



Creating Enabling Ecosystem in Agricultural Universities for Agri tech innovations : *Challenges and Opportunities*

9th-10th June 2022

University Auditorium, PJTSAU



Proceedings and Recommendations

**14th National Symposium of
Indian Agricultural Universities Association**

**Creating Enabling Ecosystem in Agricultural Universities for Agri-Tech
Innovations: Challenges and Opportunities**

**June 9-10, 2022
University Auditorium**



**Professor Jayashankar Telangana State Agricultural University
Rajendranagar, Hyderabad**

and

Indian Agricultural Universities Association

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Message



The global agri food sector is growing in leaps and bounds, with technology innovations powered by digital interventions such as IOT, Precision farming, Block chain and Big Data analytics to meet the challenges of climate change, resource use efficiency, marketing and value addition. Indian agriculture is also transforming from a food production based occupation to a food processing and business oriented enterprise with emphasis on mechanization and market driven farming practices. This paradigm shift calls for huge overhaul of enabling infrastructure, physical and digital as well as trained manpower who are tech savvy to extend the benefits of digital agriculture to small and big farmers. This is only possible with collaborations and partnerships between all the stakeholders in farming including farmers, researchers, agricultural functionaries in Government and private domain, industry, financial institutions and policy makers to leverage the technology advantage. As the federal and State Governments are giving a big boost to the startup culture, it is time for Universities in the agri food sector to gear up and take advantage of the opportunity.

We at PJTSAU are focusing on producing skilled technical manpower trained in emerging digital technologies in the areas of Agriculture, Agricultural Engineering & Community Science. Coorganizing the 14th National Symposium on "Creating Enabling Ecosystem in Agricultural Universities for Agri-Tech Innovations - Challenges and Opportunities" in collaboration with IAUA was one of the initiatives meant to provide a platform for the Vice Chancellors of the IAUA member Universities to exchange ideas and explore new possibilities with industry and relevant stakeholders in the evolving agri education system. The conference has indeed fostered productive networks between the various stakeholders and the proceedings of the conference have brought out interesting take home messages for future action.

I thank all the distinguished speakers, panelists from across the spectrum of stakeholders for making this conference a grand success and a special thanks to President, IAUA for giving PJTSAU an opportunity to host the symposium.

Date: 20.07.2022
Place: Hyderabad


(V PRAVEEN RAO)

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Message



It is an immense pleasure that Prof. Jayashankar Telangana State Agricultural University (PJTSAU) organized the 14th National Symposium of IAUA on "Creating Enabling Ecosystem in Agricultural Universities for Agri-tech Innovations: Challenges and Opportunities" on 9-10 June, 2022 at University Campus, Hyderabad. In view of technological advancements, global competitiveness and economically sustainable viability of agricultural sector, the theme of the Symposium is quite relevant. I strongly believe that development of new advance technologies and their adaption by the farmers is the only way to improve the socio-economic well-being of the farming community, food and nutritional security and national prosperity.

The IAUA is grateful to Shri M. Raghunandan Rao, IAS, Agriculture Production Commissioner & Secretary, Agricultural Marketing and Co-operation Department, Government of Telangana for gracing as Chief Guest in inauguration and enlightening the delegates about the agricultural sector related policies and steps taken by the Government for the overall improvement of agriculture sector in the state. The IAUA is also grateful to Dr. V. Praveen Rao, Vice Chancellor, PJTSAU, Hyderabad for his excellent planning and execution of the sessions, inviting distinguished speakers both from public and private sectors, providing enough time to everybody and engaging all in meaningful and fruitful discussions leading to the great success of the Symposium. Sincere thanks to all the team members of University and the learned speakers for their active participation and contribution in the Symposium and bringing out the proceedings. I also compliment Dr. Dinesh Kumar, Executive Secretary, IAUA for overall coordination of the 14th National Symposium.

The recommendations of this symposium are expected to work as guidelines for stakeholders to bring innovations and efficiency in their respective domain areas. I hope that all stakeholders find these proceedings and recommendations very useful.


(R.K.MITTAL)

The Professor Jayashankar Telangana State Agricultural University (PJTSAU)



The Youngest Agricultural University located in Telangana State, instituted on the 3rd of September 2014, Professor Jayashankar Telangana State Agricultural University (PJTSAU) strives to produce globally competitive human capital, generate cutting edge technologies to address contemporary challenges of agriculture and allied sectors and evolve responsive and dynamic farmer outreach mechanism through dedicated faculty. More than 3500 students are mentored by a 486 strong well qualified young and committed faculty in the 9 constituent colleges, viz., 6 in Agriculture, 1 each in Agricultural Engineering, Food Science and Technology and Community Science, offering 4 undergraduate degree programmes, 20 Post-graduate and 12 Doctoral programmes in various faculties. In addition, there are 12 polytechnics (12 in Agriculture and one in Agricultural Engineering) offering two year Diploma in Agriculture and three year Diploma in Agricultural Engineering. The fifteen research stations across the state focus on developing climate resilient crop varieties, sustainable natural resource management, community science, farm mechanization, post-harvest and precision agriculture technologies. The nine DAATTCs and eight KVKs serve as PJTSAU's ambassadors for the research technologies to take root in the farmer's fields.

Indian Agricultural Universities Association (IAUA)



IAUA was established on 10th November, 1967. The main objective of the association is to promote agricultural research, education and extension in the Universities and the States, and thereby enabling rural development in the country. It also acts as a bureau of information to facilitate communication, co-ordination and mutual consultation among agricultural universities. Presently, IAUA has 71 member Universities, which include 63 State Agricultural Universities; 4 Deemed to be Universities (IARI, New Delhi; IVRI, Izatnagar; NDRI, Karnal and CIFE, Mumbai), 3 Central Agricultural Universities (CAU, Imphal; Dr. RPCAU, Pusa and RLBCAU, Jhansi) and one Central University with Agriculture Faculty (BHU, Varanasi). Considering the specialization, there are 44 Agricultural, 7 Horticultural, 17 Veterinary and Animal Sciences and 3 Fishery Science Universities in IAUA. All the SAUs and institutions (Deemed-to-be Universities and Central Agricultural Universities) in India, which provide an integrated programme of teaching, research and extension education in agricultural sciences are qualified to become regular members of the Association. The IAUA facilitates conferences, seminars, workshops, lectures and research projects in agricultural and allied programs.

Acronyms & Abbreviations

AI	- Artificial Intelligence
ML	- Machine Learning
MNC	- Multi-National Company
IIT	- Indian Institute of Technology
JAU	- Junagadh Agricultural University
PPP	- Public Private Partnership
ICTs	- Information and Communication Technologies
NAARM	- National Academy of Agricultural Research Management
SKLTSHU	- Sri Konda Lakshman Telangana State Horticulture University
NEP	- New Education Policy
SKUAST	- Sher-E-Kashmir University of Agricultural Sciences and Technology
MoU	- Memorandum of Understanding
NDRI	- National Dairy Research Institute
NABARD	- National Bank for Agricultural and Rural Development
CAU	- Central Agricultural University
IGKV	- Indira Gandhi Krishi Vishwavidyalaya
FPOs	- Farmer Producer Organizations
NIFTEM	- National Institute of Food Technology, Entrepreneurship and Management
BIPA	- Bio Agri Input Producers Association
AWS	- Amazon Web Services
IAUA	- Indian Agricultural Universities Association
SDAU	- Sardarkrishinagar Dantiwada Agricultural University
WEAIM	- Women Energy Association of Incubators in Manufacturing
NASSCOM	- National Association of Software and Service Companies
SVPUAT	- Sardar Vallabhbhai Patel University of Agriculture and Technology
PJTSAU	- Professor Jayashankar Telangana State Agricultural University
EEl	- Extension Education Institute
PGS	- Post Graduate Studies
ITC	- Imperial Tobacco Company
AEOs	- Agriculture Extension Officers
SBI	- State Bank of India
FICCI	- Federation of Indian Chambers of Commerce and Industry
IARI	- Indian Agricultural Research Institute
CRISPER-CAS	- Clustered Regularly Interspaced Short Palindromic Repeats - Crispr Associated Proteins
KVK	- Krishi Vignan Kendra
IT	- Information Technology
HQV	- High Quality Vision
ITE&C	- Information Technology, Electronics & Communication
OSD	- Officer on Special Duty
DBT	- Direct Benefit Transfer
RFID	- Radio Frequency Identification
AINP	- All India Network Project
AICRP	- All India Coordinated Research Project
PMFME	- Pradhan Mantri Formalisation of Micro food processing Enterprises
CEO	- Chief Executive Officer
ICAR	- Indian Council of Agricultural Research
KPMG	- Klynveld Peat Marwick Goerdeler
UHS	- University of Horticulture Science
AAU	- Anand Agricultural University
FSII	- Federation of Seed Industry of India
RAWEP	- Rural Agricultural Work Experience Programme



The 14th National Symposium of Indian Agricultural Universities Association (IAUA) was organized with the theme "Creating Enabling Ecosystem for AgriTech Innovations in Agricultural Universities". The symposium was held at Professor Jayashankar Telangana State Agricultural University (PJTSAU), Hyderabad during 9 and 10 June, 2022. Several Vice Chancellors of various SAU's, CAU's and other stakeholders from industry, tech service providers, startups and SME's participated in the symposium. The main focus of the two days deliberations was to prepare a roadmap for building an ecosystem in the agricultural Universities to enable innovations, hitech agriculture, emerging technologies etc.,. The symposium had 4 technical sessions covering all the relevant themes besides the inaugural and wrap up session. The Technical Session - I discussed the "Potential for Emerging Technologies in the Agri - Food Value Chain and Allied Sectors". The Technical Session - II was titled "Agriculture 4.0 (Smart Farming) Ready Manpower: Stakeholder Perspective". The Technical Session - III focused on "Gearing up for the Emerging Technologies Driven Ecosystem - Challenges and Opportunities for Agricultural Universities". The Technical Session - IV discussed on the theme "Converging Partnership - Academia - Industry Incubators and Start - up Journeys". Eminent speakers provided valuable insights through 13 presentations during the four technical sessions which were followed by thought provoking panel discussions wherein 16 panelists and four moderators representing government sector, private sector, banking sector, ICAR Institutes, startups, MSME's, ISB etc. debated on the identified theme.

The inaugural programme was graced by the Chief Guest Sri. M. Raghunandan Rao, IAS, APC and Secretary to Government, Agriculture and Co-operation Department, Government of Telangana, Sri S. Siva Kumar, Group Head of Agri. And IT Business, ITC Limited, Dr. R. K. Mittal, President, IAUA and Vice Chancellor, SVPUAT,

Meerut, Dr. V. Praveen Rao, Vice Chancellor, PJTSAU who spoke about the technology innovations through digital interventions to meet the challenges of climate change, resource use efficiency and value chain management.

Some of the stakeholders from industry Sri. S. Sivakumar, Group Head of Agri. And IT Business, ITC Limited, Dr. G.V. Subha Reddy, Vice President, Coromandel International Limited, Sri Gopinath Koneti, Executive Director, KPMG, Hyderabad, Sri. Deepak Pareek, CEO and Co-Founder, Agri. Watch 2.0, New Delhi, Sri. P. Laxminarayana, MD, AG Biosystems Limited, Hyderabad, Dr. A.J. Peter, Vice President, BIPA, Chairman & MD, Varsha Bioscience and Technology India Pvt. Limited and Dr. Basavaraj Girennavar, Chairman & MD, Criyagen Agri. and Biotech Pvt. Limited have shared their valuable inputs during the sessions.

The executives from the premier national institutions / bodies gave a lead with regard to translating the challenges of emerging technologies into opportunities in the University setup. Some of the distinguished speakers were Mr. Purushotham Kaushik, Centre for the 4IR, WEF, Mumbai, Dr. Ramadevi Lanka, Director, Emerging Technologies, OSD, ITE & C Department, Telangana, Shri Ram Kaundinya, DG, FSII, New Delhi, Sri. Avik Sarkar, ISB, Mohali, Dr. Y.K. Rao, CGM, NABARD, Sri. K. Vijaya Raghavan, Chairman, Sathguru Management Consultants, Dr. Sunil Parekh, Director, NIFTEM and Dr. Deepti Dutt, Head Strategic Initiatives, Public Sector AWS, India. All the speakers agreed that data acquisition and utilization for precision farming which can help in optimization of inputs and reduce the cost of production besides safeguarding the environment is the need of the hour. Extensive use of sensor based technologies especially in the area of irrigation water management to enhance water use efficiency has to be encouraged. Use of Automation technologies to overcome the labour shortage and timely delivery of needed inputs has to be promoted along with development and use of image

processing technology for analysing biotic and abiotic stresses for timely management and saving in production costs. The Hon'ble Vice Chancellors from various Universities shared some of the success stories and the challenges encountered in their respective Universities which resulted in culmination of ideas and some implementable action points for development of a viable road map to create an enabling ecosystem in the Universities for innovations and validation of technologies before upscaling and out scaling them.

Recommendations:

- Establish Centers of Excellence promoting multi-disciplinary approach, accredited hitech labs, tapping external expertise and funding etc. to facilitate Universities to conduct top quality research for patents and economically viable solutions.
- Revamp the curriculum for igniting entrepreneurial culture among the students. State Agricultural Universities shall nurture the talents of students in agritech by introducing new courses on digital technology, business management, value chain management, market related analytics etc., along with funding for startup ideas to be part of entrepreneurship course inclusive of interaction sessions with startups and industry leaders.
- Nurture early industry interface from first year of Undergraduation, to build a mindset for innovation, adaptability to change and risk bearing.

- Faculty capacity building in AI, ML, Big Data analytics and other emerging technologies is a must to train Agri. 4.0 generation students.
- There is a need to understand the width and depth of digital needs of the farmers. Hence, it is essential to create interface between IITs and students of agriculture.
- Partnerships and collaborations with diverse stake holders is the need of the hour for which the Universities have to gear up.
- Encourage public private partnership for promoting Digital Agriculture in planning, farming, farm to fork management and data governance. On this path there is also need for overcoming ecosystem barriers like access to data, lack of domain knowledge, convergence of government policies with start-ups, digital literacy, lack of funding etc.
- The Universities shall also address the challenges of enabling IR4 to reach the small farmers by encouraging emerging technology interventions that are amenable for small farm holdings.

In a nut shell, the consensus was to develop Centres of Excellence for emerging technologies including Genome editing, AI and Data analytics, precision farming and entrepreneurial ecosystem, for which human resource development, adequate funding, necessary infrastructure and enabling policies were identified as the essential drivers for India to gain global leadership in agriculture.



"Creating Enabling Ecosystem in Agricultural Universities for Agri-Tech Innovations - Challenges and Opportunities"

The Indian Agricultural System is looking at a paradox, where most granaries are full but the wastage of agricultural produce and levels of malnourishment especially in the BPL sectors continues to rise. The self-sufficiency in food production achieved by the country post Green Revolution needs to be reflected in the farm incomes and usher higher level of economic prosperity across this sector. Opportunities emerging in value addition of food produce through technologies are growing and seek to build a new sub-sector targeted to deliver healthy, nutritious, wellness driven food products to the neo-generation clients who have better paying capacities, and higher incomes. Post pandemic, changing lifestyles have raised consumer demands for more transparent process of food production systems with adherence to new standard operating practices along with statutory regulatory systems in the agri food sector. . The constant demand-supply disparity due to crop failure, lower price realization despite good production, lack of dependable supply chain, unprecedented major disruptions in trade especially during pandemic indicate the need to identify the vulnerabilities in demand-supply chain and explore the possibilities of infusion of technology-driven tools across the Agricultural Value Chains (AVC)

Realizing this shift in stakeholder needs, agricultural scientists and policymakers at the Centre and State level are pushing for a shift in production oriented farming practices to market demand driven production practices that culminate in price realization for the farmer while sustaining the environment and offering quality produce to the consumer. High value cropping, diversification and integrated farming for

optimization of land and water use for enhancing productivity and reducing production costs are some of the interventions suggested. Introduction of digital agriculture, industrialization and mechanization of production processes, connectivity and data management are now set to cater to both the demand side and value chain /supply side of the food scarcity equation. All these measures indicate a transformation trend towards ushering in the Fourth Agricultural Revolution that is based on emerging technologies including Big Data Analytics.

Embracing these emerging technologies would facilitate the agri-food sector to transform from a rural based survival platform to a rural livelihood generating modern business enterprise. This dynamic and continuing transformative landscape also needs to build neo-generation human resources and for that the agri-education sector needs to bring in some major path-breaking innovative approaches to cater to a new set of client farmers whose technology usage and literacy may be on par with the agri professional. Therefore, the onus to build appropriate skill sets in human resources streaming out of higher education institutions engaged in agri-food sector will be on education administrators and their institutions under the umbrella of NAREES. In tune with new National Educational Policy (NEP) of the Govt. of India, a formalized convergence platform of technology driven courses with social sciences and business would be an ideal proposition. Such competently trained human resources with basic, technical and managerial skills can create a positive impact at the societal level. This responsibility also entails to develop necessary infrastructure, linkages and training opportunities for teaching faculty and policy makers for a

seamless deployment and integration of the developed convergence platforms into existing agricultural education structure in the country. It is the right time to seek answers from the entire stakeholder community and develop a policy for implementation, that the NAREES institutions can rapidly assimilate into the agri-education system

Some of the questions that need answers from stakeholders include

- i. What are the set of new technologies which can bring in higher levels of predictability, production, profitability and products in the Agri-Value Chain (AVC)?
- ii. What is new and emerging stakeholder canvas in data-driven agricultural technologies?
- iii. What are the major constraints for deployment of data-driven technologies and how can they be reduced?

- iv. What kind of physical infrastructure and manpower demand is envisioned for building the new ecosystem?

It is against this background, that the 14th National Symposium of Indian Agricultural Universities Association (IAUA) was held with the theme of "Creating Enabling Ecosystem for Agri-Tech Innovations in Agricultural Universities" on 9-10 June, 2022 at PJTSAU, Rajendranagar, Hyderabad, India. The confluence was expected to provide an opportunity for various stakeholders including educators, industry, tech service providers, startups, small and medium-sized enterprises (SMEs), farmers and students to share their views on the theme and to prepare a viable roadmap for building a sustainable, technology-enabled education ecosystem.

Rapporteurs:	Dr. M. Sreedhar, Director, Planning & Monitoring, PJTSAU
	Dr. M. Jagan Mohan Reddy, Director (EEL), PJTSAU



Dr. V. Praveen Rao, Vice Chancellor, PJTSAU, the host University, welcomed all the dignitaries and participants to the most happening State of Telangana and Hyderabad, the capital city, a hub for pharma, seed and digital technologies and wished for fruitful deliberations in the conference. He stated that an ecosystem has been established in the University for Agri-Innovations with the help of Industry and IT partners, with the establishment of Agrihub Innovation Centre, a unique urban hub and rural spoke model. An example of this being, KRISHI TANTRA, a startup incubated at Aghub which has successfully developed Soil Health Index with 92 % accuracy, which led to saving of fertilizers through reduced application to a considerable extent in the test fields. PJTSAU has focused on value addition of agricultural commodities and successfully created brands in crops like turmeric, chilli, millets, edible oil, and red gram dal etc. He opined that the 4th industrial technologies including robotics and drones in crop management and crop protection, should be validated at the field level and the success stories and impact studies of such technologies need to be documented.



Sri. S. Siva Kumar, Group Head of Agri and IT Business, ITC Ltd., Hyderabad emphasized the need for fixing the destination of the road map for digital technologies in the agri-food sector in the coming future. The primary goal of agricultural sector at present is raising farmer's income by enhancing the productivity and ensuring remunerative price for quality produce, which requires four R's; Responsiveness to consumers demand at micro level, Responsibility towards natural resources and environment, Resilience to climate change and Relevance to individual farmers to ensure the goal.



Dr. R.K. Mittal, President, IAUA and Vice Chancellor, Sardar Vallabhbhai Patel University of Agriculture, Modipuram, UP, narrated the activities of IAUA which was established in 1967 with present membership of 71 Universities. He stated that IAUA is constantly engaged in promoting and supporting initiatives to upgrade research, extension and education in the Universities. He informed that a network project on Nano Technology was successfully executed and similar networks in Artificial Intelligence, Robotics and Precision Agriculture are being planned. He opined that the self-sufficiency attained in food sector can be attributed to technological innovations and hard work by farmers. Vertical farming, post-harvest processing, value addition etc., were advocated for attracting rural youth to agriculture and sustaining the growth achieved in the agriculture. Artificial Intelligence enables Digital Agriculture in the form of Smart Farming, leading to efficient crop management and protection. While machine learning and soft computing enable effective prediction about agriculture.



Sri. M. Raghunandan Rao, IAS, Agricultural Production Commissioner and Secretary to Government, Agriculture and Co-operation Department, Government of Telangana, narrated the various initiatives taken up by the State government in the agricultural sector, aimed towards prosperity of farmers, which included the flagship programmes like creating irrigation facilities through projects like Kaleshwaram lift project, renovation of lakes, investment support to farmers, positioning of 2600 trained AEOs in the field, adequate input subsidies etc. However, he opined that there is a need for fine tuning the emerging disruptive technologies for effective decision making to fulfill the needs of

small farmers in the State. For this, the role played by the University in policy matters with regard to agriculture sector would be very crucial.

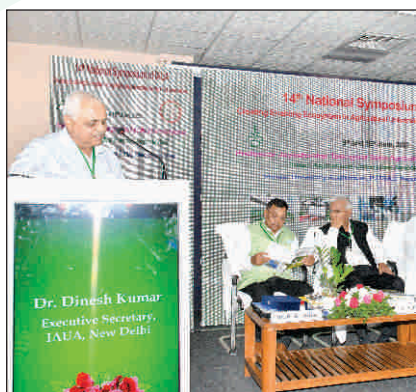
Several publications of PJTSAU were released by the dignitaries on the dais to commemorate the occasion viz., :

- i) "Telangana Vyavasayam Diksuchi",
- ii) "Autonomous Drones in Agriculture - Standard Operating Protocols for Agro-Chemical Application in Field Crops",
- iii) "Rice Insect Pest and Disease Weather Calendar"
- iv) "Trailblazer: A Series of Agritech use Cases"

The inaugural also served as a platform for presentation of awards to prize winners of pitching competitions which were a part of the Design Thinking course for UG and PG students of PJTSAU

- i) "Idea Sprout 1.0' for UG students
First prize: 'Mushroom Express'
Second prize: 'Spoonify cutlery'.
- ii) Idea Sprout 2.0 for PG students
First prize: The team idea on 'Cata-stop'
Second prize: Shared among two teams on the ideas 'Plant-it' and 'Vaiudni'.

The session closed with the formal Vote of Thanks proposed by Dr. Dinesh Kumar, Executive Secretary, IAUA, New Delhi.





'Potential For Emerging Technologies in the Agri-Food Value Chain and Allied Sectors'

Chairs	Dr. V. Praveen Rao, Vice Chancellor, PJTSAU, Hyderabad
	Dr. D.C. Joshi, VC, Agriculture University, Kota, Rajasthan
Rapporteurs	1. Dr. G. Sridevi, Principal Scientist and Head, AINP on Pesticide Residues, PJTSAU
	2. Dr. A.V. Ramanjaneyulu, Sr. Scientist and Head, AICRP on Agro Forestry, PJTSAU

The session focussed on exploring the challenges and potential for emerging technologies in the agri-food value chain and allied sectors.



Sri Hemendra Mathur, Venture Partner, Bharat Innovation Fund, IIM, Ahmedabad and Co-Founder, Think Ag and Chairman of Task force Agri-Startups, FICCI, New Delhi, emphasized on six themes

viz., access to good quality inputs (40-50 million dollar industry), market linkage, Agri-fintech, data and advisory, mechanization and controlled environment. He highlighted the role of State Agricultural Universities in nurturing the talents of students in agritech by way of integrating emerging technologies in their curriculum, exposing them to various start-ups and arranging guest lectures by young entrepreneurs and industry leaders. Multi-disciplinary approach involving various stakeholders is the need of the hour. He expressed that start-up culture began 10 yrs ago, with low capital flow during initial stages, but gained momentum from 2017-18 onwards. Eventhough 90-95% technologies are digitalized in agriculture, but, it is mearge in biotech, deep tech and robotics. There is need for Indian start-ups to invest within the country rather than outside India, for the benefit of 120 million small holder farmers. Any innovation made by start-up companies in India, would also be suitable for other countries where similar agricultural conditions prevail.

With regard to Agri-fintech, SBI has created an environment for start-ups for the purpose of lending and speedy recovery of loans, risk assessment etc. Consequently, many public and private banks have followed suit to work in tandem with start-up companies. The timely acquisition of data and dissemination of need based advisories

to the needy will help in optimization of inputs and last mile delivery. Mechanization has assumed importance to overcome labour shortage and cost at farm level and there is need to think beyond tractorization. Though higher crop productivity is possible under controlled environment (poly-house, vertical farming, aquaponics, aeroponics etc.), there is a need to develop, validate and disseminate these technologies. This is very important in view of changing climate, imbalanced nutrition and skewed NPK utilization in agriculture.



Mr. Purushotham Kaushik from the Center for the Fourth Industrial Revolution (4IR) India, the World Economic Forum, Mumbai, highlighted the need for encouraging public private partnership for promoting digital agriculture in planning farm to fork and data governance. There is need for overcoming ecosystem barriers like access to data, lack of literacy, domain knowledge, convergence of government policies with start-ups, lack of funding etc. The Universities have to play a pivotal role as a platform for innovations and in validation of developed technologies before upscaling and out scaling them.



Dr. Viswanathan Chinnusamy, Head, Division of Plant Physiology, IARI, New Delhi, gave an overview of the global and national status of genome editing technologies with special emphasis on mutations. He narrated the success story of CRISPR-CAS genome editing technology, which has revolutionized the

research in the area of stress tolerance, quality and yield improvement. He also quoted successful examples of production of anti-browning button mushroom, waxy corn (18 products), Vitamin D rich tomato, drought and salinity tolerance in rice (MTU-1010), Samba Mahsuri rice variety with stronger culm for lodging resistance, Beta carotene rich banana, aroma development in rice etc. He informed that ICAR through a network of 26 Institutes and 75 scientists, is working on 100 genes and various traits viz., yield, abiotic and biotic stress tolerance, herbicide tolerance, nutritional quality, nitrogen use efficiency and flowering duration. The Centers of Excellence for Genome editing, human resource development, adequate funding, necessary infrastructure and enabling policies are important to gain global leadership in agriculture.

The chairs of the session summed up, on the note that there is a need to include information on emerging technologies and start-up ecosystems, innovation and entrepreneurship in the course curriculum and the students must be gradually exposed to interaction sessions with start-ups, to inculcate innovativeness in them. The ongoing Design Thinking course being offered by the recently established AgHub at PJTSAU, was well appreciated. It was suggested to have separate budget for incubation centres and involve/train students for internship.

The panel discussion that followed was moderated by Dr Siva Kumar, Group Head, Agri and IT Businesses, ITC Ltd.



Dr T. Jankiram, Vice Chancellor, Dr.Y.S.R Horticultural University, Andhra Pradesh, shared information about Horti-Tech innovations developed in collaboration with other institutes and implemented in their university, which included sensor based irrigation technology in banana, bee vectoring for disease control, isolating naturally occurring fungus for pest management to ensure chemical free environment, real time kinematics, laser ray guided control of birds and monkeys, high quality vision (HQV) scanners for eliminating manual

inspection of the crops, dissemination of good agricultural practices, educating the people on carbon building, automated grafting with a capacity of 800 grafts/hour, drone technology, horti-value chain, artificial intelligence (AI), nano technology, vertical farming etc. He also informed the house that 18 Bee wax products were developed. The KVKs have been closely working with tribal farmers, aggregating them into Farmer Producer Organizations (FPOs) and developing technologies for organic cashew cultivation practices. The University also developed a digital extension model, for the dissemination of need based advisories to the farmers. The technology on bio-fortification in pomegranate and sweet potato was developed while dragon fruit and avocado cultivation is being encouraged for crop diversification. AI is being utilized for field monitoring, to detect, weeds and spray through robotics. He also emphasized the need for developing SOPs for drone spraying against black thrips and whitefly in chillies.



Dr V. Ravinder Reddy, Vice Chancellor, P.V.N.R. Telangana Veterinary University, Hyderabad, informed about development of Rajasri birds for back yard poultry, blue tongue disease vaccine in sheep and goat. He highlighted the need for automation, mechanization and digitization in poultry and livestock to reduce the human labour and enhance production efficiency, radio frequency identification (RFID) in diary etc.



Dr G.V. Subba Reddy, Vice-President, Coromandel International Ltd., Hyderabad, representing the input industry, emphasised on the need for retaining youth in agriculture by making agriculture more attractive and a viable career choice. Therefore, there is a dire need to go for strategies such as, digitalization, linking the soil health cards scheme to Direct Benefit Transfer (DBT), use of customized fertilizers, nano fertilizers, crop specific water soluble fertilizers, validation of drones for spraying

mixture of fertilizers and pesticides etc. He also stressed upon, in depth research on foliar sprays of fertilizers in view of reduced pH when fertilizers are dissolved in less water applied through drones.



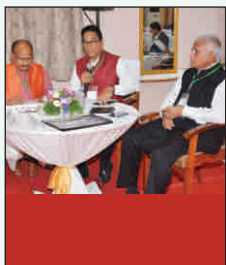
Dr. Ramadevi Lanka, Director, Emerging Technologies, OSD, ITE&C, Department of Telangana, Hyderabad, informed that the government can act as a catalyst to enable conducive environment to promote start-ups and in identifying the technologies that can impact the livelihoods. She also saw a pivotal role for its department in developing framework for government, identifying institutes of excellence for execution, identifying potential domain areas, finding solutions, implementation etc.





“Agriculture 4.0 (Smart Farming) Ready Manpower: Stakeholder perspective”

Chairs	Dr. Ch. Srinivasa Rao, Director, ICAR-NAARM, Hyderabad
	Dr. Z.P. Patel, Vice Chancellor, Naazvsari Agricultural University, Gujarat
Rapporteurs	1. Dr. T. Ramesh. Prof. & Univ. Head (Crop Physiology), PJTSAU
	2. Dr. N. Ramgopal Varma, PS (Ento.) Rice Res. Center, PJTSAU



Dr. Ch. Srinivasa Rao, Director, ICAR-NAARM, Hyderabad, highlighted the record food grain production of India (314 million tonnes) during 2021-22 but reminded that under climate change

scenario like changing rainfall patterns, there is a need to increase productivity while generating better livelihoods for farmers despite dwindling soil, water resources and reduced forest cover. In this context, smart farming, smart food systems to produce more from less, reduce post-harvest losses and GHGs emissions etc., need to be encouraged.



Dr. Z. P. Patel, Vice Chancellor, Navsari, Agricultural University, Gujarat, while narrating the havoc caused during post green revolution era through cultivation of high yielding

varieties coupled with injudicious use of fertilizers, pesticides etc., stressed on the necessity to revive the damaged ecosystem. Towards this, smart and precision farming needs to be promoted by all Universities by taking lead to train the farmers to build necessary skills.



Dr. G. V. Subba Reddy, Vice President, Coromandel International Ltd., Hyderabad pointed out that students were entering the agriculture sector by chance and not by choice, and hence, only 10-15% are

focusing seriously on internship at industry offered during the final year. Hence, there is a need to change their mindset, by planning student-industry

interactions from the first year onwards. Agri-graduates need to be encouraged to build start-ups. University and industry need to work together to shape up the agri-graduates in emerging areas like precision farming, drone technology, smart farming, market intelligence etc., so that they can cater to the needs of the industry.



Sri. Gopinath Koneti, Executive Director, KPMG, Hyderabad, emphasized on shaping rural youth towards food based enterprise & innovations through building processing strength to enable

more production gains. In view of huge export potential in the country, building small scale micro-food enterprises needs to be prioritized to curb migration from rural areas. To reduce social fear on taking up entrepreneurship among college level students, they can be encouraged to start small scale food enterprises. Financial support may be extended to a tune of Rs. 5 to 10 lakhs to build up the enterprise. Many govt. schemes like PMFME are implemented towards achieving this goal.



Sri Deepak Pareek, CEO and Co-founder, Agri Watch 2.0, New Delhi, focused on digitized transformation in agri-food value chain ecosystem including data management and application of emerging

technologies like big data analytics, block chain, drones, artificial Intelligence and machine learning, cloud computing, IOTs etc. He opined that students need to be trained on all such aspects rather than just agri-production technologies to make agriculture more sustainable.



agriculture, value chain management, food safety, farmers profitability, carbon credit system, climate change requirements etc.



during the RAWEP. However, there exists certain constraints like inadequate knowledge base, lack of awareness on technologies among faculty particularly on robotics, AI and ML etc.



will enable practical training to students. Liaison should be ensured with industry for employment of the students, particularly in food processing.



Few areas like building database of each farm, Aadharcard for animals, real-time traceability, disease forecasting, cancer register, climate controlled feed house, automation in egg collection, robotics for larger herds etc., were suggested.

Sri Ram Kaundinya added that only 6% of livestock in the country is insured, hence there is

Sri Ram Kaundinya, Director General, FSII, New Delhi moderated the panel discussion on the changing pace in agriculture through new initiatives and new technologies, such as FPOs, demand driven

Dr. K. M. Indiresh, Vice Chancellor, University of Horticultural Sciences, Bagalkot, highlighted the initiatives by the University in digital promotion and suggested to train students on extensive use of digital apps

Dr. K. B. Kathiria, Vice Chancellor, AAU, Anand, Gujarat, focused on creating infrastructural facilities in the area of precision farming and food processing in the University through RKVY funding, which

Dr. Kelawala, Vice Chancellor, Kamdhenu University, Gujarat, emphasized on innovation in livestock management, i.e., Nano technology to detect eight types of adulterations in milk at the

need to enhance the animal insurance . He informed that a firm is working towards creating digital market place for animals and one needs to understand the width and depth of digital needs of the farmers. Hence he urged to create interface between IITs and students of agriculture and institutionalize Industry-Academia models apart from introducing new courses on digital technology, business management, value chain management, market related analytics, etc., along with entrepreneurship course where funding shall be an integral part.





"Gearing Up for the Emerging Technologies Driven Ecosystem - Challenges and Opportunities for Agricultural Universities"

Chairs	Dr.B.V.Patil, Former Vice Chancellor and Director of Education, UAS, Raichur
	Dr.Kelawala,ViceChancellor,KamdhenuUniversity,Gandhinagar,Gujarat
Rapporteurs	Dr. R.VijayaKumari, DDR, O/o Director of Research, Admn. Office, PJTSAU
	Dr. K.N.Yamini, Associate Professor and Technical Officer to Dean PG Studies

The session focussed on the challenges and opportunities for Agricultural Universities for gearing up for the emerging technology driven ecosystem.



Sri Avik Sarkar, ISB, Mohali, Chandigarh, threw light on the emerging technologies in agriculture and relevance of AI and ML (Artificial Intelligence and Machine Learning) under three main aspects i.e.,

technologies, data sets and applications to find the solutions. Different agriculture and food data sets and their accessibility from government web portals was described. It was conveyed that the students would be able to grasp concepts well if trained in data science starting from data journey followed by descriptive, predictive and prescriptive analytics. There are text analytics, audio analytics, image/video analytics, geo-spatial analytics, etc. to deal with unstructured or non-numeric information.

Collaboration of agricultural universities with IITs, Startups, MNCs, Business Schools, Government, and International Organizations would be necessary to gear up and address the various challenges related to emerging technologies. For long term capacity building, hiring tech experts, collaboration of University faculty and students with industrial startups were suggested. As innovation is the key for technologies to emerge, students should be introduced to application of IoTs for soil quality testing, flying drones in campus, throwing analytical insights, hands on pilots, etc. right from first year onwards.



Dr. Narendra Kumar Gontia, Vice Chancellor, Junagadh Agricultural University, Gujarat focused on application of robotics and drones in agriculture. There is need for automation and usage

of above two emerging technologies in agriculture under present scenario of scarcity of labour and also to retain youth in agriculture. The applications of robotics and drones may save nearly 50% of labour costs. While explaining about robotics and automation, he indicated the roadmap for reforms in Agriculture as given by NITI Aayog, for doubling the farmers' income. The success of IT start-ups was attributed to the need for more intellectual efforts and less investment as compared to agri start-ups.

He advised that robots may be initially introduced for crop harvesting which requires more labour. sorting of harvested produce like fruits, and under greenhouse environment control conditions, vertical farming, hydroponics etc. . Robots placed at the farm fence, could signal animal trespassing . He quoted many examples of JAU students' activities related to automation and drone application, including mini tractor operated by robot, 3D printer, drone tech for sustainable agriculture with four/six/eight wheels which the students can easily dismantle and assemble which is used for crop health monitoring, surveying, crop damage assessment, etc. It was suggested that small drones may be purchased for providing pilot trainings to the students.



Dr. V. Praveen Rao, Vice Chancellor, PJTSAU summed up the various challenges that lie before Agricultural Universities along with opportunities to gear up to the adoption of emerging technologies in agriculture. He emphasized the need for development of knowledge ecosystems in the country, which should be started with understanding of the National/Regional/Local challenges. Citing the examples of Singapore and Japan which did not have resources like in India, he said that today they were much ahead because they had developed knowledgeable economic systems. The Constitution of India espouses the Agricultural Universities as charity institutions that provide modern technologies to farmers. While the farmers always look out for low risk technologies with high income/profit.

Smart farming can be brought into one framework by making use of any gadget that could monitor, map and put all the data into cloud, enable big data analysis and help in making informed decisions, which requires Universities to become data and demand driven along with required knowledge base. Speaking about the misconceptions about agriculture, he stated that a recent survey of students at the international level, revealed that it is considered as a profession that needs one to get their hands dirty, highly dependent on rain God, with a low return on investment. As most agricultural universities and institutes were located in cities, there is need for spread in rural areas in a hub and spokes model, to cover both urban and rural stakeholders. He highlighted the various initiatives taken at PJTSAU like development of ICTs for teaching/ research/ extension, design thinking courses, Youtube channel for with 70,000 registered subscribers and 54 lakh viewers recorded till date. He stressed on the need for preparing Institution Development Plan by every university to achieve set goals by 2030/2050. There is need for updating of course curriculum and laboratories that are nationally and internationally accredited. The challenge is to use

resources efficiently, of which many challenges are dynamic with time and need. The partnerships /collaborations (PPP) are the key for translational research to develop emerging technologies driven ecosystems.



Dr. D. Rama Rao, Former Director, NAARM, Hyderabad, moderated the Panel Discussion on how to design curricula to gear up for introduction of new technologies along with strategies that Agricultural Universities should adopt to cope with emerging technologies.



Dr. A. Kiran Kumar, Dean of Horticulture, SKLTSHU, Siddipet, Telangana, highlighted that the post-harvest losses accounting for nearly 35-40%, is a big challenge which needs suitable solutions and also has a scope for student startups while post-harvest management can be included in curriculum with necessary modifications. The students of different streams like agriculture, horticulture and animal husbandry, must have more interaction with each other, rather than only involving within their stream and it is hoped that the New Education Policy (NEP) will provide a way forward for this.



Dr. Raihana Habib Kanth, Dean Agriculture, SKUAST Kashmir, explained that in line with NEP 2020, there is a need to design curriculum in an interdisciplinary way with importance to innovation and entrepreneurship under 4 C's i.e., Critical thinking, Creativity, Collaboration and Communication. She gave an overview of what can be expected as per the 6th Dean's Committee recommendations which included flexible, choice based, interdisciplinary curricula, increased importance to soft skills, higher order skills, vocational courses, bioinformatics, business skills, entrepreneurship, artificial intelligence and machine learning, national or international internships, etc. The Universities

should be equipped with cafeteria of courses that are skill and knowledge based. The academic bank of credits, flexibility of migration, degree by design etc., forms the features of the new changes in NEP. She wished that all the Universities should come forward to ink MoU with SKUAST towards student exchange in the near future.



Sri P. Laxminarayana, Managing Director, AG Biosystems Bio Ltd., Hyderabad, while giving a glimpse of the mandate and activities of his company, stressed on aspects such as micro-herbicides, pheromones, microbiome, drones etc., which will be the areas that will vastly open up globally. He showcased the work that his company was doing and that there was huge potential to collaborate with Universities in these areas. He emphasized on the need for networking between academia and industry which will lead to larger projects and would also save taxation and manpower, while leading to good results benefitting all.



Technical Session IV

“Converging Partnerships-Academia - Industry Incubators and Starts-up Journeys”

Chairs	Dr. Arvind Kumar, ViceChancellor, Rani Lakshmi Bai CAU, Jhansi
	Dr. Girish Chandel, Vice Chancellor, Indira Gandhi Krishi Vishwavidyalaya, Raipur
Rapporteurs	Dr. G. Uma Devi, Professor and University Head (Plant Pathology), PJTSAU
	Dr. A. Madhavi, Principal Scientist (Soil Science), AICRP on STCR, PJTSAU

The session, which was related to the flagship programme of Government of India which was started in 2016, focussed on opportunities to youth and entrepreneurship which requires mentoring and linking with the Universities.



Dr. M. S. Chauhan, Director, ICAR - National Dairy Research Institute (NDRI), Karnal, Haryana shared experiences about emerging technologies driven startups and incubators and explained about the technologies generated from NDRI. Around 141 technologies were developed at NDRI, of which 85 have been commercialized and around 14 technologies were developed in 2021 itself. He opined that whatever technologies are developed

should reach the stake holders. Technologies like testing for adulteration in milk with antibiotics, chemicals, pesticides etc., using strip tests for rapid detection of common adulterants in milk, which are relatively easy to use and cheap were developed and some of them were patented too. Innovative dairy products like Bhopa Dahi, Probiotic lassi, Bajra lassi, Dairy spreads, Arjuna Herbal ghee were developed and commercialized. Area specific mineral mixtures for dairy animals were also developed. Two case studies were highlighted i.e., Delmos research Pvt. Ltd. Karnal, a startup

company with 2.0 lakhs that has earned about 2.5 crores within 5 years and Mishti farmer produce Co. Ltd, an Incubator with 50 lakh which has a turnover of 14 crores.



Dr. Y. K. Rao, Chief General Manager, NABARD Telangana highlighted the role of NABARD in establishing incubation centres and nurturing startups in agriculture. NABARD is a developmental and financial aid institution mainly focusing on refinancing agriculture, agribank loan funds for State government to finance flagship programmes like Mission Bhagiratha, Kaleswaram project. The profits generated are ploughed back as credit to self-help groups, farmers clubs, FPOs, support watershed programmes, rural economy development, promoting grass root institutions, tribal programmes etc. NABARD has supported PJTSAU for promoting innovative programmes to farmers through package of practices, drone based direct seeded rice in Kampasagar etc. NABARD is also assisting incubation centers with boot strap capital for test driven ideas, catalytic capital for commercialization and funding capital at NAB ventures which are commercially viable. Financed Jaikisan, Krishitantra, Tendercuts, Eggos and seven incubators allover India including IIT Kharagpur and six agricultural universities. NABARD also committed its collaboration to PJTSAU in Saagu Baagu program in Chilli at Khammam, and in IoT based Fasal program for Chilli in Warangal.



Sri Vijaya Raghavan Kannan, Chairman, Sathguru Management Consultants, spoke on Academia Industry synergy using the Cornell-Indian Agri Universities engagement model. There is need for Academia-Industry synergy with a refocus on approaches like curriculum, academic research, faculty engagement research, large infrastructure, academic credit for translational research etc. Under skill development, students

should be exposed to creative thinking, funding and fellowships, managing academic ownership as entrepreneurship. The elements that mainly contribute to entrepreneurship are rural farm enterprises, resources from industries, alumni contributions, gifts for incubation centre etc. He urged Universities to take responsibility in mentoring the students on entrepreneurship.



Dr. Sunil Parekh, Director, National Institute of Food Technology, Entrepreneurship and Management (NIFTEM)-Thanjavur speaking on "Disruptive Innovations", informed that food preferences are changing day by day. Disruptive technologies address market disruption in established markets. He foresaw a lot of change such as robotics, personalized cook and serve food that would be invading the food industry. Around 5065 startups in food industry are currently existing of which the top 10 are alternative protein/DNA based which are almost 25%. Digital 3D foot print, 4D and 5D are also available. Focus is on algae like spirulina which is a rich source of protein, copper and vitamins. Ideas like low fat, low salt and low sugar alternatives are available. 'Saaji' plant based salt is being imported from Pakistan. Designer salt is a nano based technology, with the size of salt particle reduced to less than 380nm with which the intake of salt will be reduced by 25%.

He cited several potential technologies such as DNA based diet also known as Celebrity diet which could regulate life style diseases like heart diseases hypertension, diabetes etc. as they are genetically and phenotypically tailor made. In addition, edible water bottles to quench thirst to reduce plastic are also available. Preferences of ethical food choices where child labour are not engaged, nano green tea which has 105mg polyphenols as compared to 10 mg polyphenols in normal greentea, Tiptop bread, nanocapsules of omega 3.0 of active canola oil, plant based meat, eggless egg as alternative for protein were other examples. These disruptive technologies open lot of avenues and act as basis for next generation startups.



Dr. R. Kalpana Sastry, MD AgHub, PJTSAU moderated the panel discussion on orientation of startups towards production technologies and inculcating the entrepreneurship culture in the education system.



Dr. Girish Chandel Hon'ble Vice Chncellor IGKV Raipur Informed that agriculture is very competitive and IGKV came up with 200 startups under AgriRaftar out of which five startups are under the category of disruptive technologies. Major products like seetaphal pulp, haldi, honey, bastar coffee, jeera, minirice were developed. An outlet Sanjeevani concentrates on forest food. Products like lemon grass oil and palmarosa oil are supplied to cosmetic industries through university incubation centre. Potash solubilizing bacteria mixed with super compost technology to reduce dependence on potash fertilizers were developed. Startups are mostly oriented toward solving problems, but not in production technologies for which policy decisions are needed. He felt that developing an idea should be inculcated to the students from II year onwards during their degree program.



Dr. Jyothi Kachroo, Director, Planning and Monitoring, SKUAST, Jammu, informed the house that at SKUAST, cluster based business units were set up on mushroom, walnut, honey basmati rice etc. An App was developed for Agribusiness centre. Around 56 incubators were set up of which 14 are startups with lots of challenges that were faced during the early phase of startups. She opined that teachers should mentor the students and organize lectures on business related aspects, digital marketing strategies for startup and cloud computing. Need for market advisory board was suggested. Industry oriented courses should be a part of curriculum while framing the syllabus. Along with internship, students should be exposed to farms as well as industries to get an idea about startups and incubators.



Dr. A. J. Peter, Vice President BIPA, Chairman and Managing Director, Varsha Bioscience and Technology India Pvt. Ltd., suggested that an interface of University and Industry for developing entrepreneurship skills is essential. Students will be oriented towards entrepreneurship when there is fire in their belly, which should be inculcated from school itself and an urge must be created in the society to become an entrepreneur. To tap the rural youth, an Entrepreneur academy is essential and students should be educated to face the failures.



Dr. Basvaraj Girennavar, Chairman and Managing Director, Criyagen Agri and Biotech Pvt. Ltd., informed about two startup companies on Biofertilizers and winery in Karnataka and also developed an app on Agritech in 2014 under their banner. To create an ecosystem for startups, four things to be kept in mind is that agriculture is an art, science, technology and commerce.



Dr. Deepti Dutt, Head Strategic Initiatives, Public sector AWS, India, informed that there should be focused programmes in student curricula which should include Agritech requirements, cloud technology, food technology etc. The programme should be flexible so that the students can choose their own path and Universities should mentor the students. There is need for system integration for scaling up and growth in technologies and all technologies should go through pre-production which shall focus on traceability.



Chairs	Dr. R.K. Mittal, VC, SVPUAT, Meerut
	Dr. R.M. Chauhan, VC, SDAU, Sardarkrushinagar, Gujarat
Rapporteurs	1. Dr.K.MadhuBabu, Professor & Head (Agric. Extension), CA, Rajendranagar
	2. Dr.T.Supraja, Professor (F&N), College of Community Science, Hyderabad

The curtains were drawn on the IAUA-14th National Symposium with the Plenary session which was chaired by Dr. R. K. Mittal, President, IAUA and Vice -Chancellor, SVPUAT, Meerut, Dr. R. M. Chauhan, Vice -Chancellor, SDAU, Sardar Krushinagar, Gujarat along with Dr. V. Praveen Rao, Secretary General, IAUA and Vice Chancellor, PJTSAU, Hyderabad.

The occasion also created an opportunity for inter-institutional collaboration; two MoUs were signed between PJTS Agricultural University and other organizations viz.,

1. Ag. Hub, PJTSAU and Telangana AI Mission T-AIM powered by NASSCOM.
2. Ag-Hub PJTSAU and Agrighar Service Pvt. Ltd and Womenergy Association of incubators in manufacturing (WEAIM) training Programme.



Dr. R. M. Chauhan, Vice Chancellor, SDAU, Sardar Krushinagar, Gujarat, appreciated the efforts of Dr. R. K. Mittal, President, IAUA and Vice-Chancellor, SVPUAT, Meerut and Dr. V. Praveen Rao,

Secretary General, IAUA and Hon'ble Vice-Chancellor, PJTSAU for meticulous planning and conduct of the event on behalf of IAUA. The National Symposium was worth the time spent and discussions during two days for gaining knowledge on how Universities have to focus on creating enabling ecosystem for innovations. Agriculture domain is the mother of all institutions pursuing Education, Research, and Extension and the presentations by all the speakers were very useful and he hoped that researchable issues would emerge out of them. However, technology validation is the most important step and has to be

done by Universities to transfer the innovations into the public domain on a large scale by the entrepreneurs. Due to indiscriminate use of fertilizers, the health of the soil has been degraded and organic manuring would help in enhancing useful microbial activity in soil thus increasing the fertility and soil health.

The emerging technologies also have to be validated for their efficacy like in the case of usage of Drones for application of fertilizers or pesticides (Nanoparticles) in blanket mode rather than row application, with no evidence of its impact on soil and human health. Though the speakers' ideas were relevant there is a need to work in that direction in consultation with farmers for increasing the income. Dr. Chauhan extended his heartfelt thanks to the Vice-Chancellor, PJTSAU for the hospitality extended to all the participants.



Dr. Seema, Dean of Agriculture, PJTSAU, while providing an overview of the proceedings of the two days presented the following session wise recommendations:

ACTION POINTS:

1. Universities shall work closely with industry to address the challenges in the farming sector.
2. The Fourth Industrial Revolution (IR4) is changing the game in agriculture, making systems more productive, profitable and sustainable. The Universities to address the challenge of how to enable small farmers get the benefit.
3. The Universities to create innovation and entrepreneurship ecosystem through promotion of startups, translational research and rural entrepreneurship.



4. The Universities to create conducive environment for scaling up disruptive agricultural technologies. The local partners, the government, entrepreneurs, investors to gear up the momentum.
5. New skill sets to be introduced and focused on the students, encouraging them towards developing entrepreneurial acumen from 1st year of under graduation.
6. The curriculum development to focus on critical thinking, creativity, communication & collaboration. Emerging technologies should find a place in the curriculum.
7. The Universities to set up Centres of Excellence in partnership/collaboration with industries and synergize towards joint research.
8. Universities to play key role in validation of developed technologies before upscaling and out scaling.
9. Encouraging students towards food based research and setting up of small scale food enterprises.
10. Better interface with premier national institutions in the country such as IITS & IIMS for joint research collaborations.
11. Emphasis on data science which starts with data journey followed by descriptive, predictive and prescriptive analytics.
12. Develop knowledgeable ecosystems with understanding of national/regional and local level challenges.
13. Develop high tech accredited labs in the Universities to facilitate quality research.
14. Competencies for attracting external funding and fellowships (National / International) to evolve in the Universities.
15. Entrepreneurship insights to to be promoted at early stage right from school in the students

16. Each University should design its Institutional Development plan with short, medium & long term vision for reaching the set goals.



Dr. V. Praveen Rao, Vice Chancellor, PJTSAU expressed gratitude to the President of IAUA Dr. R. K. Mittal and all the Hon'ble Vice-Chancellors, industry representatives for their active participation and for making the symposium a success. The main objective of the symposium was creating enabling ecosystem in Agricultural Universities for Agri Tech Innovations. Citing an example he referred to China that has emerged as an economic power with its strategic approaches to developmental activities. An example of one such strategy was the government initiative to send 50,000 students every year to America to pursue PG and Ph.D, since 1980 which enabled them to build good academic infrastructure to take up more R&D activities. He opined that the change has resistance everywhere and reforms should be in accordance with the requirement of people's needs.

There have been fast paced changes taking place in the society, for example,, the titles of the job have changed over a period of time like Receptionist to First Impression Director of the Company, Human Resource Manager to Diversity and Inclusive Manager, and Recruitment Manager to Fair Practices Hiring Manager. He emphasized that translation of innovative ideas is a key for economic development, and India's ambition to convert into a five trillion \$ economy and economic power is quite possible. A knowledgeable society and educational institutions play a major role in this direction. Agricultural Universities were built over the years for enhancing food security but the relevance of the mandate has changed and there is need to think beyond. Agricultural Universities have to evolve different models to cater to the local societal needs. The roadmap of the model should

be a transformational pathway for the new ecosystem which is taking shape. He also uniformed as a world class University the need for great investment costs about 3500 crores. Taking into account, global, national and local challenges, the agricultural sector efficiency is to be enhanced to improve the deliverables and he cited the model of the NIFTEM established based on national requirements.

ICAR has to look into SDGs, malnutrition, food security, technology integration, soil depletion, water scarcity, interoperability of data and funding, issues. Throwing light on NEP in the context of issues discussed in various sessions he recommended preparation of a robust Institutional Development Plan for all the Universities. Each State/ Institute should develop a strategic plan based on local or region-specific needs with open-ended models. Brand models are to be formulated for the next three decades.

He stated that the symposium witnessed a diversity of speakers from the World Economic Forum to Heads of the different private and public enterprises, eminent educationists who have steered the program very efficiently. There is need for more such deliberations, and brainstorming sessions to identify the elements (collaborations and innovations) which will trigger the future action plan. The recommendations of the symposium will be submitted to ICAR for translation into future action points. Dr. Rao immensely thanked all the delegates, heads, and faculty for the execution of the program meticulously.



Dr. R. K. Mittal, President, IAUA and Vice-Chancellor, SVPUAT, Meerut appreciated that the sessions were thought-provoking which included four panel discussions, thirteen presentations, four moderators,

and 16 panelists from government and private sectors including Vice Chancellors from across the country and congratulated Dr. V. Praveen Rao, Hon'ble Vice Chancellor, PJTSAU for conducting the event successfully. The two-day symposium was indeed a learning experience to all. The critical summary of the sessions made by Dr. Seema, Dean of Agriculture, PJTSAU was appreciated which will be brought out as proceeding of the symposium. Dr. Mittal while reiterating the importance of the symposium, highlighted the following points for consideration.

- For creating an enabling ecosystem, the minds of farmers, students and faculty are to be ignited for innovation.
- The presentations have equipped the participants with more implementable recommendations at respective places.
- The curriculum has to be updated including options like dual degree program, and soft skills development.
- Innovation centers/Incubators should be developed in Universities and academia industry interaction units have to be established for continuous interaction with the private sector.
- Technology management units should be established in each University.
- Data centre/digital center for analyzing data should be established.
- Accredited labs, Technology parks should find place in each University's long term agenda.

Further, Dr. Mittal extended thanks to all the participants and expressed satisfaction at the way the deliberations were carried out. The programme concluded with formal Vote of Thanks proposed by Dr. V. Anitha, Dean PGS, PJTSAU and Organizing Secretary of the National Symposium.



**14th National Symposium of IAUA****"Creating Enabling Ecosystem in Agricultural Universities for Agri Tech Innovations"****9th and 10th June, 2022**

University Auditorium, PJTSAU, Rajendranagar, Hyderabad

PROGRAMME

DAY 1 - 9th June, 2022 (Thursday)		
Inaugural Session		
10:00-10:05 hrs	University Song & Lighting of the lamp	
10:05-10:15 hrs	Welcome and Introductory Remarks	Dr. V. Praveen Rao , Vice Chancellor, PJTSAU, Hyderabad
10:15-10:25 hrs	Address by the Guest of Honor	Dr. R. K. Mittal , President, IAUA & Vice Chancellor, Sardar Vallabh Bhai Patel University of Agriculture Modipuram, Uttar Pradesh
10:25-10:35 hrs	Address by the Guest of Honor	Sri. M. Raghunandan Rao , IAS Agriculture Production Commissioner & Secretary to Government, Agriculture & Co-operation Department, Secretariat, Government of Telangana
10:35-10:45 hrs	Address by Guest of Honor	Sri. S. Siva Kumar Group Head of Agri & IT Businesses, ITC Ltd, Hyderabad
10:45-11:20 hrs	Address by Chief Guest	Sri. Singireddy Niranjan Reddy Hon'ble Minister for Agriculture, Cooperation, Marketing, Govt. of Telangana
11:20-11:25 hrs	Vote of Thanks	Dr. Dinesh Kumar Executive Secretary, IAUA, New Delhi
11:25-11:30 hrs	National Anthem	
Rapporteurs	Dr. M. Sreedhar, Director, P&M Cell, PJTSAU	
	Dr. M. Jagan Mohan Reddy, Director, EEI, PJTSAU	
11:30-12:00 hrs	Networking Break & Group Photo	
12:00-15:00 hrs	Session I : Potential for Emerging Technologies in the Agri-food Value Chain and Allied Sectors	
Co-Chairs	Dr. V. Praveen Rao, VC, PJTSAU, Hyderabad	
	Dr. S. K. Rao, VC, Rajmata Vijayaraje Scindia Krishi Vishwa Vidhyalaya, Gwalior	

Rapporteurs		1. Dr. G. Sreedevi, PS & Head, AICRP on Pesticide Residue, PJTSAU	
		2. Dr. A.V. Ramanjaneyulu, Sr. Scientist & Head, AICRP on Agro Forestry, PJTSAU	
Speaker 1	12:00-12:15 hrs	Redefining agriculture through agri-tech innovations	Sri. Hemendra Mathur, Venture Partner, Bharat Innovation Fund IIM, Ahmedabad & Co-Founder, Think Ag & Chairman of Taskforce Agri Startups, FICCI, New Delhi
Speaker 2	12:15-12:30 hrs	4th Industrial Revolution technologies to help small and marginal farmers in India	Sri. Purushottam Kaushik, Center for the 4IR India, The World Economic Forum, India
Speaker 3	12:30-12:45 hrs	Genome Editing Technologies in accelerating food and nutritional security	Dr. Viswanathan Chinnusamy, Head of Department of Plant Physiology, IARI, New Delhi
Food for Thought Lunch 13:00 - 14:00 hrs			
Panel Discussion : 14:00 - 15:00 hrs			
Moderator	Mr. S. Siva Kumar, Group Head of Agri & IT Businesses, ITC Ltd.		
Panelist 1	Dr. G.V. Subba Reddy, Vice-President, Coromandel International Ltd, Hyderabad		
Panelist 2	Dr. Rama Devi Lanka, Director, Emerging Technologies, OSD, ITE&C, Department, Government of Telangana		
Panelist 3	Dr. T. Janakiram, VC, Dr. Y. S. R Horticultural University, Andhra Pradesh		
Panelist 4	Dr. V. Ravinder Reddy, VC, P. V. N. R. Telangana Veterinary University, Hyderabad		
15:00-16:25hrs	Session II: Agriculture 4.0 (Smart Farming) Ready Manpower: Stakeholder Perspective		
Co-Chairs	Dr. Ch. Srinivasa Rao, Director, ICAR- NAARM, Hyderabad		
	Dr. Z. P. Patel, Vice Chancellor, Navsari Agricultural University, Gujarat		
Rapporteurs		1. Dr. T. Ramesh, Prof. & Univ. Head (Crop Physiology), PJTSAU	
		2. Dr. N. Ramagopal Varma, PS (Ento.) Rice Res. Centre, PJTSAU	
Speaker 1	15:00-15:15 hrs	Expectations of Industry for Agri 4.0 Ready Man Power	Sri. Sameer Goel, Managing Director, Coromandel International Ltd, Hyderabad
Speaker 2	15:15-15:30 hrs	Shaping rural youth for food based enterprises under PM-FME Scheme	Sri. Gopinath Koneti, Executive Director, KPMG, Hyderabad
Speaker 3	15:30-15:45 hrs	Digital transformation in Agro-Food Value Chain - Eco system needs	Sri. Deepak Pareek, CEO & Co-Founder, Agri Watch 2.0, New Delhi
Panel Discussion : 15:45 - 16:25 hrs			
Moderator	Mr. RamKaundinya, Director General, FSII, New Delhi		
Panelist 1	Dr. K. M. Indires, VC, University of Horticultural Sciences, Bagalkote		
Panelist 2	Dr. K. B. Kathiria, VC, Anand Agricultural University, Anand, Gujarat		

Panelist 3	Dr. Kelawala, VC, Kamdhenu University, Gandhinagar, Gujarat		
Tea Break 16:25 - 16:45 hrs			
16:45 - 18:35 hrs	Session III: Gearing Up for the Emerging Technologies Driven Ecosystem - Challenges and Opportunities for Agricultural Universities		
Co-Chairs	Dr. B. V. Patil, Former Vice Chancellor & Director of Education, UAS, Raichur		
	Dr. Kelawala, VC, Kamdhenu University, Gandhinagar, Gujarat		
Rapporteurs	1. Dr. R. VijayaKumari, DDR, O/o Director of Research, Admn. Office		
	2. Dr. K. N. Yamini, Technical Officer to Dean PG Studies		
Speaker 1	16:45-17:00 hrs	Infrastructure needs - Physical and technical readiness of agricultural universities	Dr. V. Praveen Rao, VC, PJTSAU
Speaker 2	17:00-17:15 hrs	Traditional Tech Universities Vs Agri & food universities - Need for linkages for optimization of resources	Sri. Avik Sarkar, ISB, Mohali, Chandigarh
Speaker 3	17:15-17:30 hrs	Applications of robotics and drone in agriculture	Dr. Narendra Kumar Gontia VC, Junagadh Agricultural University, Gujarat
Speaker 4	17:30-17:45 hrs	ICAR's vision for developing emerging technologies eco system in IAUA member universities	Dr. P. S. Pandey, ADG (EP& HS), Agricultural Education Division, ICAR, New Delhi
Panel Discussion : 17:45- 18:35 hrs			
Moderator	Dr. D. Rama Rao, Former Director, NAARM		
Panelist 1	Dr. B. V. Patil, Former Vice Chancellor & Director of Education, UAS, Raichur		
Panelist 2	Dr. K. C. Veeranna, VC, Karnataka Veterinary Animal & Fisheries Sciences University, Bidar		
Panelist 3	Dr. A. Kiran Kumar, Dean of Horticulture, SKLTSHU, Siddipet, Telangana		
Panelist 4	Mr. P. Laxminarayana, Managing Director, A G Biosystems Bio Ltd., Hyderabad		
Panelist 5	Dr. Raihana Habib Kanth, Dean Agriculture, SKUAST Kashmir		
Wrap Up Dinner hosted by Honourable Vice Chancellor, PJTSAU 1835 hrs onwards at Golkonda Hotel, Masab Tank, Hyderabad			
DAY 2 - 10th June, 2022 (Friday)			
09:30 - 10:40 hrs	Session IV: Converging Partnerships - Academia - Industry Incubators and Startup Journeys		
Co-Chairs	Dr. Arvind Kumar, VC, Rani Lakshmi Bai CAU, Jhansi		
	Dr. K. N. Kattimani, VC, University of Agricultural Sciences, Raichur		
Rapporteurs	1. Dr. G. Uma Devi, Univ. Head (Pathology), PJTSAU		
	2. Dr. A. Madhavi, PS (Soil Science), Radio Tracer Lab, PJTSAU		

Speaker 1	09:30-09:15 hrs	NDRIs experiences with emerging technologies driven startups and incubators	Dr. M. S. Chauhan, Director, ICAR - NDRI, Haryana
Speaker 2	09:15-09:30 hrs	NABARD srole in establishing incubation center and nurturing startups In agriculture"	Sri.Y. K. Rao, Chief General Manager, NABARD, Telangana
Speaker 3	09:30-09:45 hrs	Academia Industry synergy- Cornell - Indian Agri Universities engagement model	Sri. Vijayaraghavan Kannan, Chairman, Sathguru Management Consultants
Panel Discussion : 09:45- 10:45 hrs			
Moderator	Dr. R. Kalpana Sastry, MD, Aghub, PJTSAU		
Panelist 1	Dr. Girish Chandel, VC, Indira Gandhi KrishiVishwavidyalaya, Raipur		
Panelist 2	Dr. A. J. Peter, Vice President, BIPA & Chairman Cum Managing Director Varsha Bioscience and Technology India Pvt Ltd, Hyderabad		
Panelist 3	Dr. Jyoti Kachroo, Director Planning & Monitoring, SKUAST, Jammu		
Panelist 4	Ms. Deepti Dutt, Head Strategic Initiatives, Public Sector, AWS,India		
Panelist 5	Dr.Basavaraj Girennavar, Chairman & Managing Director, Criyagen Agri & Biotech Pvt.Ltd, Bangalore		
Tea Break : 10:45 - 11:00 hrs			
Plenary / Wrap Up Session 11:00 - 12:00 hrs			
Co-Chairs	Dr. R. K. Mittal, VC, SVPUAT, Meerut		
	Dr. R. M. Chauhan, VC, SDAU, Sardar krushinagar, Gujarat		
Rapporteurs	1. Dr. K.Madhu Babu, Professor & Head (Agric. Extension), CA, Rajendranagar		
	2. Dr. T. Supraja, Professor (F&N), College of Community Science, Hyderabad		
Sessions Recommendations	Dr. Seema, Dean of Agriculture, PJTSAU		
Address by Chief Guest	Sri. Jayesh Ranjan, Principal Secretary, Department of Industries & Commerce (I&C) and Information Technology, Electronics & Communications (ITE&C), Governement of Telangana		
	Vote of Thanks		
	National Anthem		
	Farewell Lunch 12:15 hrs onwards		

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2. Dr. M. Jagan Mohan Reddy, Director, EEI, PJTSAU
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Session Incharge - Dr. R. Jagdeeshwar, Director of Research
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2. Dr. A. V. Ramanjaneyulu, Sr. Scientist (Agro) & Head, AICRP on Agro Forestry, PJTSAU
Session - II
Session Incharge - Dr. V. Sudha Rani, Director of Extension
Rapporteurs
1. Dr. T. Ramesh, Prof. & Univ. Head (Crop Physiology), PJTSAU
2. Dr. N. Ramagopal Varma, PS (Ento.) Rice Res. Centre, PJTSAU
Session - III
Session Incharge - Dr. J. Satyanarayana, DSA
Rapporteurs
1. Dr. R. Vijayakumari, DDR, O/o Director of Research, Admn. Office
2. Dr. K. N. Yamini, Technical Officer to Dean PG Studies
Session - IV
Session Incharge - Dr. Seema, Dean Agriculture
Rapporteurs
1. Dr. G. Uma Devi, Univ. Head (Pathology), PJTSAU
2. Dr. A. Madhavi, PS (Soil Science), Radio Tracer Lab, PJTSAU
Plenary Session
Session Incharge - Dr. M. Sreedhar, Director (P & M Cell)
Rapporteurs
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2. Dr. T. Supraja, Professor (Food & Nutrition), College of Community Science, Saifabad
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