

# **ANNUAL REPORT**

## **2022-23**



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



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**National Academy of Agricultural Sciences**

NASC, DPS Marg, New Delhi - 110012 India

June 2023



## PREFACE

It gives me immense pleasure to place the annual report for the year 2022-2023 before the esteemed Fellowship. This report provides an account of the year-round activities of the Academy playing the role of the think tank guiding the policies and plans for the agriculture sector. During the year, the Academy organized nine brainstorming sessions, strategy workshops, expert meets, etc. Additionally, the “World Biodiversity Day” was organized to discuss the Global Gene Bank and Biodiversity Management for sustainable agriculture. The Foundation Day lecture was delivered by Prof. P. Balram on the “Reflections on Science in the age of Corona Virus”, highlighting the dependence of tools and technology to practice science. He lauded the application of rDNA technology which facilitated the development of genetically modified crops. Special lectures by Dr. Amit Roy, Former President & CEO, IFDC & Former Ex-Director, GPI, Morocco and Mr. Kent Nnadozie, Secretary International Treaty on PGR for Food & Agriculture, UN, FAO, Rome were also organized during the year.



I must appreciate the contributions of Academy's Foreign Secretary for successfully organizing two interaction meetings with Foreign and Pravasi Fellows and establishing linkages with reputed Scientific Academies in other countries.

It is also appreciated that special meetings with school children to create awareness of good nutrition were organized. An Academia industry meet to enhance the profit of farmers was also organized. The Academy inducted 34 Fellows during the year 2023.

The regional chapters undertook different activities to disseminate the goals of Academy through meetings with ICAR/Universities/Private sectors. I would like to place on record my thanks to all the Conveners of regional chapters, BSS and other events for their contribution. A total of 18 publications on policy/status/strategy have been brought out during the past year.

I also place on record my gratitude to the Immediate Past President Dr. T. Mohapatra, and all outgoing Office Bearers and EC members for their guidance and contributions.

A handwritten signature in blue ink, appearing to read 'Himanshu Pathak'.

**(Himanshu Pathak)**  
*President*



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## ABOUT THE ACADEMY

Inspired by the vision of late Prof B.P. Pal, FRS, the National Academy of Agricultural Sciences (NAAS) was established in 1990 to provide an interactive platform for agricultural scientists from different disciplines — crop husbandry, animal husbandry, fisheries, forestry, engineering and social sciences to deliberate on important issues related to agriculture and rural development; agricultural research, education and extension; and facilitate the provision of evidence-based inputs to policymakers and other stakeholders at different levels of governance. The Academy organizes and supports national and international congresses, conferences, seminars, symposia, workshops and brainstorming sessions on the contemporary issues in agricultural sciences and articulates the role of agricultural research, education and extension in economic development.

The Academy has emerged as a think tank for agricultural science policy in India. The Fellows of the Academy, recognized for their contributions to science, include distinguished personalities in agriculture and allied sciences from India and abroad.

### OBJECTIVES

- To promote ecologically sustainable, economically vibrant and socially equitable agriculture.
- To recognize and support excellence in scientific research in the field of agriculture.
- To provide promising scientists with the conditions necessary for the advancement of their work.
- To promote contact among research workers in different institutions and organizations within the country and with the world scientific community.
- To organize and undertake inter-disciplinary analyses of issues of importance to farmers, farming and agricultural transformation to strengthen the science-policy interface and bring out documents for the advancement of agricultural research, extension and education for development.
- To secure and manage funds and endowments for the promotion of agricultural sciences.
- To carry out other activities relevant to the accomplishment of the above goals

## Structure of the Academy

- **The General Body:** This Body of the Academy comprises all the Fellows.
- **The Executive Council (EC):** It is the main policy and decision-making body. It is assisted by different Committees to deal with various aspects of governance and activities of the Academy.
- **Regional Chapters:** Twelve Regional Chapters of the Academy are functioning in Barapani, Bengaluru, Bhopal, Coimbatore, Cuttack, Hyderabad, Karnal, Kolkata, Lucknow, Ludhiana, Pune, and Varanasi.

## SCIENTIFIC ACTIVITIES

### *Brainstorming Sessions/Strategy Workshops/Consultation Meetings*

During the year, the following brainstorming sessions/strategy workshops/consultation meetings were organized:

| Sl. No. | Title  | Convener/ Co-Convener   | Date               |
|---------|--|---|--------------------|
| 1.      | Brainstorming Session on Sustaining Pulses Revolution  | Dr. Anjani Kumar, Dr. Shivendra Srivastava  | April 05, 2022     |
| 2.      | Strategy Workshop on Impact of COVID 19 on Livestock (Animal Health and Dairy/Poultry/ Meat/Feed Industry) | Dr. R.K. Singh and Dr. D. Bardhan   | June 24, 2022      |
| 3.      | Brainstorming Session on Promoting Millets Production, Value Addition and Consumption                      | Dr. O.P. Yadav, Dr V.A. Tonapi  | July 22, 2022      |
| 4.      | Strategy Workshop on Scaling up Innovative Agricultural Extension Models                                   | Dr. Ashok K. Singh; Dr. Randhir Singh and Dr. V.P. Chahal                         | September 12, 2022 |
| 5.      | Expert Meet on Beyond Price Support and Subsidy  | Dr. Pratap Singh Birthal, Dr. Shivendra Kumar Srivastava, and Dr. Prabhat Kishore | September 30, 2022 |
| 6.      | Brainstorming Session on Sea Weed Cultivation and Utilization  | Dr. J.K. Jena, Dr. A. Gopalakrishnan  | November 16, 2022  |

| Sl. No. | Title   | Convener/ Co-Convener                                  | Date              |
|---------|---|--|-------------------|
| 7.      | Brainstorming Session on Service Delivery Mechanism in Livestock Sector     | Dr. M.L. Madan, Dr. Abhijit Mitra and Dr. P.S. Birthal | December 05, 2022 |
| 8.      | Brainstorming Session on Plant- based vs Dairy Milk-myths and facts         | Dr. A.K. Srivastava                                    | December 10, 2022 |
| 9.      | Agriculture in Harsh Environment: Challenges, Opportunities and Way forward | Dr. Rakesh K. Singh, Dr. Rod A. Wing                   | February 24, 2023 |

### Brainstorming Session on Sustaining Pulses Revolution (Convener: Dr. Anjani Kumar, Co-Convener: Dr. Shivendra Srivastava)

Pulses play a vital role in sustaining food and nutritional security in India, which is the largest producer and consumer of pulses in the world, constituting 28 percent of global production and 39 percent of global consumption. In spite of the significant progress made, the pulses production in the country has remained inadequate to fulfill the domestic demand. The poor pulses production in 2015-16 due to weak monsoon resulted in excess demand that led to surge in imports. With the concerted efforts made by the Government of India to increase pulses production, a significant upward trend in the production of pulses has been registered since 2015-2016.

Sustaining increased production of pulses, managing the supply effectively for improved food and nutritional security, and making India self-reliant on pulses need a careful strategy. The National Academy of Agricultural Sciences (NAAS) organized a one-day brainstorming session on “Sustaining Pulse



Production in India” **in hybrid mode on 05 April, 2022** under the chairmanship of Dr. T. Mohapatra, President of the Academy. The brainstorming session deliberated on various aspects to chalk-out strategies and action plans for accelerating and sustaining production of pulses and improving its consumption.

Short, medium, and long term measures were identified and technological and policy interventions were suggested, which include:

- Mapping spatial variation in pulses yields and identifying the hot spots where yield gap in pulses crops is wider, to prioritize these under NFSA-Pulses interventions. Bridging the yield gap by 25 percent alone can improve pulses production up to 1.5 million tonnes.
- Improvement of seed replacement rates.
- Promotion of pulses production and diversification in pulses basket with necessary policy support and incentives.
- Maintaining a buffer stock of about 10 percent of total production to stabilize pulses prices.
- Aggressively support advanced technological developments for improving yield potential through tolerance to various biotic and abiotic stresses.
- Make pulses an attractive option for the private sector investment in production, storage and marketing.
- Include pulses in welfare schemes for improving nutritional security and sustaining the food system.
- Create awareness about the benefits of pulses for nutrition and environment.

### **Strategy Workshop on Impact of COVID 19 on Livestock (Animal Health and Dairy/Poultry/Meat/Feed Industry) (Conveners: Dr. R.K. Singh and Dr. D. Bardhan)**

The Academy organized a brainstorming session on 'Impact of COVID 19 on livestock & poultry sector' on 24<sup>th</sup> June, 2022 in hybrid mode. Dr. T. Mohapatra, President, NAAS, chaired the session along with Dr. A.K. Singh, Vice-President, NAAS and Dr. A.K. Srivastava, Vice Chancellor, DUVASU. Dr. J.K. Jena, DDG (FS), ICAR, Dr. H. Rahman, Regional Representative, ILRI



South Asia and Dr. Abhijit Mitra, Director, ICAR-CIRC and several other eminent scientists attended the meeting.

Sector-specific presentations were made on the impact of COVID 19 on dairy, poultry, fisheries, feed and meat industries as well as on breeding and health. Specific policy inputs were suggested for managing veterinary services, supply chain solutions, challenges in veterinary science education and role of extension services in mitigating the impact of the pandemic.

The recommendations emerging from the brainstorming session were to use the learnings from COVID 19 to prepare policies to mitigate the adverse impact of such calamities in future. In this context, the role of innovative technologies in reducing the scope of human-to-human contact needs to be explored. Preparedness to address future shocks from pandemics are needed in terms of ensuring smooth supply of raw materials, like feeds, semen, even curative and preventive veterinary services to ensure that the supply chains operate normally. Points of interventions based on risk assessment need to be identified. Development of diagnostics and vaccines for challenging diseases (like ASF, MERS, LSD and RVF) and strengthening of the surveillance system is also critical.

It was felt necessary to adopt a 'one-health' approach addressing the environmental, human and animal health issues. The lack of reliable database was identified as one of the critical factors in estimating the true quantitative impact of COVID 19 and decision making for mitigating the negative impact of pandemics. Hence, preparing a repository on animal diseases is imminent and critical. It is necessary to strengthen animal husbandry sectors for preventing future pandemics and for emergency preparedness with adoption of biosecurity measures.

### **Brainstorming Session on Promoting Millets Production, Value Addition and Consumption (Convener: Dr. O.P. Yadav)**

A brainstorming session was organized on July 22, 2022 to explore the possibility of promoting millets production, enhanced value addition and greater consumption.





Following recommendations emerged out of the brainstorming session:

- Promotion campaigns with personalities of public standing; organization of fairs, exhibitions, festivals and campaigns; brand ambassadors and national level 'Eat Millets Campaigns' should be launched to create awareness about the benefits of millet-based food.
- Genetic improvement is required to develop new cultivars, using new tools and technologies, with high production potential and adequate environmental adaptation to make millets competitive with other crops.
- There is an urgent need to strengthen the seed chain by creating adequate number of seed-hubs especially for minor millets to increase the adoption of new cultivars and enhance the seed replacement rate.
- Primary and secondary processing of millets require efficient and low-cost machines. Designing, manufacture and promotion of such machines are recommended through appropriate public-private partnerships.
- Mainstreaming of millets in the Public Distribution System as in case of wheat and rice is required for creating bulk demand.
- Doubling investment in research and development of millets is essentially needed to create adequate infrastructure and sufficient human resource for carrying out R & D work on millets. Creation of millet-based FPOs, start-ups, incubation centres and Nutri-Hubs during 2023, the International Year of Millets, can be a starting point.

### **Strategy Workshop on Scaling up Innovative Agricultural Extension Models (Convener: Dr. Ashok K. Singh, DDG (ICAR); Co-Conveners: Dr. Randhir Singh, ADG (AE) and Dr. V.P. Chahal, ADG (AE))**

A brainstorming session on 'Scaling up Innovative Agricultural Extension Models' was organized by the Academy on September 12, 2022 under the chairmanship of Dr. T. Mohapatra, President, NAAS. Dr. Himanshu Pathak, Secretary DARE and Director General ICAR was the chief guest. Dr. A. K. Singh, DDG (AE), ICAR, New



Delhi, and Convener presented the base paper highlighting innovative public and private extension models, and raised issues relating to their scaling out. Dr. Pathak praised the frontline extension system of the Indian Council of Agricultural Research in planning and executing extension interventions efficiently and effectively. He also highlighted the role of Krishi Vigyan Kendras (KVKs) as a grassroots-level extension institution, linking farmers and other stakeholders to the National Agricultural Research System (NARS). Dr. Mohapatra remarked on the need of remodelling KVKs as a single window delivery centre for dissemination of technologies and agro-advisory, and capacity development. Situation-specific and demand driven extension models are the need of the hour. Convergence and partnership-based extension models are required. Private extension has to play a complementary and supplementary role to the public extension system.

Major recommendations are as follows:

- Krishi Vigyan Kendras (KVKs) need to be strengthened as Agri Clinic & Technology Incubation Centres following Single Window Delivery approach. Establishment of diagnostics lab, and processing & value addition facilities is necessary at KVKs.
- Policy framework needs to be developed to ensure convergence of stakeholders (Producers, Processors, FPOs, Market promotion agencies like APEDA etc.)
- Innovative extension model of state Government of Andhra Pradesh named Rythu Bharosa Kendra, which ensures convergence of all stakeholders for efficient extension delivery may be examined and considered for replication in other states.
- Innovative extension models of ITC, BKC WeatherSys for customized agro-advisory delivery for crop management, weather alerts and market intelligence can be integrated with public sector ICT based extension delivery platforms like Kisan SARATHI.

**Expert Meet on Beyond Price Support and Subsidy (Convener: Dr. Pratap Singh Birthal, Director, ICAR-NIAP and Co-Conveners: Dr. Shivendra Kumar Srivastava, ICAR-NIAP and Dr. Prabhat Kishore, ICAR-NIAP)**

In order to achieve self-sufficiency in food grains and ensure food security for all, an integrated approach is needed encompassing investments in agricultural research and extension systems, provision of subsidies on critical inputs, adoption of new technologies, and guaranteed support prices for food grains and their procurement. This will help minimize price fluctuations and reduce unscrupulous trade

practices, and support public stockholding of food grains and their distribution to the weaker sections at affordable prices. This strategy worked well and made the country self-sufficient in food grains. However, there are several concerns regarding their adverse effects on land and water resources, reduction in agro-biodiversity, increase



in inter-household and inter-regional disparities, and disincentive to private investment in markets, storage and warehouses, which need a relook.

In view of this, a brainstorming session was organized in a hybrid mode on September 30, 2022 under co-chairmanship of Dr. Trilochan Mohapatra, President, NAAS and Shri Siraj Hussain, former Secretary, Ministry of Agriculture and Farmers Welfare, Government of India. The important recommendations emerging from the deliberations are as follows:

- Minimum Support Price is necessary for better price realization and higher yields, but given its negative externalities there is a need for critical examination of alternative means of market support including price deficiency scheme and futures' trading.
- Invest in research on alternative crops of rice and wheat so as to improve their profitability.
- Re-purpose agricultural subsidies based on valuation of ecosystem services.
- Devise a package of compensation for farmers diversifying away from rice and wheat
- Differentiated volumetric pricing of water will aid in crop diversification

**Brainstorming Session on Seaweed Farming and Utilization [Convener: Dr. J.K. Jena, DDG (Fisheries Science), ICAR; Co-convener; Dr. A. Gopalakrishnan, Director, ICAR-Central Marine Fisheries Research Institute, Kochi]**

A Brainstorming Session on "Seaweed Farming and Utilization" was organized on 16th November 2022 under the chairmanship of Dr. Trilochan Mohapatra,



President, who emphasized the need for introduction of alternate seaweed species, especially high-yielding indigenous ones in the farming practices, and round-the-year availability of quality planting material. He also stressed on the importance of novel compounds, nutraceuticals,



and plant growth-promoting substances derived from seaweeds; and developing guidelines for promotion of seaweed-based bio-stimulants. Experts from the public and private sectors participated in the BSS and the following key recommendations emerged:

- Establish seaweed seedbanks and supply chains for round-the-year production and supply of quality planting material of all commercially important seaweed species. Micro-propagation for largescale production of planting material needs to be up-scaled and pilot-scale seaweed farming be taken up in potential areas.
- Alternative high-yielding native and exotic species of seaweed should be evaluated for farming to reduce dependence on single species *Kappaphycus alvarezii*.
- Strain improvement of selected indigenous and commercially important seaweed species.
- Mechanism for regular purchase of surplus seaweed materials by the Government at remunerative prices.
- Introduce insurance for seaweed farming.
- Test efficacy of seaweeds as fodder supplements to reduce methane emission from livestock.
- Promote offshore farming and IMTA with native seaweed species.
- Expedite FSSAI standards for seaweed products/ recipes (including dried products) for human consumption and guidelines for imports, and evaluation of exotic seaweed species.
- Promote seaweed products in domestic and international markets.
- Develop cultural practices for at least 2-3 commercial brown seaweed species for algin.

- Regular release of seaweed annual calendar and distribution pattern of seaweeds in coastal regions, and periodic estimation of potential yield to facilitate wild collection in a sustainable manner.
- To organize “National Seaweed Day” to promote seaweed consumption.

### **Brainstorming Session on Livestock Service Delivery System in India (Convener: Dr. M.L. Madan; Co-conveners: Dr. Abhijit Mitra and Dr. P.S. Birthal)**

A BSS on “Livestock Services Delivery System” was held on December 5, 2022 under the Chairmanship of Dr. T. Mohapatra, at NAAS, New Delhi to examine the current status of livestock service delivery system in India and to explore innovative models for providing service support to livestock producers.



The key recommendations emerging from the deliberations are:

- Public extension system is more efficient in improving livestock productivity, but its outreach is limited despite the country having more than 80000 veterinarians in the public sector. Thus, there is a need to redefine the role of existing veterinarians for engaging them in delivery of livestock services to farmers.
- There is need for a regular interface between public and private service providers to improve capacities of the latter in diagnosis and prescriptions.
- Promote digitization in dairying from genetics to end-consumption for improving efficiency of milk value chains.

### **Brainstorming Session on Milk vs. Plant-Based Dairy Analogues (Convener: Dr. Anil K. Srivastava, Vice Chancellor, DUVASU, Mathura)**

Milk is a super food, fulfilling requirement of all the nutrients including vitamins, minerals and bioactive molecules. The role of milk in improving human nutrition, immunity, body growth and mineral sufficiency has made it as one of the best alternatives over other foods, and, therefore nutritionists, pharmacologists, and

clinicians consider it as a complete food. However, in the recent past, a new range of products called 'plant-based milk analogues' have been introduced in the global market, which has created confusion among consumers and may harm human health if not based on sufficient scientific evidences. The plant-based food



industry can complement the dairy industry in ensuring food security. With this background, a brain storming session on 'Milk vs. Plant-Based Dairy Analogues' was held on December 10, 2022 at DUVASU, Mathura under the Chairmanship of Dr. Anil K. Singh, Vice President, NAAS. Major recommendations are given below:

- Plant-based milk analogues cannot be an alternative to milk.
- Plant-based milk is a misnomer. Use of the term 'milk analogue or beverage' is more appropriate.
- A large-scale campaign may be conducted to create awareness among people regarding anti-nutritional elements in some of the plant-based beverages.
- Myths related to consumption of milk and milk products should be addressed through awareness campaigns.
- Plant-based analogues should be used with utmost care as a complement to milk but not as a substitute of milk.
- Milk for all or Milk for life or Milk for every house or any other suitable national slogan can be designed to create awareness among consumers.
- For ensuing nutritional security, the plant-based beverages may be used along with milk but with a line of demarcation between milk and plant-based analogues.

### **Brainstorming Session on Agriculture in Harsh Environment: Challenges, Opportunities and Way Forward (Convener: Dr Dr. Rakesh K. Singh, Co-Convener: Dr. Rod A. Wing)**

A brainstorming session was organised on "Agriculture in Harsh Environment: Challenges, Opportunities and Way Forward" in hybrid mode on February 24, 2023 under the chairmanship of Dr. KM Bujarbaruah, Vice President of the Academy.

The primary goal of the session was to look for ways to improve agriculture in areas that face challenging/harsh environments such as extreme temperatures, salt-affected soils, limited/poor quality water, poor soil quality and coastal agro-ecosystems.

Several opportunities were identified and many options including agro-forestry; soil remediation; and community actions were discussed. As way forward, crop diversification, climate-smart agriculture practices, use of precision agriculture techniques and artificial intelligence were suggested. Further, integration of germplasm evaluation, identification and use of regional or locally adapted crop varieties/landraces, allele mining, genomics, physiology and breeding need to be taken up as team activities, to develop crop varieties with inbuilt resilience.

## *Special Programmes*

### **World Biodiversity Day**

On May 22, 2022, the NAAS observed World Biodiversity Day by organizing a discussion on Global Genebanks and Biodiversity Management for Sustainable Agriculture. Over 350 delegates participated in this program.

In his opening remarks, Dr. T. Mohapatra highlighted the importance of biodiversity for human life, and emphasized on developing global partnership, preparing an action plan for preserving and utilizing biodiversity, and creating public awareness especially among



school children on the role that biodiversity plays in our daily life. Capacity building of the university graduates and involvement of policymakers in the efforts towards biodiversity conservation were emphasized. Issues relating to collection and conservation of crop biodiversity; seed bank; utilization of germplasm resources for crop improvement; sharing of the biological resources through a multilateral system under the Plant Treaty (ITPGRFA); genomics, pan-genomics, and product development using genomics-assisted and superior haplotype-based fast-forward breeding approaches were discussed.



## **Special lecture by Dr. Amit Roy, Former President, and CEO, IFDC and Former Executive Director, Global Phosphorus Institute (GPI), Ben Guerir, Morocco**

A special lecture by Dr. Amit Roy, Former President, and CEO, IFDC and Former Executive Director, Global Phosphorus Institute (GPI), Ben Guerir, Morocco was organized on the topic 'Managing Fertilizers for Food Security and Environmental Sustainability' on September 08, 2022. It was co-chaired by Dr. T. Mohapatra, President, NAAS and Dr. Himanshu Pathak, Secretary, DARE & DG, ICAR. Dr. Roy highlighted that fertilizers are essential for increasing food production but need to be managed to reduce losses to the environment. Further, increased nutrient use-efficiency is urgently needed through innovative products, application practices and proper policies. He emphasized that public-private partnership is need of the hour to develop new fertilizers and application techniques.



## **Special Lecture by Mr. Kent Nnadozie, Secretary, International Treaty on Plant Genetic Resources for Food and Agriculture, United Nations, FAO, Rome**

The Academy organized a special talk on 'The International Governance of Plant Genetic Resources for Food and Agriculture: The Role and Place of the International Plant Treaty' by Mr. Kent Nnadozie, Secretary, International Treaty



on Plant Genetic Resources for Food and Agriculture, United Nations, FAO, Rome on September 15, 2022. It was Chaired by Dr. T. Mohapatra, President, NAAS, and convened by Prof K.C. Bansal, Secretary, NAAS. The talk generated a great discussion and the participants learnt a lot on recent developments on global utilization and exchange of plant germplasm for food and agriculture. The highlight of the presentation was a reminder of the need for collective action for sustainable development.

### **National Symposium on Food, Nutrition and Environmental Security: Towards Achieving SDGs (29-30 August, 2022)**

India's current population of 1.40 billion (around 17.7% of world population) is likely to reach 1.51 billion by 2030 thus becoming the most populous country in the world. A fundamental question arises as to whether India will continue to remain self-sufficient in food production and achieve sustainable development goals (SDGs) by 2030. The challenge to produce more from decreasing per capita arable land and irrigation water besides the increasing abiotic and biotic stresses, is quite alarming. The impact of climate change on agriculture is expected to further reduce production of major food crops by almost 10-20 per cent. With a widespread prevalence of malnutrition, achieving nutrition security remains a formidable task. In such a scenario the commitment of Government of India to meet SDGs and the Paris Agreement for Climate Change present a unique opportunity for the entire agricultural sector to get realigned for a better future. Hence, India is committed to bring a demand-driven and technology-led revolution to meet the challenges of rising demand for food, improved livelihood opportunities for farmers, and to attain sustainable farming for wider agricultural growth.



With this in view, a two-day symposium was jointly organized by the Trust for Advancement in Agricultural Sciences (TAAS), Indian Council of Agricultural Research (ICAR), National Academy of Agricultural Sciences (NAAS), and the

Indian Society of Plant Genetic Resources (ISPGR) in collaboration with Alliance of the Bioversity International & CIAT, ICRISAT, IRRI and CIMMYT. The symposium was well attended and addressed by eminent scientists including Dr. RS Paroda, Chairman, TAAS; Dr. Ramesh Chand, Member (Agriculture), NITI Aayog, GoI; Dr. Himanshu Pathak, Secretary DARE & DG ICAR; and Dr. T. Mohapatra, President, National Academy of Agricultural Sciences (NAAS).

The following were the major recommendations:

- Technology development plays a significant role in achieving SDG targets by improving the efficiency and effectiveness of new and more sustainable methods of development.
- The creation of new technologies that foster research and stimulate innovation are needed through stronger knowledge-sharing and collaboration amongst stakeholders both at the national and international level.
- To make supply-chains more efficient and support sustainable and durable markets, the rural infrastructure needs substantial improvement.
- Efficient and sustainable use of natural resources, adoption of hybrids and use of biofortified seeds will be essential for food and nutrition security.
- Focused attention is needed on raising farm profitability, reducing cost of production, expansion of irrigation networks, and development of the livestock sector, agri-business management and stronger producer-market linkages.
- To achieve sustainable agriculture higher investment in research for development, strong public-private partnerships, search for pro-poor innovations and their effective implementation are essential.
- This will need out-of the box thinking and creating science-based regulatory regimes; adoption of precision agriculture; digital solutions and artificial intelligence (AI).

## *Other Activities*

The Academy took part as an observer in the 9th Governing Body Meeting of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), FAO, United Nations. Prof. K.C. Bansal, Secretary, NAAS represented the Academy and participated in the deliberations.

## Interaction with Foreign and Pravasi Fellows

The Academy organized two Interaction meetings with Foreign and Pravasi Fellows on July 1 and July 5, 2022. The meetings were coordinated by Prof. Rajeev K. Varshney, Foreign Secretary. Dr. P.K. Joshi, Secretary, NAAS presented an overview of the activities of the Academy. Dr. T. Mohapatra recollected earlier interactions with some Fellows and emphasized on active participation and more contribution of Foreign and Pravasi Fellows to various activities of the Academy. After detailed discussion, specific action points were decided in order to harness the full advantage of the rich experience and expertise of Foreign and Pravasi Fellows. They agreed to contribute articles and review papers to NAAS Journal, and also act as reviewers of the articles. They can also provide gainful insights into new research areas and the policy framework for new developments in agriculture, including regulatory aspects of the GM crops, Gene editing, and Food Safety Standards. It was decided to hold such interactions once in every 6 months.



## A Special Meeting of Local Office Bearers with Delhi School Children

On the occasion of Children's Day, the NAAS Office-bearers including Dr. T. Mohapatra, President; Dr. Anil K. Singh, Vice President; Dr. P.K. Joshi, Secretary, Dr. Malavika Dadlani, Editor, and Dr. Sanjeev Saxena, Executive Director visited



Sarvodaya Kanya Vidyalaya, IARI Campus, New Delhi, on 14 November, 2022, and interacted with more than 500 girl students along with the School Principal and teachers. The interaction focused on Nutrition Awareness and importance of balanced and nutritional food in our health and wellbeing. Dr.



Malavika Dadlani introduced the topic, and Dr. Trilochan Mohapatra in his address highlighted nutritional benefits of indigenous cereals, vegetables, and fruits and informed the children about the benefits of biofortified crops. He also deliberated on the importance of scientific research in nutrition and health, and apprised the children about the advances in nutri-genomics.

## Academia-Industry Meet

NAAS organized an Academia-Industry Meet on December 23, 2022, under the Chairmanship of Dr. T. Mohapatra, President, NAAS to discuss various topical issues with regard to policy development in agriculture and allied sectors. The participants represented various sectors from the industry and deliberated issues related to seed, agro-chemicals and crop protection, fertilizers, Indian poultry, and livestock sector including cattle feed and fodder seeds, with a view to ensure sustainable growth of agriculture and enhance profit of farmers.



## REGIONAL CHAPTERS

Regional Chapters organized the following events addressing agriculture, food and nutritional issues of national and regional importance.

| Event   | Date              |
|---|-------------------|
| <b>Barapani Chapter</b>   |                   |
| A Strategy Workshop on 'Harnessing the Potential of Geographical Indication Tagged Crops in North-East India – Research Needs, Outreach Approaches and Policy Perspectives' | October 03, 2022  |
| An awareness programme for the students and teachers of Meghalaya on the importance of various agricultural models and indigenous fruits and vegetables on nutrition.       | December 07, 2022 |

| Event   | Date                            |
|---|---------------------------------|
| National Conference on Natural Farming Systems and Biodiversity Conservation under Changing Climate Scenario.   | December 5-7, 2022              |
| <b>Bengaluru Chapter</b>  |                                 |
| Guest lecture by Dr. Vivek Fellner, Director of Graduate Programmes and Professor of Ruminant Nutrition, North Carolina State University, USA on 'Rumen Microbes - Renewed Focus on Animal Health, Production and Sustainable Interventions'. | May 27, 2022                    |
| Guest Lecture by Dr. Stephen A Kraweta, Wayne State University School of Medicine, Michigan, USA on 'Sperm their Passengers, Environment and Health'.   | July 22, 2022                   |
| An awareness programme on 'Importance of nutrition for health and wellbeing' was organized for the school children from three government schools in Bengaluru Rural Districts.  | November 14, 2022               |
| <b>Bhopal Chapter</b>   |                                 |
| One-day workshop cum training on 'Composting for Soil and Human Health' was organized jointly with ICAR-Indian Institute of Soil Science, Bhopal to celebrate World Soil Day and Soil Health Awareness Week.                                  | December 02, 2022               |
| <b>Coimbatore Chapter</b>   |                                 |
| One-day training programme for seed cane growers and progressive farmers on Viral and phytoplasmal diseases and their management.   | May 07, 2022                    |
| A 'Science Quiz' competition was organized at ICAR-SBI, Coimbatore for college students.  | June 8, 2022                    |
| Demonstrations of efficient delivering of Trichoderma in banana and turmeric rhizomes in a mechanized sett treatment device were organized for farmers.   | June 13, 2022 and July 01, 2022 |
| Lecture on 'Biotechnological Interventions for Sustainable Food Production' by Dr. C. Appunu, ICAR-SBI, Coimbatore  | August 08, 2022                 |
| Interaction with school students of Panchayat union middle school, Veerakeralam, Coimbatore.  | August 10, 2022.                |

| Event   | Date               |
|---|--------------------|
| Another 'Science Quiz' competition for college students was organized as part of the 75th Independence Day celebrations.  | August 12, 2022    |
| Brainstorming Session on Researchable Issues in Plant Pathology.  | September 06, 2022 |
| A campaign on nutrition literacy for village school children on the occasion of Children's Day.   | November 14, 2022  |
| An interactive meeting on 'Quality Assurance in Agriculture Education through Accreditation' was organized in collaboration with School of Post Graduate Studies, TNAU.             | December 05, 2022  |
| Celebrating International Year of Millets at ICAR-Sugarcane Breeding Institute Coimbatore   | January 10, 2023   |
| Special campaigns for school and college students organized on National Science Day   | February 28, 2023  |
| Awareness programmes on millets were held at the Tribal settlement at Agali, Kerala   | March 17-18, 2023  |
| <b>Cuttack Chapter</b>  |                    |
| A training programme on 'Efficient and Balanced use of fertilizers (Including Nano-Fertilizers)' in Ranajhalli village of Ganjam district   | June 07, 2022      |
| Two training-cum-awareness programmes for farmers on 'Balanced Use of Fertilizers' and 'Region Specific Agroforestry'   | June 21, 2022      |
| An awareness programme on 'Crop Diversification with special Emphasis on Nutrigarden' in Tangi, Cuttack for Tribal Women.   | November 28, 2022  |
| <b>Hyderabad Chapter</b>  |                    |
| One-day training programme on Soil Testing was conducted in collaboration with KVK Yagantipalle, Andhra Pradesh and ICAR-NAARM.   | July 27, 2022      |
| A training programme was organized in association with ICAR-NAARM, Hyderabad for the farmers on 'Bio-inoculants - its Uses and Application in Agriculture' at SAIRD KVK, Gaddipally | August 25-26, 2022 |

| Event  | Date                 |
|--|----------------------|
| Sensitization Programme conducted on 'Nutrition Literacy among Rural Children' on Children's Day at Rangareddy district, Telangana.  | November 14, 2022    |
| An online lecture was organized on 'Sustainable Fishery for Food and Nutritional Security in India' by Dr. M. Vijay Gupta, World Food Prize laureate on the occasion of World Fisheries Day.   | November 21, 2022    |
| An online lecture on 'Soil Management for Climate Change Mitigation' by Dr. Anil Kumar Singh, Vice President, NAAS and Former DDG (ICAR), on the occasion of World Soil Day celebrations.  | December 05, 2022    |
| NAAS Policy Paper 87 on 'Abiotic Stress, Droughts, Floods Cyclones & Hailstorms Management' translated in Telugu, a Directory on profile of Fellows and Associates of NAAS Hyderabad Regional Chapter, and a leaflet in telugu on 'Millets for Food and Nutrition Security' in cooperation with ICAR-IIMR were released in 129th EC Meeting of NAAS. | December 16, 2022    |
| Sensitization programme on Nutrition literacy among High School Students   | January 10, 2023     |
| Skill Development Training on Vermicomposting for Farmers in Telangana   | February 2-3, 2023   |
| Training Programmes on Value addition for the Farmers of Andhra Pradesh  | February 13-18, 2023 |
| National Science Day celebrated with Girls High School Students  | February 28, 2023    |
| <b>Karnal Chapter</b>  |                      |
| On World Veterinary Day, a webinar on the theme "Strengthening Veterinary Resilience" was organized.   | April 30, 2022       |
| A Regional Essay Competition (both in Hindi and English) for Senior school and college students was conducted  | July 21-22, 2022     |
| A brainstorming conference on "Eco-regional diversification in crop and live-stock production for profitability and sustainability" was organized in virtual mode.   | November 14, 2022    |

| Event   | Date              |
|---|-------------------|
| A Brain storming session was organized on “Livestock Services Delivery Systems” in hybrid mode.   | December 05, 2022 |
| <b>Kolkata Chapter</b>  |                   |
| An online lecture on ‘Climate Change and Indian Agriculture: IPCC 6th Assessment Report and Beyond’ was organized on the occasion of World Earth Day.   | April 30, 2022.   |
| A virtual interaction with school children was held to create awareness about the career avenues in agricultural sciences and motivate them to pursue higher studies in agricultural sciences.          | June 21, 2022     |
| A brainstorming session on ‘Agricultural Water Management in West Bengal: Issues and Strategies’ was organized in hybrid mode at ICAR-CRIJAF, Barrackpore.  | August 27, 2022   |
| An online lecture on ‘Global Food System’ was organized on the eve of World Food Day.   | October 15, 2022  |
| An online special lecture on ‘Soil and Society’ was organized.  | November 12, 2022 |
| An online evening lecture on ‘National Soil Research and Education: Policies’ was organized on the eve of the World Soil Day.   | December 04, 2022 |
| <b>Lucknow Chapter</b>  |                   |
| A workshop on ‘Scientist-Stakeholders-Farmers on Climate-Smart Agriculture for Sustainable Productivity in Sodic Soils of Uttar Pradesh’ was organized in collaboration with ICAR-CSSRI, RRS, Lucknow.  | June 23, 2022     |
| An interactive meet on ‘Forage Based Agro-Ecosystems Functioning and Resilience - Farmers & Students Perspectives’ was organized at ICAR-Indian Grassland and Fodder Research Institute, Jhansi (U.P.). | December 05, 2022 |
| National Seminar on “Mechanization in Sugarcane Farming – Challenges and Solutions”   | March 28, 2023    |

| Event   | Date                        |
|---|-----------------------------|
| <b>Ludhiana Chapter</b>   |                             |
| An awareness programme on 'Strategies to combat challenges of global warming' was organized for school children and teachers.   | June 22, 2022               |
| A series of awareness programmes were organized on 'Food & Nutraceuticals', Plant Tissue Culture', 'Molecular Biology' and 'Phytochemical Analysis'. Lectures on 'Nutritional and Nutraceutical formulations' were organized for graduate students. | November 2022               |
| <b>Pune Chapter</b>   |                             |
| An ICAR-University-NAAS-Stakeholders Interface Meeting was organized at ICAR-NIASM, Baramati.   | June 17, 2022               |
| In collaboration with ICAR-NIASM a programme on 'Nutrition and feeding habit of school going children' was conducted at Chaitanya's International School, Baramati.   | August 03, 2022             |
| <b>Varanasi Chapter</b>   |                             |
| Science awareness programmes on biotechnological aspects in vegetable research were organized for the post-graduate students of Agricultural Biotechnology.   | April 11 and April 30, 2022 |
| A science awareness programme was organized for B.Sc. (Ag.) students to create awareness about the opportunities for higher education in Agriculture sector.  | May 30, 2022                |
| A special lecture on 'Possibilities of Funding Opportunity from SERB' was organized at ICAR-IIVR, Varanasi.   | October 07, 2022            |
| Awareness programme conducted on 'Importance of Nutritious Food and Cleanliness in Daily Life' for the school children on the occasion of Children's Day  | November 14, 2022           |
| An exposure visit and science awareness programme was organized for the intermediate students of agricultural science of Government Inter College, Jakhini, Varanasi.   | December 01, 2022           |

## *Highlights of the Activities of the Regional Chapters*

### **Barapani Chapter**

- The Regional Chapter, Barapani, in collaboration with ICAR Research Complex for NEH Region, Meghalaya, organized a strategy workshop in hybrid mode on “Harnessing the Potential of Geographical Indication Tagged Crops in North-East India – Research Needs, Outreach Approaches and Policy Perspectives” on 3rd October 2022 at Umiam, Meghalaya. Dr. Trilochan Mohapatra, President (NAAS) and former Secretary, DARE & DG, ICAR delivered the inaugural address and enumerated the importance of GI crops in the North East. The technical sessions deliberated on the multifaceted aspects for promotion of GI crops with special reference to the research, extension and policy requirements.
- Nutrition awareness programme for school children was organized at College of Agriculture, CAU, Kyrdemkulai, Meghalaya on 7<sup>th</sup> December, 2022. Around 100 students along with their teachers from Kendriya Vidyalaya, Christ Sr. Secondary School, St. Francis Sr. Secondary School, in Ri Bhoi, Meghalaya and from SOS Village participated. Children were apprised of the importance of nutritious food for a healthy life, nutrition garden for family’s well-being, organic-based integrated farming system and natural farming system models, as well as importance of various components (dairy, poultry, apiary, indigenous fruit plants, vegetables, fishery etc.) in a healthy diet. Experts delivered lectures on Nutrition and Health. Children interacted actively with experts.
- The NAAS Regional Chapter-Barapani, in association with the International Union of Organic Agriculture, Shillong and College of Agriculture, CAU, Kyrdemkulai, Meghalaya successfully organized a national conference on “Natural Farming Systems and Biodiversity Conservation under Changing Climate Scenario” at College of Agriculture, CAU, Kyrdemkulai, Meghalaya during 5-7 December, 2022. A total of 150 scientists and research scholars, 150 school and college students and 100 farmers participated in the event.

The Hon’ble Chief Guest Dr. S.K. Pattanayak, former Secretary, Dept. of Agriculture and Farmers Welfare, Govt. of India inaugurated the conference with other eminent dignitaries Dr. Jagadish Rane, Director, ICAR-National Institute of Abiotic Stress Management, Baramati, Pune, Maharashtra and Mr. Dinesh Kulkarni, National Secretary, Bharatiya Kisan Sangh, New Delhi.



Dr. T. Mohapatra, President, NAAS and former Secretary (DARE) and Ex-DG (ICAR) graced the event as the Chief Guest in the Valedictory session and appreciated the efforts of the whole team led by Dr. U.K. Behera, Dean, College of Agriculture and Convener of Barapani Chapter in successful organization of the Conference. He also appreciated the work and achievements of the NAAS Regional chapter, Barapani. The message from Dr. Himanshu Pathak, Secretary (DARE) and Ex-DG (ICAR) lauded the efforts of the team for successful organization of this important conference in such a remote area.

## Bengaluru Chapter

- A special lecture on “Rumen Microbes - Renewed Focus on Animal Health, Production and Sustainable Interventions” by Dr. Vivek Fellner, Director of Graduate Programmes and Professor of Ruminant Nutrition, College of Agriculture and Life Sciences, North Carolina State University, USA, was organized on May 27, 2022 by the Bengaluru chapter. He emphasized the role of ruminants in carbon pool transformation for human food, and discussed different strategies for reducing enteric methane emissions from rumen and their variable response in different types of feeding, and concluded that the rumen microbes can be used as effective models to establish link between gut biomolecules, fermentation energetics and overall energy transactions in the gut.
- An online lecture by Dr. Stephen A Krawetz, the Charlotte B Failing Professor of Foetal Therapy and Diagnosis and Associate Director, CS Mott Centre for Human Growth and Development, Wayne State University School of Medicine, Michigan, USA was organized on 22 July 2022. The lecture focused on the sperm biomolecules and microbes in relation to male fertility and reproductive health. He elaborated the role of sperm RNA and retained elements on the successful birth of the viable offspring and explained the likely role of sperm microbiome on semen quality and fertilization.
- On the occasion of Children’s Day, the Regional Chapter, Bengaluru organized an awareness campaign on 14 November 2022 for school children highlighting the importance of nutrition for health and wellbeing. The programme was organized at three government primary and middle schools located in Bengaluru Rural district, where packets of multigrain powder and laddu were distributed to the students.



## Bhopal Chapter

- One-day workshop cum training on 'Composting for Soil and Human Health' on December 02, 2022 jointly with ICAR-Indian Institute of Soil Science, Bhopal to celebrate World Soil Day and Soil Health Awareness Week.

## Coimbatore Chapter

- One-day training programme was organized for seed cane growers and progressive farmers on Viral and phytoplasmal diseases and their management on May 07, 2022.
- A 'Science Quiz' competition was organized on at ICAR-SBI, Coimbatore for college students on June 8, 2022
- Farmers engaged in banana cultivation need efficient delivery of Trichoderma to manage Panama wilt. In this regards, NAAS-Coimbatore chapter organized a demonstration to banana farmers on 01.07.2022 to deliver Trichoderma in banana rhizomes in mechanized sett treatment device at Kondayampalayam village, Thondamuthur Block, Coimbatore. About 50 farmers participated in the programme. Dr. R. Viswanathan, Convener, Coimbatore chapter explained the benefits of mechanical delivery of agro-inputs in vegetatively propagated crops.
- A lecture on "Biotechnological interventions for sustainable food production" by Dr. C. Appunu, Senior Scientist (Plant Breeding), ICAR-SBI, Coimbatore, was organized on 08.08.2022. The lecture highlighted the need for biotechnological interventions to improve specific traits, bio-safety guidelines and genome editing approaches. Dr. Hemaprabha, Director, ICAR SBI delivered the Chief Guest's address. About 100 college students from different colleges and deemed universities actively participated in the event.
- As part of 75th Independence Day celebrations, NAAS-Coimbatore Chapter and ICAR-Sugarcane Breeding Institute, Coimbatore organized an interaction meeting with students of Panchayat union middle school, Veerakeralam, Coimbatore on 10.08.2022, and a 'Science Quiz' competition for college students on 12.08.2022 at ICAR-SBI, Coimbatore.
- A campaign on nutrition literacy was organized for children of a middle school in Veerakeralam village, Coimbatore on 14th November 2022. Dr. D. Puthira Pratap delivered a talk on 'Balanced Nutrition'. Dr. R. Viswanathan addressed the students and elaborated on the importance of nutri-cereals in daily diet, and adverse impact of junk foods.

- A one-day interactive meeting on “Quality Assurance in Agriculture Education through Accreditation” was organized at TNAU, Coimbatore on 5th December 2022. Dr. R. Viswanathan delivered a talk on NAAS activities, and Dr. V. Balasubramani delivered the inaugural address. Dr. P. Ramasundaram, National Coordinator (IDP) and Nodal Officer (NAHEP), ICAR, New Delhi talked about quality assurance in agriculture education, and Dr. C.K. Narayana, Principal Scientist, ICAR-IIHR, Bengaluru and Regional Coordinator, ICAR Accreditation delivered a talk on roadmap of ICAR accreditation. A panel discussion on accreditation process was also held under the chairmanship of Dr. M. Raveendran, Director of Research, TNAU, Coimbatore. The plenary session was chaired by Dr. V. Geethalakshmi, Vice- Chancellor, TNAU. Dr. G. Hemaprabha FNAAS, Director, ICAR-SBI, Coimbatore delivered a special address.

## Cuttack Chapter

- A training programme was conducted on ‘Efficient and Balanced use of fertilizers (Including Nano-Fertilizers)’ in Ranajhalli village of Ganjam district on June 07, 2022.
- Two training-cum-awareness programme for farmers on ‘Balanced Use of Fertilizers’ and ‘Region Specific Agroforestry’ were conducted on June 21, 2022 in the village Badakrushnapur, Tangi Block Cuttack to commemorate the celebration of ‘Azadi Ka Amrit Mahotsav’.
- An awareness programme on crop diversification was organized for tribal women on 28th November, 2022 in Tangi, Cuttack with special emphasis on nutrigarden. Dr. A.K. Nayak, Director, ICAR-NRRI Cuttack briefed women farmers regarding the importance of backyard kitchen for fulfilling their nutritional requirements. Women farmers interacted with scientists regarding the problems they face in agricultural activities and other related queries.

## Hyderabad Chapter

- NAAS Hyderabad Chapter in association with ICAR-NAARM conducted a one-day training programme on Soil testing in collaboration with KVK Yagantipalle, Andhra Pradesh on 27.07.2022 in hybrid mode under SCSP of NAARM in seven villages of Kurnool.
- The chapter in association with ICAR-NAARM, Hyderabad also organized a training for farmers on ‘Bio-inoculants - its uses and application in agriculture’ at

SAIRDKVK, Gaddipally, in Suryapet district of Telangana during 25-26 August, 2022. A total of 60 farmers from 7 villages participated in the programme.

- NAAS Hyderabad Chapter in association with PGDM-ABM Students of ICAR-NAARM, Hyderabad organized the 7th edition of Sankalp, an annual Business Festival during Sep 16-17, 2022 under the aegis of NAARM PG Alumni Association.
- The Hyderabad Chapter in collaboration with ICAR-NAARM organized a sensitization programme on “Nutrition Literacy among Rural Children” on the Children’s Day at Zilla Parishad Girls High School, Shamshabad, Rangareddy district, Telangana. Around 500 girl students and teachers participated in the programme.
- The Hyderabad Chapter organized an online lecture on “Sustainable Fishery for Food and Nutritional Security in India” by Dr. M. Vijay Gupta, World Food Prize laureate on 21st November, 2022 on the occasion of World Fisheries Day. He briefed about the role of fish in food, nutrition and trade. He outlined various challenges for meeting the demand for aquaculture and ways to address them. Around 200 participants from SAUs and ICAR institutes attended the programme.
- The Hyderabad Chapter in collaboration with ICAR-NAARM organized an online lecture on “Soil Management for Climate Change Mitigation” by Dr. Anil Kumar Singh, Vice President, NAAS on 5th December 2022 on the occasion of World Soil Day. He highlighted the importance of soil resources in supporting the Sustainable Development Goals (SDGs), and the technologies for climate change mitigation. Dr. B Venkateswarlu, former Vice Chancellor, VNMKV, Parbhani stressed upon the need to work on the adaptation of soil in drought management.
- A sensitization programme on Nutrition Literacy among High School students was organized at ICAR-NAARM, Hyderabad on January 10, 2023. Dr. Ch. Srinivasa Rao, Director, ICAR-NAARM and Convener, NAAS Hyderabad Chapter interacted with the students on various aspects of nutrition.
- An Interactive Programme with Agri Students on Entrepreneurship Development in Agriculture was organized on February 6, 2023 at ICAR-NAARM, Hyderabad. 170 students of 3rd year B.Sc (Hons) from the Faculty of Agriculture, KL University, Vaddeswaram, Andhra Pradesh participated in the programme.
- NAAS Hyderabad Chapter in association with ICAR-NAARM organized a Skill Development Training Programme on 2-3rd Feb 2023 on “Vermicompost

Production Technology” at SAIRD KVK, Gaddipally, Suryapet District, Telangana. 58 farmers participated in the training programme NAAS Hyderabad Chapter associated with ICAR-NAARM in conducting two 3-day training programmes on “Improved Crop Management Technologies and Value Addition” for SC farmers at Rythu Bharosa Kendram (RBK), Jagannathpuram and RBK, Kadiyam, Rajamahendravaram, East Godavari district, Andhra Pradesh from 13-15 February and 16 – 18 February, 2023, respectively in collaboration with Agricultural College (ANGRAU) Rajamahendravaram.

- NAAS Hyderabad Chapter in association with ICAR-NAARM celebrated National Science Day on February 28, 2023 at Girls High School, Shamsabad. Role of agriculture research and development towards India’s food security and sustainable development goals (SDGs) was highlighted.

## Karnal Chapter

- programme Programme programme
- On World Veterinary Day, a webinar on the theme “Strengthening Veterinary Resilience” was organized on April 30, 2022 focusing on the services rendered by veterinary professionals, expectations of the society and the new challenges. The webinar was attended by experts, eminent scientists, policy makers and veterinarian professionals across the country. April 30, 2022
- To highlight the primacy of agriculture in school education and advocate it as a professional career for students, the Karnal chapter of National Academy of Agriculture of Sciences (NAAS) conducted an essay competition (both in Hindi and English) in agriculture for the school and college students. A total of 250 essays in Hindi and English were received. Top three performers in Hindi and English category were selected for the awards.
- A Brainstorming Session on “Eco-regional Diversification in Crop and Livestock Production for Profitability and Sustainability” was organized on November 14, 2022 in virtual mode. Dr. Trilochan Mohapatra, President, NAAS chaired the session. Panelists included Dr. Gurbachan Singh, former Chairman, ASRB; Dr. Ajay Gehlot, former Vice-Chancellor, RAJUVS; Dr. J.C. Dagar, former ADG, ICAR; Dr. Samar Singh, Vice Chancellor, Horticulture University, Uchani; Dr. J.S. Sandhu, former Vice Chancellor, SKNAU, Jobner; Dr. S N Saxena, Director, ICAR-National Research Centre on Seed Spices, Ajmer; Dr. Pratap S. Birthal, Director, ICAR - NIAP, New Delhi, and Dr. V. S. Rathore, Principal Scientist, Regional Research Station, ICAR-Central Arid Zone, Bikaner.

## Kolkata Chapter

- On the occasion of the World Earth Day, Kolkata chapter organized an online special lecture on 30 April, 2022 on 'Climate Change and Indian Agriculture: IPCC 6th Assessment Report and Beyond' by Dr. H. Pathak, Director, ICAR-NIASM, Baramati. Dr. Anil K. Singh, Vice- President, NAAS was the Chief Guest. A large number of scientists belonging to various disciplines from across the country participated in this event.
- A virtual interaction with school leaving students was organized by the Kolkata Chapter of NAAS in the evening of 21st June, 2022 to create awareness about the scope of agricultural sciences and to motivate the bright students to pursue higher studies in agricultural sciences as a career option.
- A brainstorming session on 'Agricultural Water Management in West Bengal: Issues and Strategies' was organized in hybrid mode at ICAR-CRIJAF, Barrackpore on August 27, 2022.
- An online lecture on 'Global Food System' was organized on the eve of World Food Day on October 15, 2022. More than 100 scientists from different institutes participated.
- An online special lecture on 'Soil and Society' was held on November 12, 2022. More than 100 scientists from different institutes across the country participated.
- An online evening lecture 'National Soil Research and Education: Policies' was organized on the eve of the World Soil Day, December 04, 2022.

## Lucknow Chapter

- A workshop on 'Scientist-Stakeholders-Farmers on Climate-Smart Agriculture for Sustainable Productivity in Sodic Soils of Uttar Pradesh' was organized on June 23, 2022 in collaboration with ICAR-CSSRI, RRS, Lucknow to sensitize various stakeholders.
- An interactive meet on "Forage Based Agro- Ecosystems Functioning and Resilience - Farmers & Students Perspectives" was organized on December 5, 2022 at ICAR-Indian Grassland and Fodder Research Institute, Jhansi (U.P.). Farmers from three villages of Jhansi district, and college students participated in the program. Experts also interacted with farmers and students on the following issues: a) A strategy for round-the-year fodder production in semi-arid situation; b) Soil and water conservation measures and crop

residue management; c) Adoption of agroforestry and Crop diversification; d) Convergence of government plans and schemes for technology up scaling and formation of FPOs, and start-ups.

- ICAR-Indian Institute of Sugarcane Research at IISR, Lucknow and Indian Sugar Mills Association, New Delhi organized a National Seminar on “Mechanization in Sugarcane Farming – Challenges and Solutions” along with NAAS Chapter, Lucknow on 28th March 2023 at IISR, Lucknow, which was attended by more than 300 participants representing all stakeholders, and addressed by the senior government officials and sugarcane industry personnels. Prof. Vijay Paul Sharma, Chairman, Commission for Agricultural Costs and Prices, Ministry of Agriculture and Farmers Welfare, Government of India, presided over the inaugural ceremony Prof. Sharma cited the human labour as the biggest contributor to the cost of production and urged to provide a complete package of mechanization of all agricultural activities He also stressed on increasing the income of sugarcane farmers by setting up Farm Machinery Banks. Shri Sanjay R. Bhoosreddy, Additional Chief Secretary, Sugar Industry and Sugarcane Development, Government of Uttar Pradesh and Sh. Subodh Kumar Singh, Additional Secretary (Sugar), Ministry of Food, Govt. of India also highlighted the need for mechanization in sugarcane farming, while Dr. R. Viswanathan, Director, ICAR-IISR, Lucknow highlighted various farm machineries developed by the Institute.

## Ludhiana Chapter

- NAAS Ludhiana chapter in association with the Krishi Vigyan Kendra, Budh Singh Wala, Moga (Punjab) organized an awareness programme for the school children and teachers of the Government Senior Secondary School, Charik, Moga on ‘Strategies to combat challenges of global warming’ on 22.06.2022 in which 270 school students and twenty-five teachers participated.
- Several awareness programmes were organized on food and nutraceuticals, use of plant tissue culture, molecular biology and phytochemical analysis for the development of fortified food for the UG and PG students and faculty members of Rungta College of Science and Technology, Bhilai, Chhattisgarh; Kanya Maha Vidyalaya, Jalandhar, Punjab; and SCVB Govt. College, Palampur, Himachal Pradesh.
- Lectures on “Nutritional and Nutraceutical Formulations” were organized for graduate students during the month of November, 2022.

## Pune Chapter

- An ICAR-University-NAAS-Stakeholders Interface Meeting was organized at ICAR-National Institute of Abiotic Stress Management, Baramati on June 17, 2022. Dr. V.M. Bhale, Hon'ble Vice Chancellor of PDKV, Akola and Dr. Y.S. Nerkar, Former Vice Chancellor MPKV Rahuri co-chaired the meeting. Dr. S.D. Sawant, Vice Chancellor, BSKKV, Dapoli; Dr. P.K. Patil, Vice Chancellor, MPKV, Rahuri; all the Directors of ICAR Institutes located in Maharashtra and their representatives; progressive farmers; private sectors; NGOs and KVKs, and senior NAAS Fellows and Associates based in Maharashtra also attended the meeting. Dr. Himanshu Pathak, Director, NIASM and Convener, NAAS Pune chapter, presented the background and the objectives of the meeting.

The Hon'ble Vice Chancellors presented the problems of agriculture in different regions of Maharashtra and suggested action points for their improvement. All the Directors of the ICAR institutes presented their views on the researchable, developmental and policy issues for the improvement of respective commodities.

The meeting emphasized the need to strengthen partnership among the SAUs, ICAR research organizations, private sector, NGOs, KVKs, NAAS and farmers to develop need-based technologies that can upgrade farmers' livelihood and enhance the resilience against climate change.

- ICAR-National Institute of Abiotic Stress Management (NIASM), Baramati in collaboration with Pune Chapter conducted a programme on "Nutrition and feeding habit of school going children" at Chaitanya's International School, Baramati on August 03, 2022. The faculty and more than 50 students attended the programme.

## Varanasi Chapter

- Varanasi chapter organized two awareness programmes for the PG/UG students about the scope of higher studies in agriculture. A science awareness programme particularly related to biotechnological aspects in vegetable research was organized on 11th April, 2022 for the post-graduate students of Agricultural Biotechnology of BHU Rajiv Gandhi South Campus, Barkachha, Mirjapur. Dr. Sudhakar Pandey, the convener of the Varanasi Chapter briefed about the research activities of Indian Institute of Vegetable Research and apprised about the career opportunity for Ph. D. courses in Agriculture.
- Varanasi Chapter adopted five Primary and Middle Standard Schools from rural areas of Varanasi and Mirjapur districts of Uttar Pradesh to create awareness



about the nutritious and healthy eating among the students. Besides, awareness programme, the Chapter is promoting the establishment of Nutri Kitchen Garden (Poshan Vatika) in the available space of the schools by providing seeds of important vegetables and fruit plants.

- A science awareness programme was organized on 30th May, 2022, particularly for the B. Sc. (Ag.) 4th year students of UP Autonomous College, Varanasi. A total of 50 students along with teachers visited the ICAR-Indian Institute of Vegetable Research, Varanasi. They were briefed about the career opportunities for post graduates in agriculture, particularly agricultural biotechnology and allied Sciences. Several queries raised by the students related to careers in Agricultural Biotechnology and allied sciences were replied to by the scientists of IIVR and fellows of NAAS present on the occasion.
- A special lecture by Dr. S. M. Singh, Science and Engineering Research Board, New Delhi on the “Possibilities of Funding Opportunity from the SERB” was organized by Varanasi chapter on 7th October, 2022, at ICAR-Indian Institute of Vegetable Research, Varanasi. Dr. Singh emphasized on formulation of multi-institutional and multi-disciplinary projects. Dr. T.K. Behera, Director of the Institute briefed about the achievements of the institute and their impacts.
- On the occasion of the Children’s Day, an awareness programme was organized on the “Importance of Nutritious Food and Cleanliness in Daily Life” for school children on 14th November, 2022. Essay writing & quiz competitions on “Importance of Nutritious Food and Cleanliness in Daily Life” and a special lecture on nutrition and health were also held. Shri Chandershekhar Singh, Padma Shri Awardee in his address emphasized the importance of nutrition and cleanliness for good health. Dr. T.K. Behera highlighted the role of nutrition for physical and mental health.
- An exposure visit and science awareness programme for the intermediate students of agricultural sciences and teachers of Government Inter College, Jakhini, Varanasi was organized on December 01, 2022.

## LINKAGES

### National

The Academy implements most of its programmes through the ICAR Institutes, State Agricultural Universities, and other research organizations/NGOs with whom it has strong linkages. These linkages are nurtured and strengthened by its

Fellows working in these organizations. The Academy also joined the initiative to establish linkages among the Science Academies of India, such as the Indian National Science Academy (INSA); Indian Academy of Sciences, India; Indian National Academy of Engineering; National Academy of Sciences, Allahabad; and National Academy of Medical Sciences, to address issues concerning (a) better public understanding of science in the country, and (b) identification of frontline issues facing the country in which science and scientists have a stake.

## International

The Academy has taken steps to establish and renew linkages with Science Academies in other countries. Discussions have been held with different Academies for entering into Memoranda of Understanding indicating the areas of collaboration. So far, nine Memoranda of Understanding have been signed which include the Academia Nacional de Ciencias Bolivia, Lapaz; the Russian Academy of Agricultural Sciences; the Agricultural Research Institute of Hungarian Academy of Sciences; Academy of Scientific Research and Technology, Egypt; National Academic Centre for Agrarian Research, Kazakhstan; Hungarian Academy of Sciences; Chinese Academy of Agricultural Sciences (CAAS); Bangladesh Academy of Agricultural Sciences; and Crop Science Society of USA (CSSA). The MoU with CSSA, an international scientific society with 4000+ members that fosters the vision to improve the world through crop science was signed this year on 28 March 2022 by the President of NAAS, Dr. Trilochan Mohapatra and President of CSSA, Dr. Marilyn Warburton.

The Academy organized interaction meetings with the Foreign and Pravasi Fellows on July 01 and July 05, 2022 to enhance their involvement in the Academy and harness their experience and expertise for strengthening Academy's activities.

The Academy collaborated with the World Food Prize Foundation and jointly organized a virtual workshop entitled 'Global Food and Nutritional Security, and Sustainable Development through Major and Minor Pulses' on October 14, 2022.

## Institutional Membership

The Institutions of repute, which are involved in activities aligned to the objectives of the Academy, are eligible to become an Institutional Member of the Academy. For this, they need to make a contribution of Rs 10 lakh towards the NAAS Corpus Fund for its sustained long-term support of different activities. As on March 31, 2023, 35 Institutional Members have been inducted.

## RECOGNISING EXCELLENCE

Following scientists were inducted to the fellowship of NAAS (2023)

### Section I: Crop Sciences

**Dr. Harsh Kumar Dikshit**

Principal Scientist, Division of Genetics,  
Indian Agricultural Research Institute,  
New Delhi

**Dr. Kapuganti Jagadis Gupta**

Scientist V, National Institute of Plant  
Genome Research, New Delhi

**Dr. Pankaj Kaushal**

Joint Director (Research), ICAR-  
National Institute of Biotic Stress  
Management, Raipur, Chhattisgarh

**Dr. Manish Kumar Pandey**

Principal Scientist, International Crops  
Research Institute for the Semi-Arid  
Tropics, Hyderabad, Telangana

**Dr. Parbodh Chander Sharma**

Director, ICAR-Central Soil Salinity  
Research Institute, Karnal, Haryana

**Dr. Ramesh Pal Singh Verma**

Principal Scientist (Plant Breeding),  
ICAR-Indian Institute of Wheat and  
Barley Research, Karnal

### Section II: Horticultural Sciences

**Dr. Vinay Bhardwaj**

Principal Scientist, Division of Crop  
Improvement, ICAR-Central Potato  
Research Institute, Shimla, H.P.

**Dr. Ajmer Singh Dhatt**

Additional Director of Research (Hort  
& Food Sci.), Office of Directorate  
of Research, Punjab Agricultural  
University, Ludhiana, Punjab

**Dr. Ram Kumar Sharma**

Senior Principal Scientist, CSIR-Institute  
of Himalayan Bioresources Technology  
(CSIR-IHBT), Palampur, H.P.

### Section III: Animal Sciences

**Dr. Thapasimuthu Vijayamma  
Anilkumar**

Scientist-G and Head, Division of  
Experimental Pathology, Institute for  
Medical Sciences and Technology,  
Thiruvananthapuram, Kerala

**Dr. Sachinandan De**

Principal Scientist and Incharge, Animal  
Biotechnology Centre, ICAR-National  
Dairy Research Institute, Karnal,  
Haryana

**Dr. (Ms.) Anju Manuja**

Principal Scientist, ICAR-National Research Centre on Equines, Hisar, Haryana

**Dr. Ashok Kumar Tiwari**

Director, ICAR-Central Avian Research Institute, Izatnagar, Bareilly, U.P.

**Section IV: Fisheries Sciences****Prof. Robinsondhas Jeyashakila**

Dean, Dr. M.G.R Fisheries College and Research Institute, Tamil Nadu  
Dr. J. Jayalalithaa Fisheries University, Ponneri, Tamil Nadu

**Dr. Narottam Prasad Sahu**

Joint Director, ICAR-Central Institute of Fisheries Education, Mumbai, Maharashtra

**Section V: Natural Resources Management****Dr. Debashis Chakraborty**

National Fellow & Principal Scientist, Division of Agricultural Physics, ICAR-Indian Agricultural Research Institute, New Delhi,

**Dr. Hanuman Sahay Jat**

Principal Scientist, Division of Soil & Crop Management, ICAR-Central Soil Salinity Research Institute, Karnal, Haryana

**Dr. Parveen Kumar**

Director, ICAR-Central Coastal Agril. Research Institute, Old Goa,

**Dr. Ram Swaroop Meena**

Assistant Professor, Department of Agronomy, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, U.P.

**Dr. Gangalakunta P. Obi Reddy**

Principal Scientist, Division of Remote Sensing Applications, ICAR-National Bureau of Soil Survey & Land Use Planning, Nagpur, Maharashtra

**Section VI: Plant Protection Sciences****Prof. Narayanasamy Mathivanan**

Director & Head, Centre for Advanced Studies in Botany, University of Madras, Chennai, Tamil Nadu

**Dr. Kalyan K. Mondal**

Principal Scientist, Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, New Delhi

**Dr. Radha Prasanna**

Principal Scientist, Division of Microbiology, ICAR-Indian Agricultural Research Institute, New Delhi

**Dr. Anupama Singh**

Joint Director Education and Dean, PG School, ICAR-Indian Agricultural Research Institute, New Delhi

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

### **Dr. Sudhir Pratap Singh**

Scientist - D, Center of Innovative and Applied Bioprocessing, (DBT-CIAB), NABI-CIAB, Mohali, Chandigarh

### **Dr. N. Vigneshwaran**

Principal Scientist, ICAR-Central Institute for Research on Cotton Technology, Mumbai, Maharashtra

## **Section VIII: Social Sciences**

### **Dr. Abhishek Rathore**

Regional Breeding Informatics Lead, International Maize and Wheat Improvement Center, c/o ICRISAT, Patancheru, Hyderabad, Telangana

### **Dr. Rajarshi Roy Burman**

Principal Scientist (Agricultural Extension), Division of Agricultural Extension, ICAR-Indian Agricultural Research Institute, New Delhi,

### **Dr. R. Sendhil**

Associate Professor, Department of Economics, School of Management, Pondicherry University (A Central University), Kalapet, Puducherry

## **Foreign Fellows**

### **Dr. William Dollente Dar**

Cabinet Secretary, Department of Agriculture, Office of Secretary, Philippines

### **Prof. Kazuyuki Inubushi**

Faculty of Applied Bioscience, Tokyo University of Agriculture, Setagaya-ku, Tokyo, Japan

## **Pravasi Fellows**

### **Dr. Ajay Kohli**

Deputy Director General-Research, International Rice Research Institute, Philippines

### **Prof. Karimbhai M. Maredia**

Professor, Senior Global Scholar and Director, International Programs, College of Agriculture and Natural Resources, Michigan State University, USA

### **Dr. Rai Singh Kookana**

Chief Research Scientist (CSIRO), Professor, CSIRO Land and Water, Adelaide, Australia

## **Associateship**

## **Section I: Crop Sciences**

### **Dr. Abhishek Bohra**

Scientist (Senior Scale), Crop Improvement Division, ICAR-Indian Institute of Pulses Research, Kanpur, U.P.

### **Dr. Ranjith Kumar Ellur**

Scientist, Division of Genetics, ICAR-Indian Agricultural Research Institute, New Delhi

## Section II: Horticultural Sciences

### **Dr. (Ms.) Pinky Raigond**

Senior Scientist, ICAR-National Research Centre on Pomegranate, Solapur, Maharashtra

## Section IV: Fisheries Sciences

### **Dr. G.B. Sreekanth**

Scientist (Senior Scale), Animal and Fishery Science Section, ICAR-Central Coastal Agricultural Research Institute, Goa

## Section V: Natural Resource Management Sciences

### **Dr. Subhash Babu**

Scientist, Division of Agronomy, ICAR-Indian Agricultural Research Institute, Pusa, New Delhi

### **Dr. Dibyendu Chatterjee**

Senior Scientist, Crop Production Division, ICAR-National Rice Research Institute, Bidyadharpur, Cuttack, Odisha

## Section VI: Plant Protection Sciences

### **Dr. Amalendu Ghosh**

Scientist (Senior Scale), Advanced Centre for Plant Virology, Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, New Delhi

### **Dr. D. Pramesh**

Scientist, Rice Pathology Laboratory, AICRP-Rice, Agricultural Research Station, Gangavathi, Karnataka

## Section VII: Agricultural Engineering & Technology

### **Dr. Kothakota Anjineyulu**

Scientist, Agro Processing and Technology Division, CSIR-National Institute for Interdisciplinary Science & Technology, Kerala

## Section VIII: Social Sciences

### **Dr. Eldho Varghese**

Senior Scientist, FRA Division, ICAR-Central Marine Fisheries Research Institute, Kochi, Kerala

## Young Scientist Awards for 2023

| Name of the Award                       | Name of the Awardee            |
|---|--------------------------------|
| Plant Improvement                       | Dr. Rajkumar Uttamarao Zunjare |
| Plant Protection                        | Dr. (Ms.) Namisha Sharma       |
| Soil, Water and Environmental Sciences  | Dr. Bappa Das                  |
| Animal Sciences                         | Dr. G.B. Sreekanth             |
| Agricultural Engineering and Technology | Dr. Manoj Kumar                |
| Social Sciences                         | Dr. (Ms.) Ratna Prabha         |

## Academy Awards for the Biennium 2021-2022

Following awards will be given by the NAAS during XVI Agricultural Science Congress to be held at ICAR-CMFRI, Kochi from October 10-13, 2023.

| Memorial/ Lecture Award               |  |
|---------------------------------------|--|
| Dr. B.P. Pal Award                    | Dr. Mangala Rai, Former Secretary, DARE and DG, ICAR |
| Dr. K. Ramiah Award                   | Dr. D.K. Yadava                                      |
| Dr. K.C. Mehta Award                  | Dr. M.R. Khan  |
| Dr. M.S. Randhawa Award               | Dr. P. Das   |
| Dr. N.S. Randhawa Award               | Dr. P.S. Minhas                                      |
| Dr. P. Bhattacharya Award             | Dr. J.K. Jena  |
| Dr. A.B. Joshi Memorial Lecture Award | Prof. Panjab Singh                                   |
| Endowment Awards                      |  |
| Sh. L.C. Sikka Endowment Award        | Dr. S.K. Pradhan                                     |
| Dr. (Ms.) Prem Dureja Endowment Award | Dr. K. Madhavi Reddy                                 |
| Dr. N.G.P. Rao Endowment Award        | Dr. A. Das Munshi                                    |
| Recognition Awards                    |  |
| Plant Improvement                     | Dr. S. Rakshit                                       |



|                                       |                                   |
|---------------------------------------|-----------------------------------|
| Plant Protection                      | <b>Dr. S. Uthandi</b>             |
| Soil, Water & Environmental Sciences  | <b>Dr. V.K. Singh</b>             |
| Animal Sciences                       | <b>Dr. R. Sharma</b>              |
| Agricultural Engineering & Technology | <b>Dr. C. Anandharamakrishnan</b> |
| Social Sciences                       | <b>Dr. Ranjay K. Singh</b>        |

## FOUNDATION DAY AND ANNUAL GENERAL MEETING

### *Foundation Day Celebration*

Prof P. Balaram delivered the NAAS Foundation Day lecture on June 5, 2022. He spoke on “Reflections on science in the age of the corona virus” and presented an excellent account on the evolutionary history of corona virus and highlighted the interdependence of biology and chemistry. He explained how chemistry and biology together can reveal the unknown in the nature. He defined science as the study of nature. Quoting Aldous Huxley, he said that ‘we are surrounded and embraced by nature, powerless to separate ourselves from her and powerless to penetrate beyond’, which was starkly experienced by us during the Covid 19 pandemic. He mentioned that when we practice science, we observe nature and/while the study of science depends a lot on the tools and technologies available. Citing the examples of the telescope and the microscope in pursuing the science of cosmology and microbiology, respectively, he pronounced the role of technologies and instruments in the practice of science. Quoting the theoretical physicist Freeman Dyson, he said that science is often driven by new technology than by new concepts. Science of microbiology progressed with the invention of microscope, and cosmology was driven by the discovery of telescopes. Elaborating this point, he cited the example of rDNA technology, which facilitated development of genetically modified crops.



Prof Balaram highlighted that science is advancing fast and its frontiers are endless. Scientists should keep striving to unravel the mystery of nature and search nature-based solutions for human welfare through innovations in agricultural sciences. As we have learnt immensely from the corona virus pandemic, we should prepare ourselves for a better life in future through an integrated approach based on the basics of chemistry, physics and biology. He highlighted that it is a formidable combination, and a deeper understanding of the biology would require studying chemistry, physics and biology simultaneously to explore and expand the new horizons of science including the science of agriculture. Further, disciplines of mathematics and computational aspects of biology are also equally important. He concluded by reminding us of the lessons that we must learn from the corona virus pandemic, and the lesson is that we should respect the nature.

### *Presidential Address*

Dr. T. Mohapatra, President, NAAS, in his address, drew attention to the fact that although India has made remarkable progress in food production, ensuring food and nutrition security, and increasing agricultural exports, improving agricultural sustainability remains a concern in the process

of transformation of food system in view of the changing consumers' preferences and social aspects of food consumption.



Food production is linked to consumption. As supply and demand are closely associated and linked to markets, it is pertinent to understand the markets and the disruptive technologies to capture and consolidate the market share. Food processing is another aspect of food system transformation which needs attention, as we hardly process 10% of the food produced. The government has introduced many schemes and programmes to promote food processing. Food processing and value addition not only reduce the loss, but also add nutrition through fortification. It also generates employment. Hence, transforming food system needs innovations and entrepreneurship in food processing. Farmer Producer Organizations (FPOs) can play a role in value addition from production to market, leading to more returns for farmers and reduction in import dependence.

Food waste management, along the food value chain, is another concern that needs to be addressed in the food system transformation.

Energy in agriculture is a crucial component of the food system transformation. The XV Agricultural Science Congress of the NAAS was based on this theme, and comprehensive deliberations were held on the agriculture-energy nexus. The lesson learnt is that there is an imminent need to transform farm operations to increase use of bio-resources and renewable energy.

Realizing that the public distribution system (PDS) plays a crucial role in food system transformation, pulses and millets have to be emphasized in PDS to improve the nutritional outcomes. A complete value chain approach is envisaged to transform the food system, involving various stakeholders. More importantly, the food system transformation needs to be understood through the climate lens, as climate change has started disturbing the agricultural systems away from its path of sustainability. Hence, to achieve the Sustainable Development Goals, there is a need to redefine and revisit the food system transformation strategies and accelerate programmes to offset the impacts of the Covid 19 pandemic.

The aging farm population is emerging as an issue of concern. The youth must be provided with the right kind of opportunity and technologies to attract them towards agriculture. Start-ups are addressing this issue along the value chain from farm to fork. The youth must be encouraged to come forward in creating infrastructure and explore the use of funding sources to their advantage and bring about faster transformation in the food system.

Technologies are needed to reduce the use of water and chemical footprints by encouraging eco-friendly agriculture. Can we consider compensating for ecosystem services and large-scale carbon trading? Similarly, can we use the new technology of genome editing to develop high yielding varieties of neglected crops that can economically replace the water-guzzling crops?

Finally, to transform the food system, we need to re-skill everybody in the context of new developments and redefine our strategy of skilling youth, farmers, KVK scientists, and extension personnel.

### *Presentation of the Newly Elected Fellows*

The newly elected Fellows of the Academy made their presentations on June 4, 2022 in two sessions before the full house of the Academy Fellowship. The

Session-1 was chaired by Dr. K.M. Bujarbaruah, Vice-President and co-chaired by Prof. K.C. Bansal, Secretary. Thirteen Fellows from the sections of Crop, Horticultural and Animal Sciences made presentations of their work, besides the presentations of four foreign/pravasi fellows. Twelve Fellows elected in the sections of Fisheries, NRM, Plant Protection, Agricultural Engineering and Technology and Social Sciences presented their work in Session-II that was chaired by Dr. A.K. Singh, Vice President and co-chaired by Dr. P.K. Joshi, Secretary of the Academy.

### *Excerpts from the Minutes of the 29th AGM*

The 29th Annual General Body Meeting of the Academy was held in hybrid mode on June 05, 2022, at 9.30 a.m. under the Chairmanship of the President of the Academy, Dr. Trilochan Mohapatra.

At the outset, a one-minute silence was observed as a mark of respect to the departed souls of seven esteemed fellows of the Academy, namely Dr. Jitendra Paul Khurana, Dr. Lal Narain Shukla, Dr. Vishwa R.P. Sinha, Dr. K.V.R Tilak, Dr. V.K. Batish, Dr. S. Vardarajan and Dr. K.V. Peter.

Dr. T. Mohapatra welcomed all the esteemed Fellows, including the newly elected Fellows and Associates. Dr. P.K. Joshi, Secretary, took up the agenda as listed. He informed that in 2022, 34 new Fellows, including 2 Foreign Fellows and 3 Pravasi Fellows and 11 Associates were inducted. Six scientists were also conferred the Young Scientist Awards for the year 2022. It was informed that 14 Brainstorming Sessions planned by the Programme Committee on topical themes were organized during the year. In addition, the Academy organized the National Science Day on 28th February 2022, and the International Women's Day on 8th March 2022. A special webinar was also organized on "Transforming Agriculture in Asia" on 20th December 2021. On this occasion, four Policy Papers viz. One World One Health; Sugarcane-based Ethanol Production for Sustainable Fuel Blending Programme; Utilization of Wastewaters in Urban and Peri-urban Agriculture; and Certification of Quality Planting Material of Clonally Propagated Fruit Crops for Promoting Agricultural Diversification were released.

Many important suggestions were given by the Fellowship regarding future activities, which will be considered by the Programme Committee for preparing the future programmes of the Academy.

## *Admission of the Fellows and Associates*

Dr. P.K. Joshi, Secretary conducted the formal admission ceremony of the newly elected Fellowship and Associateship during the year 2022. Respective Conveners of the Sectional Committees read out the citations of the Fellows. Thereafter, the President admitted them to the Fellowship of the Academy and presented the certificates under different sections.

## *XVI Agricultural Science Congress*

The XVI Agricultural Science Congress is being organized by the National Academy of Agricultural Sciences (NAAS) and will be hosted by the ICAR-Central Marine Fisheries Research Institute (CMFRI), Kochi from 10 to 13<sup>th</sup> October 2023. The venue of the Congress is Hotel Le Méridien, Kochi, Kerala. The President, NAAS, New Delhi, cordially invites you to attend the Congress and actively participate in the deliberations.

The theme of the Congress is **“Transformation of Agri-Food Systems for Achieving Sustainable Development Goals”**. The Congress aims to bring together leading academicians, researchers, research scholars, students, farmers, entrepreneurs, etc. to exchange and share their research findings, ideas and experiences on all aspects of agri-food systems to enable the formulation of the way forward to transform our agri-food system to meet the sustainable development goals (SDGs) of the United Nations.

## PUBLICATIONS

The Academy has brought out the following publications during the year.

### *Policy/Status/Strategy Papers*

Strategy Paper 15 : Potential of Transgenic Poultry for Biopharming

Strategy Paper 16 : Need for Breeding Tomatoes Suitable for Processing

Strategy Paper 17 : Biofortification to Address Malnutrition in India : Present Status and Way Forward

Strategy Paper 18 : Drudgery Reduction in Agriculture through Improved Farm Machinery

Policy Paper 107 : Certification of Quality Planting Material of Clonally Propagated Fruit Crops For Promoting Agricultural Diversification

Policy Paper 108 : Agri - Startups in India : Opportunities, Challenges and Way Forward

Policy Paper 109 : Emergency Preparedness for Prevention of Transboundary Infectious Diseases in Indian Livestock and Poultry

Policy Paper 110 : Strategies and Approaches for Promotion of Sustainable Bivoltine Sericulture in India

Policy Paper 111 : Food Fortification : Issues and Way Forward

Policy Paper 112 : Gender and Nutrition based Extension in Agriculture

Policy Paper 113 : Contract Farming for Transforming Indian Agriculture

Policy Paper 114 : Promoting Millet Production, Value Addition and Consumption

Policy Paper 115 : Waste to Wealth - Use of Food Waste as Animal Feed and Beyond

Policy Paper 116 : Sustaining the Pulses Revolution in India: Technological and Policy Measures

Policy Paper 117 : Road Map for Rehabilitation of 26 Mha Degraded Lands in India

Policy Paper 118 : Entrepreneurship for Quality Fodder Production

Policy Paper 119 : Secondary Agriculture - Challenges, Opportunities and Way Forward

Policy Paper 120 : Scaling up Innovative Agricultural Extension Models

Policy Paper 121 : Self-sufficiency in Edible Oil Production

### *Policy Briefs*

Policy Brief 12 : Limitations of Global Hunger Index and Way Forward

Policy Brief 13 : Regulation for Genetically Modified (GM) Foods and Detection of Unauthorized GM Food Events

### *Newsletter*

NAAS-News, Vol 22, Nos 2 to 4 and Vol. 23, No. 1(quarterly)

### *Journal (published by Springer India Pvt. Ltd)*

NAAS Official Journal 'Agricultural Research' Vol. 11, Nos. 2 to 4 and Vol. 12 No. 1 (Quarterly)

## EVENTS AND MEETINGS

### *New Year Get-together*

A get-together of NAAS Fellows and Associates was organized on 2 January, the first Monday of 2023, in hybrid mode. At the outset, Prof. K.C. Bansal, Secretary, NAAS welcomed the newly elected President NAAS Dr. Himanshu Pathak, Secretary, DARE & DG, ICAR. He also welcomed the Past Presidents Dr. R.S. Paroda, Dr. R.B. Singh and Dr. T. Mohapatra; all office bearers and distinguished NAAS Fellows. The contributions of outgoing members were appreciated, and the newly elected office bearers, Fellows and Associates were welcomed. On the occasion,





various publications along with the Year Book 2023, Planner and Newsletter of the last quarter of 2022 were released.

Addressing the Fellowship, the past President, Dr. R.S. Paroda, Dr. R.B. Singh and Immediate Past President Dr. T. Mohapatra emphasized on a more dynamic role of the Academy on agricultural research and policy in India.

Dr. Himanshu Pathak greeted the fellowship and wished a very happy and fruitful New Year 2023 to all. In his Presidential Address, Dr. Pathak laid emphasis on following points:

- Bringing more visibility and greater role of academy on policy issues for a more vibrant agricultural research and transformation of Indian agriculture.
- Generation of resources to sustain the activities of academy.
- Inclusion and involvement of all agricultural Professionals in the public and private sectors, farmers, academia and other stakeholders to broaden the base of NAAS activities.
- More effective use of ICT in NAAS for wider reach of its activities.

## **Meeting of the Conveners of Regional Chapters**

Meeting of the conveners of regional chapters was held on June 03, 2022. The President Dr. T. Mohapatra appreciated the work done by the regional chapters in disseminating appropriate technologies and awareness on the issues of national and regional importance. The regional chapters conducted several region-based programmes, which included (1) organizing brainstorming sessions and policy debates in topical areas in the region; (2) conducting lectures of eminent scientists from India and abroad; (3) sensitizing and inspiring school children to take agriculture as a profession; (4) adopting schools for nutrition literacy, and (5) establishing linkages with state governments, agro-industry and civil society organizations.

## **Executive Council Meetings**

During the year, six meetings were held on 29th April 2022, June 3, 2022, August 23, 2022, 16 September 2022, December 16, 2022, and February 11, 2023, in either online or hybrid mode. Some important items considered and actions taken during the meetings are as follows.

## 125th Meeting

The 125th Meeting of NAAS Executive Council was held through hybrid mode at 10.00 A.M. on 29th April 2022 under the Chairmanship of Dr. T. Mohapatra, President, NAAS.

The President apprised about the meetings of all the Science Academies convened by Dr. (Mrs.) Manju Sharma involving their Presidents to discuss the issue of increasing allocation to R&D activities by the Government. Based on the deliberations a brief note on R&D expenditure and suggestions on the way forward has been submitted to the Government.

On this occasion, the President released Policy Paper “One World One Health”; and two publications from the Hyderabad Chapter (i) NAAS Hyderabad Chapter Book and (ii) Telugu Translation of NAAS Policy Paper on Organic Farming. Thereafter, the Agenda items as listed were taken up for discussion.

## 126th Meeting

The 126th Meeting of the NAAS Executive Council was held in a hybrid mode at 2.30 p.m. on June 3, 2022 under the Chairmanship of Dr. T. Mohapatra, President NAAS. In his opening remarks, Dr. Mohapatra mentioned that the progress in the agriculture sector in India even during and post- Covid periods in 2021-22 had been very satisfactory, which must be highlighted and celebrated. He expressed satisfaction that the recommendations of the Academy on Gene Editing have led to significant policy change. Similarly, the recommendations on Pesticide Act and Biological Diversity Act have been very well received by the Government. It is pertinent that the Academy organizes an event to highlight these achievements, inviting the press to create general awareness about the role of the Academy and its contributions.

He also mentioned that considering the rising aspirations of the farmers, the Academy may organize a round table to invite ideas on parameters for quantifying the same, identifying the critical gaps and ways to bridge these.

The agenda items as listed were taken up for discussion and decisions taken. The EC approved the dates for the XVI ASC at Kochi.

## 127th Meeting

The 127th Meeting of NAAS Executive Council was held in a hybrid mode on August 23, 2022 under the chairmanship of NAAS President Dr. T. Mohapatra.

The Chairman welcomed EC members and briefly mentioned about the activities undertaken, including the Annual General Body meeting. A special mention was made of the intellectually stimulating Foundation Day lecture delivered by Prof P. Balaram, former Director, Indian Institute of Science, Bangalore. He appreciated the new initiative of the Academy to organize interactions with the Foreign and Pravasi Fellows to enhance their involvement in the Academy activities and harness their experience and expertise. The EC was informed about the progress in Ranking of Professional Societies based on modified criteria to make them more objective and quantifiable. As Dr. Himanshu Pathak, former Director, NIASM, Baramati and erstwhile Convener of Pune Chapter has joined the position of Secretary, DARE and Director General, ICAR, New Delhi, it was decided that Dr. C.N. Ravishankar, Director, CIFE may be nominated as the new Convener of Pune Chapter. The Academy had elected five Fellows and one Associate in the Section of Frontier Sciences, which was later discontinued in the 72nd EC Meeting following recommendations of S.S. Acharya Committee. The previously elected Fellows under this Section have, therefore, been placed in appropriate Sections (Crop Sciences/Plant Protection).

## 128th Meeting

The 128th Meeting of NAAS Executive Council was held in a hybrid mode on 16 September 2022 under the chairmanship of Dr. T. Mohapatra, President NAAS. Two Policy Papers and two Strategy Papers were released on this occasion. The EC approved the revised logo, new dates (10- 13 October 2023) and venue (Le Meridian Hotel, Kochi) for the XVI ASC at Kochi. The criteria for the election of Fellows were deliberated at length and it was suggested to have relook at the procedure and revision of the guidelines. The following activities were recommended for implementation. Roundtable meetings of NAAS EC members and Fellows with the foreign Academies with whom NAAS has already signed MoUs; an interaction meeting of NAAS and other key national Academies to deliberate on issues related to funding of R&D, food and nutritional security, climate change, etc.; an interaction meeting with the industry and farmer leaders; all Regional chapters as well as the Office Bearers at the headquarters may undertake interactive programmes with the school children focused on nutrition literacy.

## 129th EC Meeting

The 129th EC meeting was held on December 16, 2022 under the chairmanship of Dr. Trilochan Mohapatra, President of the Academy. After a brief welcome by the President all the listed agenda were discussed in details and necessary approval

accorded. The EC approved final report of the Ranking of Professional Societies for submission to the ICAR. The EC deliberated and approved changes in the Guidelines for Fellowships and Awards of the Academy. Some of the important decisions included ratification of the election of office bearers/EC members/Fellowship/Associates from January 2023 and approval of the recommendation of the Programme Committee and various Judging Committees of various Academy Awards. The EC felicitated the outgoing office bearers, which included Dr. T. Mohapatra, President, Prof. Panjab Singh, immediate Past-President; Dr. P.K. Joshi, Secretary, and Dr. P.S. Birthal, Editor; and Executive Council (2022) members, Dr. Jitendra S. Chauhan, Dr. Wazir Singh Lakra, Dr. Cherukumalli Srinivasa Rao, and Dr. Rangaraju Visvanathan.

### 130th EC Meeting

The 130<sup>th</sup> Meeting of the NAAS Executive Council was held through hybrid mode at 9.30 A.M. on 14<sup>th</sup> February 2023 under the Chairmanship of the President, Dr. Himanshu Pathak, Secretary, DARE & DG, ICAR.

At the outset, the EC of the Academy observed one-minute silence as a mark of respect to one of its very senior and distinguished Fellow Dr. Kirti Singh, who had passed away on January 23, 2023, and congratulated three of its distinguished Fellows, Dr. M. Vijaya Gupta, Dr. Arvind Kumar, and Dr. Bakshi Ram, for being awarded Padma Shri this year. The President then extended a warm welcome to all the members attending the EC meeting and wished them well for the New Year 2023. Thereafter, the meeting was conducted as per the items listed in the agenda besides discussing the preparations of the XVI ASC to be held in Kochi.

Detailed deliberations were held on reorienting the programmes of the Academy and aspired initiatives for (i) Enhancing the scope of activities; (ii) Reorienting the activities; (iii) Enlarging the span of NAAS (iv) Improving the governance, and (v) Generating resources.

### Journal Score Committee

The Academy carries out voluntary evaluation of scientific journals of standing and of relevance to agricultural and allied sciences, every three years. However, the journals left out due to non-submission/incomplete submission of the required information or the journals that become eligible for NAAS score subsequently, are also offered opportunity and evaluated on annual basis. The validity of current NAAS scoring of scientific journals will be over on 31.12.2023.

Academy has constituted new NAAS Journal Score Committee (NJSC) under the Chairmanship of Dr. Anil K. Singh with Dr. W.S. Lakra as Member Secretary.

### *Programmes Planned for 2023*

| Topic   | Convener              |
|---|-----------------------|
| Brainstorming Session on Water Auditing in Indian Agriculture   | Dr. K. Palanisami     |
| Strategy Workshop on Food Safety Strategies for Indian Fisheries Sector   | Dr. G. Jeyasekaran    |
| Strategy Workshop on Honey Bees: Harbinger for Sweet Revolution   | Dr. S.C. Dubey        |
| Brainstorming Session on Artificial Intelligence and IoT in Agriculture   | Dr. Rajender Parsad   |
| Brainstorming Session on Prospects of dsRNA based Biopesticides for Crop Protection in Indian Agriculture       | Dr. B. Mandal         |
| Expert Consultation on Digital Sequence Information (DSI)   | Dr. Rajeev Varshney   |
| Expert Consultation on Ethics and Current State of Research Publication   | Dr. G. Taru Sharma    |
| Brainstorming Session on Improving Soil Health  | Dr. B.S. Dwivedi      |
| Brainstorming Session on Promotion of Agricultural Export: Prospects and Challenges                             | Dr. Naveen P. Singh   |
| Brainstorming Session on Multiple Uses of Solar Energy in Agriculture   | Dr. N.S.L. Srivastava |
| Brainstorming Session on Greening of Livestock and Poultry Sectors  | Dr. B.M. Naveena      |
| Enhancing Agri-Infrastructure and Agri-Business Development through Public-Private Partnerships (PPPs) in India | Dr. Ch. Srinivasa Rao |
| Brainstorming Session on Enhancing Investment in Research for Indian Agriculture                                | Dr. P.S. Birthal      |

In addition, the following programmes were approved to be taken up as Annual Programmes

- Expert Consultation on COP 28: Preparedness for Indian Agriculture (Dr. P.K. Aggarwal)
- Collaborative Programme with World Food Prize Foundation (Dr. Rajeev Varshney)

## FINANCIAL STATEMENT

The Academy received from Department of Agricultural Research and Education (DARE), New Delhi, Grant-in-Aid of Rs. 93 lakh during the year 2022-23. The Accounts of the Academy are audited by Chartered Accountants appointed with the approval of the General Body. The Utilization Certificate for the year 2022-23 has been submitted to the DARE.

A brief Audited Statement of Accounts and Auditor's Report for 2022-23 is annexed as Annexure I & II.

## ACKNOWLEDGMENT

The Academy gratefully acknowledges the Department of Agricultural Research and Education and the Indian Council of Agricultural Research, for their continued financial and logistics support. The Academy also places on record the cooperation and support in terms of logistics provided by other organizations. Academy's publication activities are largely due to the voluntary and honorary services of its Editor-in-Chief, Editors, Associate Editors, Advisory Board, NAAS Office Bearers and EC Members, large number of Reviewers (who examine and provide comments and suggestions on the manuscripts). The esteemed Fellows also lend their services for various activities of the Academy such as Annual General Body Meeting, Scoring of Research Journals, critically examining nominations for new Fellowship and Academy Awards, Agricultural Science Congress, Brainstorming Sessions, Strategy Workshops, Symposia and conducting Programmes on Public Lectures, Interaction Meetings, etc. The Academy gratefully acknowledges the services of the Fellowship and NAAS Secretariat staff involved in the above activities during the year.

## AUDITORS REPORT



**Pawan Shubham & Co.**  
CHARTERED ACCOUNTANTS

601, Roots Tower,  
7 District Centre,  
Laxmi Nagar, Delhi-110092  
Pawan@pawanshubham.com  
Tel : 011-45108755

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### Independent Auditor's Report

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TO,

THE MEMBERS,  
**NATIONAL ACADEMY OF AGRICULTURAL SCIENCES**  
NASC COMPLEX, DPS MARG, PUSA  
NEW DELHI-110012

We have audited the attached Balance Sheet of **National Academy of Agricultural Sciences (hereinafter "Academy")**, New Delhi as on 31<sup>st</sup> March 2023, the Income and Expenditure Account, the receipt and payment accounts and notes annexed for the year ended on that date (hereinafter "Financial Statements").

#### Management's Responsibility for the Financial Statements

Management is responsible for the preparation of these financial statements. This responsibility includes maintenance of adequate accounting records for safeguarding of assets of the Academy and for preventing and detecting frauds and other irregularities; selection and application of appropriate policies; maintenance of adequate internal control for ensuring the accuracy and completeness of the accounting records relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

#### Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Academy's preparation of the financial statements that give a true and fair view. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.





### Opinion

In our opinion and to the best of our information and according to the explanations given to us, the said statements of accounts read together with notes thereon and documents annexed there to give a true and fair view:

- a. In the case of balance sheet, of the state of affairs as at 31<sup>st</sup> March 2023.
- b. In the case of Income and Expenditure Account, of the excess of Income over Expenditure for the year ended on that date.
- c. In the case of Receipts and Payments Accounts, of the receipts and payments for the year ended on that date.

For Pawan Shubham & Co.

Chartered Accountants

ICAI Firm's Registration No.: 011573C

  
(CA Pawan Kumar Agarwal)

Partner

M. No. 092345

UDIN: 23092345BGSRTD7271



Place: New Delhi

Date: 29-05-2023



## National Academy of Agricultural Sciences

### 1. Basis of preparation of financial statements

The financial statements have been prepared under the historical cost convention on going-concern basis in accordance with the generally accepted accounting principles and in accordance with the mandatory accounting standards issued by the Institute of Chartered Accountants of India.

### 2. Recognition of Income and Expenditure

Revenues/Income is accounted on accrual basis as and when they are earned in accordance with the generally accepted accounting principles.

### 3. Investments

- The Academy has made investments as required to be invested under section 11(5) of the Income Tax Act, 1961 and value of the investments are shown at cost.
- Income from investment has been recognized on accrual basis.

### 4. Fixed Assets and Depreciation

Fixed assets are stated at written down value less depreciation calculated as per the rates of Depreciation provided in the Income Tax Act 196, read with the rules made there under.

### 5. Income Tax Provision and Contingent Liabilities

- Income Tax Order dated 30-12-2019 raising the demand of Rs.1,11,91,925/- for AY 2017-18 has been passed U/s 143(3) of the Income Tax Act. Academy has filed an appeal against the same before the CIT(A) Delhi. However, Rs. 22,34,385/- has been deposited against the grant of stay. Management is of the view that no addition should sustain hence, no provisions is made.
- Appeal has been filed against refund due Rs.24,25,978 for AY 2019-20 for which assessment order no. ITBA/AST/S/143(3)/2021-22-1032627782(1) dated 23rd April 2021 passed after scrutiny, demand tax of Rs. 38,26,000/-has been adjusted from refund/deposited.

For PAWAN SHUBHAM & CO.  
Chartered Accountants  
Firm Registration Nos. 011573C

(CA Pawan Kumar Agarwal)  
Partner  
M. No. 092345  
Place: New Delhi  
Dated: 28/05/2023



National Academy of Agricultural Sciences



Secretary

Treasurer

K. B. Bawa  
29.5.2023  
21/5/2023  
26/9/23

# NATIONAL ACADEMY OF AGRICULTURAL SCIENCES BALANCE SHEET AS AT 31 MARCH, 2023

| LIABILITIES  | AMOUNT (Rs.)  | ASSETS  | AMOUNT (Rs.)   |
|--|---|---|--|
| <b>CAPITAL FUND</b><br>Opening Balance<br>Add: Transferred from Accumulated Fund<br>Add: Excess of Income over Expenditure during the year<br>Less: Funds transferred to Specific Reserve Fund   | 175,974,202<br>11,470,979<br>5,985,763<br>16,291,389          | <b>FIXED ASSETS (Ann. B.S. 1)</b><br>Opening Balance<br>Additions during the year<br>Write off during the year<br>Depreciation for the year   | 16,063,902<br>99,588<br>-<br>(1,809,186)               |
| <b>SPECIFIC RESERVE FUND</b><br>Opening Balance<br>Add: Addition during the year<br>Less: Utilized during the year   | 166,328,574<br>16,291,389<br>11,470,979                       | Deposits in Approved Securities (Ann. B.S. 2)<br>Deposits in Approved Securities- Interest Accrued (Ann. B.S. 5)  | 14,354,303<br>299,401,797<br>10,966,083                |
| <b>ENDOWMENT FUND</b><br>Opening Balance<br>Received during the year   | 2,000,000<br>-  | <b>CURRENT ASSETS</b><br>Bank Balances (Ann. B.S. 3)<br>Cash Balances (Imprest A/c)<br>Sundry Debtor (Ann. B.S. 7)  | 8,350,470<br>356<br>153,990                            |
| <b>CURRENT LIABILITIES</b><br>National Soil & Land Use Policy<br>Developing Proforma to Rank ICAR Institutions<br>Compendium on Impact of NARS.....<br>Earnest Money (MM ACTIV)<br>PFIMBY Project<br>Sundry Creditors (Ann. B.S. 6)<br>Other Current Liabilities (Ann. B.S. 6) | 470,524<br>545,506<br>519,323<br>500,000<br>43,200<br>809,514 | <b>ADVANCES</b><br>Advances with NAAS Regional Chapters (Ann. B.S. 4)<br>Advances with XVI ASC Cmfri Kocchi<br>Advances with Sundry Creditor<br>Income tax receivable<br>GST Receivable | 507,865<br>1,000,000<br>3,469<br>17,921,181<br>517,091 |
| <b>TOTAL</b>   | <b>353,176,606</b>  | <b>TOTAL</b>  | <b>353,176,606</b>                                     |

Refer Notes Attached To and forming part of Accounts.

As per report of even date attached

For Pawan Shubham & Co

Chartered Accountants

Firm Reg No.: 011573C

CA Pawan Kumar Agawal

Partner

M.NO.-092345

Place: New Delhi

Date: 28/05/2023



National Academy of Agricultural Sciences

Secretary

Treasurer



## NATIONAL ACADEMY OF AGRICULTURAL SCIENCES

### INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31st MARCH, 2023

| EXPENDITURE  | AMOUNT (Rs.)      | INCOME  | AMOUNT (Rs.)      |
|--|-------------------|---|-------------------|
| To Expenditure towards NAAS activities (Ann. I.E. I) | 20,671,391        | By Grant-in-Aid from D.A.R.E.   | 9,300,000         |
| To Depreciation (Ann. B.S. 1)                        | 1,809,186         | By Interest on Investment   | 16,927,163        |
| To Excess of Income over Expenditure                 | 5,985,763         | By Interest, Contribution from Subscriptions, Publications and Other receipts towards NAAS activities (Ann. I.E. III) | 2,239,177         |
| <b>Total:</b>  | <b>28,466,340</b> | <b>Total:</b>   | <b>28,466,340</b> |
| To Provision for Income tax                          | -                 | By Excess of Income over Expenditure  | 5,985,763         |
| To Excess of Income over Expenditure after tax       | 5,985,763         |   |                   |
|  | <b>5,985,763</b>  |   | <b>5,985,763</b>  |

#### Refer Notes Attached To and forming part of Accounts.

As per our report of even date attached

For Pawan Shubham & Co

Chartered Accountants

Firm Reg No.: 011573C



*Pony*

CA Pawan Kumar Agawal

Partner

M.NO.-092345

Place: New Delhi

Date : 28/04/2023

National Academy of Agricultural Sciences

Secretary *K.Bal*



Treasurer *21/03/2023*

## EXECUTIVE COUNCIL

| Position                 | 2022                    | 2023                    |
|--------------------------|-------------------------|-------------------------|
| President                | Dr. T. Mohapatra        | Dr. Himanshu Pathak     |
| Immediate Past President | Prof Panjab Singh       | Dr. T. Mohapatra        |
| Vice-President           | Dr. Anil K. Singh       | Dr. Anil K. Singh       |
| Vice-President           | Dr. K.M. Bujarbaruah    | Dr. K.M. Bujarbaruah    |
| Secretary                | Dr. P.K. Joshi          | Prof. K.C. Bansal       |
| Secretary                | Prof. K.C. Bansal       | Dr. W.S. Lakra          |
| Foreign Secretary        | Prof Rajeev K. Varshney | Prof Rajeev K. Varshney |
| Editor                   | Dr. P.S. BIRTHAL        | Dr. Malavika Dadlani    |
| Editor                   | Dr. Malavika Dadlani    | Dr. V.K. Baranwal       |
| Treasurer                | Dr. Rajender Parsad     | Dr. Rajender Parsad     |
| Member                   | Dr. J.S. Chauhan        | Dr. M.S. Chauhan        |
| Member                   | Dr. M.S. Chauhan        | Dr. S.K. Datta          |
| Member                   | Dr. S.K. Datta          | Dr. Anjani Kumar        |
| Member                   | Dr. B. Mohan Kumar      | Dr. B. Mohan Kumar      |
| Member                   | Dr. W.S. Lakra          | Dr. Suman K. Pandey     |
| Member                   | Prof A.R. Podile        | Dr. R.T. Patil          |
| Member                   | Dr. Ch. Srinivasa Rao   | Prof A.R. Podile        |
| Member                   | Dr. C.N. Ravishankar    | Dr. E.V.S. Prakasa Rao  |
| Member                   | Dr. (Ms) G. Taru Sharma | Dr. A.S. Raghavendra    |
| Member                   | Dr. Ashok K. Singh      | Dr. C.N. Ravishankar    |
| Member                   | Dr. P.S. Sirohi         | Dr. (Ms) G. Taru Sharma |
| Member                   | Dr. R. Visvanathan      | Dr. Ashok K. Singh      |
| ICAR Nominee             | Sh. Sanjay Garg         | Sh. Sanjay Garg         |

## Secretariat

1. Dr. Sanjeev Saxena, Executive Director, Budget & Accounts Executive
2. Ms Minu Tiwari, Chief Programme Executive
3. Shri P. Krishna, Programme Executive
4. Shri Jai Singh, Office Management Jr. Executive
5. Shri B.L. Yadav, Driver cum Office Assistant
6. Shri Kamal Singh, General Office Assistant

## LIST OF ACRONYMS

|        |  |
|--------|--|
| ADG    | Assistant Director General   |
| AE     | Agricultural Engineering   |
| AGM    | Annual General Body Meeting  |
| AI     | artificial intelligence  |
| AICRP  | All India Coordinated Research Projects                                    |
| ANGRAU | Acharya N. G. Ranga Agricultural University                                |
| APEDA  | Agricultural and Processed Food Products Export Development Authority      |
| ASC    | Agricultural Science Congress  |
| ASRB   | Agricultural Scientists Recruitment Board                                  |
| BHU    | Banaras Hindu University   |
| BSKKV  | Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth                              |
| BSS    | Brainstorming Session  |
| CAAS   | Chinese Academy of Agricultural Sciences                                   |
| CAU    | Central Agricultural University  |
| CEO    | Chief Executive Officer  |
| CIAB   | Center of Innovative and Applied Bioprocessing                             |
| CIAT   | International Center for Tropical Agriculture                              |
| CIFE   | Central Institute of Fisheries Education                                   |
| CIRC   | Central Institute For Research On Cattle                                   |
| CMFRI  | Central Marine Fisheries Research Institute                                |
| COP    | Conference of the Parties to the UN Framework Convention on Climate Change |
| CRIJAF | Central Research Institute for Jute and Allied Fibers                      |
| CSIR   | Council of Scientific & Industrial Research                                |
| CSIRO  | Commonwealth Scientific and Industrial Research Organisation               |



|         |   |
|---------|---|
| CSSA    | Crop Science Society of America   |
| CSSRI   | Central Soil Salinity Research Institute  |
| DARE    | Department of Agricultural Research and Education   |
| DBT     | Department of Biotechnology   |
| DDG     | Deputy Director General   |
| DG      | Director General  |
| DSI     | Digital Sequence Information  |
| DUVASU  | Uttar Pradesh Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan |
| EC      | Executive Council   |
| FAO     | Food and Agriculture Organization   |
| FNAAS   | Fellow National Academy of Agricultural Sciences  |
| FRA     | Fishery Resources Assessment  |
| FRS     | Fellow of the Royal Society   |
| FS      | Fisheries Science   |
| FSSAI   | Food Safety and Standards Authority of India  |
| GM      | Genetically Modified  |
| GPI     | Global Phosphorus Institute   |
| IARI    | Indian Agricultural Research Institute  |
| ICAR    | Indian Council of Agricultural Research   |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics  |
| IFDC    | International Fertilizer Development Center   |
| IHBT    | Institute of Himalayan Bioresource Technology   |
| IIHR    | Indian Institute of Horticultural Research  |
| IIMR    | Indian Institute of Millets Research  |
| IISR    | Indian Institute of Sugarcane Research  |
| IIVR    | Indian Institute of Vegetable Research  |
| ILRI    | International Livestock Research Institute  |

|            |  |
|------------|--|
| INSA       | Indian National Science Academy  |
| IPCC       | Intergovernmental Panel on Climate Change                                |
| IRRI       | International Rice Research Institute                                    |
| ISPGR      | Indian Society of Plant Genetic Resources                                |
| ITPGRFA    | International Treaty on Plant Genetic Resources for Food and Agriculture |
| KVK        | Krishi Vigyan Kendra   |
| MPKV       | Mahatma Phule Krishi Vidyapeeth  |
| NAARM      | National Academy of Agricultural Research Management                     |
| NAAS       | National Academy of Agricultural Sciences                                |
| NABI       | National Agri-Food Biotechnology Institute                               |
| NAHEP      | National Agricultural Higher Education Project                           |
| NARS       | National Agricultural Research System                                    |
| NASC       | National Agricultural Science Complex                                    |
| NFSA       | National Food Security Act   |
| NIAP       | National Institute of Agricultural Economics and Policy Research         |
| NIASM      | National Institute of Abiotic Stress Management                          |
| NIIST      | National Institute for Interdisciplinary Science & Technology            |
| NJSC       | NAAS Journal Score Committee   |
| NRM        | Natural Resource Management  |
| NRRI       | National Rice Research Institute   |
| PDKV       | Dr. Panjabrao Deshmukh krishi Vidyapeeth                                 |
| PDS        | Public Distribution System   |
| PGDM (ABM) | Post Graduate Diploma in Management (Agri Business Management)           |
| RAJUVS     | Rajasthan University of Veterinary & Animal Sciences                     |
| RBK        | Rythu Bharosa Kendram  |
| RRS        | Regional Research Station  |

|           |  |
|-----------|--|
| SAIRD-KVK | Sri Aurobindo Institute of Rural Development, Krishi Vignan Kendra |
| SBI       | Sugarcane Breeding Institute                                       |
| SDG       | Sustainable Development Goals                                      |
| SERB      | Science and Engineering Research Board                             |
| SKNAU     | Sri Karan Narendra Agriculture University                          |
| TAAS      | Trust for Advancement of Agricultural Sciences                     |
| TNAU      | Tamil Nadu Agricultural University                                 |
| USA       | United States of America   |
| VNMKV     | Vasantrao Naik Marathwada Krishi Vidyapeeth                        |

## NAAS DOCUMENTS ON POLICY ISSUES

### Policy Papers

|      |  |      |
|------|--|------|
| 71.  | Role of Root Endophytes in Agricultural Productivity   | 2014 |
| 72.  | Bioinformatics in Agriculture: Way Forward   | 2014 |
| 73.  | Monitoring and Evaluation of Agricultural Research, Education and Extension for Development [AREE4D]                     | 2014 |
| 74.  | Biodrainage: An Eco-friendly Tool for Combating Waterlogging   | 2015 |
| 75.  | Linking Farmers with Markets for Inclusive Growth in Indian Agriculture  | 2015 |
| 76.  | Bio-fuels to Power Indian Agriculture  | 2015 |
| 77.  | Aquaculture Certification in India: Criteria and Implementation Plan   | 2015 |
| 78.  | Reservoir Fisheries Development in India: Management and Policy Options  | 2016 |
| 79.  | Integration of Medicinal and Aromatic Crop Cultivation and Value Chain Management for Small Farmers                      | 2016 |
| 80.  | Augmenting Forage Resources in Rural India: Policy Issues and Strategies   | 2016 |
| 81.  | Climate Resilient Livestock Production   | 2016 |
| 82.  | Breeding Policy for Cattle and Buffalo in India  | 2016 |
| 83.  | Issues and Challenges in Shifting Cultivation and its Relevance in the Present Context                                   | 2016 |
| 84.  | Practical and Affordable Approaches for Precision in Farm Equipment and Machinery  | 2016 |
| 85.  | Hydroponic Fodder Production in India  | 2017 |
| 86.  | Mismatch between Policies and Development Priorities in Agriculture  | 2017 |
| 87.  | Abiotic Stress Management with Focus on Drought, Flood and Hailstorm   | 2017 |
| 88.  | Mitigating Land Degradation due to Water Erosion   | 2017 |
| 89.  | Vertical Farming   | 2019 |
| 90.  | Zero Budget Natural Farming - A Myth or Reality?   | 2019 |
| 91.  | Loan Waiving versus Income Support Schemes: Challenges and Way Forward   | 2019 |
| 92.  | Tropical Wilt Race-4 Affecting Banana Cultivation  | 2019 |
| 93.  | Enhancing Science Culture in Agricultural Research Institutions  | 2020 |
| 94.  | Payment of Ecosystem Services  | 2020 |
| 95.  | Food-borne Zoonotic Diseases   | 2020 |
| 96.  | Livestock Improvement through Artificial Insemination  | 2020 |
| 97.  | Potential of Non-Bovine Milk   | 2021 |
| 98.  | Agriculture and Food Policy for the Five Trillion Dollar Economy   | 2021 |
| 99.  | New Agricultural Education Policy for Reshaping India  | 2021 |
| 100. | Strategies for Enhancing Soil Organic Carbon for Food Security and Climate Action  | 2021 |
| 101. | Big Data Analytics in Agriculture  | 2021 |
| 102. | WTO and Indian Agriculture: Issues, Concerns, and Possible Solutions   | 2022 |
| 103. | Antimicrobial Resistance   | 2022 |
| 104. | One World One Health   | 2022 |
| 105. | Sugarcane-based Ethanol Production for Sustainable Fuel Ethanol Blending Programme                                       | 2022 |
| 106. | Utilization of Wastewaters in Urban and Peri-urban Agriculture   | 2022 |
| 107. | Certification of Quality Planting Material of Clonally Propagated Fruit Crops For Promoting Agricultural Diversification | 2022 |
| 108. | Agri-Startups in India: Opportunities, Challenges and Way Forward  | 2022 |
| 109. | Emergency Preparedness for Prevention of Transboundary Infectious Diseases in Indian Livestock and Poultry               | 2022 |
| 110. | Strategies and Approaches for Promotion of Sustainable Bivoltine Sericulture in India                                    | 2022 |
| 111. | Food Fortification : Issues and Way Forward  | 2022 |
| 112. | Gender and Nutrition based Extension in Agriculture  | 2022 |
| 113. | Contract Farming for Transforming Indian Agriculture   | 2022 |
| 114. | Promoting Millet Production, Value Addition and Consumption  | 2022 |
| 115. | Waste to Wealth – Use of Food Waste as Animal Feed and Beyond  | 2022 |
| 116. | Sustaining the Pulses Revolution in India: Technological and Policy Measures   | 2022 |
| 117. | Road Map for Rehabilitation of 26 Mha Degraded Lands in India  | 2022 |
| 118. | Entrepreneurship for Quality Fodder Production   | 2022 |
| 119. | Secondary Agriculture - Challenges, Opportunities and Way Forward  | 2022 |
| 120. | Scaling up Innovative Agricultural Extension Models  | 2022 |
| 121. | Self-sufficiency in Edible Oil Production  | 2022 |

### Status / Strategy Papers

|     |   |      |
|-----|---|------|
| 1.  | Role of Social Scientists in National Agricultural Research System (NARS)                                   | 2015 |
| 2.  | Towards Self-sufficiency of Pulses in India   | 2016 |
| 3.  | Strategy for Transformation of Indian Agriculture for Improving Farmers Welfare                             | 2016 |
| 4.  | Sustaining Soybean Productivity and Production in India   | 2017 |
| 5.  | Strengthening Agricultural Extension Research and Education - The Way Forward                               | 2017 |
| 6.  | Strategy on Utilization of Glauconite Mineral as Source of Potassium  | 2017 |
| 7.  | Vegetable Oil Economy and Production Problems in India  | 2017 |
| 8.  | Conservation Policies for Hilsa and Mahseer   | 2018 |
| 9.  | Accelerating Seed Delivery Systems for Priming Indian Farm Productivity Enhancement: A Strategic View Point | 2018 |
| 10. | Renewable Energy: A New Paradigm for Growth in Agriculture  | 2018 |
| 11. | Rumen Microbiome and Amelioration of Methane Production   | 2019 |
| 12. | Harnessing Full Potential of A1 and A2 Milk in India: An Update   | 2019 |
| 13. | Development and Adoption of Novel Fertilizer Materials  | 2019 |
| 14. | Innovations in potato seed production   | 2021 |
| 15. | Potential of Transgenic Poultry for Biopharming   | 2022 |
| 16. | Need for Breeding Tomatoes Suitable for Processing  | 2022 |
| 17. | Biofortification to Address Malnutrition in India: Present Status and Way Forward                           | 2022 |
| 18. | Drudgery Reduction in Agriculture through Improved Farm Machinery   | 2022 |

### Policy Briefs

|     |   |      |
|-----|---|------|
| 1.  | To Accelerate Utilization of GE Technology for Food & Nutrition Security and Improving Farmers' Income  | 2016 |
| 2.  | Innovative Viable Solution to Rice Residue Burning in Rice-Wheat Cropping System through Concurrent Use of Super Straw Management System-fitted Combines and Turbo Happy Seeder | 2017 |
| 3.  | Soil Health: New Policy Initiatives for Farmers Welfare   | 2018 |
| 4.  | Uniform Policy for Fish Disease Diagnosis and Quarantine  | 2019 |
| 5.  | Saving the Harvest: Reducing the Food Loss and Waste  | 2019 |
| 6.  | Better Management of Pesticides in India: Policy Perspectives   | 2019 |
| 7.  | Regulatory Framework for Genome Edited Plants: Accelerating the Pace and Precision of Plant Breeding  | 2020 |
| 8.  | Covid-19 Pandemic: Impact and New Normal in Agriculture   | 2020 |
| 9.  | Direct Benefit Transfer of Fertilizer Subsidy: Policy Perspectives  | 2020 |
| 10. | Harmonization of seed regulations for sustainable food security in India  | 2020 |
| 11. | Towards Revision of Biological Diversity Act 2002   | 2021 |
| 12. | Limitations of Global Hunger Index and Way Forward  | 2022 |
| 13. | Regulation for Genetically Modified (GM) Foods and Detection of Unauthorized GM Food Events   | 2022 |

## NAAS DOCUMENTS ON POLICY ISSUES\*

### Policy Papers

|   |      |
|---|------|
| 1. Agricultural Scientist's Perceptions on National Water Policy  | 1995 |
| 2. Fertilizer Policy Issues (2000-2025)   | 1997 |
| 3. Harnessing and Management of Water Resources for Enhancing Agricultural Production in the Eastern Region                           | 1998 |
| 4. Conservation, Management and use of Agro-biodiversity  | 1998 |
| 5. Sustainable Agricultural Export  | 1999 |
| 6. Reorienting Land Grant System of Agricultural Education in India   | 1999 |
| 7. Diversification of Agriculture for Human Nutrition   | 2001 |
| 8. Sustainable Fisheries and Aquaculture for Nutritional Security   | 2001 |
| 9. Strategies for Agricultural Research in the North-East   | 2001 |
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