



## Dr. Manmohan Singh

(26.09.1932 – 26.12.2024)

Dr. Manmohan Singh, India's 13<sup>th</sup> Prime Minister and a great economist, passed away on December 26, 2024, at the age of 92. He was born on September 26, 1932, in a small village Gah, Panjab (now in Pakistan). His early schooling in Pakistan was held in a local Government Primary School, where he studied in Urdu-medium until the age of 10. Later, his life was disturbed due to partition of India and Pakistan, when he migrated with his family to India in 1947. He pursued his higher education with remarkable distinction, earning Master's degree in Economics from Panjab University in 1954, followed by an Economics Tripos from the University of Cambridge, England in 1957. In 1962, he completed his doctorate degree in Economics from Nuffield College at Oxford University, England focusing his research on India's export performance. After obtaining his doctorate degree, he worked for the United Nations during 1966–1969. For a short stint (1969-71), he was Professor at the prestigious Delhi School of Economics, Delhi University.



Later, Dr. Manmohan Singh moved to the bureaucratic career, where he made remarkable contribution in shaping India's economic landscape. He held several key positions in the Government, including Advisor, Ministry of Commerce & Industry, and then Chief Economic Adviser (1972) and Secretary (1976) in the Ministry of Finance. He also served as 15<sup>th</sup> Governor (1982-85), Reserve Bank of India, Chairman, University Grants Commission, and Deputy Chairman (1985) in the Planning Commission. In 1991, when India was facing severe economic crises, Dr. Manmohan Singh was appointed as the Finance Minister, which he served till 1996. During this period, he was instrumental in implementing various economic reforms that liberalized India's economy, pulled-out the country facing severe financial crisis and established a strong foundation for a path of higher and sustained economic growth.

Dr. Manmohan Singh became Prime Minister under the United Progressive Alliance (UPA) government in 2004. He served for two consecutive terms as Prime Minister until 2014. His tenure was characterized by high economic growth and significant achievements, including the historic nuclear deal with the United States of America. During his tenure, various social welfare programs, including Mahatma Gandhi National Rural Employment Guarantee Scheme (also known as 'Right to Employment') and National Food Security Act (also known as 'Right to Food'), were introduced. These aimed to ensure food security and alleviate rural poverty. 'Right to Information' and 'Right to Education' were also enacted during his tenure. In 2019 he was elected to Rajya Sabha until 2024.

He received several awards and recognitions for his invaluable and outstanding contributions in the nation building. He received the second highest civilian award, Padma Vibhushan, by the Government of India. He was also decorated with the highest awards of the 'Order of King Abdulaziz' by Saudia Arabia and the 'Order of the Paulownia Flowers' by Japan.

Dr. Manmohan Singh started from an ordinary background to an extraordinary force of change. He will always be remembered for his intellectual vigour, visionary leadership, policy acumen and extraordinary contribution in liberalizing the Indian economy and introducing various social welfare programs which accelerated economic growth, ensured food security and assured employment opportunities in rural areas.

The National Academy of Agricultural Sciences (NAAS) feels proud that he was its Fellow for his distinguished contribution in transforming Indian economy.

The void created with the demise of Dr. Manmohan Singh will never be filled. He will always be remembered for his calmness and uncommon wisdom.

**Dr. P.K. Joshi**  
(Vice-President, NAAS)

## Digitalization of Indian Agriculture



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#### Editors

Dr. V.K. Baranwal  
Dr. R.K. Jain

### 1. Introduction

Digitalization promises to revolutionize Indian agriculture by improving resource management, increasing productivity, and promoting sustainability. However, this will require collaborative efforts from the government, private sector, academia, and civil society. This transformation can significantly boost farm income, reduce environmental impact and strengthen food security, positioning India as a leader in sustainable tech-driven agriculture.

### 2. Core Technologies

**Internet of Things (IoT):** Sensors in fields to collect real-time data on factors like soil moisture, animal health etc.

**Big Data:** Massive agricultural data collection to enable better decision-making.

**Artificial Intelligence (AI):** To optimize farming processes, predict crop yields, and detect pests and diseases.

**Robotics and Automation:** To reduce labor-intensive tasks and improve efficiency.

**Variable Rate Technologies (VRT):** Precision tools to enhance cost-efficient farming, boosting productivity and sustainability.

### 3. Sectors Benefiting from Digitalization

The digitalization of agriculture can drive innovation and transformation broadly in four sectors, such as:

**Precision Farming:** Using core technologies like : (i) Sensors; (ii) Data Analytics; (iii) Remote Sensing and Geographic Information Science; and (iv) Variable Rate Technologies, farmers can monitor their crops, orchards, animals, aquaculture systems, soil, water, weather, post-production management of produce in real-time, to make more informed decisions about planting, irrigation, fertilization, pest management, harvest and post-harvest management of agricultural produce. This would not only improve yields & quality, but also reduce waste and save costs.

**Climate Smart Agriculture (CSA):** This will help farmers to make better decisions, increase productivity, and reduce the environmental impacts on agriculture. Major benefits of CSA include: (i) weather monitoring and forecasting; (ii) precision farming; (iii) crop production management; (iv) market access; (v) data management; and (vi) farm management.

**Supply Chain Management:** Overseeing the flow of goods from farm to fork would help in (i) reducing food waste; (ii) improving farmers income; (iii) fair pricing for consumers; and (iv) transparency and traceability.

**Financial Inclusion:** This would provide farmers, especially small and marginal ones, access to formal financial products and services, which includes (i) credit; (ii) savings and insurance products; (iii) payment systems; and (iv) financial literacy.

#### 4. Challenges

Despite making progress in digitalization of agriculture, there are still challenges to overcome for its successful implementation. However, challenges also provide opportunities for innovation, public-private partnerships, and the development of tailored solutions for diverse agricultural contexts. Some of the major challenges are:

**Limited Access to Technology:** In many rural areas, farmers lack access to basic digital technology infrastructure such as internet connectivity and electricity.

**Cost of Technology:** Digital agriculture often involves the use of sophisticated technologies such as sensors, drones, and data analytics software, which can be expensive to acquire and maintain.

**Data Quality and Standards:** Ensuring the quality, reliability, and inter-operability of agricultural data remains a significant challenge.

**Digital Literacy and Skills Gap:** Many farmers, especially in developing countries, may lack the necessary digital literacy and skills to effectively use digital agriculture tools.

**Policy and Regulatory Barriers:** Inconsistent or outdated policies and regulations related to data ownership, privacy, and intellectual property rights can pose barriers to the adoption of agricultural informatics.

**Infrastructure Constraints:** Inadequate infrastructure, such as transportation networks and storage facilities, can limit the effectiveness of digital agriculture initiatives.

**Cultural and Socioeconomic Factors:** Socio-cultural factors, including traditional farming practices, social norms, and perceptions of technology, can influence the adoption of agri-informatics.

**Fragmented Supply Chains:** A large number of small and marginal farmers with limited bargaining power dominate production.

**Lack of Awareness:** Many farmers, especially smallholders, are unaware of the formal financial products and services available to them, or the processes involved in accessing them.

**Digital Divide:** Limited internet connectivity and digital literacy in rural areas can be a barrier to access online financial services.

#### 5. Major Initiatives by Government of India

Realising the potential of digital agriculture, Government of India has launched several initiatives:

##### **National e-Governance Plan in Agriculture (NeGP-A):**

This scheme aims to provide timely access to agriculture-related information to farmers through ICT. It includes a one-stop window Farmers' Portal that disseminates information on various agricultural matters. The mobile application Kisan Suvidha has been developed to facilitate dissemination of information to farmers on the critical parameters such as, weather, market prices, plant protection, agro-advisory, extreme weather alerts, input dealers (Seed, Pesticide, Fertilizer, and Farm Machinery), soil health card, cold storage & godowns, soil testing laboratories and veterinary centre & diagnostic labs.

##### **India Digital Ecosystem of Agriculture (IDEA):**

This framework empowers farmers with real-time, data-driven insights for enhancing profitability. Its primary goal is to increase their revenue and profitability by providing access to the information at the right time through innovative services. IDEA lays the foundation for building a robust digital agriculture ecosystem in India.

##### **ICAR Network Program on Precision Agriculture (NePPA):**

It focuses on exploring technologies like drones, IoTs, and VRTs to improve efficiency across soil health, crop management, and livestock. This Network Program on Precision Agriculture was initiated with 16 ICAR Research Institutes.

##### **KISAN SARATHI:**

ICAR has also developed a digital platform for agricultural extension system, named as KISAN SARATHI (System of Agri-information Resources Auto-transmission and Technology Hub Interface). This has been developed to support this emerging need of multilingual communication among various stakeholders.

#### 6. Salient Outputs

- (i) The satellite and UAV data for monitoring of natural resources, identification and management of infestation of diseases and pests, nutrient deficiency, draught monitoring and management etc.
- (ii) Sensor and AI based digital technologies developed for smart irrigation and fertigation of different crops and commodities. Weather information from IMD along with weather forecasting is also being integrated on this platform for precise application of irrigation and fertigation of crops through these systems based on weather forecast.



- (iii) Sensor and AI based digital system for pre-clinical detection of mastitis, estrus and parturition in livestock animal.
- (iv) Digital technology for automatic fish feeding, health monitoring and biomass estimation under different aquaculture fish production system.
- (v) Sensor and computer vision-based Post Harvest quality monitoring, grading, counting and tracking system for banana, mango and fishes.
- (vi) SoPs for smart protected production system including hydroponics, aquaponics, aeroponics and vertical cultivation
- (vii) Robotics based fruit harvester and weeding system, sensor-based paddy transplanter, variable rate fertilizer applicator and hand-held crop health monitoring farm machineries
- (viii) A robust digital agricultural extension multimedia, multilingual platform as KISAN- SARATHI for providing advisories to more than 2.5 Crore registered farmers. This platform is also integrated with 5.0 Lacs Common Service Centres of the country for handholding of the farmers to get effective advisories. Apart from this, more than 300 Mobile Apps and number of digital platforms have been developed for providing different services to various stakeholders of the country.

## 7. Conclusion

The digitalization of agriculture in India is indeed driving a profound transformation across the agricultural landscape, positioning the country as a leader in leveraging cutting-edge technologies for farming. The digital tools are making an impact and highlight the potential for innovative and disruptive changes in Indian agriculture.

**Himanshu Pathak**  
President

## Executive Council Meeting

### 139<sup>th</sup> Meeting

The 139th meeting of the NAAS Executive Council was held in hybrid mode on December 19, 2024 under the Chairmanship of Dr. Himanshu Pathak (President, NAAS). After brief welcome address by the President, key agenda items, including progress updates, elections, fellowship announcements, and institutional developments were addressed. The EC felicitated the outgoing office bearers, which included Dr. K.M. Bujarbaruah (Vice-President), Prof. Rajeev K. Varshney (Foreign Secretary), Dr. B. Mohan Kumar (Member), and Dr. C.N. Ravishankar Rao (Member). Thereafter, the agenda items were taken up for discussion. Some of the important decisions included:

- Identified “Agri-food Innovations for Rural Transformation” as the NAAS 2025 theme.
- Awarded Smt. Kanak Agarwal NAAS Girls Scholarship to 84 female students for 2024-25.
- Ratified the election of Office Bearers/EC Members/Fellowship/Associates from January 2025 and approved the recommendation of the Programme Committee and Judging Committees for various Academy Awards.
- Prof. Anupam Varma presented an update on the NAAS Journal “Agricultural Research,” highlighting its growth, global reach, and increased research article submissions since 2012. He acknowledged the support of editorial team and presented the challenge of handling large number of submissions. To overcome this, reducing article acceptance time and improving peer review, language editing, and figure quality were suggested. Further discussion led to proposals for encouraging young researchers in peer review, increasing open-access articles, and adding a Co-Editor-in-Chief.



### *Elected Office Bearers and Members of the Executive Council from January 1, 2025*

1. Vice-President: Dr. Baldev Singh Dhillon
2. Treasurer: Dr. Rajender Parsad
3. Foreign Secretary: Prof. Karimbhai M. Maredia
4. Members (4): Dr. Paramjit Singh Minhas; Dr. Achamveetil Gopalakrishnan; Dr. Suman Kumar Pandey; Dr. Devendra Kumar Yadava

### *The EC also ratified the election of the following Scientists to the Academy Fellowship 2025*

#### **Section I: Crop Sciences**

Dr. Krishnendu Chattopadhyay  
Prof. Nafees Ahmad Khan  
Dr. Dharmendra Singh  
Dr. (Ms.) Sneha Lata Singla-Pareek  
Dr. Chellapilla Tara Satyavathi  
Dr. Nepelean Thirunavukkarasu

#### **Section II: Horticultural Sciences**

Dr. Om Prakash Chaurasia  
Dr. Shyam Sundar Dey  
Dr. Jagesh Kumar Tiwari

#### **Section III: Animal Sciences**

Dr. Sukhadeo B. Barbuddhe  
Dr. Kadirvel Govindasamy  
Dr. Naveen Kumar  
Dr. Swaraj Rajkhowa

#### **Section IV: Fisheries Sciences**

Dr. Venkateshwarlu Gudipati  
Dr. Neeraj Kumar

#### **Section V: Natural Resources Management Sciences**

Dr. Subhash Babu  
Dr. Ajay Kumar Bhardwaj  
Dr. Anil Kumar Choudhary  
Dr. Debashis Mandal  
Prof. Sivakumar Uthandi

#### **Section VI: Plant Protection Sciences**

Dr. Dilip Kumar Ghosh  
Dr. Selvarajan Ramasamy  
Dr. Govind Pratap Rao  
Dr. Satya Nand Sushil

#### **Section VII: Agricultural Engineering & Technology**

Dr. Narsaiah Kairam  
Dr. Harinder Singh Oberoi



### Section VIII: Social Sciences

Prof. Souvik Ghosh  
 Dr. G. Bhanuprakash Reddy  
 Dr. Eldho Varghese

#### Foreign Fellows

Prof. Andreas Kurt Börner  
 Dr. Hugo A. Campos

#### Pravasi Fellows

Prof. Rose Prabin Kingsly Ambrose  
 Prof. Om Parkash Dhankher  
 Prof. Zora Singh

### NAAS Associates selected for 2025

Name	Section
Dr. (Ms.) Nitika Sandhu	Crop Sciences
Dr. Kuldeep Tripathi	Crop Sciences

Name	Section
Dr. Gograj Singh Jat	Horticultural Sciences
Dr. (Ms.) Sreelekshmy Mohandas	Animal Sciences
Dr. Vikrant Sudan	Animal Sciences
Dr. T.G. Sumithra	Fisheries Sciences
Dr. Meraj Alam Ansari	Natural Resources Management Sciences
Dr. Bappa Das	Natural Resources Management Sciences
Dr. G Basana Gowda	Plant Protection Sciences
Dr. P.R. Shashank	Plant Protection Sciences
Dr. Amit Kumar Rai	Agricultural Engineering & Technology
Dr. Arpan Bhowmik	Social Sciences

### NAAS Young Scientists Award 2025

Field	Awardee
Plant Improvement	Dr. Mukesh Choudhary, Research Scientist, ICAR-Indian Institute of Maize Research, Ludhiana, Punjab
Horticultural Sciences	Dr. Milan Kumar Lal, Scientist-SS, ICAR-Central Rice Research Institute, Cuttack, Odisha
Animal Sciences	Dr. Arun Prince Milton, Scientist-SS, ICAR Research Complex for NEH Region, Umiam, Meghalaya
Fisheries Sciences	Dr. Himanshu Sekhar Swain, Scientist-SS, ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar, Odisha Dr. Raja Aadil Hussain Bhat, Scientist-SS, ICAR-Directorate of Coldwater Fisheries Research, Bhimtal, Uttarakhand
Soil, Water & Environmental Sciences	Dr. Hari Sankar Nayak, Post-Doctoral Research Associate, ICAR-Indian Agricultural Research Institute, New Delhi
Plant Protection Sciences	Dr. Sudhir Pandurang Navathe, Scientist C, Agharkar Research Institute, Ratnagiri, Maharashtra
Agricultural Engineering & Technology	Dr. Aniesrani Delfiya D. S., Scientist-SS, ICAR-Central Institute of Fisheries Technology, Cochin, Kerala
Social Sciences	Dr. Kiran Kumara T.M., Scientist-SS, ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi

### Academy Awards for the Biennium 2023-2024

Award	Awardee
<b>Memorial/Lecture Awards</b>	
Dr. B.P. Pal Award	Dr. S.K. Vasal, Former Distinguished Scientist (CIMMYT)
Dr. K. Ramiah Award	Dr. Pritam Kalia, Former ICAR Emeritus Scientist (IARI)
Dr. K.C. Mehta Award	Dr. Rasappa Viswanathan, Director, ICAR-Indian Institute of Sugarcane Research (IISR), Lucknow
Dr. M.S. Randhawa Award	Dr. H.P. Singh, The Founder and Chairman, Confederation of Horticulture Associations of India (CHAI), New Delhi



Award	Awardee
Dr. N.S. Randhawa Award	Dr. Ch. Srinivasa Rao, Director, ICAR-Indian Agricultural Research Institute (IARI), New Delhi
Dr. P. Bhattacharya Award	Dr. Raghavendra Bhatta, Deputy Director General (Animal Science), Indian Council of Agricultural Research (ICAR), New Delhi
<b>Endowment Awards</b>	
Dr. L.C. Sikka Award	Dr. Jai Chand Rana, Country Director, Alliance of Bioversity International and CIAT, New Delhi Dr. Tusar Kanti Behera, Director, ICAR-Indian Institute of Horticultural Research (IIHR), Bengaluru
Dr. (Ms.) Prem Dureja Award	Dr. Madhoolika Agrawal, Head, Department of Botany, Banaras Hindu University (BHU), Varanasi
Dr. N.G.P. Rao Award	Dr. S.K. Pradhan, ADG (Food & Fodder Crops), Indian Council of Agricultural Research (ICAR), New Delhi
<b>Recognition Awards</b>	
Plant Improvement	Dr. Gyan Prakash Mishra, Head, Division of Seed Science and Technology, ICAR-IARI, New Delhi Dr. Viswanathan Chinnusamy, Joint-Director (Research), ICAR-IARI, New Delhi
Plant Protection	Dr. Supradip Saha, Principal Scientist, Division of Agricultural Chemicals, ICAR-IARI, New Delhi
Soil, Water & Environmental Sciences	Dr. Rajbir Singh, Assistant Director General (AAF & CC), Indian Council of Agricultural Research (ICAR), New Delhi
Animal Sciences	Dr. Yashpal Singh Malik, Joint Director, ICAR-Indian Veterinary Research Institute (IVRI), Nainital
Agricultural Engineering & Technology	Dr. Narayan Lal Panwar, Associate Professor, College of Technology and Engineering, MPUA&T, Udaipur
Social Sciences	Dr. Ranjit Kumar Paul, Senior Scientist (Agricultural Statistics), ICAR-Indian Agricultural Statistics Research Institute (IASRI), New Delhi

### **Dr. A.B. Joshi Memorial Lecture Award**

Dr. P.L. Gautam, Former Vice-President (NAAS), for delivering the 7th Dr. A.B. Joshi Memorial Lecture

at the XVII Agricultural Science Congress scheduled from February 20-22, 2024 at GBPUA&T, Pantnagar, Uttarakhand.

## **NAAS Programmes**

### **BRAINSTORMING SESSIONS**

**“Promotion of Agricultural Exports: Prospects and Challenges” (Convener: Dr. Anajani Kumar, Senior Research Fellow, IFPRI, New Delhi; Co-Convener: Dr. K. Elumalai, School of Social Sciences, JNU, New Delhi)**

The Academy organized a brainstorming session on “Promotion of Agricultural Exports: Prospects and Challenges” on October 10, 2024 under the Chairmanship of Dr. P.K. Joshi (Vice-President, NAAS)

to deliberate on key aspects of India’s agricultural trade, its evolution, and the associated challenges and opportunities. The discussion centred on the role of agricultural exports in India’s economic transformation, the diversification of export markets and commodities, and the sustainability concerns linked to the rising export volumes. Dr. W.S. Lakra (Secretary, NAAS), while welcoming the participants, provided an overview of the session, emphasizing the importance of agricultural exports to India’s economy and the need for new insights to address current challenges. Subsequently, Dr. Anajani Kumar and Dr. K. Elumalai presented a base paper outlining the background of India’s agricultural



trade. The session also featured a panel discussion on “Accelerating and sustaining agricultural exports from India”. Dr. P.K. Joshi in his concluding remarks reiterated the importance of addressing sustainability concerns in agricultural exports and encouraged stronger collaboration between research institutions, policymakers, and the private sector.

**“Strategies and Policy Design for Enhancing the Global Footprint of Indian Spices” (Convener: Dr. Duraisamy Prasath, Project Coordinator, AICRP on Spices, ICAR-Indian Institute of Spices Research (IISR), Kozhikode, Kerala; Co-Conveners: Dr. Sudhakar Pandey, ADG, Horticulture and Dr. Lijo Thomas, ICAR-IISR)**

The Academy organized a brainstorming session on “Strategies and Policy Design for Enhancing the Global Footprint of Indian Spices” on November 04, 2024 in hybrid mode under the Chairmanship of Dr. Himanshu Pathak (President, NAAS) to develop a comprehensive Policy aimed at enhancing the global presence of Indian spices. Dr. D. Prasath’s (Convener) initial presentation on India’s position in the spices trade was followed by a number of insightful presentations by Mr. Ramkumar Menon (World Spice Organisation); Dr. Baby KC (Synthite Industries); Dr. K. Nirmal Babu (Former Director, ICAR-IISR); Mr. Deepak Pareek (Founder, HnyB Tech-Incubations Pvt. Ltd.); Ms. Madhuri Nanda (Rainforest Alliance);



Mr. Jijo Joseph (Kancor Mane); and Dr. Venugopal K.J. (Food Safety & Quality Solutions Inc.).

These presentations addressed a wide range of issues, including global trends and consumer shifts in spices, next-gen spices, a roadmap for research, and the digital revolution in spices, sustainable spice production, and global regulatory challenges. The session also featured a panel discussion moderated by Dr. Sudhakar Pandey (Co-Convener). Dr. Ashok K. Singh (Secretary, NAAS) in his concluding remarks reiterated the importance of addressing sustainability concerns in spice exports and encouraged stronger collaboration between research institutions, policymakers, and the private sector.

**“Underutilized Wild Fruits and Vegetable Crops for Economic and Nutritional Security: Policy Perspectives” (Convener: Dr. T.K. Behera, IHR, Bengaluru; Co-Convener: Dr. Oliver King, MSSRF, Chennai)**

The Academy organized a brainstorming session on “Underutilized Wild Fruits & Vegetables for Nutritional and Health Security: Policy Perspectives” on November 14, 2024 in hybrid mode under the Chairmanship of Dr. W. S. Lakra (Secretary, NAAS). Dr. T. K. Behera (Convener) initially presented an overview of underutilized fruits and



vegetable crops, present status, challenges and future strategies for promotion of cultivation, processing and marketing of underutilised fruits and vegetables. This was followed by a number of insightful presentations including Dr. V. B. Patel (ADG, Horticulture) and Dr. Sudhakar Pandey (ADG, Horticulture).

**“Climate Adaptive Conservation of Aquatic Genetic Resources” (Convener: Dr. U.K. Sarkar, Director, ICAR-National Bureau of Fish Genetic Resources NBFGR, Lucknow)**

A brainstorming Session on “Climate Adaptive Conservation of Aquatic Genetic Resources” was





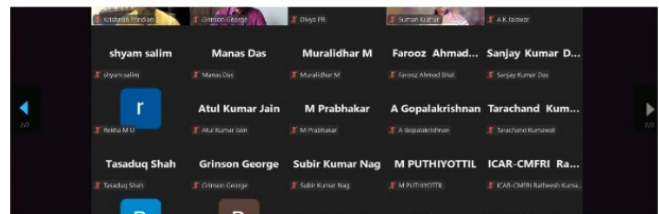
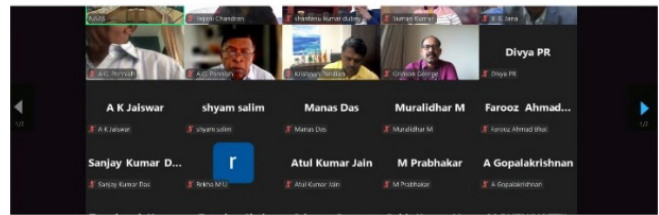
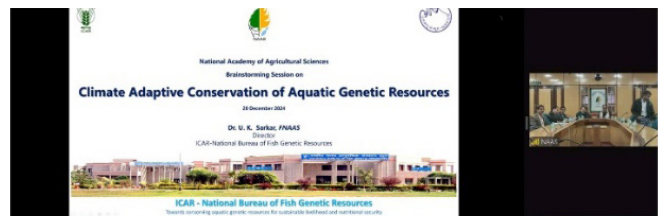
organised on December 20, 2024 in hybrid mode under the Chairmanship of Dr. K. M. Bujarbaruah (Vice-President, NAAS). Following the welcome address by Dr. W. S. Lakra (Secretary, NAAS), Dr. Uttam Kumar Sarkar (Convener) in his lecture emphasized the need for the event in the context of changing climatic conditions and research and policy need for preserving the valuable fish genetic resources of the country. The session also featured a panel discussion facilitated by the experts including Dr. A.G Ponniah (Former Director, ICAR-NBFGR & ICAR-CIBA), Dr B.B. Jana (Professor Emeritus, Kalyani University), Dr Krishnan Pandian (Director, BoBP-IGO), Dr Grinson George (Director, ICAR-CMFRI), Dr Prabhakar (ICAR-CRIDA), Dr J Johnson (Wild life Institute of India, Dehradun) and Scientists from ICAR-NBFGR to address various aspects of climate change aspects covering freshwater, marine and brackish water systems, genomic approaches, climate change and AMR measures to adopt adaptations and inputs for policy guidelines.

## STRATEGY WORKSHOP

**“Microplastics Pollution: Strategies for Remediation in Sustainable Environmental Management” (Convener: Dr. S.P. Datta, Indian Institute of Soil Science (IISS), Bhopal; Co-Convener: Dr. Tapan Adhikari, IISS, Bhopal)**

A strategy workshop on “Microplastics Pollution: Strategies for Remediation in Sustainable Environmental Management” was organized under the Chairmanship of Dr W. S. Lakra (Secretary, NAAS) on December 03, 2024 in hybrid mode to gather current understanding of MP pollution in soils of India.

A number of insightful presentations by Prof. Dave Chadwick, & Prof. Davey Jones (Bangor University,



UK); Dr. Tapan Adhikari (Co-Convener); Dr. Smita Mohanty (CIPET, Bhubaneswar); Dr. Surajit Das (National Institute of Technology Rourkela); Dr. Subrata Hait (IIT, Patna); Dr. Sukalyan Chakraborti (BIT, Ranchi); Dr. Anurag Garg (IIT-Bombay, Mumbai); Dr. Pankaj Kumar Srivastava (CSIR-NIBR, Lucknow); and Dr. Monoranjan Mohanty (Office of the Principal Scientific Adviser to the Government of India) were made to identify the gaps in current knowledge and develop way forward for future research.



## Other Activities

**National Conference on “Digital Agriculture: Empowering Indian Farming” (Convener: Dr. Anil Rai (ADG, ICAR, New Delhi); Co-Conveners: Dr. Ashok K. Singh (Secretary, NAAS); Dr. Rabi N. Sahoo (Program Leader, NePPA, ICAR-IARI); and Dr. Mangi Lal Jat, (Global Research Program Director, ICRISAT)**

The National Conference on “Digital Agriculture: Empowering Indian Farming” was organized jointly by the Academy in Association with ICAR and ICRISAT during December 17-18, 2024 at NASC Complex New Delhi. The inaugural session was Chaired by Dr. Himanshu Pathak (Secretary, DARE). Dr. Pathak’s lead presentation covered different aspects of digital agriculture including the achievements of ICAR in this field. Dr. Trilochan Mohapatra (Chairman, PPV&FRA) was the Guest of Honour in the conference. He emphasized the importance of digital agriculture and suggested different organizations of the country to work jointly following a multi-disciplinary approach.

During the first day of the Conference, three technical sessions were organized followed by a panel discussion. The first technical session was on **“Digital Agriculture for Enhancing Productivity”**, which was moderated by Dr. Tilak Raj Sharma (Deputy Director General, Crop Sciences, ICAR). In



this session, the lead talk was delivered by Professor Santanu Chaudhury (Professor, IIT Delhi) on various innovative digital tools and techniques, which can be used in digital agriculture. The second technical session on **“Last Mile Connectivity and Delivery”** was moderated by Dr. U.S. Gautam (Deputy Director General, Agriculture Extension, ICAR). In this session, Shri Abhishek Singh, (Additional Secretary, Ministry of Electronics and Information Technology) in his lead talk highlighted various programs of the Government

of India related to the Digital India Mission along with importance and achievements of various digital platforms developed by the Government, using various digital innovative technologies including artificial intelligence, computer vision and digital computing. The third session was on **“Investments and Policy for Digital Agriculture”** was moderated by Dr. Alka Singh, (Head and Professor, ICAR-IARI). In this session, Shri Shaji K.V., (Chairman, NABARD, Mumbai) delivered lead talk on the investment and policy issues for digital agriculture and various initiatives taken by the government of India. Further,



it was highlighted that there is an urgent need to work jointly by different government departments/ organizations in this field to empower the farmers with the innovations and technological know-how in this field for increasing their agricultural productivity and profitability.

On the second day, there were concurrent sessions to understand the strengths and requirements of various stakeholders of digital agriculture on: (i) Academia-Industry Stakeholder Engagement; (ii) Digital Agriculture by Professional Agricultural Societies; and (iii) Joint Initiative on Digital Innovations by CGIAR-ICRISAT- ICAR. In these concurrent sessions, extensive consultation was held with different stakeholders including academic institutions, industries, agri-startups, farmers, research scholars from ICAR, agricultural universities and international organisation of CGAIR.

In the final concluding session, it was emphasized that there is an urgent need for (i) capacity building of different stakeholders at all levels in the field of agriculture; (ii) developing a common platform/forum for sharing the knowledge on digital agriculture by different stakeholders at global level; and (iii) joint working of ICAR and CGAIR institutions need to avoid duplication of work and complement the research and development in the field of digital agriculture.

## Activities of the Regional Chapters

### Bengaluru Chapter

The NAAS-Bengaluru Chapter organized a workshop on “Diagnosis and Control of Rabies under One health Approach” on October 29, 2024 as a part of the month long activities in view of the World Rabies Day-2024 in collaboration with KVAFSU-CVA Rabies Diagnostic Laboratory; WOAH Reference Laboratory for Rabies; Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University (KVAFSU), Hebbal, Bengaluru. More than 150 participants comprising veterinary students, teachers and human health professionals attended the workshop. The workshop started with a walkathon in the morning to create awareness on Rabies control, followed by technical interaction with the participants. Dr. Shrikrishna Isloor (Professor & Head, Department of Veterinary Microbiology and Laboratory Director, KVAFSU-CVA Rabies Diagnostic Laboratory and WOAH Reference Laboratory for Rabies, Veterinary college, KVAFSU, Hebbal, Bengaluru) and Dr. D.H. Aswathnarayana (Former President, Association for Prevention and Control of Rabies in India and Professor, Department of Community Medicine, Kempegowda Institute of Medical Sciences, Bengaluru) were the resource persons to provide information on strategies to control Rabies and eradicate dog mediated Rabies by 2030. Dr. A. B. Sahoo (Chief Guest) (Director, ICAR-NIANP, Bengaluru) complimented the efforts of both Veterinary and Medical professionals in Rabies prevention.



### Coimbatore Chapter

- The NAAS Coimbatore Chapter organized “Tribal Awareness-cum-Campaign” in association with ICAR-Sugarcane Breeding Institute (SBI), Coimbatore and Tamil Nadu State Rural Livelihood Mission on October 09, 2024 in the tribal settlement at Aladipatti Panchayat of Salem District, Tamil Nadu. More than 75 tribal families were exposed to the ways of starting community units to process local produces with the facilities given to them under Scheduled Tribe Component.



- A lecture was arranged on the “Role of Plant Nutrition in Food Security-Achievements, Aspirations and Action plan” at ICAR-SBI, Coimbatore on November 29, 2024 to observe World Soil Day. Dr G. Byju (Director, ICAR Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala) delivered the lecture for the benefit of students.

### Kolkata Chapter

The NAAS-Kolkata Chapter organized various events in the Sundarbans region in collaboration with ICAR-Central Inland Fisheries Research Institute (CIFRI) and Joygopalpur Gram Vikash Kendra (JGVK).

- Observed World Fisheries Day on November 21, 2024, in Basanti block, Sundarbans, aligning with the theme, “Let the Waters Teem with Living Creatures”. The program aimed at promoting sustainable fisheries and biodiversity conservation. About 330 small-scale fishers and fish farmers, including 255 women, participated in the event. A rally involving students, fishers, and Scientists, was organized to raise awareness about indigenous fish species, hilsa conservation, and aquatic biodiversity. During the technical session, Dr. B.K. Das (Convener) highlighted the significance of sustainable fisheries for livelihood security and resilience.



- Conducted a sensitization program on December 23, 2024 at Army Public School, Barrackpore to inspire young minds about career opportunities in fisheries and aquaculture. Dr. B.K. Das (Convener) delivered a lecture on “Digital Aquaculture for Enhancing Productivity” to Class IX and XI students.



- Observed Mahila Matsyajibi Diwas on December 26, 2024 for the first time at Mela Ground, Kultali, Sundarbans. The event was organized in collaboration with ICAR-CIFRI, NFDB, and Kultali Milon Tirtha Society, to recognize

the contributions of women in fisheries. Dr. Pradip Dey (Director, ATARI) emphasized the role of women in small-scale aquaculture, while Dr. B.K. Das (Convener) showcased SCSP interventions empowering women in the Sundarbans. Demonstration of drone application in fisheries and the distribution of fisheries inputs to 500 Scheduled Caste women beneficiaries were highlights of the event. Approximately 5,000 women participated, showcasing their resilience and dedication to sustainable aquaculture.

### Ludhiana Chapter

- The NAAS Ludhiana Chapter in association with the Crop Improvement Society of India, PAU, Ludhiana organized a special lecture on ‘Developing Cheap and Efficient Tools for Genetic and Genomic Research in the 21st Century’ on November 28, 2024. Dr. Rajdeep Khangura (Lead Research Scholar, Purdue University, Indiana, USA) in his lecture highlighted cost-effective methodologies in genetic and genomic research. His discussion on the sequencing method WideSeq and its applications for genetic analysis was well-received.





- Celebrated World Soil Day on December 5, 2024 with the theme “Caring for Soils: Measure, Monitor, Manage.” Dr. Hardeep Singh (University of Florida, USA) delivered a lecture on integrated nutrient management for sustainable agriculture, emphasizing biochar’s potential for improving soil health. A poster competition for students was also organized and the winners were awarded.
- An awareness programme on advancing agricultural knowledge among school children was organized on October 21, 2024 in association with KVK, Moga for students from GSSS Khosa Pando. Dr. Parminder Kaur highlighted career opportunities in agriculture.



- A programme on “Scope and Importance of Beekeeping” was conducted at GSSS Piplanwala, Hoshiarpur on October 30, 2024. The programme



featured Dr. Prabhjot Kaur’s lecture on the economic and ecological benefits of beekeeping. About 55 students were benefitted.

- Awareness programmes on “Nutrition Garden and Its Importance” & “Paddy Residue Management and Career Opportunities” were organized on November 11, 2024 at Sahibzaada Ajit Singh Public School, Ladhewal. Around 130 students were exposed to sustainable agriculture practices.



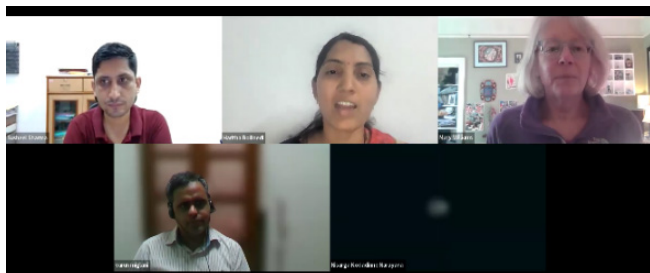
- An awareness programme on “Higher Education Opportunities in Agriculture” was organized at KVK, Moga, for students of GSSS Rauke Kalan on November 21, 2024. The session also included a field visit to demonstration units guided by Dr. Purna Thakur.



- Another awareness programme on “Modern Agricultural Practices for Farmers” was organized at Village Tharaj, Moga on December 19, 2024. Besides programmes on “Integrated Nutrient, Weed, and Pest Management”; “Use of Mineral Mixture and Winter Management of Dairy Animals”; and “Integrated Nutrition Gardening and Mushroom Cultivation” were organized at Village Narunangal Khas, Hoshiarpur on December 31, 2024. About 25 farmers participated in each programme.

## Activities of NAAS-YUVA

A Webinar on “Scientific Writing” was held on October 22, 2024, which was moderated by Dr. Haritha Bollinedi, (Convener). While welcoming the participants, she introduced the distinguished speaker, Dr. Mary Williams, Features Editor of the peer-reviewed journals *Plant Cell* and *Plant Physiology*. Dr. Williams has to her credit the development of the “Teaching Tools in Plant Biology” series and the “Plant Science Research Weekly” blog. She also mentors



early-career Scientists, including Assistant Features Editors and Plantae Fellows.

Dr. Williams delivered a lecture on “Preparing Manuscripts for Journal Submission”, and stressed the significance of publications. She suggested some valuable tips, which are as follows:

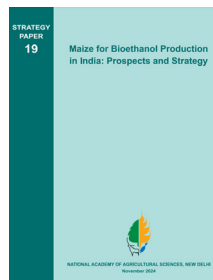
- dedicate a fixed time each day for writing.
- read articles to learn the structure, format and language of scholarly papers.
- avoid forming long sentences and using unnecessary words.
- conciseness for better clarity
- advised not to blame and respond immediately on receiving a negative feedback from reviewers.

The webinar concluded with a formal vote of thanks from Dr. Susheel Sharma (a YUVA member).

## Publication

### Strategy Paper (SP)

**SP-19:** Maize for Bioethanol Production in India: Prospects and Strategy

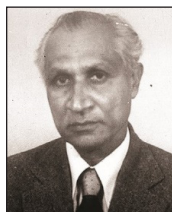


## Forthcoming Programmes

### Following Brainstorming Sessions were shortlisted for 2025:

- Preparing Future Ready Youths for Entrepreneurship Development in Agriculture
- Enhancing Efficiency and Sustainability of Farmer Producer Organizations in India
- Precision Irrigation Systems Using AI and IOT
- Harnessing the Functional Plant Microbiome for Next-Generation Plant Health Management
- Marine Nutraceuticals for Boosting Bio-Economy in India
- Semio-Chemicals Driven Pest Management Strategy
- Managing Emerging Environmental Contaminants in Aquaculture and Fisheries
- Horticultural Innovation to Enhance Export Promotion
- Organic Farming for Sustainable Agriculture
- Genome Editing In Agriculture – Prospects and Challenges
- Innovative Approaches for Crop Residue Management
- Policy Interventions for Accelerating Farm Mechanization in India to Achieve Goal of 75% Mechanization Level By 2047
- Fisheries Research and Development Priorities for Partnership in South Asia

## Obituaries



**Dr. Akhtar Husain**  
(1928-2024)

Dr. Akhtar Husain, a pioneering figure in India's medicinal and aromatic plants (MAPs) sector and the founding Director of the CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) in Lucknow, passed away on November 19, 2024, at the age of 96. His contributions to MAPs were instrumental in establishing India as a global leader in menthol mint production, solidifying his legacy as one of the nation's foremost scientists and administrators dedicated to the advancement of MAPs.

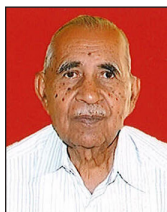
Dr. Akhtar Husain obtained his Ph.D. in Plant Pathology from North Carolina State University, USA in 1957 under Professor Arthur Kelman. He later engaged in ground breaking research at the Connecticut Agricultural Experimental Station (USA), addressing challenges like Dutch elm disease and tomato wilt. In 1977, he took on the role of Director at the CSIR-CIMAP in Lucknow, where his visionary leadership propelled the Institute to global prominence in the field of MAPs.

Dr. Husain's remarkable contributions to the artificial cultivation of ergot and the study on plant diseases have led to the development of high alkaloid-yielding strains, reshaping the landscape of plant pathology. His extensive research, documented in over 150 prestigious publications, illuminated the critical roles of polysaccharides and hydrolytic enzymes in vascular diseases. He inspired the next generation by mentoring seventeen Ph.D. students. He held influential positions, including Director General of the Hamdard Group and Vice-Chancellor of Jamia Hamdard, while contributing his expertise to UNIDO, WHO, and UNESCO.

Dr. Akhtar Husain, a distinguished recipient of the Vasvik Award and Fellow of several prominent scientific Academies, is recognized for his exceptional leadership at CSIR-CIMAP and his lasting impact on the scientific community. Known for his humility, and generosity, Dr. Husain embodied a tireless work ethic and a strong belief in science as a catalyst for societal change.

He will be greatly missed by his colleagues and former students across the world, by his family and by his many friends. To all of us he was a shining example and was never hesitant to support and encourage, but always with the goal of achievement and advancement. He leaves an enormous legacy of excellence in the area of MAPs. May his soul find eternal peace.

**Dr. Alok Kalra & Dr. Rakesh Pandey**  
*CSIR-Central Institute of Medicinal  
and Aromatic Plants, Lucknow*



**Dr. S.B. Varade**  
(1936-2024)

Dr. Supada Bhiku Varade, popularly known by his short name, S.B. Varade, passed away after a brief illness on November 4, 2024 at age of 88 at his residence in Chhatrapati Sambhajnagar, Maharashtra. His death marks an immense loss to agriculture scientific community but especially for Marathwada, the region considered backward in Maharashtra, where he dedicated his life to and regarded as his work ground. A true guide, he profoundly impacted Marathwada through his lifelong commitment and contribution. Having known him for over four decades, I can attest to his exceptional competence, profound knowledge, and articulate communication. Dr. D.K. Salunkhe as Vice-Chancellor during 1975-76, on a sabbatical leave from Utah University, USA, transformed the Marathwada Agriculture University(MAU) (now Vasantrya Naik MAU), Parbhani by inviting and selecting scientists from all over the country who had liking for development of the intensively agrarian Marathwada Region of Maharashtra. Dr Varade was one of them who joined the University, after serving IIT, Kharagpur. He brought with him rich experience in soil science particularly Soil Physics and Water Management. He set up one of the leading Departments in MAU, Parbhani in short span of time as Centre of Excellence.

Dr. Varade earned his postgraduate degree from IARI (1959-61), Delhi, completed his Ph.D. at IIT Kharagpur (1966), and conducted postdoctoral research at Riverside, California (USA) (1968-69). His professional journey began at IIT, Kharagpur (1963-70), where he contributed to dissertations and essays of international calibre. Later, he served as Head at Marathwada Agricultural University, Parbhani (1974-80), guiding many students to complete their Ph.D. degrees under his mentorship. The World Bank advocated Maharashtra Government for establishment of Water and Land Management Institute (WALMI), choosing Israeli experts, Drs Perry and Carmeli to set its vision. These experts recommended Dr. Varade's name to the Maharashtra Government as Technical Director highlighting the magnitude of his expertise. Although he never sought administrative power, his profound knowledge earned him the respect and influence that only true wisdom can command. Dr Varade was part of WALMI since its inception and was instrumental in shaping the organization. He contributed far beyond mere participation; helped define what WALMI should

be, including the structure of its training and the essential elements of its curriculum. His insights were respected and adopted due to his solid academic background, extensive research in soil science, and a wealth of experience, as well as the deep trust everyone placed in him. A selfless, impartial, and universally respected individual, he worked solely for the benefit of the organization and to improve water management practices. A true guide, he passionately advocated for the “Importance of Soil in Water Management in Agriculture” and dedicated his life to Marathwada, which he considered his primary field of work. His historical contributions alongside Mr. Vijuanna Borade, a social reformer of Marathwada remain unparalleled, though sadly, they did not receive adequate recognition. The classical watershed development work around Chatrapati Sambhajnagar, the erstwhile Aurangabad, is a testimony of his vision, mission, and dedication.

After his retirement, Dr. Varade took on several significant responsibilities such as; Member, NERIVALM Assessment Committee (WALMI for North East India, known as NERIVALM), Member, Maharashtra Water and Irrigation Commission, Member, Kelkar Committee - Agriculture and Water Sub-Group and many others. Dr. Varade balanced significant responsibilities with his guidance of numerous organizations, making substantial institutional contributions through initiatives like Shinchan Sahyog, Maharashtra Pani Parishad, Geoforum, Krishi Vigyan Kendra (Kharpudi-Jalna), Marathwada Agriculture Assistance Board, and the Swami Ramanand Tirth Marathwada Research Institute. His work across these bodies is invaluable to the field.

Though Dr. Varade received some honours such as the Vasant Rao Naik Krishi Puraskar, the Gold Medal of the Soil Conservation Society of India, and Fellowships of the Indian Soil Science Society and NAAS, I feel that his contributions have not been fully recognized by society and he remained a true unsung hero scientist. On this occasion as his colleagues from NAAS, our heartfelt condolences go out to his bereaved family. May Dr. Varade’s soul rest in eternal peace and tranquillity.

**Dr. C.D. Mayee**

*Fellow, National Academy of  
Agricultural Sciences, New Delhi*



**Dr. Brijendra Pratap Singh**  
(1938-2024)

Dr. Brijendra Pratap Singh was born on October 10, 1938 in Koda Jahanabad, Fatehpur district of Uttar

Pradesh, India. After graduating from Agriculture College, Kanpur during (1954-1960), he did his Ph.D. in Plant Virology from University of Florida, Gainesville, USA in 1963. He started his professional inking as Associate professor (Horticulture) at Allahabad Agriculture Institute (1964-66). Subsequently he joined CSIR-National Botanical Research Institute (NBRI), Lucknow in 1966 as Scientist C and Head, Virology Division and worked in the area of Floriculture and Biotechnology till his superannuation as Scientist H (Senior Deputy Director) in 1998 and then Emeritus Scientist during 1998-2003. Dr. Singh established Advance Centre of Virology at NBRI to work on characterization & management of viral diseases. He generated all facilities required for purification of plant viruses through ultracentrifugation, column chromatography & spectroscopy, diagnostics through serology, molecular probes, electron microscopy and PCR. He has been the project leader in several research projects in the area of viral genome organization, virus resistant transgenic plants, viral ecology and to develop integrated pest management (IPM) for viral diseases in crops of floricultural and agricultural importance. He was also the Area Coordinator and had developed multidisciplinary research in Floriculture and Biotechnology. Dr. Singh travelled many countries including: USA, UK, Germany, Maldives, Ceylon, Maritus and Muskut to develop international scientific collaborative programs.

His research group has successfully investigated genome organization of Begomo; Cucumo, Poty, Nano and Badna-viruses as well as Phytoplasma associated with various diseases of important crop plants. Rapid and reliable diagnosis of plant viruses; virus resistant transgenic tomato plants utilizing coat protein gene of Cucumber mosaic virus, and Tomato leaf curl viruses and virus-free plants of Chrysanthemums, Gladiolus, Gerbera, Narcissus and Canna have been developed. He guided 15 students for the Ph.D. programme and published more than 250 research papers in the journal of national and international repute and edited many books and review articles.

He also bagged several national and international awards and recognitions. Dr. Singh has been the Life Member of many scientific Societies. Also he has been the president of the Association of Plant Pathology and Indian Virological Society. Dr. Singh has been the Fellow of National Academy of Agricultural Sciences, National Academy of Sciences, India and Indian Virological Society.

Dr. B. P. Singh took last breath on December 28, 2024 in Narayana hospital, Gurgaon due to cardiac arrest at the age of 86. He left his wife (Mrs. Taramani



Khare) and two sons (D. P. Singh and G. P. Singh) and their families settled in New Delhi. Dr. Singh was an excellent person, very friendly and helpful to his colleagues and a good human being. I am fortunate and feel honored to be associated with him for a long time both as a colleague and one of his students. We express our deep condolences and pray the almighty to bless his holy soul rest in peace and provide strength to bear this irreparable loss to his family members.

**Dr. Shri Krishna Raj**

*Former Chief Scientist and Head,  
Molecular Virology Laboratory, CSIR-NBRI, Lucknow*



**Prof. R.P. Singh**  
(1939-2024)

Prof. R.P. Singh, a visionary academician and dedicated advocate for agricultural development, passed away on December 31, 2024, after being hospitalized in Lucknow for 10

days. Known for his transformative contributions to agricultural extension, Prof. Singh's legacy will continue to inspire generations.

Prof. Singh held several esteemed positions throughout his illustrious career, including Vice-Chancellor of Maharana Pratap University of Agriculture and Technology (MPUAT), Udaipur, and Pro Vice-Chancellor and Director of Extension at Acharya Narendra Deva University of Agriculture and Technology (ANDUAT), Kumarganj, Ayodhya (formerly Faizabad). As the first Director of Extension at ANDUAT, he was instrumental in establishing Krishi Gyan Kendras (KGKs) and Krishi Vigyan Kendras (KVKs) across eastern Uttar Pradesh, ensuring the dissemination of agricultural knowledge to farmers within a limited budget. His leadership at Chaudhary Charan Singh Haryana Agricultural University, Hisar from 1971 to 1982, further solidified his reputation as a pioneer in agricultural education and research.

Prof. Singh's extraordinary contributions earned him national recognition, including the prestigious "Lal Bahadur Shastri Award" for his outstanding work in agriculture and rural development, presented by the then Prime Minister Shri Rajiv Gandhi. His efforts not only uplifted the farming community but also significantly advanced the field of agricultural extension services in India.

In fact, we have lost one of the finest academicians and a true leader in agricultural extension. His dedication to farmers and the academic community will remain an inspiration for generations to come.

Prof. R.P. Singh's life exemplified the transformative power of education and innovation in agriculture. His vision and tireless efforts laid the foundation for resilient agricultural systems and empowered countless farmers. He will be greatly missed by his colleagues, students, and the farming community. May his soul rest in eternal peace.

**Prof. S.K. Singh**

*Head, Department of Genetics and  
Plant Breeding, Banaras Hindu University, Varanasi*



**Padma Bhushan Dr. Manju Sharma**  
(1940-2024)

Dr. Manju Sharma, a prominent figure in Indian science, made significant contributions to research, science policy, and biotechnology. Dr. Sharma, grand-daughter of the illustrious

Pandit Madan Mohan Malaviya, founder of the Banaras Hindu University, excelled throughout her academic career. She graduated with top honour from Lucknow University, receiving the prestigious Birbal Sahni Memorial Gold Medal in Botany in 1961. Her doctoral research focused on the detailed development and distribution of sclereids (hardening cells) in plants, a ground breaking research that shed light on plant taxonomy and evolution. Upon completing her Ph.D. in 1965, Dr. Sharma advanced her academic career by undertaking postdoctoral research at Purdue University (1967-68). Her finding that ethanol could significantly increase the yield of latex and rubber by 100% in latex-bearing plants, had a direct impact on Malaysian rubber plantations and boosting their production.

Her career extended far beyond the laboratory. She served as the General President, Indian Science Congress Association (ISCA) and became the first woman President of the National Academy of Sciences, India (NASI). During her tenure as the Secretary of the Department of Biotechnology (DBT) from 1996 to 2004, she played a pivotal role in establishing several new institutions dedicated to biotechnology research, such as the National Institute of Immunology (NII), National Institute of Plant Genome Research (NIPGR), Biomass Research Centres at Lucknow and Madurai, Plant Molecular Biology Unit at the University of Delhi, and the Centre for DNA Fingerprinting and Diagnostics (CDFD). This distinctive aspect of her tenure at DBT highlighted her commitment to building India's research infrastructure in biotechnology.

She also collaborated closely with the Prime Minister's Scientific Advisory Committee (PM-SAC) throughout

her service as DBT Secretary, playing a pivotal role in shaping national science and technology policy, particularly in the field of biotechnology. Together, they promoted public-private partnerships, capacity building in biotechnology through training and scholarships, overall development, promotion, and advancement in biotechnology for both national and global benefit.

Dr. Sharma recognized the potential of Bt cotton to address challenges faced by Indian farmers, such as pest infestations and low yields. Despite opposition, she championed its introduction, ensuring rigorous biosafety, regulation, and economic evaluation. Her leadership led to the successful commercialization of Bt cotton in 2002, transforming Indian agriculture and helped establish the country's position as a leading cotton producer globally. Further, she was instrumental in launching India's Genome initiative, focusing on sequencing key crops like rice, wheat, pigeon pea and medicinal plants, which boosted agricultural productivity and contributed to global genomic databases. She also initiated research on the genetic basis of diseases in India, laying the foundation for advancements in personalized medicine and diagnostics. Her efforts in fostering international collaborations provided Indian scientists with access to cutting-edge technologies and global collaborations.

Dr. Sharma's exceptional contributions were recognized with numerous awards and honours. These include the Birbal Sahni Memorial Gold Medal (1961) for her academic excellence in Botany. Her work in industrial research was acknowledged with the Vasvik Award (1991), while the Borlaug Award (1995) recognized her contributions to agriculture. Several awards, including the FIE National Award (1998) and the G.M. Modi Science Award (2002), highlighted her significant work in biotechnology and science & technology. Her leadership and advocacy for women in science were celebrated with honours like the Hall of Fame recognition (2001) and her role as the first chairperson of the International Council for Science's Forum on Science for Women (2004). These are just a selection of the many awards Dr. Sharma received throughout her distinguished career.

Dr. Manju Sharma's life and career represent a remarkable dedication to science and technology, which was acknowledged with Padma Bhushan Award. Her research discoveries, leadership in policy and administration, and unwavering commitment to mentoring future generations solidify her position as a true pioneer in Indian science. The institutions she established, the policies she championed, and

the international collaborations she fostered continue to shape India's scientific landscape for years to come.

**Dr. G. Taru Sharma**  
*DBT-National Institute of  
Animal Biotechnology, Hyderabad*



**Dr. Kumara Panicker Gopakumar**  
(1942-2024)

Dr. K. Gopakumar, former Deputy Director General (Fisheries, ICAR) and former Director, of ICAR-Central Institute of Fisheries Technology (CIFT), Kochi, passed away on December 05, 2024. Dr. K. Gopakumar obtained his post-graduation in Chemistry from University College, Trivandrum (1962-64); Ph.D. from the University of Kerala (1973); Post-Doctoral Research from Tropical Products Institutes, London, United Kingdom; and Doctor of Science (D.Sc., Honoris Causa) from the ICAR-Central Institute of Fisheries Education (CIFE), Mumbai. He carried out research in biochemistry, microbiology, fish processing technology, food science, drugs from marine organisms, and fish waste utilisation. He has to his credit over 400 scientific research papers and 14 Books.

A noted international Scientist of repute in post-harvest technology of fish served as Director, ICAR-CIFT, Kochi from 1991-97, and Deputy Director General (Fisheries, ICAR), New Delhi between 1997 to 2002. He was also the Chief Technical Advisor (Fish Processing), FAO of the United Nations to the Bureau of Fisheries and Aquatic Resources, Government of Philippines, Manila during 1994-95; Fisheries Consultant, FAO of United Nations, Bangladesh (2005); IFAD Project Advisor in Bangladesh (2005), United Nations Mission Member, Sri Lanka (2007), Advisor NFDB (2008), Professor of Eminence, Kerala University of Fisheries and Ocean Studies, Kochi, between 2013 and 2021. He was a Member of the Pacific Fisheries Commission (IPFC), Fish Technology and Marketing of FAO of the United Nations from 1984 to 1997 and a Visiting Scientist at the Natural Resources Institute, London, United Kingdom, from 1984 to 1986.

Dr. Gopakumar was elected as Fellow of the National Academy of Agricultural Sciences in 1998. He bagged several prestigious awards such as the ICAR Team Research Award (1993); Rafi Ahamed Kidwai Memorial Award (1996); SL Hora Gold Medal (2000); Society of Fisheries Technologist Award (2001); 14<sup>th</sup> Khwarizmi International Award from the Islamic Republic of IRAN (2001); VASVIK Award (2009) and



Outstanding Fisheries Research Award by the Kerala University of Fisheries and Ocean Studies (KUFOS) (2015) etc. He was also the Honorary Fellow of the Institutes of Chemists India (FIC), Society of Fisheries Technologists (India); Inland Fisheries Society of India; Association of Aquaculturists, India.

Dr. Gopakumar has been a guiding light in fisheries research, making significant contributions to its growth and development, especially in the post-harvest fisheries sector. In his visionary role as the Deputy Director General (Fisheries, ICAR), he has shaped the future of fisheries research in the country. He was a source of the latest advancements in the field and has effectively mentored many young individuals, leading them to successful careers as researchers in fisheries. Dr. Gopakumar was also an exceptional

teacher renowned for his care and compassion towards his students.

Its indeed a sad loss for the fisheries sector in India with the passing of Dr. Gopakumar. He was a renowned expert in his field, having contributed significantly to the growth and development of fisheries in the country. Through his long and dedicated service, he had also played a crucial role in shaping the growth and development of ICAR-CIFT into the unique Centre of Excellence in Fisheries Technology. Dr. Gopakumar's legacy will continue to inspire future generations of fisheries professionals in India. He is survived by his wife, two sons and grandchildren.

**Dr. A. Gopalakrishnan**

*Former Director, Central Marine Fisheries Research Institute, Kochi*

## Announcement



### XVII Agricultural Science Congress

The XVII Agricultural Science Congress will be organized by the National Academy of Agricultural Sciences (NAAS) in collaboration with the GB Pant University of Agriculture and Technology (GBPUA&T) at Pantnagar, Uttarakhand during February 20-22, 2025.

The President (NAAS) warmly invites you to attend and actively engage in the Congress deliberations. The theme of the Congress is "Frontier Science and Technologies in Agriculture for a Developed India".

**Editors:** Drs. V.K. Baranwal and R.K. Jain

Published by: Executive Director, on behalf of the National Academy of Agricultural Sciences, NASC, Dev Prakash Shastri Marg, New Delhi 110012; Tel. (011) 25846051-52, Fax. 25846054; Email: naas-mail@naas.org.in; Website: <http://naas.org.in>