in which students are attached to a particular village for identification of the farming problem; industry attachment; and business proposal development.

The University also has an active placement cell. Starting from grooming to placing students in good agro-based companies, the placement cell under the University helps its students at every step of their growth. Many students choose to go for higher studies and prepare for civil services, Bank, Agricultural Research Service, and other reputed jobs in the country and abroad.

EDUCATION:

The University has total intake capacity of 319 students in 6 disciplines of UG Programme, 286 students in 26 disciplines of PG Programme and 38 students in 13-disciplines of Ph.D. programme. The academic Programme of the University was shifted to online mode from the last week of March, 2020 to cope up with pandemic of COVID-19. Every effort was made to protect the interest of students. The study materials related to ongoing courses were uploaded on the university website for access by the students. The classes, examination and evaluations were conducted online using digital platform- google meet, email, whatsapp etc. To enhance the visibility of the University, the provision has been made for admission of In-service students, overseas students and Industry sponsored students

EXTENSION:

The university is actively engaged in enhancing the livelihood of farming community by transferring technology through its adequate infrastructure and efficient system for dissemination of technology through Directorate of Extension Education, Agriculture information Technology Centre (ATIC) and Agro advisory service at headquarter level and 16 KVKs at different districts under jurisdiction of the university.

Social Responsibilities

- Initiated training programme at various



KVKs under the PM Garib Kalyan Yojna to poor and large number of migrant labourers

- Awareness programme through phone call, SMS, whatsapp group, leaflets, posters for Dos and don'ts regarding COVID-19.
- Shared RTPCR machine with Shri Krishna Medical College, Muzaffarpur for the test of COVID-19.
- Distribution of Bal Shakti- 500 kgs to nearby slums.
- Distribution of hermetic bags for storage of wheat- 4000 bags to 1000 resource poor farmers.
- Fabrication and distribution of mask to the COVID-19 warriors, vegetable vendors and policemen.

ENVIRONMENTAL SAFEGUARD INITIATIVE

University has developed very efficient system for making the campus environment free of pollution through the following activities

- Conversion of house hold waste and farm waste into vermi compost and other value added products with a generation of revenue of 16 lakh per year.
- Utilization of solar energy for various activities in campus as well in the farm activities through 25 installed solar tree/roof top solar system resulted saving of a sizable proportion of energy consumption.
- Developed a model of management of floral offering temples into vermi-compost and initiated with Baidyanath Dham temple, Deoghar (Jharkhand) and Garibnath temple, Muzaffarpur (Bihar)
- Boat Mounted Solar based Pump, developed by the University, has been selected under RAFTAR Project and assistance of 25 lakhs is given by MANAGE to the prospective entrepreneurs.

AGRI STARTUPS REVOLUTION AND WAY FORWARD

While we aim to transform agriculture by improving farmers' incomes, it would be most fitting to include the rising number of agri entrepreneurs as an important fragment on this journey. The agriculture sector, considered to be the spine of the Indian economy, has been significantly robust and resilient during the pandemic. Innovations by agri startups have contributed enormously. The vibrant ecosystem of AgriTechs has played a critical role in the last few years. Future interventions in the agriculture sector should certainly focus on the two aspects of reducing production costs for farmers and decreasing losses in the agri and food supply chain. Innovations and new-age technologies in this regard will certainly bring about major changes.

In the last few years, we have seen young entrepreneurs come up with ideas, innovations and business models to support farmers and help them achieve scale and sustainability. Enterprising young entrepreneurs of urban India as well as from rural backgrounds are now coming up with innovations to turn around the rural & agriculture landscape through their startups in recent years. A study shows that 70% agripreneurs are from non-agri field as they find greater



About the AUTHOR

Dr Ramesh Mittal is Director, CCS National Institute of Agricultural Marketing, GOI, MOA&FW. He has over 25 years of experience of training, research, education and consultancy in the field of agricultural marketing and entrepreneurship development



opportunities of business and impact in agriculture and allied activities. These agripreneurs are coming with thorough knowledge and business acumen to deal with the challenges of agriculture to maximize the farmer impact as well as profitability.

Major Impact On The Sector

Aspiring entrepreneurs have made a significant impact across all the segments of the agriculture sector. With so much potential, these agri start-ups need to be appropriately supported and guided. Going forward, building a conducive agri start-up ecosystem is very crucial for the country and this can be done by strengthening collaboration between key stakeholders and developing friendly policies. Strong alliances with potential agri start-ups will lead to innovation-led growth in the sector.

The AgriTech sector has gained momentum in the last four years, driven by the entry of highly talented



entrepreneurs. Today, India has built a strong name for itself in the global AgriTech start-up ecosystem and has more than 700 AgriTech start-ups that are providing customised solutions. The year 2021 has been a fantastic one for Indian AgriTechs. Indian agri start-ups raised investments to the tune of almost USD 1 billion. The investments gathered momentum despite the pandemic, with the participation of many new investors from the seed stage to late stage, and it is expected that the momentum continuing in 2022 and beyond. The collaboration and alliances will also ensure that AgriTech start-ups scale up and realize the desired high-level impact that will be crucial not only for their sustainability but also for enhancing the productivity and output of the sector. AgriTech start-ups harness the potential of the emerging technologies to support farmers in reaching better scale, systems and sustainability.

Future Potential Immense

With an impressive inflow of funding, more than 48% of AgriTech CEOs in the country believe that they will have the next AgriTech unicorn within a three-year time frame. Hence, the future potential for AgriTech start-ups in India is immense. The Indian AgriTech sector, which took root in the last decade, has evolved into a space that offers innovative solutions to the problems faced by Indian farmers. It is expected that India will have more than 10,000 sustainable start-ups in the

RKVY-RAFTAAR supports agribusiness incubation

This initiative has helped transform the face of the rural economy and enhance the farmer's income. RKVY-RAFTAAR supports agribusiness incubation by tapping innovations and technologies for venture creation in agriculture. So far, 646 startups of agriculture and allied sectors have been incubated by Knowledge Partners (KPs) and RKVY Agribusiness Incubators (R-ABIs) under the agri-entrepreneurship programme under this scheme. Out of these 646 Startups, 173 woman startups have been supported under the scheme.

Other than the RKVY scheme, startup ecosystem including Agri Startups are being supported by various initiatives including:-

- Startup India
- Atal Innovation Mission (AIM)
- New Gen Innovation and Entrepreneurship Development Centre (NewGen IEDC) under the National Science & Technology Entrepreneurship Development Board (NSTEDB)
- Dairy Entrepreneurship Development Scheme promoted by National Bank for Agriculture and Rural Development (NABARD)
- Venture Capital Finance Assistance (VCA) Scheme promoted by Small Farmers' Agri-Business Consortium
- Aspire (MSME), etc.

Some of the successful examples of accelerators/incubators/mentors in the agriculture ecosystem:-

- AGRI UDAAN – Food and Agribusiness Accelerator 2.0
- Centre For Innovation, Incubation & Entrepreneurship (CIIE)
- Agri-Tech Startup Accelerator CIE, Hyderabad
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Food Processing Business Incubator/ Agribusiness Incubator (ABIO)

Indian Council of Agriculture Research (ICAR) has been supporting Agri-based startups under the project called National Agriculture Innovation Fund (NAIF) initiated in the year 2016-2017. It has two components - Innovation Fund and Incubation Fund & National Coordinating Unit (NCU).

CCS NIAM along with other knowledge partners is putting its best efforts into mentoring agri startups and extending all possible support. CCS NIAM has incubated 150+ agri startups and provided a grant-in-aid of Rupees 7.52 Crores to scale up their innovations and enterprising spirit.

The Indian AgriTech sector, which took root in the last decade, has evolved into a space that offers innovative solutions to the problems faced by Indian farmers. It is expected that India will have more than 10,000 sustainable start-ups in the next 8-10 years

next 8-10 years. Many such start-ups have already been founded by farmer families, making the ecosystem more inclusive. Indian AgriTech is entering its third phase, which will be driven by increasing farmer adoption of new-age innovations and a significant degree of consolidation in the start-up space. For instance, it is witnessed that significant participation from agri corporates are trying to partner with start-ups or building their own platforms. The intersection of agribusinesses and AgriTech will further drive the scale and innovation agenda in the sector.



The scale of Indian AgriTech start-ups depends on the partnerships that they are able to develop with ecosystem players such as farmers, farmer producer organisations (FPOs), cooperatives, common service centres (CSCs), research institutions, agricultural universities, incubators, investors, central/state governments and district administrations, this makes 'partnership and collaboration' as the core.

As per a report of FICCI-PwC, in this next phase of AgriTech, two big opportunities are ahead – innovations for solving climate risk issues and integration of unique financing models for farmers and value chain members, including processors, warehouses, distributors and retailers. We just need to create an enabling ecosystem for these themes to foster participation from governments, multilaterals and financial institutions.

Increasing Participation Of Women

It is also a joyful feeling that the participation of women in Indian agriculture is increasing, and it is anticipated to see more women

We need to reorient the curriculum in our agricultural universities to make it multidisciplinary, especially by including data science, digital tech, biotech, nutrition tech and behavioural sciences. We must build capacity to provide to the emerging talent needs of the start-up ecosystem

entrepreneurs in the sector in order to bring in more diversity and build more women farmer centric solutions. A few such women startups are already engaged in some path-breaking work, and they will inspire other women entrepreneurs to join the ecosystem.

One big challenge faced by the sector is lack of talent. It is due season that we reorient the curriculum in our agricultural universities to make it multidisciplinary, especially by including data science, digital tech, biotech, nutrition tech and

behavioural sciences. It is now essential that we build capacity to provide to the emerging talent needs of the start-up ecosystem.

GOI has shown its deep commitment to bring policy reforms in the agriculture and allied sector to further strengthen the Agri Entrepreneurship ecosystem. Looking to the possible potential of employment and business in the agriculture sector, the Ministry of Agriculture & Farmer Welfare, Government of India came up with the Innovation And Agri Entrepreneurship Cell for strengthening infrastructure in agriculture and allied areas, and to promote agripreneurship and agribusiness by providing financial support and nurturing the incubation ecosystem.

The scheme is called RKVY - RAFTAAR. Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RKVY-RAFTAAR) aims to make farming a remunerative economic activity through strengthening the farmer's effort, risk mitigation with a major focus on development and creation of pre & post-harvest infrastructure.



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Dr. A. Vishnuvardhan Reddy
Vice Chancellor

The ANGRAU established on 12th June of 1964 is serving the new state Andhra Pradesh with renewed interest and dedication, quality education, research and extension.

MANDATE OF THE UNIVERSITY

- Train the manpower in Agriculture, Agricultural Engineering & Technology and Home Science for the development of the state (Teaching).
- Constantly generate and improve technologies for increasing production in Agriculture and for the welfare of rural folk (Research).
- Assist in dissemination of the improved technologies to the farmers of the state through development departments of Government (Extension).

COLLEGES

Constituent Colleges :

Agriculture (5), Agril. Engg. (2), CFST (2), Community Science (1), IABM (1),

Affiliated Colleges :

Agricultural Colleges (6)

Constituent Polytechnics :

Agril. (15), Agril. Engg. (2), Organic Farming (1), Seed Technology (1)

Affiliated Polytechnics :

Agril. (53), Seed Technology (11), Organic Farming (3), Agril. Engg. (16)



Hon'ble VC interacting with Students



Institute of Frontier Technology



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Receiving award for 2nd position in JRFs

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Post Graduation :

M.Sc. (Agri.), M.Sc. (Agri. Business Management), M. Tech. (Agril. Engineering), M.Sc. (Home Science)

Doctoral :

Ph.D. (Agri.), Ph.D. (Agri Engineering & Technology), Ph.D. (Home Science)

Diploma :

Diploma (Agricultural Polytechnic), Diploma (Seed Technology Polytechnic), Diploma (Agricultural Engineering Polytechnic), Diploma (Organic Farming)

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- Campus surveillance with CC cameras
- Individual labs and Central Instrumentation facilities
- Indoor and outdoor games facilities
- Digital Libraries
- Good housing facilities
- Well-developed research farms
- Good medical facilities

NEW INITIATIVES

- Student READY Programme
 - RAWE Programme
 - Experiential Learning
 - In-Plant Training (Internship)
- Personality enhancement & Soft Skills
- Innovative thinking and research skills
 - AGRI CARNIVAL
 - Annual Post Graduate Student Conference
- Capacity building – Global awareness through Institutional Development Plan (IDP) under National Agricultural Higher Education Project (NAHEP)
- Open and Distance Learning Centre (ODLC)
- Agricos Green programme
- Sports and Extra-curricular activities

ACHIEVEMENTS

PG Seats in AIEEA and GATE 2021
(Total 272 admissions all over India)

Agriculture - 188
ABM - 20
(Agriculture)

Ag Engineering - 16
GATE Ranks - 15
PG Management - 12 (Agri. Engineering)

Community
Science – 21

ANGRAU ranked
as per ICAR ranking
of Agricultural
Universities for 2020



DIGITAL AGRICULTURE CHALLENGES AND OPPORTUNITIES IN AGRICULTURE EDUCATION

Agriculture and its allied activities act as the main source of livelihood for more than 80% population of rural India, but its contribution to GDP is less than 20%. India emerged from a food deficient to food surplus nation with spectacular growth in agriculture sector since 1966. Today, India is one of the major exporters of food grains. The food grain production of India increased from 51 million tons in 1950 to about record 273.38 million tons in 2016-17. This growth represents a remarkable achievement in the history of world agriculture. India has achieved significant growth in agriculture, milk, fish, oilseeds, fruits and vegetables owing to green, white, blue and yellow

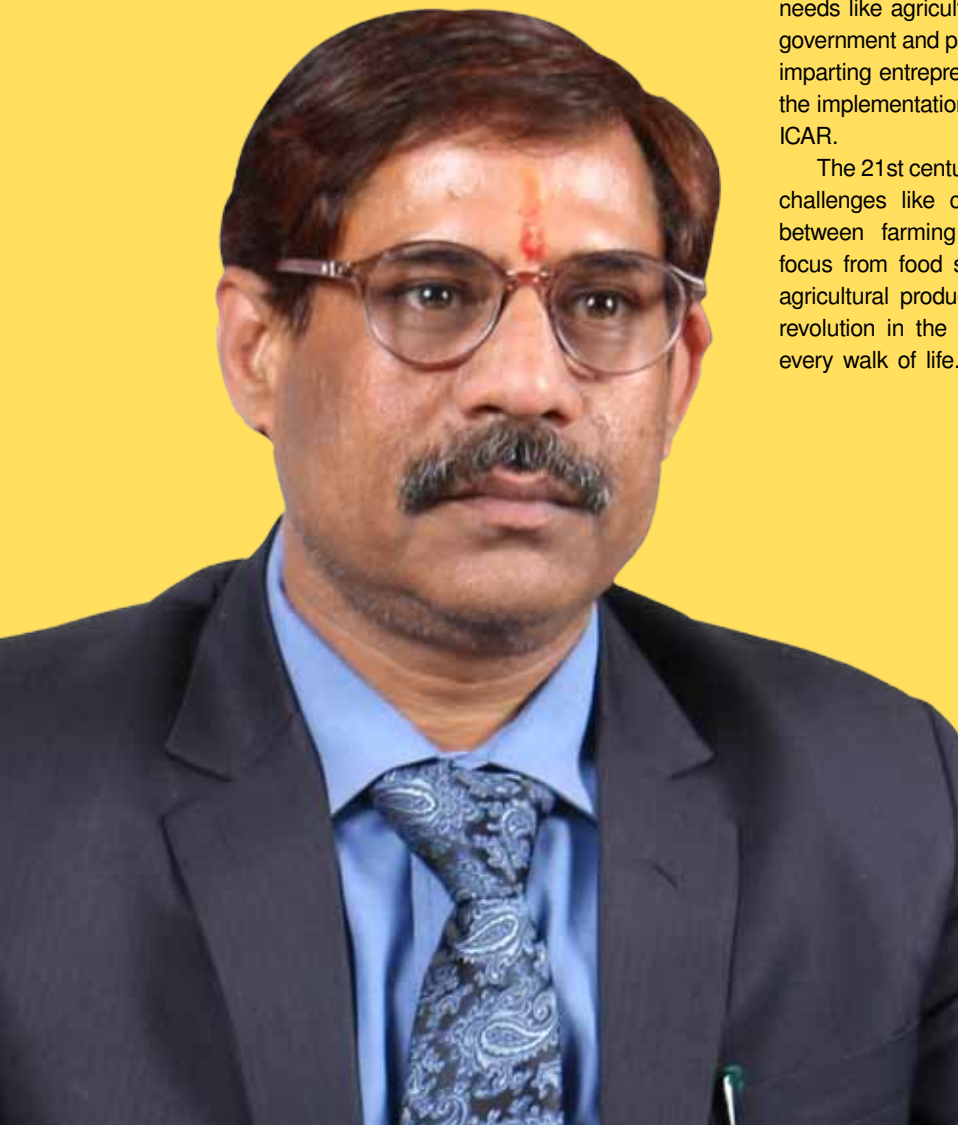
revolutions.

Agriculture Education has played pivotal role in the agricultural development in the country. The foundation for full-scale agricultural education in India was laid in 1960 with the establishment of first Agricultural University (AU) at Pantnagar. The university later became the harbinger of green revolution in the country.

Later, State Agricultural universities were established across the country which played crucial role in development of agriculture and allied sector across the country.

Initially, agricultural education was structured with the major focus of developing human resource with to cater the needs like agricultural research and extension activities in the government and private sector. Of late, focus is shifting towards imparting entrepreneurship-oriented agricultural education with the implementation of 5th Dean Committee recommendation of ICAR.

The 21st century agricultural sector in India is facing several challenges like climate change, growing financial disparity between farming and other sectors, demand for shifting focus from food security to nutrition security, and sustaining agricultural production under limiting land resources. The IT revolution in the century has brought digital technologies to every walk of life. The emerging tools and technologies from



About the **AUTHOR**

Dr Ravindra Kumar Sohane is Director Extension Education at Bihar Agricultural University, Sabour, Bhagalpur. He has more than three decades of varied professional experience in Agricultural Research, Extension & Development. He is the recipient of National e governance award & ICAR Swami Sahajanand Best Extension Scientist award



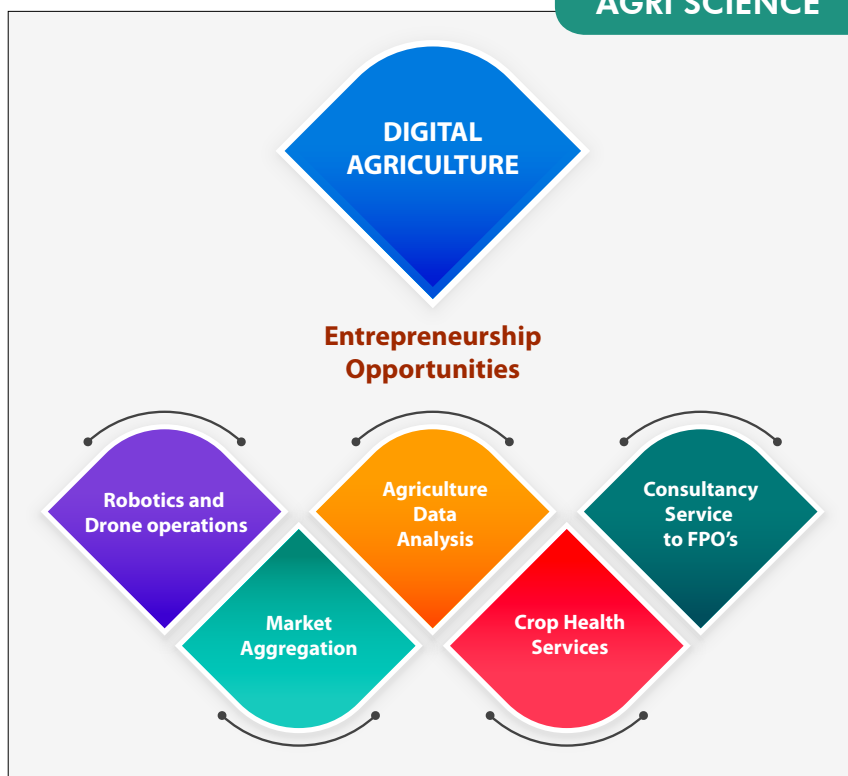
developing the ICT ecosystem has huge potential to address the hitherto unresolved issues of Indian agriculture like enhancing resource efficiency of small holder farmers through community level planning and deployment of site specific interventions. In this direction, the concept of 'Digital Agriculture' has gained global importance and is considered as the future of farming.

Initiatives Taken By GOI

Digital Agriculture is an emerging concept which is an amalgamation of the concepts of precision farming and smart farming. Precision farming aims at enhancing resource use efficiency by site-specific application and optimization of inputs. The decision making under precision agriculture requires assessment of special and temporal data of several sites of the individual farms derived from various sensors.

Smart farming is aimed at optimizing complex farming systems using information and data technology tools. Digital Agriculture is essentially using digital technologies, like artificial intelligence (AI), machine learning (ML), remote sensing, big data, block chain and IoT (Internet of Things), etc. to help farmers to take right farming decisions and help to enhance overall agriculture system productivity. Digital Agriculture is an emerging field in Indian Agriculture, poised to bring revolutionary changes from crop production to marketing and value chain creation.

Although the digital agriculture is still nascent in India, several initiatives have been made by GOI to accelerate the introduction of various digital tools in Agriculture. Govt. has initiated Digital Agriculture Mission 2021–2025, in partnership with various private agencies during September 2021. Enabling Drone Technology in Agriculture by launching SOP's for use of Drone in Agriculture was brought during December 2021. Schemes like "Swamitva" to draw drone based maps of each village. All these initiative would help in accelerating development digital agriculture.



Agricultural Education in Digital Era

In order to sustain, diversify and realize the potential of agriculture sectors, it is necessary to develop skilled human resources. Agricultural human resource development is a continuous process undertaken by agricultural universities. Agricultural Education in India was always dynamic and embraced several emerging technologies like the emergence of Agricultural Biotechnology. Similarly, it is the time to bring 'Digital Agriculture' into mainstream course curriculum of agriculture and allied streams.

Incorporation of Digital Agriculture as part of agricultural education will help to develop next generation human resource

who could take up real world challenges in implementation of digital agriculture and taking farming to next level. Apart from that, the future agriculture sector based on digital agriculture would also bring several entrepreneurship opportunities which need to be exploited to its full potential.

Agriculture Education need to be revamped to exploit new employment and entrepreneurial opportunities in the field of robotics and drones in agriculture, consultancy services, digital crop health services, big data analysis, etc.

Entrepreneurship and employment opportunities under Digital Agriculture

Key Initiatives Required in Agriculture Education

- Development of course curricula in line with developing digital world including focus on e-learning as envisaged in the new education policy
- Design & development of region specific and need-based vocational courses with focus on developing digitally enabled human resources
- Focus on enhancing the learning outcomes though adopting emerging teaching technologies



Dr Sohane likes traveling and he enjoys spending time with his pet Oreo

AGRICULTURAL EDUCATION

LEAN TO LEARN



About the **AUTHOR**

Dr AS Krishnamoorthy is Acting Vice-Chancellor, Tamil Nadu Agricultural University (TNAU), Coimbatore. He has a passion for mushroom research, and also to groom students to have a global outlook

India is the second largest food producer. It also has the second highest under-nourished population in the world. Realizing the necessity of transforming agricultural education with reference to global context, Indian Council of Agricultural Research (ICAR) under NEP 2020 had embarked on an ambitious National Agricultural Higher Education Project (NAHEP). A major objective of NAHEP is to invest in infrastructure, competency and commitment of faculty and to attract talented students to agriculture. The project aims to bring quality in higher education and focus on selected agricultural universities. This University is also a partner under NAHEP which strives to bring in quality transformation among scientists and students to compete in the global arena. For bringing in holistic changes in agricultural education, ICAR has brought out the following changes in the recent past.

- a. Improving the performance of each of the Institute / University offering agriculture by ranking them at All India basis which would facilitate the aspiring students to select the best
- b. Introduction of Student READY program incorporating Experiential and Rural learning, in plant, skill development training etc. to transform the students as entrepreneurs
- c. Declaration of Undergraduate programmes in Agriculture and allied subjects (13) as Professional degree
- d. Introduction of All India Entrance Examinations, centralized admissions to selected seats, accreditation of courses, colleges and universities, online counseling and admissions etc.
- e. Introduction of several scholarships and fellowships to the admitted students as per their eligibility and to promote diversity among the students by attracting students from abroad through Study in India (SII) program
- f. Strengthening of Library resources
- g. Introduction of Academic Management System (AMS)
- h. Assigning Unique Student Id (USID) under EKTA

initiative

i. Creation of E-Krishi Shiksha (e-learning portal of ICAR), Krishikosh (Digital repository of theses), E-Granth, Agri Diksha (Agri web education channel) etc.

More Girls Pursuing Professional Agri Courses

For bringing changes in the agricultural sector, it is wise to attract young talented students to pursue agriculture as their UG degree. Students need to be motivated at the school level itself to join UG programs in agriculture and allied sciences. An estimate provided in the Landscape of Higher Agricultural Education in India (2020) brought out by ICAR revealed an increasing trend of girl students (7 % in each) applying to UG, PG and Doctoral programs (11 %) during 2019-20 as compared to 2014. It also indicated that the candidates recommended for admissions in UG programs through ICAR had been very low in Tamil Nadu and had been higher in states like Rajasthan, Bihar, Kerala, Odisha and Andhra Pradesh.

It was also indicated that there had been a decreasing interest of students for opting for Animal Science subjects in their PG program. Gender gap reduced, and during 2019-20, female candidates competed equally with the male candidates to receive JRF /SRF (PGS). The report revealed that the admission status of agricultural graduates increased over time since 2011 to 2015; their



Dr Krishnamoorthy likes to read and paint during his leisure hours

placement at All India level had been only around 19.3 to 24 %.

Recommendations Made by Dr RS Paroda Committee

One of the factors for sustaining agricultural growth is to attract youth to agriculture. Several recommendations have been made by Dr RS Paroda committee (2019). These include

- Formation of National Mission on Youth in Agriculture to build new skills in youth for innovative agriculture through both formal and informal education
- Development of a new research agenda for Youth-Agriculture Nexus
- Involving youth in "Plough to Plate" initiative
- Paradigm shift from "Youth as a farmer" to "Youth as a value chain developer"
- Institutionalization of incentives and awards/rewards system
- Projecting successful entrepreneurs as role models

- Creation of Agri-Youth Innovation corpus fund
- Creation of Department of Youth in Agriculture
- Enhancing the ICT knowledge of Youth

Sustainable Development Goal (SDG) pertaining to Education affirms that SDG 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunity to all". Agriculture is a subject which can be learnt by both formal and informal ways, by seeing and doing, through interactions with the learned scientists and stakeholders, which shall promote lifelong learning among all.

In the present day context of digitizing education, ICAR and TNAU have taken enormous steps in promoting digital agriculture. This includes the availability of updated technologies, agro advisory and market linked services, Kisan Call Centre and discussions with experts, through Youtube channel, etc.

An estimate provided in the Landscape of Higher Agricultural Education in India (2020) brought out by ICAR revealed an increasing trend of girl students (7 % in each) applying to UG, PG and Doctoral programs (11 %) during 2019-20 as compared to 2014. It also indicated that the candidates recommended for admissions in UG programs through ICAR had been very low in Tamil Nadu and had been higher in states like Rajasthan, Bihar, Kerala, Odisha and Andhra Pradesh

Higher Education Sustainability Initiative (HESI)

The Higher Education Sustainability Initiative (HESI) was created in 2012 in the run-up to the United Nations Conference on Sustainable Development (Rio+20). With commitments from over 300 Universities from around the world, HESI accounted for more than one-third of all the voluntary commitments that were launched at Rio+20. Through its strong association with the United Nations, HESI provides higher education institutions with a unique interface between higher education, science and policy making. This operates at the World level and ICAR operates at the National level for providing quality education. Many ways of improving the knowledge, skill, attitude, behavior, response, inclination etc. of students towards self actualization are available in both physical and digital forms. It is up to the students and the faculties to use them appropriately.

POULTRY & LIVESTOCK SECTOR TO SEE HIGH GROWTH

The government has given thrust on infrastructure development for poultry and livestock sector in the Union Budget (2022-23) and has initiated specialised schemes and funds to boost the poultry industry, which plays a critical role in the Indian economy

Livestock sector is a critical sub-sector of agriculture in the Indian economy. According to the Economic Survey (2021-22) tabled in the Parliament recently, the livestock sector consisting

of dairy, eggs and meat grew at CAGR of 8.15 per cent. As per the estimates of National Accounts Statistics, 2020, the contribution of the livestock sector in the total GVA (at constant prices) of agriculture and allied sectors grew from 24.32 per cent in 2014-15 to 29.35 per cent (2019-20). The livestock sector contributed 4.35 per cent of total GVA in 2019-20.

According to FAOSTAT data of 2020, India ranks third in egg production and sixth in meat production globally. India's egg production has increased from 78.48 billion in 2014-15 to 122.11 billion in 2020-21. Per capita availability of eggs is at 91 eggs per annum in 2020-21 (Provisional). Meat production has increased from 6.69 million MT in 2014-15 to 8.80 million MT in 2020-21. Basic Animal Husbandry Statistics, 2020, states that India's poultry meat production was 4.34 million MT, contributing almost 50% of the total meat production in 2019-20.

Allocation For Livestock Sector In Union Budget

Union Finance Minister Smt. Nirmala Sitaraman in the Union Budget (2022-23) allocated Rs 6,407 crore for the Ministry of Fisheries, Animal Husbandry and Dairying, which is an increase of 44 per cent from the 2021-22 allocation.

Commenting on the Budget, Union Minister of Fisheries, Animal Husbandry, and Dairying Shri Parshottam Rupala said that 95% of livestock farmers are concentrated in rural India. Infrastructure development under the 'Vibrant Villages Program' will play a significant role in enhancing market access for these poultry and livestock farmers. He stated that the reduction in alternate minimum tax for cooperatives from 18.5% to 15% as announced in the Budget is a significant announcement that shall provide a level playing field between cooperative societies and companies. The incentivizing of digital banking, digital payments & fintech innovations as announced in the Budget will have a ripple effect in the poultry and livestock sector.

According to Shri Atul Chaturvedi,

About the AUTHOR

Mr Ricky Thaper is Honorary Treasurer, Poultry Federation of India. He has been working in the poultry industry for 35 years. Mr Thaper attended the course on Poultry & Livestock Nutrition and Management at A&M University, Texas, USA, under the Cochran Fellowship Program. He has also attended the course on processing of soybeans at National Soybean Research Centre, University of Illinois, Champaign-Urbana, USA



Secretary, Department of Animal Husbandry & Dairy (DAHD), allocation for livestock has been increased by 40% and central sector schemes have been increased by 48% in the Budget, indicating the government's commitment to the growth of poultry and dairy farmers.

Special Schemes For Poultry Sector

To support the poultry and livestock sector, DAHD was implementing the Entrepreneurship Development and Employment Generation (EDEG) as a component of the National Livestock Mission (NLM). Poultry Venture Capital Fund was implemented as an activity under the EDEG. The salient features of realigned NLM scheme include employment generation, entrepreneurship development and increase in per animal productivity, leading to increased production of meat, eggs, milk and wool. The scheme also envisages increase in productivity development through breed improvement. The scheme focuses on increasing availability of fodder and feed.

After union cabinet approval in June 2020, Animal Husbandry Infrastructure Development Fund (AHIDF) worth Rs 15,000 crore was established and implemented from 2020-21. AHIDF aims at incentivizing investments by individual entrepreneurs, private companies, Farmers Producers Organizations (FPOs) and companies for establishing meat processing and product diversification, infrastructure and animal feed plant, breed multiplication farms and breed improvement technology and the dairy processing and product diversification infrastructure.

Under AHIDF Rs. 13,500 crore loan shall be disbursed by the scheduled bank and Rs 1500 crore will be the end borrowers' contribution. Rs 1623 crore will be provided as interest subvention of 3 per cent over a period of 10 years for repayment of loan during 2020-21 to 2030-31. Rs 750 crore will be credit guarantee to be managed by NABARD, for which Rs75 crore will be provided by the DAHD to NABARD for 10 years.



Leading poultry industry players have welcomed the pro-farmer announcements in the Budget. These schemes shall boost the sectors connected to agriculture, poultry, farming, animal husbandry, food processing etc. Capital and technological infusion into these sectors will help build long-term vision to benefit the farmers

So far 206 projects with an estimated cost of Rs 2813 crore have been approved under AHIDF with a loan of Rs 2014 crore. Projects worth Rs 911 crore for setting up animal feed plants, Rs 227 crore for meat processing and Rs 874 crore for setting up of dairy processing plants have been approved. Establishment of animal feed plants include activities such as bypass protein

unit, total mixed ration block making unit, mineral mixture plant, animal feed testing laboratory and integrated poultry meat processing units.

DAHD is implementing a scheme - Assistance to States for Control of Animal Diseases (ASCAD) under the Livestock Health and Disease Control (LH&DC) scheme. This covers the vaccination of economically important poultry diseases, including control and containment of emergent and exotic diseases. Under the LH&DC Scheme, financial assistance is provided to the states for upgradation of diagnostic laboratories at district level. In addition, there are six Regional Disease Diagnostic Laboratories for prompt and effective diagnosis of different Livestock and poultry Diseases.

According DAHD data, Rs 13.87 crore had been released to states and UTs under ASCAD for the FY 2020-21 and 2021-22 for control and containment of Avian Influenza including compensation to farmers whose birds have been culled, poultry eggs and poultry feed has been destroyed.

Training Programs For Entrepreneurs

The Central Poultry Development Organizations are carrying out training programs to increase skill of entrepreneurs in the field of poultry and livestock. The Department is also assisting the state government to impart training on poultry, sheep, goat and pig farming to enhance technical knowledge and entrepreneurship development.





SRI KONDA LAXMAN TELANGANA STATE HORTICULTURAL UNIVERSITY

MULUGU, SIDDIPET DISTRICT, TELANGANA-502279

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Sri Konda Laxman Telangana State Horticultural University (SKLTSHU), is the only horticultural university in the state and fourth in the Country.

The University was established in the year 2014 and is ICAR Accredited. The main mission



Vice Chancellor
(SKLTSHU)

of University to impart quality education, conducting Research and outreach by providing extension services to the farming community and stakeholders in horticulture.

The University comprises of two horticultural colleges and two horticultural polytechnics. The University offers Undergraduate degree (B.Sc. (Hons.) (Horticulture), Post graduate degree (M.Sc. (Horticulture) and Doctoral degree programmes (Ph.D (Horticulture). Two colleges offering Undergraduate and Post graduation degree Programme viz., College of Horticulture, Rajendranagar, Hyderabad & College of Horticulture, Mojerla, Wanaparthy District.

The annual intake of students is 310 (270 + 40) in Under graduate and post graduate programme which includes State seats and ICAR seats (15%).

The University has 11 Research stations, each focusing

on conducting need based, location specific research on production, protection, Post harvest technology and value addition on mandatory horticultural crops.

The extension component of University has one Krishi Vigyan Kendra (KVK) for disseminating the horticultural technical information to the farmers, private and public entrepreneurs / stake holders.



The University has collaboration with the National level Academic Institutions, State Agricultural Universities, Public and Private Institutions and Scientific Societies for strengthening of academics and research.





RANI LAKSHMI BAI CENTRAL AGRICULTURAL UNIVERSITY, JHANSI



Rani Lakshmi Bai Central Agricultural University (RLBCAU) was established in the Bundelkhand region of India on 5th March, 2014 by an Act of Parliament for the development of agriculture through advanced teaching, research and extension in agriculture and allied sciences. RLBCAU has adopted a combined approach to strengthen agricultural research, education and extension education activities with an ultimate aim to increase and stabilize agricultural production in the country with an emphasis on the Bundelkhand region. Being the first Agricultural University of the nation established as an Institution of National Importance, manpower development activities of the University are supported for creating skillful and professional youth to meet the future global challenges and also sound implementation of research programmes in emerging areas.

Goals:

- Act as a 'Center of Excellence' in education with social commitment by integrating modern, scientific and technological knowledge, skills with the basic human ethos and values
- Set forth a model in teaching, research and personality development, entrepreneurial and scholastic abilities for achieving required growth in agriculture and allied sectors
- Improve farmers' income and sustain food and nutritional security through outreach programmes by integrating cutting-edge technologies
- Promote multi-disciplinary and multi-institutional approach through partnerships and linkages with national and international institutions of repute

Seat Matrix

UNDERGRADUATE

B.Sc. (Hons) Agriculture	66
B.Sc. (Hons) Horticulture	33
B.Sc. (Hons) Forestry	33

POSTGRADUATE

	PG	PhD
M.Sc. Agriculture (Agronomy)	04	02
M.Sc. Agriculture (Plant Breeding & Genetics)	04	02
M.Sc. Agriculture (Plant Pathology)	04	02
M.Sc. Agriculture (Soil Science & Agril. Chemistry)	04	-
M.Sc. Agriculture (Entomology)	04	-
M.Sc. Horticulture (Fruit Science)	02	-
M.Sc. Horticulture (Vegetable Science)	02	-
M.Sc. Forestry (Silviculture & Agroforestry)	04	02

Academic Activities

- Admissions in all degree programmes through ICAR-All India Entrance Examination conducted by the National Testing Agency
- Implementation of Student READY programme comprising of Rural Appraisal Work Experience (RAWEx) with village placement,
- Experiential Learning and Industrial attachment to expose them to rural environment and develop entrepreneurship skills
- Celebration of core national events including NSS and more than 30 National Days of prominence.
- Mentoring by leading academicians by organising 'Atal Jai Vigyan' lecture series
- Participation of students in All India Agri-Unisports, Agri-Unifests and other extra-curricular activities

State of the Art Facilities

Academic and Administrative buildings are energy efficient (with roof top solar panels), LED lights and solar street lights, water efficient, environment friendly, waste reduction (sewage treatment plant and use of treated water). The building has double unit glasses and natural stone facade - for energy efficient centralized air conditioning and maintenance free exteriors and integrated building for easy access. The Academic building has 22 SMART Classrooms, 23 centralized laboratories, two seminar rooms and 2 multipurpose halls with centralized RO water facilities in all buildings. Buildings are provided with 100% Power Back-Up with UPS supply for IT equipment. WI-FI Connectivity enabled in all buildings including staff quarters. Also, provided with Control system, CCTV and firefighting with PA system. These buildings were inaugurated by Hon'ble Prime Minister of India on 29 August, 2020 and are unique amongst the National Agricultural Research System in the country. The e-Library with 40 desktop computers, virtual classroom, strengthening of library and laboratories etc. through National Agricultural Higher Education Project (NAHEP) helped in securing Accreditation from ICAR for RLBCAU and its College of Agriculture and College of Horticulture & Forestry in 2021. University has huge collection of germplasm accession of cultivated species of cowpea, chickpea, sesame, linseed, mustard, urdbean and mungbean from different sources have been done. Biodiversity Park having 42 tree species of economic importance has been established.

HORTICULTURE

A BOON FOR SUSTAINABLE LIVELIHOOD

Horticulture is the growth engine of Telangana state and the chief source of income to the economy of the state. It contributes approximately 5.16% GSDP of the state. In India, Telangana state stands 3rd in area and 8th in production of fruits and vegetables. Horticulture in Telangana covers 16.5 % of net sown area and contributes 40.5 % to agriculture GSDP. Major fruit crops in the state are mango, citrus, banana, guava, papaya and custard apple. Vegetables like tomato, brinjal, bhendi and various varieties of gourds are predominant. Chillies, turmeric ginger and coriander are important spice crops and oil palm cultivation expanding constantly in recent times.

In view of the horticultural importance in the state, as emphasized in the 13th schedule of Andhra Pradesh Reorganization Act 2014, Agriculture and Cooperation (H&S) Department, established Sri Konda Laxman Telangana State Horticultural University (SKLTSU) on 23rd December 2014 at



Mulugu, Siddipet District.

The University runs on the mandate of Education, Research and Extension comprising of two horticultural colleges and three horticultural polytechnics, 11 Research Stations and one Krishi Vigyan Kendra (KVK).

The University serves exclusively on horticulture with a vision to develop skilled manpower and technologies for horticultural crops in relation to the present needs of the horticulture industry. It conducts need-based, location-specific research on production, protection, post harvest technology, value addition and export promotion to reduce the cost of

production through increased efficiency of inputs to enhance the profitability to the growers.

Huge Potential For Horticulture

Over the past years, horticulture has emerged as one of the potential enterprise in accelerating the growth of economy. Its role in the country's nutritional security, poverty alleviation, employment generation programme and earning foreign exchange is becoming increasingly important. But in the present scenario, shrinking land and depleting water and other related resources in farming especially in horticulture are the major challenges arising for sustainable farmer's income.

There is a huge potential for horticulture sector growth which remains untapped. Hence there is need for promoting location-specific production system management technologies in a concerted manner such as precision farming, integrated farming system, value addition and export to achieve vertical growth in horticulture production for better remuneration per unit area and

The University is striving relentlessly to conduct need-based location-specific research in different areas of horticulture, transferring the technologies to farmers and stake holders and to collaborate with other universities and reputed institutes to explore multidisciplinary academic approach for *Cultivating Ideas for Sustainable Future*

for escalating farm revenue.

Precision Farming In Horticulture

Precision farming in horticulture is an approach where inputs are utilized in precise amounts to get increased average yields, compared to traditional cultivation techniques. Precision farming in horticulture aims at increasing productivity, decreasing production costs and minimizing the negative environmental impact and ultimately to maintain sustainable ecosystem. Although precision farming is a proven technology in many advanced countries of the world but its scope in India are limited due to heterogeneity of cropping systems, lack of knowledge and technological gaps.

Challenges Faced By The Sector

Horticulture sector is still facing a lot of challenges in terms of huge post-harvest losses and gaps in post-harvest management and supply chain infrastructure. There is tremendous scope for enhancing the productivity of Indian horticulture which is imperative to cater to the country's estimated demand of 650 Million MT of fruits and vegetables by the year 2050. Some of the new initiatives like focus on quality planting material production, cluster development programme, formation and promotion of Farmers Produce Organizations are the right steps in this direction. Although challenges persist, there is need to provide proper infrastructure, generate effective marketing

**fun
FACT**



Dr Neeraja likes doing yoga and meditation. She loves to spend time with her grand children and listen to music. She also likes to visit different tourist places within India or abroad either for pilgrimage or as a site seeing, and watching movies

intelligence and provide quality inputs to facilitate diversification for sustainable farm income.

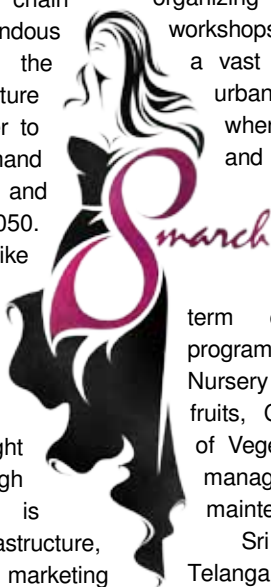
Our University serves as a knowledge and resource center for disseminating the technologies in Horticulture to all the stake holders such as farmers, private and public entrepreneurs by organizing training programmes, workshops and webinars. There is a vast scope for urban and peri urban horticulture in recent years, wherein home owners, women and interested youth can be technically trained.

Hence the University has planned to organize short term certification training programs in the areas of Nursery management of fruits, Commercial cultivation of Vegetable crops, Oil palm management, Landscape maintenance.

Sri Konda Laxman
Telangana State Horticultural

University aims at imparting quality education in various disciplines of horticulture to develop skilled entrepreneurs in the field of horticulture. The objective is to enable the students to be 'Job Providers rather than Job Seekers'.

Even during the pandemic, the determination of our university in continuing education has never taken back foot. We scrupulously followed all UGC and ICAR guidelines to keep the students engaged with academics and research through online mode using various platforms of virtual classes, conducted qualifying exams, seminars and webinars. The University is also striving relentlessly to conduct need-based location-specific research in different areas of Horticulture, transferring the technologies to farmers and stake holders and to collaborate with other Universities and reputed institutes to explore multidisciplinary academic approach for *Cultivating Ideas for Sustainable Future*.



About the AUTHOR

Dr Neeraja Prabhakar is the first regular Vice Chancellor of Sri Konda Laxman Telangana State Horticultural University (SKLTSHU), Mulugu, Siddipet district. She received the "State Level Best Scientist Award" in 2007; "University Meritorious Teacher Award" from Dr MS Swaminathan in 2010 and "State Best Teacher Award" in 2019 from Govt of Telangana



NATIONAL FOOD SECURITY

REVAMPING AGRICULTURAL EDUCATION



The modern agriculture practices and tools are knowledge and skill-based. Gaining expertise in them is not an easy task for many of our rural farmers. The farmers need to be educated with adequate knowledge and skill required to use the modern tools and technologies properly.

With the entry of FDI in the agriculture and allied sector, many MNCs have introduced dozens of agro-products. The need of the hour is to impart adequate training to various stake holders of the agriculture production system to bring about the desired change in the farming sector.

Some emerging issues of the farming sector require due emphasis in agriculture education to achieve national food security for our growing population.

About the **AUTHOR**

Dr Ramesh Chandra Srivastava is the Vice-Chancellor of Dr Rajendra Prasad Central Agricultural University. In his career spanning 45 years, Dr. Srivastava has developed 25 technologies, 20 concepts, 12 prototypes and 4 softwares. He has been honoured with Rafi Ahmed Kidwai Award of ICAR, Gold Medal by Indian Society of Agricultural Engineers in addition to about 30 more awards by different organizations





Agriculture Education on Climate Change and Global Warming

Climate change has been a global issue due to its causes and consequences. A number of strategies can be adopted to deal with the negative impact of climate change. Agriculture education should give emphasis on climate smart agriculture technology to effectively mitigate the effect of global warming and climate change on agriculture production. The Centre of Advance Studies On Climate Change under RPCAU Pusa is devoted to the development of climate smart production technology to address the issues of climate change.

Education on Use of Water Resources

In India, 84 % of water resources are used for agriculture. Increasing urbanization and industrialization combined with intensive use of agricultural chemicals and fertilizers has led to the problems of water pollution, ground water depletion, water logging, salinity and desertification. To tackle the issue, education on effective water management is necessary. Education on various tools and techniques to effectively combat calamities like flood and drought will surely help the agricultural output.

Contingent agriculture planning for the areas prone to drought and flood can be of great help to farmers living in those regions. Water use efficiency can be enhanced through precision agriculture technology. Variable Rate

Appropriate policies can speed up the establishment of agriculture-based rural industries. Farmers can be transformed into producers-cum-processors. They will get more dividends for their labour, inputs and the risks taken

Irrigation (VRI) technologies provide the tool to farmers to adjust the quantity of water to be applied spatially and temporally. It is designed to put water inputs to judicious use by irrigating the areas that are in need and not wasting the resources elsewhere. RPCAU has developed solar-energy based boat mounted irrigation pump to facilitate the farmers in flood affected area for irrigation. The Centre of Excellence on Water Management in the university is doing a wonderful job for development of technology of water management under stress situation.

Education on Post Harvest Technology

The post-harvest technology relies on the capability to meet food requirement of growing population by eliminating losses and making available more nutritive food items from raw materials. This is done through proper processing and enrichment with the help of technology comprising the usage of optimum harvest factors and reducing the losses during handling, packaging, transportation and storage, processing into a wide variety of products, home scale preservation with low cost technology. Thermal processing, low temperature, drying, chemical and biological reactions coupled with other preservation techniques are applied to enhance the storability. Containers and packaging materials confer portability and extend the shelf-life.

Adoption of these techniques can make available a large quantity of food by avoiding losses and provide better quality food and nutrition, more raw materials for processing and thus ensuring better returns to producers. Post-harvest technology has immense potential to create rural industries.

In India, where 80 percent people

live in the villages and 50 percent of them depend on agriculture, the process of industrialization has gradually shifted food, feed and fiber industries to urban areas. This ultimately resulted in capital drain from rural to urban areas. It also decreased employment opportunities in rural areas, causing mismatched growth in economy and standard of living between rural and urban people.

Importance of Agriculture-Based Rural Industries

Appropriate policies can speed up the establishment of agriculture-based rural industries. Farmers can be transformed into producers-cum-processors. They will get more dividends for their labour, inputs and the risks taken. They will also be able to generate resource for socio-economic advancement keeping pace with the modern times. RPCAU has started the degree program on Food Technology from the session 2021-22 in order to generate qualified manpower in the field of food technology. These trained manpower shall serve as resource persons to educate the rural people in proper application of technology for rural industrialization.

In spite of rapid growth in the agriculture economy, India is yet to emerge as a significant trade partner in the world agriculture market. Presently India holds around just 1% of the global trade in agro- commodities, which is low when compared to the large workforce engaged in this sector. Despite many structural transformations such as better input facilities and technology changes with regards to irrigation, high yielding seeds and changes in cropping pattern etc., the agriculture sector in India is required to be revamped through proper agriculture education on the emerging issues to achieve the target of national and global food security.

ESSENTIAL REFORMS IN AGRICULTURAL EDUCATION SYSTEM

PATHWAYS TO SUCCESS

The primary driving force for a transformational change in any sector is well-educated, trained, dedicated and ethically sound human resource.

Hence the following essential reforms are suggested in the agricultural education system, starting from schools to universities.

Reforms in undergraduate education system

The National Agricultural Education Policy, in alignment with the National Education Policy of India, emphasizes the establishment of academic credit banks and experiential learning modules. The purpose is to strengthen the multidisciplinary practical skills of agriculture, veterinary, animal and fishery sciences graduates in a flexible manner in all 74 universities. For implementation of these guidelines, the following strategic plan is suggested.

Establishment of Academic Credit Banks to create MERUs and McMERUs: To strengthen the multidisciplinary expertise of graduate students, MERUs (Multidisciplinary Education and Research) and McMERUs (Multi Campus MERUs) need to be established so that students can experience experiential learning from able faculty of multiple institutes. To develop MERUs and McMERUs in a well-coordinated manner, Academic Credit Bank units should be developed within MERUs in different regions of the country associated with one



About the AUTHOR

Dr MS Chauhan is Director and Vice-Chancellor, ICAR-National Dairy Research Institute, Karnal. He is the pioneer in hand-guided cloning and has produced 17 cloned buffaloes including the world first cloned buffalo calf *Garima*



centralized unit at McMERUs. The units will not only integrate the credit system and streamline the experiential training, but also ease the students' flexible multi entry and exit system.

Development of multiple academic credit bank units in collaboration with IT and AI from eminent technological institutes like IITs will help students to strengthen their multidisciplinary expertise to be applicable in the diversified culture systems of our country. Such an approach will help students to understand the practical agricultural problems of the country and get an opportunity to think about the feasible solutions to the emerging problems.

Year-wise experiential learning to graduates in addition to the course-end internship: To strengthen the ex-

periential learning during undergraduate education, year-wise project on the basis of the multiple disciplines learned in that particular year should be implemented. In this way the students' skillset shall be enhanced to a greater level necessary to serve the public, private and service sectors of agriculture and animal husbandry.

Integration of Core Sciences with humanities and social sciences to enhance the ethical values in agricultural enterprises: In addition to the multiple disciplines of core sciences, elective humanities, like anthropology, law, logic and philosophy, and also social sciences like economics needs to be offered to all the students, so that they can be trained in a holistic manner to understand the agricultural enterprises and profitable markets according to the social structures, human rights and ethical values.

Electives for Enterprise (Production, Processing, Value addition) and Service Sectors: The job market will be driven by the enterprise and service sectors in the future. Therefore, the MERUs and McMERUs need to be strengthened with business and service sector collaborators, quality control agencies (e.g. FS-SAI), Intellectual property agencies (e.g. Patent offices) etc. to provide experiential learning to the students in these domains, so that they can serve the sectors with professionalism.

Enriching knowledge in indigenous farmers' innovations (Land to Lab): We have rich indigenous technical knowledge which needs scientific validation and documentation. Increased interaction of students with the farming community can help in understanding how



We have rich indigenous technical knowledge which needs scientific validation and documentation. Increased interaction of students with the farming community can help in understanding how local resources can be utilized for solving region-specific problems.

local resources can be utilized for solving region-specific problems.

Undergraduate research projects to promote innovations: To nurture scientific and innovative thinking, undergraduate research projects need to be promoted in agriculture education system.



Reforms in postgraduate education system to develop a national think tank in agriculture and animal husbandry: Present postgraduate entrance examinations in agriculture education system test the students' memory in a few specific subjects rather their thinking and analytical ability. Learning lessons from the developed countries like United States, students need to be tested in GRE kind of exams (either in local or English) in addition to the subject exams. Such a strategy will select good brains into the pool of the envisioned think tank.

Development of good thinkers, executors and story tellers (extension specialists) will help in devising simple and feasible technologies and also in their implantation for improvement of farm productivity, which is very essential in view of the current trend of depleting resource base and growing population. To nurture such a think tank, the infrastructure of the universities needs to be continuously developed to achieve world-class development in agriculture education system, which will eventually pave the way to accomplish the national goals of Indian Agriculture.

Reforms to meet the requirement of skilled labour force in agriculture and animal sector: Skilled labour development through vocational education and diploma courses is essential so that professional labour resource can be developed which can then be hired by the commercial farms/agro-industries. Several diplomas can be introduced by every agricultural university. The learners should be connected to farms and industries for educating them in an experiential manner.

Attracting school kids towards agriculture and animal sciences

Every school should introduce an elective vocational course in agriculture and give practical classes to the kids of this course. Students should be encouraged to maintain a kitchen garden and a small animal farm rearing a few dairy species. As an incentive to those children, 50% of the produce from this garden and farm can be given freely to them. The remaining 50% can be marketed through vocational course of marketing. Agriculture based competitions and internships at the school level similar to the "Scheme for Early Attraction of Talent (SEATS)" program by Department of Science and Technology (DST) can help in increasing the interest of school kids.

STRENGTHENING AGRI-EDUCATION IN INDIA

FROM SCHOOL TO VARSITY

Recently, while addressing the National Conclave on Natural Farming, Hon'ble Prime Minister emphasized on undertaking research and teaching on zero budget farming for achieving sustainability with reduced costs and higher incomes. In the present day scenario, we have to revive our traditional agriculture knowledge together with modern technical knowledge to strengthen the economy as well as environment.

New Education Policy announced by GOI in July 2020 introduces several changes in the education system from school to college level. The aim is to make India a global knowledge superpower with major emphasis on vocational education (25%) and nurturing new generation of agribusiness technocrats, entrepreneurs & researchers. Agricultural education has all the ingredients to promote entrepreneurship among rural youths for being job providers than job seekers.

India has only 5 percent of vocational education in school curricula, as compared to 96% in South Korea, 75% in Germany and 62% in USA. The New Education Policy presents a new hope by targeting enhancement in vocational education upto 50% till 2025 & 80% till 2035.

Minimizing Post-Harvest Losses

More than 15% of farm produce in India gets wasted, with only 2% actually processed as compared to 70% in Brazil, 78% in Philippines and 90% in USA. Again, the solution is to provide vocational agri-education that can promote value addition and processing. With more and more youths understanding the concept after acquiring practical experience on valued addition and processing, we can



able to reduce the post-harvest losses..

Agri-education is consequently the solution to all the core problems faced by the agriculture sector in India. The decision of Hon'ble Prime Minister's to introduce agri-education in middle school is a path-breaking step. Understanding of concepts at this age can transform the activities and interest of young children and we can expect the desirable change in agriculture sector too.

SKUAST Jammu has taken proactive steps to encourage agri-education in J&K UT. On the request of the UT Administration, SKUAST Jammu has drafted curricula on organic farming for middle school children.

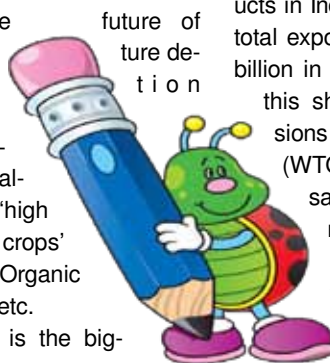
Arable land in the country is shrinking. Average land holding in India is 1.08 ha (0.12 ha per capita against 0.29 ha per capita at world level). We have more than 85% of farmers with small and marginal holdings. The future of profitable agriculture depends on introduction of precision agriculture for water management and specialty agriculture with 'high value - low volume crops' such as Saffron, Organic farming, Kala zeera etc.

Climate change is the big-

gest threat to the agriculture sector and is making production and returns uncertain for the farmers. There is a dire need to promote climate resilient technologies for better adaptation to the changing scenario. National Innovations in Climate Resilient Agriculture (NICRA) project of CRIDA Hyderabad has been implemented by SKUAST Jammu to ensure better education and knowledge of climate change among rural youths, including its ill effects on agriculture and effective mitigation strategies.

Hands-On Agri-Education For Entrepreneurship Development

GOI has set a target for formation and promotion of 10,000 Farmer Producer Organizations (FPOs) to promote effective marketing through accumulation of small marketable surpluses. Agri-products in India contributed 12.6% towards total exports, with a value of US\$ 38.5 billion in 2018-19. In order to enhance this share, the knowledge of provisions of World Trade Organization (WTO) such as sanitary and phytosanitary (SPS) measures, Technical barriers to Trade (TBT) etc. is essential for ensuring food safety at international level. We need a compre-



Agri Education has enormous opportunities for generating employment and income through entrepreneurship development. The way to Atmanirbhar Bharat goes through self-sufficient agriculture, and agri-education is the key to success

hensive module of agri-education to encash these opportunities by making students understand the idea of innovative agricultural practices.

SKUAST Jammu has implemented several programs for imparting practical and hands-on agri-education for entrepreneurship development. This includes RKVY-Remuneration Approaches for Agriculture and allied sector Rejuvenation (RKVY-RAFTAAR).

This includes grant in-aid up to Rs 25 lakh, two years incubation program and eight week residential incubation workshop and mentorship by industry experts. Our Krishi Vigyan Kendaras are running projects on 'Attracting & Retaining youths in Agriculture (ARYA)' in Kathua and Reasi districts. Here rural youths are encouraged to start their own ventures for creating employment opportunities in agriculture and allied sectors.

SKUAST-Jammu is also a partner to the Government of J&K UT in implementing the New Education Policy by supporting degree colleges on 'hub and spoke model'. Various agricultural enterprises have been identified under this policy such as mushroom production, bee-keeping, vertical farming & hydroponics, floriculture, nursery management etc. Industry linkages are also developed by organising industrial meets and exposure visits of students. New applied and market oriented courses

fun FACT



Dr Sharma likes to motivate people with anecdotes and stories that can help them tackle the challenges faced by them

and degree programmes are introduced to create market-ready students in seed production technology, agri-business management and horticulture.

Many other programmes at national level are introduced to encourage skill development of rural youths such as Agri Clinics and Agri Business Centre (ACABC). This aims to tap the expertise available in the large pool of agriculture graduates – whether fresh graduate or not; or currently employed or not; Student Ready programme (Rural Entrepreneurship Awareness Development Scheme), Atal Innovation Scheme etc.

The promotion of agri-education in India is the need of the hour for holistic development of economy and the country. This sector has enormous opportunities for generating employment and income through entrepreneurship development. The way to self-reliant India (Atmanirbhar Bharat) goes through self-sufficient agriculture and agri-education is the key to success.

About the AUTHOR

Prof JP Sharma is Vice Chancellor SKUAST Jammu & former Joint Director IARI New Delhi



THE ROLE OF AGRICULTURAL EDUCATION

UNIQUE CHALLENGES, INNOVATIVE SOLUTIONS

India is an agricultural country. Agriculture and its allied activities are the main source of livelihood for more than 80% population of rural India. They provide employment to approximately 52% of labour.

India is self sufficient in most of the food grain production despite population increase. This has been achieved

through the farmer- friendly policies of the government and establishment of agricultural education institutes for higher learning. In order to sustain, diversify and realize the potential of the agriculture sector, it is necessary to develop skilled human resources. Agricultural human resource development is a continuous process undertaken by agricultural universities. Agricultural universities impart education in the various disciplines of agriculture viz., Agriculture, Agricultural Engineering, Horticulture, etc.

Agricultural education enhances farm productivity through adoption of modern technology. It enhances the farm skills and productive capabilities of the farmers. Farmers face unique challenges and require education and training to ensure their success. Training imparted by educational institutes helps farmers to incorporate the latest scientific advances and technology tools into their daily operations. The result of enhancing knowledge and skill in field operations increase efficiency and thereby lead to profitable revenue. Sound financial management decisions are facilitated by agricultural education and new economic opportunities are discovered.

Precision Farming

Precision farming is gaining traction due to its highly adaptable use of technologies to observe, measure and apply exact quantities of inputs to crops on a large scale. Robotics and artificial intelligence have been woven into irrigation systems. Variable rate technologies create an opportunity for farmers to adapt and vary how their water is applied spatially and temporally. It is designed to put water inputs for better use by irrigating areas that are in need and taking away unnecessary

About the **AUTHOR**

Dr Tolety Janakiram is Vice-Chancellor, Dr YSR Horticultural University, Andhra Pradesh. He is former Assistant Director General (Hort Sci), ICAR. He has developed 46 flower crop varieties. Dr Janakiram has been conferred with the PNASF Gold medal Award, HSI Gold Medal and ISOH Lotus Puraskar



irrigation dead zones.

Autonomous irrigation (AI) can process complex data inputs and create tailored schedules and recommendations for water application. Soil water sensors and temperature sensors can provide current information about soil moisture availability for plants and how quickly is expected to dissipate. Soil moisture sensors have been proven to conserve water by preventing unnecessary irrigation and flooding.

Substantial improvement can be brought about by agricultural knowledge system through optimized response to changing climatic conditions which includes change of sowing and harvesting time, cultivation of short duration varieties, inter-cropping, alterations in cropping pattern, investment in irrigation and agro-forestry. Adapting to climate change involves taking the right measures to reduce the negative effects of climate change by making appropriate adjustments and changes. Adoption of strategies to climate change like planting of drought resistant varieties, crop diversification, adopting soil conservation measures that conserve soil moisture and planting of trees are facilitated by agricultural education.

Sustainability Initiatives

Sustainability initiatives from use of fertilizer to nitrogen fixing legumes, from pesticides to emphasis on natural enemies, from ploughing to zero tillage, centres on intensification of resources, making better use of existing resources (ex. land, water,

The training imparted by educational institutes helps farmers adopt the latest scientific advances and technology tools. With sound financial management decisions, new economic opportunities are discovered

biodiversity) and technologies and other inputs (best genotypes and best ecological management) are integrated by agricultural education.

Bio-safety and appropriate post harvest practices of agricultural commodities from harvesting, packing, labelling, handling, storage and transport according to food safety practices that

minimize the risks of microbial hazards are better achieved through agricultural education.

Improper use of additives, pesticides, antibiotics and hormones in food production processes has caused undeniable effects on the people health. Agricultural knowledge system creates awareness about indiscriminate use of pesticides and other chemicals. It also creates awareness about international standards, crop quality and packaging for export purpose by conducting agricultural export related training programs.

Comprehensive Knowledge

Agri education equips people with comprehensive knowledge and skills on various aspects of international agri business, identifying product-market potential, availing of trade finance, understanding trade policies and dealing with global economic volatiles. It helps agri and processed food exporters to enhance their global footprint and catalyze agri exports.

Agri education helps to know about new foreign trade policy, changing domestic regulatory framework on farm bills. Methodology of identifying the best products for exports suitable to ever changing consumer preferences is dealt with. It also addresses selection of appropriate marketing channels, export pricing methods, promotion of global reach, social media/ digital marketing and finally establishment of own brand.



**fun
FACT**

Dr Janakiram loves to listen to old songs, spend time with his mother and play with pet cat Lucifer. He is also extremely fond of nature and pets

THE SHAPING AND CONDITIONING OF AGRICULTURAL EDUCATION MEETING CHALLENGES AHEAD



In spite of the significant contribution by ICAR and agricultural universities for human resource development for the agricultural sector, the Indian higher agricultural education sector faces numerous challenges. To properly address such challenges, competent human resource in sufficiently large numbers shall be required.

Indian agriculture faces several challenges like low farm productivity and profitability, lackadaisical attitude of youth for farming, poor market intelligence, minimal mechanization, food safety, lack of value addition and processing, lack of qualified manpower in new and emerging challenges, degradation of natural resources, peril to sustainability, biotic and abiotic stresses, and the threats posed by climate change. Instead of the traditional content-heavy and rote-learning approach, we will have to lay emphasis on a more holistic view.

Agricultural education needs to focus primarily on income enhancement from this profession and make it more lucrative for the youth. In order to meet the national agenda of doubling farmers' income, there is need to direct scientific research into areas that can bring income gains in the comparatively shorter term for all agriculturists, especially for under developed and poorly resourced farmers.

About the **AUTHOR**

Dr Narendra Singh Rathore is Vice-Chancellor, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan. As DDG (AE), Dr Rathore was instrumental in reforming agricultural education on the theme of TREE (Teaching, Research, Extension and Entrepreneurship), which is highly relevant in the wake of National Education Policy 2020

Digital Agriculture

Inclusion of study material and hands on training in the field of precision agriculture and digital technologies is needed. Precision agriculture is a management strategy that gathers, processes and analyses temporal, spatial and individual data and combines it with other information to support management decisions according to estimated variability for improved resource use efficiency, productivity, quality, profitability and sustainability of agricultural production.

Precision agriculture is an advanced innovation and optimized field level management strategy used in agriculture that aims to improve the productivity of resources on agriculture fields. The goal of precision agriculture research is to define a decision support system for farm management with the goal of optimizing returns on inputs while preserving resources. Technologies such as Global Positioning System (GPS), Artificial Intelligence, Sensor Network and Geographical Information System and their details need to be incorporated in curriculum.

The availability of various digital technologies can pave way for smart agriculture. Digital agriculture impacts the entire agri-food value chain - before, during, and after on-farm production. Digital agriculture is not limited to only precision agriculture but its scope is extended to e-commerce platforms, e-extension services, warehouse, receipt systems, block chain-enabled food traceability systems, tractor rental apps, etc. Digital technologies have

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FACT**



Dr Rathore is fond of reading, surfing the net and technical writing

the potential to be game-changers for traditional agricultural practices. By applying modern technologies, farmers will gain more profits and able to increase their productivity of yield. Examples of graduates from IITs and IIMs adopting enterprises like soil less agriculture, protected cultivation under green house, hydroponics, aeroponics and vertical farming give us a strong ray of hope of retaining youth in agriculture.

The strenuous labour and lower income from the agriculture sector is responsible for the rural youth turning away from it and shifting to urban areas for earning livelihood. Fortuitously the literacy rate of youth in India has increased, opening vistas of modernization of agriculture to make it convenient and lucrative.

Major Areas For Agri Education

Modern agriculture should move ahead with innovations in farming practices that can help in increasing agricultural efficiency. Improved agricultural implements and machinery are essential inputs for modern agriculture. It enhances productivity besides reducing human

drudgery and cost of cultivation. It also helps in improving utilization efficiency of other inputs. The role of the division of Farm Machinery and Power Engineering (FMPE) in the universities is highly important. FMPE should draw separate strategies for small and marginal and big farmers as their mechanization requirements are entirely different.

Sustainability is another issue of vital importance in agricultural education. Sustainable agriculture is farming in such a way that it meets society's present food, feed and fibre needs, without compromising the ability for current or future generations to meet their needs. The goals of sustainable agriculture viz. increasing profitable farm income, promoting environmental stewardship, enhancing quality of life for farm families and communities and Increasing production for human food and fibre needs need to be popularized amongst agriculture scholars.

The sense of Food Safety and Good Agricultural Practices (GAP) has become far more relevant today than ever before. The four pillars of GAP include economic viability, environment sustainability, social acceptability and food safety & quality. GAP in commercial agricultural production for long term improvement and sustainability is necessary to facilitate our farm produce to be internationally competitive. Implementation of GAP shall promote optimum utilization of water resources such as pesticides, fertilizers and water to aid eco-friendly agriculture. The social dimension of GAP is to protect the farmers' health from improper use of chemicals and pesticides. Agriculture scholars need to confront the goals and objectives of GAP.

The agriculture sector faces many challenges. A clear-eyed analysis of the present and future needs is essential to streamline the production system to keep the society safe today and tomorrow. The shaping and conditioning of agricultural education to meet all these challenges is a gigantic task which needs to be prioritized to achieve the goals of farm income, adaptability against climate change, sustainability and food safety.

The role of the division of Farm Machinery and Power Engineering (FMPE) in the universities is highly important. FMPE should draw separate strategies for small and marginal and big farmers as their mechanization requirements are entirely different



More than 60 Years in Service

NAFED WELCOMES 2022 WITH SUCCESSFUL PLANNING AND IMPLEMENTATION OF AGRI SCHEMES

Due to India's immense growth in the agricultural sector, GOI has exhibited tremendous efforts into developing and implementing various schemes interrelated to this sector. From collaborating with the Ministry of Food Processing Industries (MoFPI) to signing an effective MoU with the Indian Oil Corporation (IOC), NAFED has kicked off 2022 with a plethora of successful initiatives for the development of the agricultural industry in India.

Since MoFPI launched the Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme (PM FME), NAFED has been constantly working to make this scheme a success. The PM FME scheme adopted the concept of ODOP which stands for One District One Product. ODOP aims to sustainably up-scale and formalise the micro food processing enterprises of India and make their products competent enough for the market, which is dominated by foreign or



(From left) Union Minister MoFPI Shri Pashupati Kumar Paras launching Makhana King brand under PM FME scheme along with Dr Subodh Kumar and Mr Nand Kishore, Director, Department of Horticulture, Bihar

private companies. Owing to this development, the NAFED launched its second ODOP brand 'Makhana King' on January 3, 2022.

As a brand, *Makhana King* aims to bring premium quality, popped and roasted Makhana (fox nuts) from the state of

Bihar. It made perfect sense to cater this ODOP product from Darbhanga, Bihar – one of the top producers of fox nuts in the world. This landmark product initiative was launched by Hon'ble Union Minister Shri Pashupati Kumar Paras, Ministry of Food Processing Industries (MoFPI) in Patna, Bihar.

TWO VARIETIES OF PREMIUM MAKHANA

Premium quality Makhana products have been introduced in two varieties. One of them is Plain Makhana, a kitchen essential. It can be used as an ingredient for various dishes. The second is ready-to-eat Chatpata Roasted Makhana, which has been garnished with spices. *Makhana King* products were greatly enjoyed by the guests as the taste stood out from other products in the market. The distinctive taste of the Chatpata Makhana is due to its exclusive recipe that was developed by award-winning chefs and cooked with



Shri Pashupati Kumar Paras, Hon'ble Union Minister, MoFPI; Shri Prahlad Singh Patel, Minister of State, MoFPI and other dignitaries at the launch of Kashmiri Lal Mirch under the brand Kashmiri Mantra of PM FME scheme in New Delhi



Hon'ble Prime Minister digitally transferred matching equity grants to 42 FPOs promoted by NAFED under the PM KISAN scheme



(From left) Mr Pankaj Kumar Prasad, AMD NAFED briefing Shri Prahlad Singh Patel, Minister of State, MoFPI and Shri Pashupati Kumar Paras, Union Minister, MoFPI during the launch of Atta Cookies under the PM FME scheme, ODOP brand Dilli Bakes in New Delhi



Union Minister, MoFPI Shri Pashupati Kumar Paras and Shri Prahlad Singh Patel, Minister of State, MoFPI launched 6 ODOP brands developed by NAFED under the PM FME scheme in New Delhi

healthy alternatives. Each Makhana has been hand-picked in order to retain its natural attributes and nutritional value. Besides having a reasonable price for better accessibility in the market, these products have been made available in both the on-line and offline NAFED Bazaar stores.

THE ODOP SUCCESS

The ODOP approach is a step towards a self-reliant India. Through this initiative, local and underrated products of each Indian district are getting a platform in the food market that had been dominated by private or foreign products previously. From upgrading the ingredients by using healthier alternatives, to the minute details of using the best quality raw materials, each product has been developed with utmost caution and research for the customers. The market research and in-depth food reviewing that went on before the launch of these products were organised with maximum regard to the standard of Indian customers. After the successful launch of two ODOP products, NAFED introduced 6 products on January 5, 2022, in a landmark event.

The 6 ODOP products which were the highlights of this event include "Dilli Bakes- Whole Wheat Cookies" from West Delhi, Delhi "Madhu Mantra- Multiflora Honey" from Saharanpur, Uttar Pradesh and "Amrit Phal- Amla Juice" from Gurugram district, Haryana. These belong to the 'healthier alternatives' segment of food products.

"Kashmiri Mantra - Kashmiri Lal Mirch" from Kulgam district and "Cori Gold- Co-

MoU with Indian Oil Corporation

Another major accomplishment for NAFED was the signing of an MoU with the Indian Oil Corporation (IOC) for setting up biofuel projects, plants for post-processing of products, and marketing of end products of CBG (Cannabigerol). This event was attended by senior officials of both organizations on February 17, 2022. The current development is a step towards a greener and more sustainable future for India as such plants will help in the post-processing and marketing of end products that also includes cattle feed. The unfolding of such productive initiatives at the beginning of 2022 has motivated everyone at NAFED to work harder and better for the development of the country. The dream of having a self-reliant India seems more pragmatic and real now.

riander Powder" from Kota district are authentic fresh spices from J&K and Rajasthan respectively, which are known for their indigenous spice crops. "Somdana-Ragi Flour" from Thane district, Maharashtra has been developed as a healthy ingredient for a number of dishes. Such swift promotion of brands within a few months is a commendable accomplishment. This was possible due to the mutual effort of those working under the PM FME scheme.

These products were launched by Shri Pashupati Kumar Paras, Hon'ble Union Minister along with Shri Prahlad Singh Patel, Hon'ble Minister of State, MoFPI. During the launch, Shri Paras highlighted that "PM FME is bringing about a revolutionary impact on the Indian food manufacturing sector. The launch of these six products is a testimony to the fact that India is going well ahead to become *Aatmanirbhar* as envisioned by our hon'ble Prime Minister."

The Ministers appreciated the efforts made by NAFED as we are constantly thriving towards bringing high-quality Indian food products into the market following

all the latest industry standards. The fact that this approach is not only helping the food industry but also empowering small enterprises in India clearly shows that we are marching towards a 'Vocal for Local' India.

Formalising and Empowering Grassroots Level Farmers

The continuous effort of Hon'ble Prime Minister Shri Narendra Modi in formalising and empowering grassroots level farmers has seen significant progress due to the Pradhan Mantri Kisan Samman Nidhi (PM KISAN). This scheme allotted an equity grant of more than Rs 14 crore to numerous FPOs, out of which 42 FPOs have been promoted by NAFED. The PM digitally launched this event through video conferencing on January 4, 2022. Interacting with FPOs from across the country, the PM had a constructive conversation with the CEO of a Honey FPO. He emphasized upon the significance of creating a honey corridor from Kashmir to Arunachal Pradesh.

THE MAKING OF NEW INDIA

HOW AGRICULTURE EDUCATION CAN HELP



Agriculture education in India is offered through Agricultural Universities which are established on the land grant pattern of USA integrating teaching, research and extension. The Agricultural Universities in India have contributed exceptionally for human resource development in diverse subjects. The courses provide hands-on practical experience to the students. At present, India has the world's

largest National Agricultural Research and Education System (NARES) with 74 Agricultural Universities (AUs), 106 Indian Council of Agricultural Research (ICAR) institutes, 11 ATARIs, 721 *Krishi Vigyan Kendras* (KVKs or Agriculture Science Centers), 57 All India Coordinated Research Projects (AICRP), and 25 Network projects. The AUs and ICAR institutes have helped immensely in making India self-sufficient in food grain production.

Agriculture is the most jeopardized sector. It is impacted by extreme events and increased unpredictability of changing weather patterns due to

About the **AUTHOR**

Dr A Vishnuvardhan Reddy is the VC of ANGRAU from August, 2020. Prior to this, he served as Director of ICAR-Indian Institute of Oilseeds Research from August 2016 to August 2020. Dr Reddy is a Plant Breeder with over 28 years of research experience. During his career spanning three decades, he contributed immensely in oilseeds research besides pulses, millets, rice and seed technology along with research coordination and policy making at the national level



The sea change anticipated with the new education policy implementation for *Atmanirbhar Bharat* can enhance the required skill development for production, processing, marketing and trade in ever changing situations that exist in agriculture

climate change. Food and Agriculture Organization (FAO) has estimated that globally, agricultural production will have to increase by 60 per cent by 2050 to meet the expected demands for food and feed of burgeoning population.

Agriculture shall need to concentrate on food security and sustainability in the present climate changed scenarios. Climate-smart agriculture can pave way to reduce the negative impact of climatic variations on crop adaptations. This is because climate-smart agriculture concentrates on increasing productivity and income sustainably. It also helps in reducing greenhouse gases and in building resilience to climate change. Transformation needs to be accomplished without depletion of natural resources. Developing countries and small scale/holding farmers are hard hit by these vagaries already with degraded natural resource base.

Path-Breaking Courses UG Level Onwards

Agriculture education in the country

is now following the Fifth Deans Committee Report and the new curriculums recommended by it at undergraduate level from 2016. A lot of new courses have been included which focus on GIS and Nano-technology, precision agriculture, renewable energy, mechatronics, big data analytics, hi-tech horticulture, food safety issues, agricultural waste management etc.. The students are also exposed to experiential learning, implant training in various organizations during the final year of the four year degree course to

train the human resource to suit the changed agricultural scenario.

ICAR provides professional and financial support to the respective state-funded Agricultural Universities for enhancing quality, faculty competence and accreditation through National Agricultural Education Accreditation Board (NAEAB) for quality assurance in higher education. The post graduate and doctoral curriculum also is changed from 2021 with more emphasis on research.

Achieving The Goals of NEP-2020

The National Education Policy-2020 (NEP-2020) of India definitely provides an initiative to usher in changes in the agricultural education system. This shall be achieved by transforming higher education institutes into multidisciplinary universities and colleges and by including vocational education in higher education at entry level. The main emphasis is to provide diverse higher education of a certificate course, a diploma, a degree or a PG or PhD to large number of students with more privilege to complete their education both in terms of courses as well as duration(years). The implementation of NEP-2020 requires Acts and Statutes of Agricultural Universities to be revised as strong support and role of state governments is necessary.

The sea change anticipated with the new education policy implementation for *Atmanirbhar Bharat* can enhance the required skill development for production, processing, marketing and trade in ever changing situations that exist in agriculture . The promotion of agri-entrepreneurs, agri startups for Make in India using the block chain, digital technology, artificial intelligence with public-private partnership and promoting agriculture as a business, tapping the potential of Corporate Social Responsibility (CSR) etc can ensure in achieving the national goals. It also requires considerable changes in national and local legislation, policies and mainly financial support for the institutions.



fun FACT

Dr Reddy is enthused by tribal development. His dream is to see the hilly tribal areas as a better resourced community

NURTURING ECONOMIC EMPOWERMENT

INTERTWINE FORMAL EDUCATION & INFORMAL LEARNING

Agriculture sector is the mainstay of the Indian economy, contributing 20.19 per cent of national Gross Value Added (GVA) at current prices and more importantly, provide employment to about half of India's population (1.39 billion people) for their livelihood.

India has done remarkably well and is the second largest producer of agricultural products. India accounts for 7.39 per cent of total global output that ushered green, white, yellow and blue revolutions and improved food security. But agriculture's relative share in GDP decreased gradually over the last four decades.

This paradox is forcing a large proportion of rural population to live on lesser resources, leading to malnutrition and widening rural-urban income gap. In addition, there has been mounting pressures on natural resources and to climate change, both of which threaten the sustainability of food systems at large. Thus, India has a contrasting scenario of over flowing granaries, buffer stock of food grains (75 million tonnes in 2020), rotting grain, malnourishment, degrading soils, depleting water resources, reduced net income to farmers but more price tag for consumers.

This implies that the ongoing



Prof Kumar loves listening to old songs. He enjoys his morning walk, yoga and likes to motivate the youths for innovations

growth rate in farm income has to be sharply accelerated in a sustainable manner within as well as outside the agricultural sector by raising investment in agri-education and research that has paid rich dividends and gained global prestige. Innovative farming systems, build upon technological improvements ingrained in indigenous and traditional knowledge, are needed to increase productivity while protecting the natural resource base.

The Changes That We Need

There is a need to change the existing system of teaching-research-extension in the agricultural institutions to make it more problem-solution oriented, emphasizing on quality and product development, and delivery of services to the end-users. At least half of the content of teaching should be based on practicals, hands on training coupled with interaction with farmers and industry, and building partnerships. User and eco-friendly models based on practical approaches should be developed to provide hands-on experience to the students so as to enable them to become job-providers rather than job-seekers after completion of their degree program. Quality of education imparted rather than the quantity of graduates produced should be the sole criteria for ranking of Agri-Institutions. Government of India has been providing a lot of support for start ups and establishment of FPOs to usher in a new era in agriculture so as to meet commitments of COP 26. According to the September 2021, mid-year update to the global report on food crisis (GRFC) an estimated 161 million people in 42 countries/territories have faced food insecurity. This challenge necessitates reforms in agricultural education towards a secure and sustainable future.

Some small-scale farmers in India have shown ability to adapt, and are passionate to try new crops and cultivars, better animals, and alternative technologies to increase productivity and profits. But their production decisions are still based on what they need – not on what is possible

Empower Youth With Action Oriented Skill Set

In the past, agriculture was seen as a low-tech enterprise dominated by numerous marginal and small family farms but this situation has changed dramatically in last two decades due to economic liberalization and a fast-changing

demand of the market, consumer habits, environmental regulations, new requirements for product quality, food safety, sustainability, and so on. Farmers, researchers, agricultural business and governments have recognized this and emphasized for a more entrepreneurial environment in the farming business.

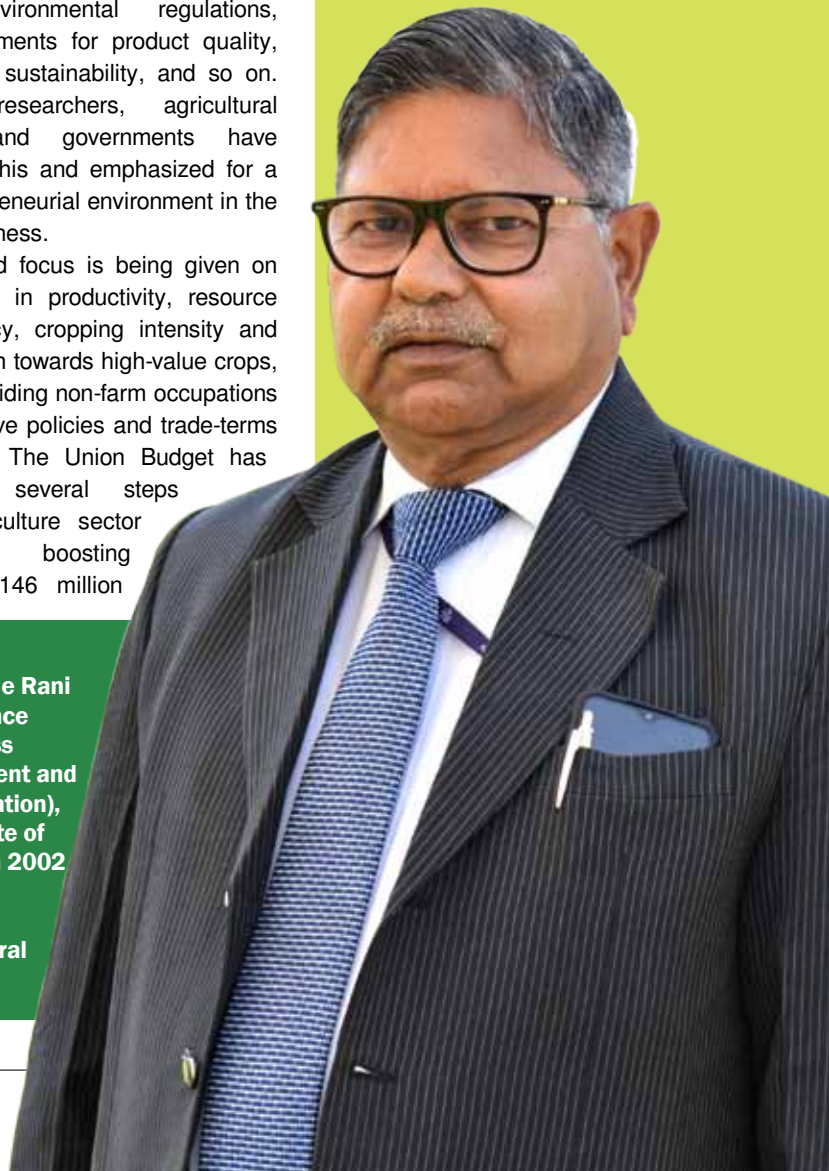
Sustained focus is being given on improvement in productivity, resource use efficiency, cropping intensity and diversification towards high-value crops, besides providing non-farm occupations and conducive policies and trade-terms for farmers. The Union Budget has announced several steps in the agriculture sector aimed at boosting income of 146 million



About the AUTHOR

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farm holdings. Improving the viability of agriculture as a remunerative economic activity, considering the fact that 86% farmers are small holders with less than 2 ha land, has been of the key concern.

The focus is on to deliver digital and hi-tech services to farmers to cut costs, promote startups to facilitate Kisan Drones for crop assessment, digitization of land records, mapping of natural resources and spraying of insecticides, promote post-harvest, value addition, consumption and blending of millets, find new markets, railways to support efficient logistics services for small and medium enterprises, and gain competitiveness in the global markets. However, the long-term success of stipulated measures is interlaced with motivation of farmers to challenges related to technology adoption, market potential, the availability of resources and basic business skills to negotiate with financial and other agencies to get the required assistance to establish their new enterprise.

Can small-scale farmers become entrepreneurs?

The pathway to become more marked oriented. We need a comprehensive road map and knowledge to create an

The farmers need to be exposed to the possibilities of innovation, targeting newer markets, establishing more linkages with a vision for changing their economic environment which results in business growth and income. Since about 90% agriculture work force is in the informal sector, it is crucial to make them acquire modern skill sets with strong market linkages for sustainability of their livelihoods

entrepreneurial environment and skills among farmers. Some small-scale farmers in India have shown ability to adapt, and are passionate to try new crops and cultivars, better animals, and alternative technologies to increase productivity and profits. But their production decisions are still based on what they need – not on what is possible.

Having achieved fairly good amount of self-sufficiency through technology adoption in primary agriculture (food

grains, vegetables, fruits, milk, meat, egg etc.), the country has to focus on secondary agriculture to generate additional value to the farm produce and income and employment for youth and women to get attracted to farming and also engage women in the profession. There are several potential areas for secondary agriculture, such as Seed Production, Dairy Industry, Animal Rearing, Poultry and Piggery, Fisheries, Sericulture, Apiculture, Mushroom Production, Hi-tech Floriculture, Vegetable Farming, High Value Fruit Farming, Food Processing, Mechanization, IT uses in Agriculture, Biotech Product Development, Input Supply Chain Management, Group and Cluster Based Farming, Land-share Holding Companies, Credit Management and so on. All these ideas and technologies need to be shared both through informal and formal channels of education and skill development programs designed for diverse work force engaged in agriculture and allied sectors.

Integrate new knowledge with traditional wisdom

The modern crop and the animal husbandry are knowledge intensive and



demand skills as any other vocational enterprises. Most of the working force in agriculture and allied activities in India are un-organized that continue with activities related to agriculture with expertise gained through significant hands-on experience acquired from one generation to the other.

The process of informal learning is now taking different dimensions due to commercialization of farm activities. It has necessitated farmers and youths to undergo formal trainings to achieve faster changeover to technology-driven, environment-friendly and climate resilient commercial agriculture.

These technologies are being transferred to farmers by the experts mostly by formal trainings-learning environment. Therefore, integration of formal and informal education in agriculture is an area that needs interventions for its wider reach to heterogeneous farming community and greater linkages with all the stake holders and players in the food-chain right from production to consumption.

The farmers need to be exposed to the possibilities of innovation, targeting newer markets, establishing more linkages with a vision for changing their economic environment which results in business growth and income. Since about 90% agriculture work force is in the informal sector, it is crucial to make them acquire modern skill sets with strong market linkages for sustainability of their livelihoods. A need for thorough revamp of the vocational education and training system is required to overcome literacy, knowledge and skill gaps in agriculture by providing diverse platforms for informal workers based on actual skills or competencies performable by the person.

Where Information Technology is available and accessible, it is a very powerful way to educate about new ideas, technologies and other information to different stake holders. Mobile phones, tablets, virtual labs and skilling e-labs and computer-based systems can be used to overcome

There is imminent need to revise the National Curriculum Framework for School Education to prioritize introduction of subjects like artificial intelligence, financial literacy, farming systems, natural resource management, and data science in school curriculum to meet the fast-changing demands of the job market



physical distances and barriers and also promote critical thinking skills and stimulated learning environment. The challenge is how information technology can be harnessed for the benefit of both extension agents and farmers without compromising the importance of human and diverse local factors.

Approaches to capacity building

The complexities of and interactions between local, regional and global forces are dominating education policies. This is truer for Agricultural education and training on the back drop of value addition, export potential and emerging high-tech production systems without losing sight of the local knowledge needs and infrastructure. Transformation of farmers as entrepreneurs need new ideas, opportunities, and resources. Cognitive skill set allows farmers to make informed choices and puts them in a better position to compare the current practices being used with alternatives provided by innovative technologies propagated by research and education establishments. Farmers need grasp in each of the key areas of farm management: planning, implementing and controlling. They also need information about primary production, harvesting, processing,

wholesaling and retailing and about input supply, financial services, transport, packaging, promotion and advisory services. Training program should be purposefully designed following a formal analysis of training needs. Non-formal capacity building programs include awareness workshops, action learning workshops, combined extension and training, business clinics, success case replication, study groups, farm field schools, farm business schools, counselling, learning networks and electronic networking.

There is imminent need to revise National Curriculum Framework for School Education to prioritize introduction of subjects like artificial intelligence, financial literacy, farming systems, natural resource management, and data science in school curriculum to meet the fast-changing demands of the job market. The potential of vocational and distance education in providing necessary skills to various stake holders involved in farm production, food services, agri-business management and marketing, food processing, retailing, landscape architecture, agricultural implements, etc. remains untapped not only to nurture innovation, but also to bring innovative elements in their applications in an entrepreneurial environment.

Agri-food systems contribute about 30% of the Green House gases and there is now renewed thinking to resort to conservation agriculture and technologies which are more harmonious with nature and ensure sustainable livelihoods. With the implementation in New Education Policy it is envisaged to enhance Gross Enrolment Ratio and adopt multi-disciplinary mode with emphasis on skilling youths.

TIME FOR AGRICULTURE 4.0

During the pandemic, Agriculture and Horticulture emerged as the most resilient sectors. They were among the few sectors that registered a positive growth despite the pandemic.

The increase was registered in vegetables, spices, medicinal and aromatic plants. The demand for health food has increased the overall consumption of spices in the country and also in the export markets served by India.

Various technologies have helped the farmers to achieve these revolutions. Access to irrigation, high yielding varieties, quality seeds/planting material, fertilizers, plant protection agents etc helped in achieving self-sufficiency. Integrated actionable intelligence is driving the growth.

It is predicted that by 2050, the world population is going to increase to 10 billion. Therefore, 70% increase in food demand is estimated by 2050. Further, 12% increase in urbanization will put lot of pressure on growing more from less

Education 4.0 is the key for success of Agriculture 4.0 by providing the desired skill sets

land, water, farmers, and natural resources. Thus, challenges are to grow more from less land, less water, limited resources, sustainably with challenging climate to feed the growing population.

Future Farming Technology

High tech Agriculture and Horticulture i.e. Agriculture 4.0 is emerging as future farming technology. Agriculture 4.0 will no longer depend on applying water, fertilizer and pesticides. Rather, farm operations will have to be run very differently utilizing technologies such as sensors, AI, block chain, precision agriculture, aerial image, drones, satellites and so on to make farming



About the **AUTHOR**

Dr Nutan Kaushik is DG,
Amity Food and Agriculture
Foundation



more profitable, safe and efficient and environment friendly.

Precision agriculture, controlled environment farming, vertical farming, robotic drones, block chain, artificial intelligence, sensors, online marketing are the backbone of high-tech farming. All these technologies need entirely different skill sets for the industry than what we have been traditionally training. Keeping the pace with these changes, Amity University added courses in 2019 to make our agriculture and horticulture students ready for Agriculture 4.0 skill sets. New Education Policy 2020 provides ample opportunity to the students to learn through industrial internships.

The high-tech farming business requires knowledge of project management, knowledge of backhand and front hand business, critical thinking, precise communication, blockchain, traceability, operation management, automation to internet of things (IOT), data analytics, mobile apps for product development, packaging.

In India, a large number of farmers are marginal farmers. To tackle this, GOI is promoting FPOs and has developed several mission programs such as Doubling Farmers' Income, Per Drop More Crop, Soil Health Card, Pradhanmantri Fasal Bima Yojna, Digital India, NICRA, National Agriculture Market (NAM) etc.

Per drop more crop mission targets to improve irrigation efficiency. Micro irrigation can enhance the water efficiency by saving up to 70% of water which can further be enhanced to 90% saving by using vertical farming. Sensor based irrigation and promotion of micro irrigation requires skill sets in operations and maintenance of equipment besides other essential knowledge.

Blockchain, drone, satellite image based yield prediction etc are some of the technologies which are extremely useful for realization of Pradhan Mantri Fasal Bina Yojna.

Precision Agriculture

Precision Agriculture is highly dependent on sensors, big data, artificial intelligence

Agriculture – The New Data-Driven Industry

Farming is becoming software based, be it precise farming or smart farming. Farming, extension activities/ services are also becoming tech savvy and have reached rural areas.

Agriculture sector is going to be data driven industry. Huge data sets are being generated, be it satellite based or drone based images for estimation of crop yield, prediction of plant stress, maintenance of records of soil health etc., farm inventory, enhancing supply chain efficiency, fair pricing etc.



My major passion is listening to music and reading about different cultures, and writing. Depending on the mood I pick up one of these activities during leisure time

and block chain as we need real time data to take appropriate decision.

Various types of sensors are available in the market which can be used to monitor moisture content, soil nutrients and soil properties. They are electrical, electromagnetic, optical, mechanical, airflow, acoustic, laser included breakdown spectroscopy (LIBS), X-ray fluorescence (XRF). Sensor development requires a multidisciplinary approach of Agriculture, Horticulture, Chemistry, Nanoscience, Physics etc. Education 4.0 takes care of these requirements while designing the courses.

Protected agriculture in green house, poly house, controlled environment farming etc ranges from semiautomatic to fully automated controlled environment. We still need to make it energy efficient by using solar energy and many other improvements.

Integrated Farming Systems For Small And Marginal Farmers

Through government support, green houses can be made on small plots for high value crops such as exotic

vegetables and also for agro-tourism. Precision agriculture needs to reach small and marginal farmers for doubling farmers' income.

Advanced technologies such as hydroponics, aeroponic, energy efficient artificial light (light emitting diode (LED) and automated control system are emerging as promising vertical farming agricultural practices to produce vegetables, fruits and other crops the year around. It also protects farmers from weather-related problems and is human health friendly. It requires multidisciplinary approach to achieve the targeted goal. Vertical farming is in nascent stage in India.

Block chain based solutions will change the food supply value chain, enhance traceability, improve crop insurance operations and will help farmers to sell their commodities by lowering transaction fees and faster payments.

Drones are being used for right from soil and nutrient mapping to water management, pests and disease identification, yield predictions etc. Budget 2022 has introduced Kisan Drones. Use of Robotics is also increasing in agriculture, particularly in vertical farming. Through robots are deployed for various farm operations, till now they are majorly used for harvesting and sorting and grading. Hortibest is being used to remove weeds from the field.

Agriculture 4.0 is transforming the Agri-Horti food business eco-system and meeting national goals. Automation is the key. Crop modeling, digital soil mapping, weather forecasting, pest and disease forecasting will help in automation of farming. Education 4.0 is the key for success of Agriculture 4.0 by providing the desired skill sets.

AGRICULTURAL EDUCATION

ADDRESSING SCENARIOS

“Improved and sustain quality of higher agricultural education for addressing emerging challenges for livelihood security and sustainable development”.

India is fostering the needs of 1.38 billion people in terms of nutrition and is committed to ensuring food safety and security in the future as well. To cater to the needs, India has successfully revamped the traditional existing agricultural education system into a modern advanced agricultural education system (AES) with an aim to meet the requirements of the future both in terms of food production and supply. The major objective of AES is to -“To improve and sustain quality of higher agricultural education for addressing emerging challenges for livelihood security and sustainable development”. The Indian AES is diverse



EMERGING

having multiple dimensions due to existing wider and variant biogeographical areas of India with different systems of agriculture, cultural pursuits, feeding behavior, climate variables, and geographical demands. Therefore, the challenges are more for designing, implementing, and getting the output of the AES uniformly throughout the country. In spite of all these, India has done wonderfully in achieving the needs and objectives behind the implementation of AES. Further, there is a need for agricultural graduates having knowledge, skills, ability and also entrepreneurship to provide a class of village-based services such as diagnostic laboratories, advisories on new innovations, markets and avenues of development assistance for corporate and contract farming. Industry and universities partnership is essential if industry is to obtain well-trained agricultural professionals in cutting edge technologies for international competitiveness. The thrust points on which the AES was designed and implemented are- poverty reduction, malnutrition management, enhanced productivity, precision in animal and agricultural systems, bridging the gap between traditional and modern systems of agriculture, national and international collaboration, enhancing livelihood security, awareness among farmers, job creations and ensuring food safety with modern tools and techniques.

MAJOR CHALLENGES

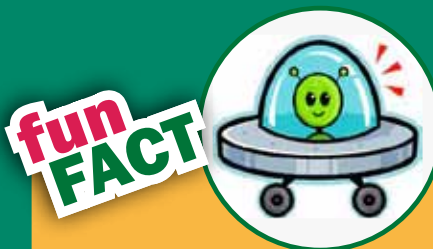
The major objective of AES was to upgrade the existing AES and to design it in such a way to meet the requirements of the national and as a whole will help in nation-building. The major challenges in the nation are impeding climate-change associated issues both to agriculture and livestock; reduction in agricultural land cover and fodder land; the emergence of new diseases, vectors, cross-border diseases; reduction in fertility competence of animals, soil fertility, raising issues of population explosion, reduction in

About the AUTHOR

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groundwater, surface water, water holding capacity of the land, the emergence of new pests, livestock management issues, nutritional requirements of animals, faster industrialization and rising nature of natural calamities. Looking to these, the current AES has been developed and successfully implemented to enhance the food production system both in agriculture and livestock.

The major advancement which is brought about in AES is the up-gradation of education policy and infrastructure. The IDP-NAHEP is the super most example of educational advancement made in past and also going to further advance the existing system of AES. The major objectives of this IDP-NAHEP are to advance the existing agricultural education system, upgrade the existing facilities of teaching-learning system, generation of trained manpower, meet



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FACT**

**I love listening to music,
watching Sci-fi movies and
exploring software and tech**

Momentum in the directions of precision farming has boosted in the last decade. The major aim of this system is to enhance the production output with low input with a scientific approach



Focus On New Advancements

The AES focuses on new advancements in the areas of food processing and marketing. Value addition to the existing food along with improvement in nutraceutical values has gained pace due to AES. Various course modules and industrial links have further strengthened them. Value addition has not only increased the business cost of the food products but also has opened doors from the agricultural and livestock exports. Collaboration with industries and Universities abroad has further strengthened the production system.

The AES focuses on another aspect that is creating veterinary doctors, health professionals, and scientists to provide the best possible treatment to animals so as to boost animal production as well as reduce the cost of animal health management. The active vaccination, probabilities of disease biomarker discoveries, and development of a potential disease diagnostic system are the outcomes of AES. The generation of employment among the youth and entry of the best brains into the agricultural education system are the outcomes of the AES.

global standards in teaching and research, training of students and faculty members abroad, generation of incubation centers, frame the base for startups, creation of green campus with state-of-art facilities, modernization of plants related to livestock products and agriculture and making the facilities in Indian university at par with the foreign universities. The accreditation of agricultural and veterinary universities, faculty training and development, student-faculty exchange programs, and timely assessment of impact in the educational institutes are some of the major factors of the success of AES.

Agriculture is the main source of livelihood for over 80% of the rural poor in India. Although, it employs about 52% of the labor force, it contributes to only 14.4% of GDP and 10.23% of all exports. Human Resource development is critical for sustaining, diversifying and realizing the potentials of agriculture. Agricultural human resource development is a continuous process being undertaken through partnership and efforts of the components of the Indian Council of Agricultural Research (ICAR) - Agricultural Universities (AUs) System comprising 53 State Agricultural Universities (SAUs), five Deemed to be universities (DUs), one Central Agricultural University (CAU) and four Central Universities (CUs) with Agriculture Faculty.

Momentum In Precision Farming

Momentum in the directions of precision farming has boosted in the last decade. The major aim of this system is to enhance the production output with low input with a scientific approach. The AES inculcates these mastering tools into the system and enhances farmer-friendly agriculture and animal husbandry practices. The second aim of this precision farming is the conservation of water and enhancing productivity through an organic and modern approach. Farm revenue generation is another feather in the cap of AES which not only enhances the socio-economic status of the farmers but also ensures food security cum safety.

LIVESTOCK: THE KEY TO FARMER PROSPERITY

Tips to Foster & Enhance Livestock Rearing – Unique Farming Practices

Shafali Khatun has built a 'chicken empire' in her home village of Kendua, Murshidabad in West Bengal. Starting off with literally nothing in 2012, she has built up a flock of over 30,000 chickens in just 9 years and earns a handsome sum of Rs. 17,000 per month – money she uses to support a household of 12 and her niece's education.

She is just one of India's myriad small and marginal farmers who are harnessing the power of 'livestock rearing' to lift themselves out of poverty.



Capital Asset

Whilst many farmers in rural India depend on animal husbandry solely for their livelihood, many are turning to it to offset the risks of failed crops and build up a herd as 'a capital asset' for the future. One which pays dividends along the way - not only providing income, but additional benefits to families in poverty

such as the supply of milk, meat, eggs, wool, castings (dung) and hides for household consumption. Some animals provide a source of power in fields also. As a result, animal husbandry plays a fundamental role in the rural economy and in poverty reduction among developing countries.

It is no surprise then that India has seen a dramatic rise in the share of income from the livestock sector among small and marginal farmers,



About The AUTHOR

Ms Pearl Tiwari is the Director and CEO of Ambuja Cement Foundation and President (CSR & Sustainability) at Ambuja Cements Limited. Ms. Tiwari is a social development professional with 37 years of experience. She has worked in this area across diverse academic, NGO and CSR roles. Ambuja's CSR efforts have been recognised widely and the recent years has seen a slew of national and international awards for CSR, water management, and skill training bestowed by different chambers of commerce and other organisations of repute



from 4.3% in 2002-03 to 15.7% in 2018-19 - due in part to the increased demand for animal products which comes from the higher incomes and consumption patterns seen across the country.

How then can we foster this trend going forward, and enhance the positive impacts of livestock rearing to take small farmers from poverty to prosperity?

Empowering Women to Provide Local Veterinary Services to Local Farmers

Healthy livestock supply better products. Be it milk, eggs, meat or other by-products, the health of livestock plays a significant role in the success or failure of small and marginal farmers in rural India.

But farmers face a lack of knowledge of proper practices in caring for animals and there is a lack of available support services, both treatment and care, for livestock. Those veterinary services that are available in some regions are far off and unaffordable.

With only 1 veterinarian allotted for 10 veterinary dispensaries and with difficult mountainous terrain, cattle health was severely impacted resulting in high cattle mortality rates. To tackle this problem in areas like Darlaghat, Himachal Pradesh, a cadre of women volunteers from local communities are being trained to offer

There is great power in facilitating the 'coming together' of farmers in less formal arrangements, via small 'farmer learner groups,' to collectively work together to solve common problems

basic veterinary services to local farmers, along with advice on health, hygiene, feeding and fodder management issues to farmers.

Shanta Sharma is one such Pashu Swasthya Sevika (PSS) who has been empowered and is helping reduce livestock mortality and increase milk production among dairy cows/buffalo in Darlaghat. With over 40 women working as PSS tending to more than 8,000

animals in the area, the entire region has prospered with a booming dairy industry. The result is a dramatic transformation in the status of women, as livestock is one asset (unlike land) which is often owned and tended to, by women.

Boosting Production and Profitability of Aquaculture via BioFloc

Aquaculture has emerged as a key strategy for farmers in areas like West Bengal to generate a livelihood from farm ponds. However production is often inhibited by the accumulation of ammonia and hydrogen sulphide which are toxic and impact the growth of fish. Additionally, the intensity of fish farming is limited in traditional methods of aquaculture and farmers face challenges in pumping adequate fresh water for water exchange in ponds.

To address this, some farmers are adopting the use of BioFloc Technology in aquaculture tanks to bolster production and therefore, profits. BioFloc is a mixture

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FACT**



Ms Tiwari loves travelling and exploring new places, or immersing herself in a good book. She delights in tending to her garden and is an ardent foodie

of floc forming bacteria, micro-organisms, diatoms, filamentous micro algae, micro and macro invertebrates, protozoa, rotifer, exocellular polymers, faecal matter and uneaten feed, which is formulated and nurtured in 'water column's' before being introduced into fish tanks.

This innovation is helping substitute fish meal and provide better nutrition to fish; increase protein levels; reduce the need for water exchange and intensify the farming of fish for marginal farmers.

The lives of small farmers like Milu and Udayan Makhal from Sankrail West Bengal have been revolutionised. Milu and Udayan farmed 2500 fish in their first cycle using Biofloc Technology. Within just four months they earned a profit of Rs. 11,700, recovered their installation costs and had ready access to fresh fish for household consumption.

Engaging Small & Marginal Farmers into Groups

Most landholdings in India are small and marginal which makes farming unprofitable. Farmer Producer Organisations provide a platform for farmers to collectivise and pool their capital and to undertake processing and trading of agricultural commodities more effectively. FPOs are also a great base to collectively market products and by-pass middlemen – enabling farmer members to command higher prices for their products. This enhances farm profitability and ultimately reduces distress.

Similarly, there is great power in facilitating the 'coming together' of farmers in less formal arrangements, via small 'farmer learner groups,' to collectively work together to solve common problems.

By forming Goat Based Livelihood Groups, for example, many farmers are enhancing the profitability of their enterprises. Via the group, farmers learn about breed improvement using new, desired and healthy breeding bucks; proper feed and fodder management and growth monitoring; proper goat-shed management and hygiene; and farmers also collectively sell goats on the basis of live body weight.

Collaborating with Like-Minded Key Stakeholders

Collaboration via the pooling of resources, knowledge and networks, is a key factor in expanding the reach and impact of development initiatives. The same is true in Animal Husbandry where the coming together of multiple stakeholders provides a powerful impetus for farmers to achieve success in livestock.

In Chandrapur, Maharashtra, development organisations are partnering with IDH (The Sustainable Trade Initiative) in the wake of COVID19, to support women in SHGs for securing their livelihoods by providing training and an initial set of goats and chickens to kickstart their homebased livestock enterprises. By pooling resources and capitalising on the strengths of each organisation, the on ground impact can be multiplied and enhanced.

Similarly in Himachal Pradesh, the Amrit Dhara Dairy Milk Cooperative has risen to widespread success and is just one of the 4 FPOs supported by NABARD. Today the group strength has swelled to 300 women and was awarded Best FPO in the state in 2021. So successful are they, that they have been invited to play an advisory role to the Ministry of Finance, Agriculture and Animal Husbandry in the Himachal Pradesh State Government in planning Dairy activities for the state. This is the power of partnerships.

Given the fact that livestock contribute at least 70 percent of the income of the world's rural poor (LID 1999), there is a significant case to be made for increased focus on livestock in rural development. By embracing unique approaches and interventions, development organisations can go far in exponentially expanding the impact of this industry in the reduction of rural poverty – helping double incomes and generate the much needed prosperity in the agricultural sector that fuels the Indian economy.



By forming Goat Based Livelihood Groups, many farmers are enhancing the profitability of their enterprises

Amoli Yadav from Kukurdih village in Rawan, Bhatapara believes the Goat Based Livelihood Group he joined has

been a turning point for his business. He has improved his goat shed, learnt improved practices and better negotiation skills – selling goats through live body weight and earning an addition Rs. 2000 per goat this way. He has sold two quintals of goat droppings and despite being illiterate, is educating his children with his increased profits.



गोविन्द बल्लभ पंत कृषि एवं प्रौद्योगिक विश्वविद्यालय,
पंतनगर द्वारा आयोजित

111 वाँ अखिल भारतीय किसान मेला एवं कृषि उद्योग प्रदर्शनी मार्च 24-27, 2022



प्रमुख आकर्षण

- अनुसंधान केन्द्रों पर प्रदर्शनों का अवलोकन
- कृषि सूचना केन्द्र का अवलोकन
- उन्नतशील बीज और पौधों की बिक्री
- कृषि उद्योग प्रदर्शनी
- आधुनिक कृषि यंत्रों का प्रदर्शन
- डॉक्यूमेंट्री शो

विशेष कार्यक्रम एवं प्रतियोगिताएँ

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| • उद्घाटन समारोह:- गाँधी हॉल (पूर्वाह्न 11.00 बजे) | 24 मार्च |
| • फल-फूल, शाक-भाँजी एवं परिरक्षित पदार्थों की प्रदर्शनी व प्रतियोगिता:- मेला प्रांगण | 24-25 मार्च |
| • संकर बछियों की नीलामी:- शैक्षणिक डेरी फार्म, नगला (अपराह्न 2.00 बजे) | 25 मार्च |
| • मत्स्य उत्पादन प्रदर्शनी व प्रतियोगिता (अपराह्न 3.00 बजे) | 25 मार्च |
| • पशु प्रदर्शनी एवं प्रतियोगिता (गाय एवं भैस):- पशुचिकित्सा एवं पशुविज्ञान महाविद्यालय (पूर्वाह्न 10.00 बजे) | 26 मार्च |
| • डॉक्यूमेंट्री शो | 24-26 मार्च |
| • समापन एवं पुरस्कार वितरण:- गाँधी हॉल (अपराह्न 3.00 बजे) | 27 मार्च |

समस्त कृषक भाइयों, बहनों एवं आगन्तुकों से अनुरोध है कि कोविड-19 महामारी के सन्दर्भ में राज्य/केन्द्र सरकार द्वारा निर्गत दिशा-निर्देशों के पालन करने में अपना सहयोग दें।

किसान मेले को स्वच्छ बनाने एवं पॉलीथीन मुक्त रखने में सहयोग करें

स्वस्थ जीवन के लिए स्वच्छता, दो गज की दूरी एवं मास्क जरूरी

विशेष जानकारी हेतु सम्पर्क करें - निदेशक प्रसार शिक्षा, गो. ब. पंत कृषि एवं प्रौद्योगिक विश्वविद्यालय, पंतनगर, ऊधम सिंह नगर (उत्तराखण्ड) ☎:05944-233336

AGRICULTURAL EDUCATION

POWERFUL NEW INITIATIVES

The agricultural sector is getting more complex due to globalization, the impact of climate change, entry of the corporate sector into the agriculture value-chain, expanding demand for processed food, and the need for postharvest technology. India will need the rich human capital of highly qualified, motivated, and well trained agricultural scientists to meet these challenges of the 21st century. It is the responsibility of the State Agricultural Universities (SAUs) to provide such human resources.

The National Agricultural Education Policy (NAEP) is the first in India. Academic credit banks and degree programmes with multiple entries and exit options will be brought to 74 universities, focussing on crop sciences, fisheries, veterinary and dairy

training and research. This agricultural education project continues with the National Education Policy (NEP) launched by GOI. Aspects such as widening the availability of scholarships, strengthening infrastructure for Open and Distance Learning, Online Education, and increasing technology usage have received great attention in the NEP. These are vital reforms for the Agricultural education sector. Schools/school complexes will be encouraged to hire local eminent persons or experts as 'master instructors' in agriculture to help preserve and promote local knowledge and professions.

NAEP

The Universities which have been included as a part of NAEP have been divided into 4 parts:

1. Central Agricultural Universities – comprising three Universities, one each from Imphal, Samastipur and Jhansi
2. ICAR Deemed Universities – there are 4 Universities in this cadre
3. State Agricultural Universities – includes 63 Universities
4. Central University with Agriculture

Faculty – comprises four Universities

Academic Credit Banks

- The service providers available to a desirable student community, that may ease the integration of the campuses and distributed learning systems, by creating student mobility within the inter and intra university system
- Consistent integration of skills and experiences can be achieved in the form of a credit-based formal system by providing a credit recognition mechanism
- The storage of academic credits earned from recognised Higher Education Institutions (HEIs), on digital mediums can be managed through the academic credit banks
- It will also allow credit redemption in order to be awarded a certificate, degree or diploma

Experiential Education

- o Experiential Education is a teaching method or philosophy, as per which an educator focuses on direct experience and explains the learner. This results in increasing



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Prof S Rajendra Prasad is the Vice-Chancellor of University of Agricultural Sciences, Bangalore. He has 27 years of meritorious service in the National Seed Project, including time spent as a Seed Research Officer and Special Officer (Seeds). As Director (ICAR), Mau, Gazipur, Balia, and Azamgarh in Uttar Pradesh, he pioneered the seed village concept and raised major funds to establish model Seed Processing Seed Farms

The entry and exit modules option in the National Agricultural Education Policy shall be a bit complex to manage. The universities will have to come up with measures such that the entire education and experiential methodology - both are adapted while completing the education of each student

knowledge, developing skills and also analysing people's capacity and skills to contribute

- o As per NEP, India aims at setting the agricultural undergraduate courses to a full time duration of four years. India is already a step ahead with all its agricultural courses running for a four year tenure
- o NEP also states experiential education for all the 74 Universities which have been covered under NAEP. Even this milestone had been achieved as experiential education had been mandated in agricultural education since 2016.



The entry and exit modules option shall be a bit complex to manage. The universities will have to come up with measures such that the entire education and experiential methodology both are adapted while completing the education of each student

Student READY Programme

Another important aspect of the National Agricultural Education Project is the Study READY Programme. As per the Student READY (Rural Entrepreneurship Awareness Development Yojana) Programme, all students will have to take up a six month internship or training program in their final year of education. This will enhance their experience, gain in-hand rural awareness, research expertise, industry experience, and entrepreneurship skills.

India will have the highest population of young people in the world over the next decade. This structure will enable the country to provide quality education which shall determine our future. The academic legitimacy of producing More from Less for More (MLM) will become doubly important.

Challenges

Since this project is India's first-ever agricultural education-based project, there are various challenges with which the authorities will have to deal with.

Role of ICAR

The Indian Council of Agricultural Research (ICAR) comes under the administration of the Ministry of Agriculture and Farmers Welfare, and shall be responsible for ensuring quality education is being provided to all students across the country. Although agricultural education is a State subject, ICAR will have to maintain a standard for Universities under the new system of higher education



regulation proposed by the NEP.

To overcome the unprecedented disruption caused by the COVID-19 pandemic, a holistic approach will be needed with agriculture at the centre stage of the national rebuilding process. To address the large and systemic challenges, inclusiveness and rapid conversion of knowledge into needed and commercial products will be the key to innovative and affordable solutions. Promoting the policy of Zero Hunger India, Make-in-India, Swasth Bharat, One Health, Atmanirbhar Bharat, and the like, technical and financial support to strengthen entrepreneurship, start-ups, Ministry of Micro, Small and Medium Enterprises (MSME), and other concerned Ministries and Departments will synergistically integrate their efforts to build a green and strong India.

Being Vocal for Local, region-specific courses such as Coastal Agriculture, Hill Agriculture, Tribal Agriculture etc have been formulated. New degree programs and courses have been recommended in emerging fields like genomics (biotechnology), nanotechnology, GIS, precision farming, conservation agriculture, secondary agriculture, hi-tech cultivation, specialty agriculture, renewable energy, artificial intelligence, big data analytics, mechatronics, plastics in agriculture, dryland horticulture, agro-meteorology and climate change, waste disposal and pollution abatement, food plant regulations and licensing, food quality, safety standards and certification, food storage engineering, food plant sanitation and environmental control, emerging food processing technologies, sericulture, community science, and food nutrition & dietetics. These will need additional high quality human resources and shift in pedagogy.

AGRICULTURE EDUCATION SUPPORTING THE ECONOMY

Jammu and Kashmir's economy is predominately agriculture-dependent. Nearly 70% of the population is directly or indirectly engaged in agricultural and allied occupations. JK has an edge over the rest of India by providing off-season vegetables. This gives our farmers monopoly over the market and provides them enhanced price for their produce.

This approach needs to be replicated in other areas of J&K on the basis of site specific crop production. These crops can be branded as Kashmir Fresh to tap the available potential of the open markets all over the world. Traditional heirloom Varieties like Mushkabudji, Red Rice (Zagg), Kamad should to be revived and successfully marketed. The department after successfully reviving Mushkabudji is now focusing on the revival of varieties like Red Rice (Zagg) and Kamad.

The production of the food grains in Jammu & Kashmir recorded an increase from 13,066 thousand quintals in 1980-81 to 19,312 thousand quintals in 2019-20. This has majorly come through productivity gains by improved varieties and management practices. Likewise, there are increased yield levels in pulses, oilseeds, fodder crops, vegetables and fruits which are due to the strenuous and continuous R&D efforts through breeding program and newer technologies in crop management. Agriculture education has played a seminal role in ensuring the prosperity of farmers.

Pre-vocational agriculture was

Fostering the culture of agricultural innovations, start-ups and entrepreneurship will be a game changer for paving way towards sustainable growth and development

integrated into the junior secondary curriculum in order to provide young pupils with the necessary pre-vocational or entry skills into agricultural employment.

Broad objectives

- * Stimulate students' interest in agriculture
- * Assist students acquire and integrate basic knowledge and skills in agriculture
- * Expose students to various occupational opportunities available in agriculture
- * Prepare students for studies in agriculture.

Agricultural education is the type of education that is employed in training learners in the process of agricultural productivity, as well as in the techniques for the teaching of agriculture. Presently agricultural education in India takes place at the informal and formal levels. At the informal levels learners are trained to modern agricultural production processes outside the formal school system. At the formal level, agriculture is studied at various levels in the Indian educational system.

Agricultural education is concerned

with the part of learning that prepares people and personnel to become agricultural extension teachers and other professionals in fields requiring a broad understanding of agriculture. It focuses on the development of leadership qualities needed in planning and attaining long-term goals and objectives, such as increased agricultural productivity, among other things.

Agri-Sustainable Development

Sustainable development means continuous development using the earth's resources without destroying the life sustainable properties of the environment. It is vital to meet the goals of sustainable development through reforms and next-generation intervention of Agricultural Education. Agri-sustainable development shall serve multiple needs like economic needs; social, cultural and health needs; political needs. It shall minimise the waste of non-renewable resources and ensure sustainable use of renewable resources e.g. fresh water, soils, forests etc.

There is a growing consensus that sustainable development means achieving the quality of life that can be maintained for many generations because it is socially desirable, economically viable and ecologically sustainable.

Agricultural Education and Sustainable Future Development

Agricultural Education trains people to engage

themselves in various ways as part of an organization or through self employment. Crop production, such as food grains and horticulture, and animal production, such as dairy, poultry, fisheries etc are all viable options for making a livelihood.

Through agriculture education, individuals can work for themselves and create jobs. Self-employment is becoming more popular among farmers in recent years as a result of the learning of marketable skills. The basic skills that are obtained enable individuals to support a growing modern economy and contribute to the society's well-being. Ordinary graduates are unable to find gainful employment because they lack the necessary competencies and abilities. They are without employment because they do not have employable skills. But through agriculture education, diverse skills can be acquired in different areas like poultry, piggery, bee keeping or apiculture, vegetable gardening, shrimp farming, fish farming etc.

Strategies to Bridge Gap between Agri Education & Sustainability

- * Increasing productivity, employment and value addition through intervention of Next Gen Agriculture Education
- * Protecting and enhancing natural resources
- * Improving livelihood and fostering inclusive economic growth
- * Enhancing the resilience of



Dr Raihana loves reading books by great authors. She loves nature and loves to explore new destinations

- people, communities and ecosystem
- * Adopt governance to new technologies
- * Fostering the culture of Innovation and entrepreneurship
- * Imbibing the culture of agricultural Start-ups.

The strategies will help us in achieving the goals of

□ Productivity: Grow enough food and fiber to meet humanity's needs

□ Stewardship: Enhance the quality of the land, water and air; and make the most efficient use of non-renewable resources

□



About the AUTHOR

Prof (Dr) Raihana Habib Kanth is Dean of the Faculty of Agriculture, Wadura, Sher-e-Kashmir University of Agricultural Sciences & Technology (SKUAST), Kashmir. She has more than 30 years of experience in teaching, research and extension in the field of Agronomy and Agrometeorology

Profitability: Maintain the economic viability of farms and ranches

□ Quality of Life: Promote the resilience and well-being of producers, their families and society as a whole

Agricultural education prepares people to be productive members of society. It focuses on educating students how to enhance agricultural production processes as well as teaching methods in agriculture. Individuals will become self-sufficient as a result of the marketable talents obtained in various fields such as agricultural production, animal production, goat, cattle, sheep, snail, fisheries, gardening, and so on. Fostering the culture of agricultural innovations, start-ups and entrepreneurship will be a game changer for paving way towards sustainable growth and development.





ENACTUS DCAC

A STUDENTS INITIATIVE TO REDUCE POST HARVEST LOSSES AND INCREASE FARMER INCOME

Farmers form the backbone of the Indian economy, making up more than 40% of the workforce. However, every day 28 people dependent on farming commit suicide. The post harvest losses in the country amount to over Rs 93,000 crore per year, which constitutes 40% of the country's total produce. This occurs due to the perishable nature of agricultural produce, which often forces farmers to sell their produce at the prevailing market price – be it high or low. This results in loss of bargaining power.

Addressing this issue through the positive power of social entrepreneurship, Enactus DCAC, an international not-for-profit student body organisation initiated Project Zaraat for the upliftment of the farming community. The mission of Project Zaraat is to minimise post harvest losses and enhance forward linkages through a self sustaining social enterprise.

Under the mentorship and guidance of Michigan State University and Indian Agricultural Research Institute (IARI), Zaraat provides the farmers with a unique storage solution which works on the principle of evaporative cooling. It is affordable, portable and eco friendly, which makes it different from the conventional storage facilities.

This solution increases the shelf life of the produce by up to 10 days, which makes sure that the quality of produce does not get deteriorated. Apart from this, they also aim to partner with various B2B aggregators to ensure rise in income for the farmers along with providing them payment security.

Currently, they are in the process of integrating farmers into an FPO to ensure collective bargaining power. They are also exploring sustainable agriculture practices that are vital in a climate constrained world.

Project Zaraat is a recipient of the KPMG Ethics Grant. It has also received Special Mention at the Enactus Early



The aim of Project Zaraat is the upliftment of the farming community

Stage National Competition 2021.

Building on this by the end of the year, Enactus DCAC aims to sustain the lives of 100 farmers by providing them an income boost of 25%, reduce post-harvest losses by a whopping 60%, and minimize the energy consumption by 20%.

For more information, visit www.enactusdcac.com



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