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From the President's Desk

Energising Fisheries and Aquaculture for Blue Transformation

Fisheries and aquaculture sectors play crucial role in providing food and nutritional security besides being a source of income and livelihood to millions of people. Over the years, India's fisheries and aquaculture sector registered impressive growth, exhibited considerable resilience, and established itself as a key component of the agriculture and food industry. Expansion and intensification supported by technological advancements resulted in a remarkable improvement in fish production from 0.75 million tonnes in 1950-51 to 17.54 million tonnes in 2022-2023. The resilience and adaptation of the industry to the changing environment and market demand can be discernible from the 7.98% average annual fish production growth rate. Notably, over the years, the sector has witnessed a paradigm shift in the production profile in which inland production, especially aquaculture, dominated with 13.11 million tonnes over marine production (4.43 million tonnes).

Concomitant with the progress in production, India's fisheries export has significantly improved, reaching 17,35,286 tonnes, generating a value of Rs. 63,969 crore in 2022-23. The surge in production has contributed considerably to the country's economy, with the Gross Value Added (GVA) by the fisheries sector standing at 288,526 crore in 2021-22. This translates to a 1.1% contribution to the Indian economy and 6.72% to the agriculture GVA. The performance of India's fisheries and aquaculture sector has helped the country to secure prominence in the global market, with the country's contribution to world fish production reaching an all-time high of 8.92% in 2022-23. India is now the third largest fish and aquaculture producing country, contributing 16% of inland and 5% of marine global fish production. Beyond its economic contributions, the fisheries sector is a vital source of employment to as many as 28 million people at the primary level, apart from almost twice the number along the value chain. This includes an array of jobs spanning from fishing, processing, and

marketing, highlighting the sector's pivotal role in socio-economic development and community welfare.

Recognising the significance of the fisheries sector, the Govt. of India launched an ambitious PMMSY programme with a budget of Rs. 20,050 crore in 2018, targeting fish production of 22 million tonnes by 2025. The sector provides enormous potential in the form of un/underexploited aquatic resources to augment production and productivity through sustainable intensification, diversification of food as well as non-food fishes, and multi-trophic and multi-sectoral integration. Thus, the Indian fisheries and aquaculture sectors, which are on the cusp of both horizontal and vertical expansion, have to be energised to achieve the global food security envisioned as blue transformation: '*a vision for the transformation of aquatic food system for better production, better nutrition, better environment, and better life for all*'. Multiple challenges galore in seizing the opportunities to guide this transformation.

Challenges and Opportunities

1. **Food and Nutritional Security Concerns:** The UN projects a population of 9.7 billion people on earth by 2050, implying considerable increases in demand for higher volumes and quality of food and nutrition. By 2030, 62% of seafood supplied and consumed by humans will come from aquaculture. Aligning the goals and activities of blue transformation with the SDGs 2030 is essential to sustain the momentum of aquaculture growth and provide affordable protein-rich food to the growing millions.
2. **Modernisation of Infrastructure and value chain:** Though the sector has transitioned from a subsistence-level, predominantly small-scale livelihood-dependent sector, into a significant commercial-scale enterprise, a huge infrastructure gap exists across the value chain, especially in terms of integrated fishing harbours, cold storage, hygienic markets, and vertically integrated processing facilities, thus leading to post-harvest losses which need to be reduced from current 30% to 10%. The penetration of disruptive technologies (IoT, robotics, AL & ML, GIS & block chain) to improve the efficiencies in the value chain is very limited. To match with this, Research & Development (R&D) organisations and extension system need revamping to be equally or more tech-savvy and be able to deliver their services through modern tools.
3. **Deteriorating Aquatic Habitat and Ecosystem Health in the Climate Change Scenario:** This is a consistent concern in the midst of fast-paced economic growth and development. Shrinking resources as well as the increasing carbon footprint of aquaculture and fisheries development further compound this universal challenge, especially in the Global South, where environmental conservation has to be aligned with livelihood development. Science-based, energy-efficient, environment-friendly and cost-effective development solutions shall drive the blue and green growth.
4. **Genetic Improvement and Biotechnological Applications:** Given the diversity of aquatic fauna and flora, India is yet to exploit the genetic potential realisable through the application of the rapidly evolving new generation genetic and molecular tools to increase the production and productivity, unlike some of the breakthroughs in Salmon and Tilapia aquaculture elsewhere in the world. Genetic improvement has only addressed 10% replacement of improved species, and it needs to be strengthened with more commercially important species being brought into the basket. Genetic improvement programs shall receive a greater attention in the immediate future to leapfrog in terms of productivity and disease resistance.
5. **Feed and Nutrition:** Aquaculture's reliance on fishmeal and fish oil from pelagic food fisheries needs to be reduced significantly using non-conventional plant and insect-based feed ingredients through cutting edge R&D. Greater understanding of nutrient requirements in practical culture systems and the nutritive value of feed ingredients for aqua species with an objective of better management of farming system is important.
6. **Diseases and their Management:** Disease outbreaks pose a significant threat to the aquaculture industry causing significant economic losses and environmental degradation. Therefore, efficient tools for rapid diagnosis, better preventive and therapeutic options, effective surveillance for pathogens, and monitoring of environmental factors that trigger diseases need to be developed. Developing and implementing science-based management measures including strict biosecurity protocols, vaccination programs, and developing disease-resistant strains through selective breeding and genetic improvement are priorities. Adopting technology with early monitoring and detection systems through the application of AI can play a key role.
7. **Limiting Regulatory Frameworks and Governance Processes:** The age-old, some of

them persisting from colonial times, legislative and regulatory frameworks in existence or their absence in some areas have hindered India's fisheries development trajectory. They need a major overhaul and reforms to make them enabling and facilitative. Contemporary and good governance practices shall become internalised by the research, development and extension systems providing a seamless service and support to the primary producers and entrepreneurs. Collaboration among governments, industry associations, and other stakeholders is necessary to develop strong standards and guidelines that support responsible fisheries and aquaculture practices.

8. **Expanding Social Acceptance of Fish as Healthy Food:** Perceptions and public acceptance of aquaculture and concerns about environmental impact, animal welfare, and food safety are keys. As fish consumption is set to increase, greater emphasis would be on the health aspects of eating aquatic food. Further, as consumers' awareness increases, concerns about where the food comes from, including the ecological footprint, carbon emission, ecological sustainability, and humane treatment of animals and aquatic foods, need to be addressed. The presently lower per capita consumption levels fish in India (6 kg as against the global average of 20 kg / annum) provides ample opportunities to increase the supply.

9. **Generating Competent Human Resources:** To drive the sustainable aquatic food system forward, highly trained and competent human resources are essential. Innovative ways to reach out to stakeholders (students) who have advanced technological and mental capacity need to be developed to suit the present and future requirements of the sector. Well-equipped Institutions with highly competent teachers/trainers who can offer the most professional education accredited by a certifying authority will be the primary requirement for this.

ICAR Initiatives for Blue Transformation

ICAR's technologies and innovations have spearheaded the science-led growth of fisheries and aquaculture in the country. Realising the challenges being faced by the sectors, along with the Department of Fisheries, Govt. of India, and ICAR has taken several new R&D initiatives in recent years to drive the blue transformation. Major programs breeding and rearing of high-value indigenous ornamental fish (from north-east and western ghats), breeding and seed production technologies on select fishes including Hilsa, climate-resilient farming with new species and systems, shrimp farming in saline affected areas, cage aquaculture, trout farming in coldwater regions, refinement and validation of improved aquaculture systems (biofloc, RAS, IMTA, carbon neutral aquaculture), precision aquaculture involving drone and other AI tools, development strategies to harvest from deeper waters with new vessels and nets, monitoring and early detection of system, protecting biodiversity loss and enhancing fish catch in open waters, river ranching of Indian major carps seeds in River Ganga etc. have been taken up.

Value-addition (ready-to-cook, and ready-to-eat products), branding, marketing, ensuring quality and safety and utilization of best raw materials for developing nutraceutical and pharmaceutical products; Seaweed cultivation and value-added products of pharma and nutraceutical potentials; Farm level disease diagnostics and surveillance, alternative therapeutics with the application of vaccines to address commercially important diseases; and Strengthening the KVK-led fisheries extension network for demonstration and dissemination of technologies and innovations are other initiatives that would lay the groundwork for a more promising and resilient future for Indian fisheries and aquaculture, in line with the Sustainable Development Goals (SDGs) and vision of Viksit Bharat@2047.

Himanshu Pathak
President

New Year Get-Together 2024

A get-together of the Academy Fellows and Associates was organized on January 1, 2024 in hybrid mode. At the outset, Dr. W.S. Lakra (Secretary) welcomed Dr. Himanshu Pathak (President); Past Presidents Dr. R.B. Singh and Dr. T. Mohapatra; all office bearers and all esteemed Fellows and Associates. He also acknowledged the leadership transition by welcoming Dr. P.K. Joshi as the new Vice President, Dr. Ashok K. Singh as the new Secretary, and Dr. Rakesh K. Jain as the new Editor, along with the new Executive Council members of the Academy. The outgoing members were thanked for their significant contributions to the Academy.

Dr. Himanshu Pathak, (President), while reflecting on Academy's achievements during 2023, including fellowship recognitions, collaborations and successful XVI Agricultural Science Congress, greeted the Fellowship and wished a New Year 2024 to all. He outlined plans for newer initiatives such as online nominations, journal scoring, student engagement programs and strategies for financial sustainability following the government's cessation of funding. The Academy deliberated on collaborations with foreign Academies, and enhancing media outreach, aiming to augment its global presence and impact. The importance of policy advocacy, adaptation to new technologies, and alignment with national education policies were underscored, with a view to develop a roadmap for agricultural innovations by 2047.

The meeting stressed the need to address challenges such as hunger, poverty, and climate change. Key next steps included generating additional budgetary resources, prioritizing agricultural education reforms, addressing India's Global Hunger Index ranking, and developing implementation pathways for action plans with defined actions and accountability.

The Academy also proposed initiatives such as memorizing Dr. Swaminathan through Foundation Day Lecture; recording lectures for students benefit, inducting interested Fellows as Adjunct Faculty in Universities, and organizing workshops with journalists to enhance agricultural awareness.

Executive Council Meeting

136th Meeting

The 136th Meeting of the Executive Council (EC) was held in hybrid mode on March 16, 2024 under the Chairmanship of Dr. Himanshu Pathak (President, NAAS). After brief welcome, the agenda items were deliberated upon by the EC. Some of the important points emerged during the meeting were:

- Updates on two publications on Indian Agriculture. Of which, the publication "State of Indian Agriculture" by Dr. Anjani Kumar and Dr. Himanshu Pathak was released. Dr. P.K. Joshi

provided update on the status of another publication "Indian Agriculture in the Amrit Kaal: The Road Map".

- Finalization of G.B. Pant University of Agriculture and Technology, Pantnagar as the venue for XVII Agricultural Science Congress scheduled for 2025.
- Updates on upcoming events, such as NAAS-PAAS linkages, Prof. M.S. Swaminathan Foundation Day lecture, and scholarship programs for students pursuing agricultural courses.
- Bioinformatics discipline, shall find place in related Sections. Furthermore, different Sectional Committees for the election of Fellows/Associates and Young Scientist Awards for 2025 were constituted.
- Finalization of various Conveners for NAAS Regional Chapters, along with updates on legal matters and financial grants received by the Academy. Proposals for additional awards, collaboration with external organizations such as

the World Food Prize Foundation, and progress on various workshops and publications were reviewed.

General updates on special invitees, nomination processes, upcoming virtual meetings, facility upgrades, and plans for future events, including Inter-Academy and Industry meets, were shared with the Council members. The meeting concluded with vote of thanks by Dr. W.S. Lakra (Secretary, NAAS).

NAAS Programs

BRAINSTORMING SESSION (BSS)

'Smart Animal Farming: Perspective Planning Towards 5 Trillion Economy' (Convener: Dr. Yashpal Singh Malik)

A BSS on "**Smart Animal Farming: Perspective Planning Towards 5 Trillion Economy**" was organized in hybrid mode on March 22, 2024 The programme was chaired by Dr. Himanshu Pathak, (President, NAAS) and co-chaired by Dr. K.M. Bujarbaruah, (Vice President, NAAS). More than 50 participants from ICAR Institutes/SVUs/SAUs and representatives from private industries and farmers associations participated.

Dr. Pathak stressed upon the integration of animal and agricultural smart farming to maximize benefits for farmers. While Dr. Bujarbaruah and Dr. PK Joshi, (Vice Presidents, NAAS) appreciated the initiative. They emphasized on embracing AI technologies in the animal sector for boosting productivity through precision farming and efficient resource use.

Based on the presentation by Dr. Yashpal S. Malik (Convener) and subsequent discussion, it was observed that there was a need for more research, evaluation and testing and pilot scale demonstrations of smart technologies for their large-scale adoption in field. The major recommendations from the deliberation are:

- Encourage mechanization and automation in dairy farming to optimize input utilization and reduce costs. Transform selected dairy farms into precision dairy farms with advanced sensors and data analysis capabilities to evaluate new technologies.
- Foster collaboration among public sectors, private sectors, and farmers for successful implementation of smart animal farming strategies.
- Redirect research towards developing smart animal production technologies for smallholder farmers, aligned with national production system.
- Develop AI-based technologies to address challenges like mastitis, pregnancy diagnosis, and disease diagnostics.
- Encourage genomic selection and breed improvement, emphasizing value addition for sustainable breed utilization.
- Establish standardized practices for smart animal farming nationwide and provide farmer education and training on smart animal farming practices.

- Develop comprehensive health coverage and vaccine production units for livestock, ensuring equitable access to veterinary healthcare services in rural areas.

EXPERT CONSULTATION

"Digital Sequence Information for Agriculture" (Convener: Prof Rajeev K. Varshney; Co-Convener: Prof K.C. Bansal)

The Expert Consultation on Digital Sequence Information (DSI) for agriculture was organized on March 26, 2024 in collaboration with the Centre for Crop & Food Innovation, Murdoch University, Australia and DivSeek International. The Consultation, which attracted >200 participants from 25 countries, was Chaired by Dr. Himanshu Pathak (President, NAAS) to discuss understanding the concept, scope, and definition of DSI; importance of generation and storage of DSI; role of DSI in conservation and use of plant genetic resources for food and agriculture for R&D and crop improvement; concerns and issues related to access and use of DSI; and resolving a common mechanism for the use of DSI, and fair and equitable benefit-sharing.

In the opening remarks, Dr. Pathak mentioned that Indian agriculture has always been at the forefront of adopting new technologies including DSI for improving agriculture. Prof. Varshney mentioned that the information on DSI is available in public database, the International Nucleotide Sequence Database Consortium (INSDC) and is growing exponentially. Making DSI accessible and available through public databases is key to use these sequences for food and agriculture applications.

Subsequently, Dr. Amber Scholz (Head of the Science Policy and Internationalisation Department) at the Leibniz Institute DSMZ (Braunschweig, Germany) presented various activities of DSI Scientific Network. She highlighted and advocated for multi-lateral benefit-sharing from DSI for both science and diversity conservation. Dr Michael Halewood, Head of the Policy Research and Support Unit at Bioversity International, provided an overview on DSI and benefit sharing in CGIAR. He highlighted several ongoing initiatives in CGIAR that are generating DSI. He also highlighted the Plant Treaty Governing Body resolution to reduce the existing gap on capacity regarding generation, access and use of DSI

Australian Grains Genebank lead Dr. Sally Norton in her presentation highlighted DSI being generated in Australia and their management and use for biodiversity conservation and agriculture. Dr. Sunil Achrak, (National Fellow ICAR- National Bureau of Plant Genetic Resources), while highlighting the status of DSI in India, stressed the need for developing infrastructure and HRD. Dr. Brad Sherman highlighted legal aspects of DSI, patents and other related issues in agriculture.

Other Activities

Interaction meetings with Foreign and Pravasi Fellows for enhancing their contributions (Convener: Prof Rajeev K. Varshney)

Two virtual meetings were held with NAAS Foreign and Pravasi Fellows in the Academy on March 20, 2024, with Fellows from Australia, Asia, and Europe regions, and on March 22, 2024, with Fellows from the North and South Americas regions. Both the meetings were Chaired by Dr. Himanshu Pathak (President, NAAS and 35 Foreign and Pravasi Fellows along with Office Bearers and EC Members of the Academy attended the meeting.

The President (NAAS) in his introductory address outlined the Indian Government's plan for the development of a roadmap towards "Viksit Bharat", with a focus on the country's transition into a developed nation. This plan entails drafting three-year document detailing immediate action plan, five-year plans, and long-term plans for every government department, including agriculture. The aim is to make agriculture more efficient, productive, profitable, and climate-resilient. The plan is expected to be implemented starting from June with the new government in place.

Key areas identified during the meeting are given below:

- Collaboration of agricultural scientists from India with leading labs from abroad, especially in new/ emerging areas of research including Artificial Intelligence to promote joint publications and thereby addressing lack of Indian representation in global scientific journal
- Develop strategies to improve teaching quality and enhance shared degrees, and Scientist-Student exchange programs. The academy may facilitate the development of a structured program for the Education Division of ICAR through Foreign and

Pravasi Fellows. Organizing expert consultations, and brainstorming sessions to effectively harness new ideas

- Collaboration of NAAS fostering South-South collaboration, particularly for Africa, by having more Fellows, and also organizing international conferences.
- Collaboration between various Institutions and Countries including CGIAR and international organizations, particularly in the field of agriculture and food security

Activities of the Regional Chapters

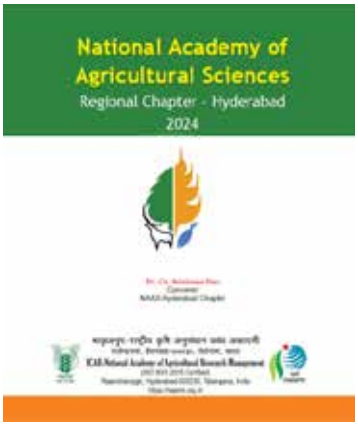
Hyderabad Chapter

Felicitation to Prof. Rajeev K. Varshney (NAAS, Foreign Secretary) for receiving Fellowship of the Royal Society (FRS)

Hyderabad Chapter in collaboration with Indian Institute of Millets Research (IIMR) and NAARM organised ceremony on January 4, 2024 at IIMR, Rajendra Nagar, Hyderabad to felicitate Prof. Varshney for getting the coveted Fellow of Royal Society. During the ceremony, he stressed upon the role of science communication in the research and development and shared his experience working with various national and international research labs.

NAAS-Hyderabad chapter fellows profile book published

Hyderabad chapter published Fellows (58) and Associates (8) Profile Book-2024, which was shared with government departments in both Andhra Pradesh and Telangana regions, press and media, private Institutes, agri-industry and others.



Online meeting of Associates of NAAS-Regional Chapter, Hyderabad

The online meeting of the NAAS Associates (Hyderabad Chapter) was held on January 24, 2024 to strengthen Regional Chapter. Dr. Ch. Srinivasa Rao, Convener of the Regional Chapter, welcomed the participants and briefed about the various activities like student's sensitization programs and special guest lectures arranged in recent past under the aegis of NAAS. He also called upon the members to organise various scientific events to strengthen the NAAS. Dr. R M Sundaram, (Treasurer) outlined the planned activities from ICAR-IIRR, Hyderabad, which will be conducted under the umbrella of NAAS.

Special Lecture on "ASRB - In Search of Talent"

Hyderabad chapter, in collaboration with ICAR-NAARM, organised a special lecture by Dr. Sanjay Kumar, Chairman, Agricultural Scientists Recruitment Board (ASRB) on 'ASRB - In Search of Talent' on February 17, 2024 in hybrid mode. He shared the various initiatives taken by ASRB to attract talent. He also shared the historical perspective of the board

and along with the new activities and progress in recruitments at ASRB in the recent past.

National Science Day Celebrations

Hyderabad Chapter in collaboration with ICAR-NAARM, and ICAR - Indian Institute of Rice Research (IIRR) organized two events on 'National Science Day (NSD)' February 28, 2024. The theme of this year NSD was 'Indigenous Technology for *Viksit Bharat*'.

The school students visited developmental activities in the NAARM campus which included visits to nursery, herbal garden and bio-diversity Park of the Academy, so as to nurture scientific attitude among them. More than 250 students visited ICAR-IIRR Museum, to know about the Institute's released varieties/hybrids and rice-based technologies. Various competitions *viz.,* elocution, essay writing, poster presentation and quiz were also conducted.

Prizes and certificates to the winning students and mementos to the participating schools were presented.

Lucknow Chapter

Lucknow Chapter in collaboration with the ICAR-Indian Institute of Sugarcane Research (IISR), Lucknow,

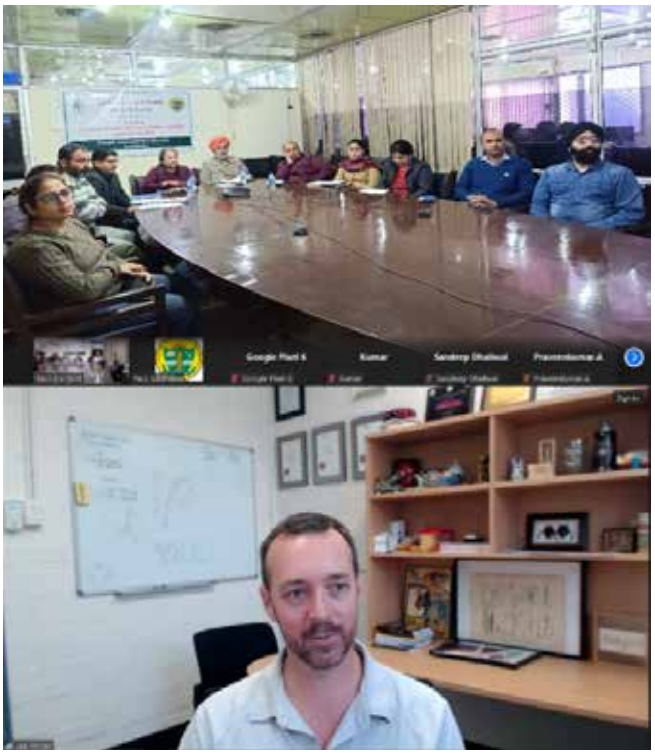
and the Sugar Technologists Association of India organised seminar on "**Mechanization of Sugarcane Cultivation**" on March 7, 2024 and more than 200 experts including scientists, technocrats, farmers and industry representatives attended the programme. Dr. R. Viswanathan, (Director, IISR and Convener, Lucknow chapter) presented Institute's advancements

in sugarcane mechanization, showcasing various machinery developed and commercialized by the Institute, such as sugarcane cutters, planters, and residue shredders.

Shri Sanjay Singh Gangwar (Chief Guest) (Member, Uttar Pradesh Assembly) stressed the importance of mechanization and modernization in empowering sugarcane farmers, essential for India's journey towards development.

Ludhiana Chapter

Ludhiana Chapter organized an interactive workshop on 'Speed Breeding' with Punjab Agricultural University (PAU) on February 20, 2024. Dr. A.S. Dhatt, (Additional Director, Research, PAU), Chaired the event. Prof. Lee Hickey from the University of Queensland, Australia was the guest speaker. He advocated for speed breeding to enhance crop breeding programs by stressing protocol development and integration with genomic techniques.



Forthcoming Programmes

Brainstorming Sessions

- Strategies and policy design for enhancing the global footprint of Indian spices (Convener: Dr. Prasath Duraisamy)
- Cellular Fish Meat production: Prospects and Challenges (Conveners: Dr. C.N. Ravishankar and Dr. A. Gopalakrishnan and Co-convener: Dr. Mukund Goswami)
- Underutilized Wild Fruit & Vegetables for Nutritional and Health Security: Policy Perspectives (Convener: Dr. T.K. Behera and Co-convener: Dr. Oliver King, MSSRF)
- Climate Adaptive Conservation of Aquatic Genetic Resources (Convener: Dr. U.K. Sarkar)
- Agrivoltaics in Agriculture (Convener: Dr. A.K. Sikka and Co-Convener: Dr. P. Santra)

Strategy Workshops

- Maize to Ethanol in India: Prospects and Strategies (Convener: Dr. H.S. Jat)
- Crop Protection Solutions: Group MRL & Minor Uses of pesticides (Convener: Dr. P.K. Chakrabarty)
- Carbon Farming (Conveners: Drs. Biswapati Mandal and Vinay Sehgal)
- Water Security: Is Quantum or Management the Issue? (Conveners: Dr. Anil K. Singh and Dr. K. Palanisami)
- Nano Fertilizers (Conveners: Dr. V.K. Singh and Dr. Sanjay Singh Rathore)

Obituaries

Prof. Mohammad Shamim Jairajpuri
(1942 – 2024)

Prof. M. Shamim Jairajpuri, an eminent figure in the field of Nematology, passed away on January 10, 2024, at the age of 82. Born in the humble village of Jairajpur in Eastern Uttar Pradesh, he embarked on his academic journey with early education in his hometown before joining Aligarh Muslim University (AMU). At AMU, he completed his B.Sc. and M.Sc. degrees in 1959 and 1961, respectively, followed by his Ph.D. in 1964, at a remarkably young age. His academic prowess was further recognized with a D.Sc. from AMU in 1969, achieved in record time.

Prof. Jairajpuri's expertise in Nematology spanned over five decades, during which he made substantial contribution to nematode taxonomy, morphology, reproductive biology, ecology, and behavior. He authored and edited 28 books and published over 400 research papers in esteemed National and International journals. Notably, his collaboration with me resulted in two seminal works: "DORYLAIMIDA" (1992) and "MONONCHIDA" (2010), which are widely regarded as authoritative references in the field.

Throughout his illustrious career, Prof. Jairajpuri held various academic and administrative positions, including Lecturer, Reader, and Professor at AMU. He also served as Principal Nematologist at the International Institute of Parasitology, Commonwealth Agriculture Bureau, U.K., and the youngest Director of the Zoological Survey of India. He played a pivotal role in establishing Institutions such as Maulana Azad National University and the Institute of Agriculture at AMU, Aligarh.

Prof. Jairajpuri's contributions were not limited to academia; he held leadership positions in scientific societies and journals and received numerous National awards and honors for his outstanding contributions to science and education. His demise is mourned by the scientific community, especially among Nematologists, who recognize him as a luminary in the field.

Prof. Wasim Ahmad
Former Dean, Faculty of Life Sciences,
Aligarh Muslim University, Aligarh

Dr. Nath Saran Lal Srivastava
(1943 – 2024)

Dr. Nath Saran Lal Srivastava, a distinguished figure in the field of agricultural engineering, was born on July 1, 1943, in Bishunpura, Gorakhpur. He pursued his education with dedication, graduating from Allahabad Agricultural Institute, completing his Master's at IIT Kharagpur, and obtaining his Doctoral degree from Bhopal University in 1988. Throughout his illustrious career, Dr. Lal held several significant positions, including Acting Director at Central Institute of Agricultural Engineering and Assistant Director General (Engg.) at the Indian Council of Agricultural Research (ICAR) in New Delhi.

His contributions extended beyond administrative roles, He published more than 200 research papers in National and International journals and received numerous prestigious awards, including the Rafi Ahmed Kidwai Award of ICAR, Fellowships of the National Academy of Agricultural Sciences (NAAS) and the Indian Society of Agricultural Engineers (ISAE), the Mason Vaugh Agricultural Engineering Pioneer Award, and the ISAE Gold Medal. Additionally, he served as President (ISAE) and held editorial roles for several journals.

On January 1, 2024, Dr. Nath Saran Lal passed away, leaving behind a profound legacy of professionalism and dedication to his field. Dr. Lal's unwavering commitment to his responsibilities and his gentle spirit, which will be deeply missed by the agricultural engineering community. The National Academy of Agricultural Sciences (NAAS) paid heartfelt tributes to Dr. Lal, expressing condolences to his family and friends during this difficult time.

Dr. C. R. Mehta
Director, Central Institute of Agricultural Engineering, Bhopal

Dr. Gajendra Bahadur Singh
(1940 – 2024)

Dr. Gajendra Bahadur Singh, the founder Joint Director of ICAR, Research Complex for NEH Region, Sikkim Centre, passed away on February 28, 2024. He played a pivotal role in shaping the development of Sikkim during his tenure as the first Joint Director. Known for his leadership qualities

and strong bonds with state authorities, Dr.Singh focused on strategic land use and research farm development. He spearheaded initiatives in terrace cultivation, introduced livestock management, and promoted agro-forestry and large cardamom plantations. Dr. Singh's efforts transformed vast forest lands into cultivable terraces, facilitating sustainable agricultural practices. Under his leadership, significant infrastructure developments, including administrative buildings, laboratories, and scientist hostels were accomplished. He also contributed to publications on package of practices for various crops.

Born in Lucknow on July 1, 1940, Dr. Singh pursued his education at UP College, Varanasi, and obtained his graduation and master's degrees in Agriculture from Allahabad Agricultural Institute and Kanpur Agriculture College, respectively. He initially served as Assistant Professor at PAU Ludhiana and later joined ICAR-Indian Institute of Sugarcane Research (IISR), Lucknow as a Senior Agronomist before his appointment as Joint Director at ICAR Research Complex for NEH Region, Sikkim Centre. His illustrious career also included roles such as ADG (Agronomy) at ICAR, Director, ICAR-IISR, Lucknow and Vice Chancellor, JNKVV, Jabalpur. Dr. Singh received prestigious awards such as the Fakhruddin Ali Ahmad Award and the ICAR Award for Team research. He was also Fellow of NAAS, ISA, and SCSI.

His passing is mourned by the agricultural community, recognizing his legacy as a visionary leader and esteemed scientist. The National Academy of Agricultural Sciences (NAAS) and other organizations paid heartfelt tributes, expressing condolences to Dr. Singh's family and friends during this difficult time.

Dr. V. K. Mishra
Director, ICAR Research Complex for NEH Region
Umium, Meghalaya

Professor Mam Chand Goel
(1941 – 2024)

Prof. M. C. Goel, a distinguished Veterinary Immunologist and Microbiologist, hailed from Sultanpur village, Saharanpur, Uttar Pradesh. After completing his primary education, he pursued his high school studies from Hisar and later joined the College of Veterinary Sciences, Hisar in 1959, where he excelled academically and was awarded Gold Medal for his achievements in BVSc & AH. He furthered his education with a Master's degree from IVRI Izatnagar, Bareilly, and a Ph.D. in Veterinary Bacteriology and Hygiene from HAU, Hisar in 1970. Prof. Goel commenced his academic career as an Assistant Professor from the Department of Veterinary Bacteriology and Hygiene, HAU, Hisar in 1970. He undertook a Commonwealth Post Doctoral Fellowship at the Lister Institute of Preventive Medicine, London in 1971. Dr. Goel's expertise and dedication led to his appointments as Associate Professor in 1974 and subsequently as Professor of Immunology in 1985 at CCS Haryana Agriculture University, Hisar.

Throughout his career, Prof. M. C. Goel made pioneering contributions to Veterinary Immunology, particularly focusing on the buffalo immune system. For his significant achievements he received prestigious awards such as the Hari Om Ashram Trust Award of CAR, New Delhi in 1985, and a DAAD Fellowship as a Visiting Scientist in Germany in 1996. He published numerous research papers in reputable National and International journals.

Prof. Goel played a crucial role in establishing the Veterinary Immunology Section at the Department of Veterinary Microbiology, CCS HAU, Hisar, and initiated MVSc and Ph.D. programs in Veterinary Immunology. He also guided several MVSc and Ph.D. students. In addition to his academic endeavors, Dr. Goel held various administrative positions, including Head, Department of Veterinary Microbiology, Project Coordinator for AICRP on Blood Protista, Additional Director of Research, and Dean, Post Graduate Studies, CCS, HAU, Hisar.

Prof. M. C. Goel passed away on February 10, 2024 in Hyderabad after a brief illness. With his demise, the country lost a luminary in Veterinary Immunology and Microbiology. The veterinary community mourns his loss and remembers him as a pioneering scientist and educator.

Dr. (Mrs.) Minakshi Prasad
Former Professor and Head, Department of Animal Biotechnology, CCS Haryana Agricultural University, Hisar

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