Annual Report 2016-17



National Academy of Agricultural Sciences NASC, DPS Marg, New Delhi - 110 012, India

ANNUAL REPORT

2016-17



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PREFACE

Ever since its inception in 1990 the National Academy of Agricultural Sciences, has established itself as a "Think tank" to provide views on a broad spectrum of issues related to agriculture development and over the years has emerged as vibrant organization. Therefore, it is a matter of privilege for me to share the responsibility of serving this prestigious Academy. Through this report the Academy places before its Fellowship an account of activities executed during 2016-17 to meet the objectives of the Academy.

In order to promote the scientific activities, we organized six brainstorming sessions/ strategy workshops/ national level consultations on very important issues related to agriculture in



Dr Panjab Singh

the country with a major focus on pulses and improving the farmers' income, topics of current priority with the government. Organizing XIII ASC was a major event of the year. The Academy organized biennial XIII Agricultural Science Congress at Bengaluru during Feb 21-24, 2017 in collaboration with UAS Bangalore. It was inaugurated by the Honorable Governor of Karnataka State. The theme of Congress was 'Climate Smart Agriculture'. It attracted large scale participation both national and international. It was widely covered by press and Bengaluru declaration emerged as a major output of the Congress. Among regional chapters, six chapters' viz., Bhubaneswar, Hyderabad, Kochi, Ludhiana, NEH, and Patna have been very vibrant in organizing different NAAS activities.

The Foundation Day Lecture was delivered on June 5, 2016 by Dr V.K. Saraswat, Member (Science), NITI Aayog, GoI, on "Second Green Revolution in India". On the publication front, the Academy has been active and several publications were brought out and released at different events organized during the year under report.

Recognizing the excellence, the Academy during the year elected eminent scientists as Fellows, under different categories viz, National, Foreign, Pravasi and also selected NAAS Associates. The Academy also honored scientists for their achievements in different fields of Agriculture by conferring them with biennial awards during XIII ASC.

I place on record my gratitude to Dr S. Ayyappan, Immediate Past President, the NAAS Executive Council, Prof. Anupam Varma and Dr C.D. Mayee (Vice-Presidents); Dr K.V. Prabhu and Dr J.K. Jena (Secretaries); Dr P.K. Joshi (Foreign Secretary); Dr K.K. Vass and Dr V.K. Bhatia (Editors); Dr B.S. Dwivedi (Treasurer) for their support and

contributions. I am grateful to the conveners, organizers, coordinators and members of various committees for effectively organizing various brainstorming sessions / strategy workshops / national consultations and XIII Agricultural Science Congress.

My sincere thanks are due to colleagues in NAAS Secretariat, Shri H.C. Pathak (Executive Director), Shri Miraj Uddin, Ms Minu Tiwari, Shri P. Krishna, Shri Umesh Rai, Shri Jai Singh, Shri Banwari Lal Yadav and Shri Kamal Singh for effectively managing the day to day activities of the secretariat. The financial and logistics support of DARE and ICAR is gratefully acknowledged.

(Panjab Singh) President

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ABOUT THE ACADEMY

Inspired by the vision of late B.P. Pal, FRS, the National Academy of Agricultural Sciences (NAAS) was established in 1990. The main focus of the Academy is on the broad field of agricultural sciences including crop husbandry, horticulture, animal husbandry, fisheries, agro-forestry, agricultural engineering, and interfaces between agriculture and agro-industry. The Academy's role is to provide a forum for agricultural sciencts to deliberate on important issues of agriculture, agricultural research, education and extension, and offer views of the scientific community as policy inputs to planners and decision/opinion makers at various levels. The Academy organizes and supports national and international congresses, conferences, seminars, symposia, workshops and brainstorming sessions on the critical issues in the field of agricultural sciences. It articulates issues of agricultural research and education in various fora.

The Academy has emerged as a vibrant national level body devoted to agricultural sciences. The Fellows of the Academy, recognized for their contributions to science, include distinguished personalities in the field of agriculture and allied sciences, both 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 performed by scientists.
- 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 agrarian transformation to strengthen 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: The General Body of the Academy comprises its Fellows.
- The Executive Council (EC): EC 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: Fourteen Regional Chapters of the Academy are functioning at Bengaluru, Bhubaneswar, Chennai, Hyderabad, Jodhpur, Karnal, Kochi, Kolkata, Lucknow, Ludhiana, Mumbai, Nagpur, NEH Region and Patna.

SCIENTIFIC ACTIVITIES

Brainstorming Sessions/Strategy Workshops/Consultation Meetings

During the year 2016-17, following brainstorming sessions/strategy workshop/ consultation meetings were organized:

Sl. No	Title	Convener	Dates
1.	Strategy Workshop on Towards Achieving Self-sufficiency of Pulses in India'	Dr M.C. Saxena Dr N.P. Singh	April 7-8, 2016
2.	Brainstorming Session on Abiotic Stress Management with Focus on Drought, Flood and Hailstorm	Dr P.S. Minhas	May 23, 2016
3.	<i>Strategy Workshop on Transformation of Indian Agriculture and Improving Farmers Welfare</i>	Dr Suresh Pal Dr P.K. Joshi Dr Anjani Kumar	June 3, 2016
4.	Brainstorming Session on Strengthening Agricultural Extension Research and Education	Dr A.K. Singh Dr C. Ramasamy	July 9, 2016
5.	National Consultation on System of Crop Intensification (SCI)/System of Rice Intensification (SRI)	Dr B.C. Barah	Sept 10, 2016
6.	Consultation Meet on Qualitative and Quantitative Assessment of Glauconite as Source of Potassium and More	Dr J.C. Katyal	Sept 13, 2016

Strategy Workshop on 'Towards Achieving Self-sufficiency of Pulses in India' (Conveners: Dr M.C. Saxena and Dr N.P. Singh)



The strategy workshop on '*Towards achieving self-sufficiency of pulses in India*' was organized by National Academy of Agricul-tural Sciences (NAAS) on April 7-8, 2016 at New Delhi. Dr S. Ayyappan, President, NAAS welcomed all the

dignitaries, speakers and distinguished participants. The workshop was organized in six sessions covering genetic enhancement, productivity enhancement, smart farming, harvest and post harvest management, trade and policy, new dimensions and way forward with over 130 participants. The inaugural session was graced by Dr R.S. Paroda, Chairman, TAAS, as Chief Guest and Prof Ramesh Chand, Member (Agriculture), NITI Aayog as Chairman. The Workshop was attended by Dr Trilochan Mohapatra, Secretary, DARE & DG, ICAR; Prof R.B. Singh, Immediate Past President, NAAS; Shri S.K. Pattanayak, Secretary, DAC & FW; Dr Gurbachan Singh, Chairman, ASRB; Dr Shyam Bahadur Khadka, FAO representative in India; Dr David Bergvinson, DG, ICRISAT; Shri A.K. Srivastava, Secretary, MFPI; Dr P.K. Joshi, Director, IFPRI, South Asia; Dr J.S. Sandhu, DDG (CS), ICAR; Dr A.K. Sikka, DDG (NRM), ICAR; Dr A.K. Srivastava, Director & Vice Chancellor, NDRI, Karnal; Dr R.R. Hanchinal, Chairman, PPV& FRA; among others.

Dr M.C. Saxena presented the global pulses scenario and challenges ahead in increasing global pulses production and productivity including international pulses trade scenario. Dr N.P. Singh, Director, ICAR-IIPR apprised the house about the pulses statistics; possibility of expanding areas under cultivation; highlighted the grey areas in achieving self-sufficiency; and identified the gaps in its vertical and horizontal expansion.

An action plan as well as a roadmap for achieving self-sufficiency in pulses emerged from the workshop, with important recommendations on researchable issues and policy interventions, these have since been published as *NAAS Strategy Paper No.* 2.

Abiotic Stress Management with Focus on Drought, Flood and Hailstorm (Convener: Dr P.S. Minhas)

A Brainstorming Session on "Abiotic Stress Management with Focus on Drought, Flood and Hailstorm" was organized on May 23, 2016 at NASC, New Delhi. Dr S. Ayyappan,



President, NAAS chaired the session, with Prof R.B. Singh, Immediate Past President, NAAS as Co-Chair. In his opening remarks, Dr S. Ayyappan stressed the need to integrate crops and animals in a system biology mode to enable risk

reduction in the agricultural production system. Dr P.S. Minhas, Convener highlighted that agriculture in the country continues to be the most vulnerable to the vagaries of the "Extreme Weather Events". He emphasized the insidious nature of edaphic stresses and suggested a holistic multidisciplinary approach to build up systems perspectives to get best combination of technologies for a particular agro-ecosystem. Action plan must be prepared to involve tools like GIS, remote sensing, precision agriculture, biotechnology and nanotechnology, polymers, etc.

Thematic presentations were made by Dr S.K. Bal, Dr Jagadish Rane, Dr K.K. Krishnani and Dr Maheshwari. Dr S.M. Virmani, Co-convener suggested to focus efforts on ground water management and soil/water conservation and stressed that land use planning must be relooked with long term goals instead of short term profit. Prof R.B. Singh, Immediate Past President, NAAS in his concluding remarks, emphasised the need for scientific contributions to reach distressed people, particularly in drought prone areas. Emphasizing that abiotic stresses do not act in isolation, all concerned departments should work in synergy with a holistic approach for tangible outcome.

Some important recommendations that emerged from the deliberations include: (i) Since the instances of extreme events are locale-specific, the solution should be agroeco region-specific and crops vulnerable to such extremities must be taken on differential approach; (ii) Quality/Quantity of investment should be adequate as events of extreme nature have increased many-fold; (iii) Appropriate action must be planned by the government for sustainable ground water use; (iv) Land-use systems for long-term capability management should be introduced, particularly in hitherto neglected areas; (v) New farming systems must be designed and adopted for imparting resilience against abiotic stresses; (vi) Drought management must be mainstreamed into developmental projects and drought monitoring system should be strengthened; (vii) Short term objective should be post-hail management whereas the long term objective should be to develop genotypes for escaping hail period; (viii) New technologies like use of remote sensing and drones should be employed for assessing loss due to abiotic stresses.

Strategy Workshop on 'Transformation of Indian Agriculture and Improving Farmers Welfare' (Conveners: Dr Suresh Pal, Dr P.K. Joshi and Dr Anjani Kumar)



Realizing the importance of accelerating transformation of Indian agriculture for improving farmers' welfare, the National Academy of Agricultural Sciences (NAAS) organized a workshop on "Strategy for Transformation of

Indian Agriculture and Improving Farmers Welfare" on June 3, 2016. The workshop was attended by a galaxy of eminent scholars, policy makers, research managers, development professionals, and representatives from government, civil society and private sector.

The recommendations emerging from the workshop pertained to: (i) Creation of nonfarm opportunities in rural areas for efficient and viable agriculture; (ii) Greater emphasis on allied sectors (e.g. livestock, poultry, fisheries); (iii) Reorientation of agricultural extension system and higher investments; (iv) Realization of National Agricultural Market, promotion of contract farming, custom hiring for agricultural mechanization, value addition at production centres, conducive land market policies and effective linkage between land to lab; (v) Market research and intelligence; physical and virtual incubation; and mentoring for entrepreneurship development; (vi) Convergence among researchers, development professionals and extension agencies within a definite time frame; and (vii) Enhanced investment on agricultural R&D. The details have been published in *NAAS Strategy Paper No. 3*.

Strengthening Agricultural Extension Research and Education (Conveners: Dr A.K. Singh and Dr C. Ramasamy)

A Brainstorming Session on *Strengthening Agricultural Extension Research and Education* was organised on July 9, 2016 at NAAS, New Delhi. Dr S. Ayyappan, President NAAS, Chaired the session. Dr A.K. Singh presented an overview of the Agricultural Extension Research and Education in the country and the need to strengthen the system for global learning. He emphasized that the efforts required to strengthen the extension research and education would come from extension professionals only and not from outside agencies. It was also highlighted by him that there is a need to explore the role of



Agricultural Technology Application Research Institutes (ATARI) in designing and implementation of core extension and multidisciplinary research in the respective zones. In the BSS, Dr R. Parshad, Dr J.P. Sharma, Dr Premlata Singh and Dr R.N. Padaria also presented their views on the topic.

In order to draw roadmap for reorienting and prioritizing Extension Education and Research and Course Curriculum in Extension Education, institutional support, networking of extension scientists, capacity building, and identification of new research areas with detailed recommendations and way forward have been published in *NAAS Strategy Paper No. 5*.

National Consultation on System of Crop Intensification (SCI)/System of Rice Intensification (SRI) (Convener: Dr B.C. Barah)



The National Academy of Agricultural Sciences (NAAS), the National Consortium on SRI (NCS) and National Bank for Agriculture and Rural Development (NABARD) organized a one day National Consultation Meet on SCI/SRI

on September 10, 2016 at the NAAS, NASC, New Delhi, for assessing the prospects of up-scaling the technology. Dr S. Ayyappan, President, NAAS welcomed the participants. Dr B.C. Barah, Convener and former NABARD Chair Professor, introduced the subject.

Dr S.K. Pattanayak, Secretary, DAC&FW, New Delhi; Dr H.K. Bhanwala, Chairman, NABARD, Mumbai; and Dr T. Mohapatra, Secretary, DARE & DG, ICAR graced national consultation. Dr H.K. Bhanwala mentioned that improvement in agriculture sector can be brought with a 3-pronged strategy: (i) technology led, (ii) change in cropping time scale and expansion of post-harvest technology to avoid a glut situation, and (iii) reorienting extension mechanisms for enhanced outreach and increase in yields by reducing the yield gaps. He informed that in pursuance of this objective, NABARD has already invested Rs. 25 crores, covering 1.4 lakh farmers, on promoting SRI across 13 states, wherein productivity gains have been reported to be about 50% with simultaneous decrease in cost of production and saving of natural resources.

Dr S.K. Pattanayak dwelt upon the issues of doubling the income of farmers by 2022. He appreciated the need for further promotion of crop intensification initiative as the way forward for food security in the country. It was emphasized that the role of ICAR will be critical in validating various principles of SRI.

Dr T. Mohapatra, Secretary DARE and Director General, ICAR, elucidated that sustainable crop intensification and development of best management practices, including new varieties and associated most suited agronomic practices, is the hallmark of ICAR research for development. SRI is not a new technology and is not a fixed package of practices. Situationally, the farmers differentially adopt the SRI components, but seldom in toto. Many feel that the approach is more of a social phenomena.

Notwithstanding the enhanced yield, water-saving and environmental friendliness advantages of SRI, it emerged that the overall adoption of the package is sluggish, and there are several bottlenecks in SRI's scientific basis. Its adoption is often linked with subsidy and other governmental support, and the withdrawal effect is high. As NABARD, RKVY and NFSM have been promoting SRI for the past several years, the disaggregated impact of SRI in these programmes should be critically analysed to provide future guidance.

From the overview of presentation and discussions, it emerged that SRI is an approach based on global best management practices of properly spaced, young, single seedlings, periodically drained and aerated soils, and weed free fields. It is getting fairly popular among the farmers in Tripura, Bihar, Andhra Pradesh, Tamil Nadu and other states. SRI principles have variably been adopted for developing crop and location specific good agronomic practices for other crops, referred to as SCI. Though SRI has been advocated for widespread adoption in the country, the spread is patchy both in space and time. The detailed action plan and recommendations have been documented in *National Consultation Proceedings (NAAS/NABARD/NSC)*.

Consultation Meet on Qualitative and Quantitative Assessment of Glauconite as Source of Potassium and More (Convener: Dr J.C. Katyal)



Consultation Meet was organized on September 13, 2016 at NAAS, New Delhi. The Session was Chaired by Dr S. Ayyappan, President and Prof R.B. Singh, Immediate Past President. Participants representing NAAS, SAUs,

ICAR institutes and Central Institute of Mining and Fuel Research attended the meeting.

Dr J.C. Katyal made a comprehensive presentation centring on the extent and severity of K deficiency in soils; differential needs of diverse annual and perennial crops and agronomic value of glauconite as source of K in the management of K under-supply. He also informed on the available biological and industrial routes of enrichment and beneficiation of glauconite ore. This thematic presentation was supported by 3 independent talks with focus on: (i) assessment of glauconite mining for agriculture; (ii) delineation of niche crops and soils *vis-a-vis* management of K deficiency by locally available minerals and ores; and (iii) role of K solubilising microorganisms in mineralizing glauconite-bound K. It emerged that economic and environmental considerations point to potential of glauconite as K source and soil ameliorant.

Major recommendations emerging for future programmes and activities are as under:

- Initiate exploration and identification of benchmark sites endowed with high-grade glauconite i.e. greensands having high glauconite content and glauconites with high K enrichment.
- Identify and prioritize niche crops and soils responsive to glauconite application.
- Launch comparative evaluation studies of improved glauconite through size reduction, enrichment with soluble K sources and management practices.
- Investigate potential of K solubilising micro organisms (KSM) (bacteria, fungi and actinomycetes) for enhancing availability of otherwise sparingly soluble glauconite-K.
- Prepare an evaluation report highlighting beneficiation technologies in this regard, narrating relative advantages and disadvantages from the Indian standpoint would be necessary.

XIII Agricultural Science Congress



Sri Vajubhai Vala Ji, Hon'ble Governor of Karnataka inaugurating the Congress

The XIII Agricultural Science Congress (XIII ASC) 2017 was held under the aegis of NAAS in collaboration with University of Agricultural Sciences, Bengaluru, Karnataka, (UASB) during February 21-24, 2017. The theme of the congress was *"Climate-Smart Agriculture"* keeping in tune with the global climate change and the need for developing adaptation and mitigation strategies for achieving sustainable

agriculture in the country. The congress was attended by over 1500 participants representing the faculty and students from various SAU's in Karnataka and other parts of the country, traditional universities, ICAR Institutes, representatives from central and state governments, farmers, NGO's, representatives of industry including IT sector and financial institutions. The international representations included University of Kassel, Germany, University of Massachusetts, Boston, USA; The World Bank, Washington, USA, and ICRISAT, Hyderabad, India. The Congress was inaugurated on February 21, 2017 by the Chief Guest Hon'ble Governor of Karnataka, and Chancellor of the University, Sri Vajubhai Vala Ji, with a special "Water the Earth-Ceremony" organized on this occasion. Sri Krishna Byregowda, Hon'ble Minister for Agriculture, Government of Karnataka and Pro-chancellor of the University, Dr T. Mohapatra, Secretary, DARE and DG, ICAR, Dr Ramesh Chand, Member, NITI Aayog, Government of India, and Dr S. Ayyappan, Immediate Past President, NAAS were guests of honour. Prof Panjab Singh, President, NAAS presided over the function. Dr H. Shivanna, Vice-Chancellor, UASB graced the function as Convener of XIII ASC. Dr S. Ayyappan, Past President, NAAS, extended a hearty welcome with plant sapling to the Chief Guest and all dignitaries on the dais, distinguished participants and delegates and gave an overview of XIII Congress. Prof Panjab Singh, President, NAAS extended a warm welcome on his behalf and on behalf of the Academy to the Chief Guest, dignitaries and all distinguished participants. In his remarks, he mentioned that the Academy has completed 26 years and established great credentials in Agriculture science, technology and education at national / international level. Prof Singh highlighted some key strategies and wished the Congress a success and hoped that Academy would look forward for good actionable recommendations as the output from the Congress.



Dr T. Mohapatra addressing the Congress

Dr T. Mohapatra, Secretary, DARE and DG, ICAR, in his remarks said that climate change is a big obstacle in achieving the targeted food production and the country needs to tackle it. He expressed confidence on our Agriculture scientists and was hopeful that this Congress will come up with very useful recommendations which will be vibrant enough to face the challenges of climate change by finding appropriate solutions for developing suitable technology under enabling policies.

Dr Ramesh Chand, Member, Niti Aayog, Government of India called upon farm scientists to come out with region-specific impact assessments. He also suggested that cropping patterns that are climate friendly and consistent with natural resources should be evolved so that they are sustainable in the long-term. Impressing upon scientists not only to look at the adaptation strategies but also focus on mitigating the impact of



climate change. Prof M.S. Swaminathan, Chairman, M.S. Swaminathan Research Foundation, who could not attend the Congress in person addressed the participants through his video message and highlighted some key strategies that need to be followed for making Indian Agriculture Climate smart. Karnataka State Agriculture Minister, Sri Krishna Byregowda in his remarks exhorted scientists to start creating awareness both among the public and policy makers including national and

state leadership, on the efficient use of water and sustainable use of land resources, which could help to tackle the challenge of climate change. Sri Vajubhai Vala Ji, Hon'ble Governor of Karnataka, presented the Academy awards to the scientists selected by NAAS, and released publications brought out by NAAS and UASB for this Congress.



Hon'ble Governor, Sri Vajubhai Vala Ji addressing the Congress

In his address, Hon'ble Governor of Karnataka, congratulated the Academy for this timely initiative of holding this important Congress in Karnataka state, facing drought for last 4-years. He was highly appreciative of scientists who undertook large scale experimentation and found solutions to our problems and congratulated all the awardees. He drew comparison of modern scientists with "Rishi-Munis" of yester-years, who on the strength of their knowledge, used to provide leadership and impart understanding to the communities, in different areas of daily activities. He emphasized that if we save water-water in turn will save us. He impressed upon all stakeholders of agriculture to join hands to promote, innovate climate smart technologies which in holistic way will lead us to achieve the objective of Climate-Smart

Agriculture resulting in Green economy. He declared the Congress open and wished all participants intellectually beneficial discussions, desired implantable outputs from the Congress and memorable stay at Bengaluru.



Dr Anil Kakodkar



Dr Kamaljit S. Bawa



Dr V. Prakash



Dr K. Kasturirangan

Several plenary lectures were delivered by eminent speakers viz. Dr Andreas Buerkert, University of Kassel, Witzenhausen, Germany; Dr Anil Kakodkar, Former Chairman, Atomic Energy Commission of India; Dr Kamaljit S. Bawa, Professor of Biology, University of Massachusetts, Boston, USA; Dr V. Prakash, Former Director, CFTRI, Mysore and Vice-President, IUNS; Dr K. Kasturirangan, Former Chairman, ISRO, and Former Member, Planning Commission, Government of India; Dr (Ms) Uma Lele, Independent Researcher and Former Senior Advisor, The World Bank, Washington DC, USA; Dr David Bergvinson, Director General, ICRISAT, Hyderabad; Sri Krishna Byregowda, Hon'ble Minister of Agriculture, Government of Karnataka and Dr Prashant Gupta, Principal Director, Microsoft Cloud & Enterprise Division, Hyderabad.



Dr Uma Lele



Dr David Bergvinson



Dr Prashant Gupta



Sri Krishna Byregowda

During four day Congress, 12 technical sessions were organized covering 15 sub-themes in which very eminent, 84 invited speakers presented their research in each specific sub-theme area. In the Congress three panel discussions were held in which very senior level experts involving scientists, policy makers, development departments and farmer groups actively participated and presented their views. Three poster sessions were organized, in which young scientists presented their work. These were evaluated by expert judges for selecting Best Poster papers. On this occasion Agri-Expo was inaugurated by Sri Krishna Byregowda, Hon'ble Minister and it was followed by Farmer – Scientist interaction at the same venue and large number of farmers raised many



Sri D.V. Sadananda Gowda, Hon'ble Minister for Statistics and Programme Implementation, Government of India, releasing the Bengaluru Declaration

issues concerning impact of climate change on their crop productionthe scientists present, satisfactorily explained them the coping strategies that farmers need to adopt to minimize production loss. Sri D.V. Sadananda Gowda, Hon'ble Minister for Statistics and Programme Implementation, Government of India, presided over the valedictory function on February 24, 2017. Two Hon'ble MLA's from Karnataka State Assembly, Sri S.R. Vishwanath and Sri Y.A. Narayana Swami were guests of honour. Sri Gowda in his remarks stressed the importance of science and scientists in solving societal problems and hoped that the deliberations of the Congress would enable and empower the nation in dealing with impacts of climate change in agriculture. The recommendations emerged from the different technical sessions led to drafting and adoption of Bengaluru Declaration of XIII ASC.



REGIONAL CHAPTERS

Bhubaneswar Chapter

The Bhubaneswar Chapter of NAAS organized a discussion meeting on "Minimizing water use in Agriculture" on September 3, 2016 at ICAR-IIWM, Bhubaneswar under the Convenership of Dr D.P. Ray, with four broad components as (1) Minimizing water in agriculture and horticulture; (2) Minimizing water use in livestock and fisheries; (3) Water management issues in the context of climate change; (4) Water governance and policy.



To minimize the water use in cropping systems it was recommended that technologies like resource conservation, laseraided land levelling, ridge furrow method, use of sprinkler and drip irrigation, and integrated farming systems developed by ICAR institutes can be very useful. It was highlighted that with a 10% increase in water

use efficiency, an additional 14 million ha area can be brought under irrigation with modest investment and enabling policy support.

For livestock it was recommended that use of technologies like superior germplasm, improving indigenous species, improved nutritional management, shelter management can effectively improve water productivity from the sector. To reduce the water footprint from capture fisheries and aquaculture, reduction of seepage and water exchange losses, integrated aquaculture, re-circulation and re-use of water for aquaculture, organic aquaculture, feed and nutrition; waste water fisheries are recommended. Possibilities should be explored for utilizing grey-water for aquaculture and fisheries.

Agricultural water management issues in the context of climate change were also deliberated upon. The house advocated that strategies for mitigating methane emission from rice cultivation could be achieved through improved water management, including promoting mid-season aeration by short-term drainage, wetting and drying methods of irrigation, SRI and aerobic rice cultivation, improving organic matter management by promoting aerobic degradation through composting or incorporating it into soil during off-season drained period; use of rice cultivars with few unproductive tillers, high root oxidative activity and high harvest index; and application of fermented manures like biogas slurry in place of unfermented farm yard manure.

Hyderabad Chapter



The NAAS – Hyderabad Chapter and Indian Society of Dryland Agriculture (ISDA), jointly organized a quiz competition for class X students to celebrate the 88th Birth Anniversary of Late Dr M.V. Rao at ICAR – CRIDA on 18th June 2016. The main purpose of organizing such a quiz competition was to create awareness among the students about the career opportunities in

agricultural research and education. Nine teams from different schools located in Hyderabad participated in the competition. The trophy and prizes were distributed to the winners.



A special lecture was organized by the Chapter at CRIDA, Hyderabad on January 13, 2017.

The lecture on "Climate Smart Agriculture – Concept for Sustainable Land Management" was delivered by Dr J.C. Katyal, Former Vice-Chancellor, CCS HAU, Hisar. It was attended by Eminent Fellows of local chapter, scientists, research associates and senior research fellows from CRIDA, Hyderabad. Dr J.C. Katyal in his lecture highlighted the

impact of Green Revolution on productivity as well as on natural resources under climate change scenarios. Non-judicious use of natural resources such as ground water, imbalanced fertilizers, and lack of organic matter recycling resulted in soil health degradation and production plateau. He highlighted different measures to overcome the adverse effects of climate change on Indian Agriculture. He further emphasized that the integration of research, policy and development measures is must for the success of Climate Smart Agriculture. He also stressed that the success of climate smart agriculture is also linked with increased interaction level of scientists with farmers.

Kochi Chapter

A special lecture was organized by NAAS, Kochi Chapter at CMFRI, Kochi on January 09, 2017. The lecture was delivered by Dr Pranab Mukhopadhyay, Professor of Economics, Goa University on the topic 'Economics and Nature'. Dr Pranab



Mukhopadhyay, in his lecture gave an introduction of the basic principles of economics that are applied in the study of nature. He highlighted the services provided by the nature to the human and society and how they are valued including economic principles underlying such valuations. He mentioned that the concept of GDP measured today excludes the cost of services provided by the nature to the society. The concept and methodology followed in green accounting wherein the GDP included the social and environmental costs of

the services provided by the nature were elaborated by him. Dr Mukhopadhyay also presented a case study conducted by him on valuation of coastal and marine ecosystem and informed the house that provisionally about 3.1 % of the Net National Product (NNP) comes from marine ecosystem. Dr Mukhopadhyay concluded that the valuation of natural resources and their services is very much essential and important in arriving at the economic development indicators of the country.

Dr A. Gopalakrishnan, Convener, thanked the speaker for a thought provoking lecture on economic evaluation of ecological services of natural resources.

Ludhiana Chapter



A special lecture was delivered by Dr Tilak Raj Sharma, Director, National Agri-Food Biotechnology Institute (NABI), Mohali on March 1, 2017 at Punjab Agricultural University, Ludhiana, under the aegis of Ludhiana Chapter of NAAS. Dr Sharma talked on 'Cloning and Characterization of Genes and their Application in Rice Improvements - A Success Story'. Dr Tilak Raj Sharma presented the research work on identification, gene cloning, validation and

characterization of the rice blast resistance gene Pi54 ultimately leading to its commercial utilization for the development of rice varieties carrying this gene. Dr B.S. Dhillon, Vice Chancellor, PAU and Convener of the Chapter appreciated the lecture delivered by Dr Sharma.

Another lecture in the series under aegis of NAAS was delivered by Dr Arun Kumar Joshi on March 9, 2017 at Punjab Agricultural University, Ludhiana. Dr Arun Kumar Joshi is the South Asia Regional Director, CIMMYT and Managing Director, Borlaug Institute of South Asia. The title of his lecture was "Expectations from wheat for food



security". Dr Joshi outlined the historical importance of wheat, tracing its evolutionary origin, its domestication as evident from archaeological studies, its significance in early civilizations and emergence as a global crop. He portrayed the journey of agricultural revolutions in the backdrop of Malthusian challenge. Dr Joshi went on to outline the case for wheat as a major component of national

food security. Dr Joshi took up the core issue of challenges facing wheat productivity enhancement in the face of projected demand by 2050. He spelt out the major challenges in form of climate and weather perturbations and emergence of new pathogens, citing the case of blast disease on wheat in Bangladesh. He demarcated the vulnerable regions in India based on geo-physical parameters. At the same time, he showed some bright spots, for instance high wheat productivity potential in Iran and central India. He discussed the CIMMYT strategy based on massive germplasm churning, starting with a set of diverse 70,000 genotypes. He cited the example of biofortified wheats, which have now been released for cultivation as a result of continuous support and investment by national and international programmes. Dr Joshi also discussed technological strategies, including latest crop breeding and biotechnological approaches including hybrid wheat. The concluding remarks were made by Dr B.S. Dhillon, Vice-Chancellor, PAU and Convener of the Chapter.

NEH Chapter - Lecture Series



The Chapter organized on June 10, 2016 at the College of Home Science, Assam Agricultural University (AAU), Jorhat, a lecture on "Relevance of Home Science Education to Address Socio-Economic Issues" delivered by Dr Minaxi Pathak, Former Dean, Faculty of Home Science, AAU. She highlighted the important socio-economic issues confronting Assam as well

as other north eastern states of India which could be effectively addressed by the home science scientists.

The Chapter also organized on September 02, 2016 at the College of Agriculture, AAU, Jorhat, a lecture on "Agricultural Development in Eastern India and Integrated Farming System for Resource Conservation" delivered by Dr B.P. Bhatt, Director, ICAR Research Complex for Eastern Region (ICAR-RCER), Patna. Dr Bhatt made an excellent exposition on problems and prospects of Agriculture in the North Eastern (NE)



India and elaborated on the prospect of Integrated Farming System (IFS) for rural livelihood promotion with some unique IFS models.



Dr S.P. Biswas, Professor, Department of Life Sciences, Dibrugarh University and an eminent fishery scientist of the region, delivered a lecture on "Prospects and Challenges of Rearing Small Fish Species" at the College of Fisheries, Raha, Assam Agricultural University, on October 25, 2016. Dr Biswas highlighted the potential of ornamental fisheries in North-East India and also discussed the challenges to be met. He

emphasised on substantial market demand of indigenous ornamental fish species and expressed his concern on the declining trend of ornamental fish biodiversity due to various anthropogenic stresses and clandestine trade. Highlighting the nutritive value



of small indigenous food fish species (SIFFS) he opined that potential scope exists to address the malnutrition problem of rural poor in India by cultivating small indigenous species.

Dr C.K. Rajkonwar, Former Associate Dean, Lakhimpur College of Veterinary Science, AAU, and former Director, Department of Animal Husbandry and Veterinary, Govt. of Assam, delivered a lecture on "Growth and Development of Veterinary Profession over a Period of 100 Years in Assam" at the College of Veterinary Science, Khanapara, on November 10, 2016. He stressed on animal health and animal welfare issues and gave a clarion call to the veterinary and animal husbandry scientists to engage themselves more on field oriented research so that the ultimate stakeholders i.e. the farmers can reap the benefit of this science.

Patna Chapter



A discussion meeting on 'Agroforestry for Rehabilitation of Water-Congested Ecologies of the Eastern Region' was organized at ICAR-Research Complex for Eastern Region, Patna on April 5, 2016 under NAAS-Patna Regional Chapter. Large number of participants representing ICAR institutes and SAUs of eastern states, Ministry of Agriculture and Farmers' Welfare, World Agro-

forestry Research and CGIAR institutes attended the event and contributed substantially to the deliberations and discussions.

Dr B.P. Bhatt, Director, ICAR-RCER described the scenario of water congested ecologies, wastelands and demand-supply gaps of fodder and fuel wood in different eastern states. He stressed upon the need to integrate woody perennials and livestock for ensuring sustainability and doubling income of farmers of the region.

Salient recommendations were: (i) Inventorization and characterization of water congested ecologies in different states of Eastern India; (ii) Development of policy guidelines on bio-drainage and constitution of a Task force for its implementation; (iii) Developing contingency plan for different water-logging scenarios of Eastern India; (iv) Popularization of rice-fish cultivation with agro-forestry systems in Chhattisgarh; and Integrated farming systems with pig or goat as animal component for Jharkhand; (v) Studies on existing shelterbelt models of coastal region of Odisha; (vi) Interinstitutional collaboration for maintaining germplasm of different fodder crops, agroforestry species and bamboos species, which can withstand the water logged area and field gene bank of water-logging tolerant fodder species; (vii) Replicating farmers' innovations on management of waterlogged area like floating vegetable fields of Assam in other parts of Eastern India; (viii) Using the available dataset of NRSA or State Remote Sensing Agencies for characterization of waterlogged areas; (ix) Collection and identification of water loving local grasses of the Eastern States; (x) Identification,

characterization and promotion of wild rice in low lying areas of Eastern States as per the guidelines of NBPGR; and (xi) Documentation of the success stories on agro-forestry in Eastern region.

LINKAGES

ICAR/SAU/NAAS-MSU Partnership for Agricultural Research and Education



Delegates at NAAS Secretariat

Under the auspices of the National Academy of Agricultural Sciences (NAAS), New Delhi, the brain trust of India's agriculture, a round table meeting was organized on September 9, 2016. Seventeen senior officials and members of NAAS, ICAR, IARI and Michigan State University (MSU) participated in the roundtable meeting. The roundtable meeting was coordinated by Dr S. Ayyappan (President of NAAS) and Prof R.B. Singh (Chancellor of Central Agricultural University and Immediate

Past President of NAAS). Dr Steven Hanson (Vice Provost and Dean of MSU International Studies and Programs), Dr Karim Maredia (Professor and Director of MSU South Asia Partnership), and Dr Vibha Dhawan (Executive Director of Biotechnology and Bioresources at TERI and Consul General of MSU in India) represented Michigan State University.

The purpose of the roundtable meeting was to discuss and identify key areas and innovative approaches for sustained long-term collaboration among the DARE/ICAR, NAAS, SAUs and MSU. Both, DARE/ICAR and MSU aim to become global leaders and expressed strong interest to partner and promote South-South and North-South collaborations, including trilateral partnerships, to help strengthen institutional capacity and human resources in countries of South Asia and Africa. MSU expressed strong interest to collaborate with DARE/ICAR, including under the proposed World Bank funded National Agricultural Higher Education Project (NAHEP), to build knowledge networks and enhance institutional capacity through interdisciplinary collaborative research, education, training and outreach programmes in cutting-edge areas. The following 10 broad areas were suggested for collaborative programmes between DARE/ICAR and Michigan State University:

- 1. Biotechnology, Biodiversity, Plant Breeding and Seed Systems
- 2. Water Resources and Water Management

- 3. Animal Agriculture, Dairy Science and Technology
- 4. Bioenergy and Alternate Energy (biogas, solar, wind, etc.)
- 5. Food and Health (bioactive natural products)
- 6. Post-harvest Management of Agricultural and Food Products (food processing, food safety, storage, packaging, and value addition)
- 7. Fisheries and Aquaculture
- 8. Agroecology, Soil Health, Organic and Sustainable Agriculture
- 9. Gender Equity and Social Empowerment
- 10. Impact Evaluation

1st International Agrobiodiversity Congress

The Academy collaborated with the Indian Society of Plant Genetic Resources (ISPGR) and Bioversity International in organizing the 1st International Agrobiodiversity Congress held in New Delhi from November 06-09, 2016. The Congress was inaugurated by the Hon'ble Prime Minister of India, and attended by 900 participants from 60 countries, discussed various aspects of access, conservation and use of agrobiodiversity in 16 technical sessions, four satellite sessions, a genebank roundtable, a public forum, a farmers' forum and poster sessions. The Congress alerted that the world is facing rapid loss and extinction of biodiversity, and loss of a gene is a major loss for our future generations. It underpinned that, if conserved and used sustainably, agrobiodiversity could make an important contribution towards resolving problems of hunger, food insecurity, malnutrition and climate change, thus help in attaining the Sustainable Development Goals (SDGs). But, limitations in policies, investment, infrastructure, technical capacity as well as cross-sectoral coordination and partnerships have often prevented efficient use of agrobiodiversity.

Based on the presentations and comprehensive deliberations, the delegates adopted the following declaration:

- We call upon nations to accord top priority to the agrobiodiversity conservation and their sustainable use towards achieving targets of SDGs relating to poverty alleviation, food and nutritional security, good health, gender equity and partnership.
- We recognize the importance of traditional knowledge on agrobiodiversity of farm men and women, pastoralists and other tribal and rural communities and their central role in its conservation and use for a food and climate resilient world. We, therefore, call upon countries to develop the necessary funding, legal and institutional mechanism to ensure and facilitate their continued active participation.

- We urge researchers and policy-makers to initiate, strengthen, and promote complementary conservation strategies to conserve and use agrobiodiversity including crop wild relatives in more dynamic way to ensure a continuum between ex situ, in situ and on farm conservation strategies to combat food and nutrition insecurity as well as adverse effects of climate change, land degradation and biodiversity loss.
- We invite researchers to employ modern technologies including, but not limited to, genomic, space, computational, and nano-technologies for characterization, evaluation and trait discovery using genetic resources. The aim should be to achieve efficiency, equality, economy and environmental security in agricultural production systems and landscapes.
- We re-emphasize the necessity of global exchange of plant, animal, aquatic microbial and insect genetic resources for food and agriculture to meet the ever-growing food and nutritional needs of each country. Nations also need to harmonise their multiple legal systems and prioritize the improvement of their phytosanitary capacities to facilitate safe transfer of genetic resources using latest technologies and trans-boundary partnerships.
- We strongly recommend that the governments and societies put greater emphasis on public awareness and capacity enhancement programs on agrobiodiversity conservation and use.
- We strongly suggest developing and implementing an agrobiodiversity index to help monitor conservation and use of agrobiodiversity.
- We urge public and private sector partnerships to actively invest in and incentivize the utilization of agrobiodiversity to address malnutrition, increase the resilience and productivity of farms, and enhance ecosystem services leading to equitable benefits and opportunities with particular emphasis on women and youth.
- The UN is urged to consider declaring soon a 'Year of Agrobiodiversity' to draw worldwide attention and to catalyze urgent action.
- We unanimously recommend that a congress focusing on agrobiodiversity be held each 3-5 years in order to maintain emphasis on this important area that we have realized in Delhi, for which a continuing committee be formed."

4th International Agronomy Congress

The Academy collaborated with the Indian Society of Agronomy and the ICAR in organizing the 4th International Agronomy Congress on "Agronomy for Sustainable Management of Natural Resources, Environment, Energy and Livelihood Security to Achieve Zero Hunger Challenge", held at New Delhi during November 22-26, 2016. The theme discussed was extremely topical and addressed emerging challenges and possible solutions towards a Zero Hunger World.

NAAS-JHU interaction

The NAAS interacted with one of the world's leading research universities – Johns Hopkins University (JHU), Washington DC, USA. On January 11, 2017, a JHU delegation visited the Academy and held discussion with selected Delhi-based NAAS Fellows and IARI students. The Indian Council of Food and Agriculture (ICFA), a Delhi-based NGO, also participated. The JHU delegation was led by Dr Sharon Yanagi, Associate Director of the School of Advanced International Studies (SAIS), JHU. The SAIS group was keen to know as to how India handles developmental and strategic challenges in agriculture, which is pivotal to the nation's food, nutrition, and livelihood security.

Prof R.B. Singh, on behalf of the NAAS welcomed the JHU delegation and other participants. He reiterated the centrality of the NAAS as the nation's think tank for transforming agriculture to reshape India. Prof Singh highlighted the milestones of development in agriculture during the journey from the Green Revolution to the Right to Food Bill. He emphasized the Academy's role in putting Agriculture in the middle of Science, Technology, Engineering and Mathematics to transform STEM into STEAM, thus facilitating wider collaboration among disciplines, research and educational institutions, industrial development and employment opportunities to attain the New Normal and Green Economy.

Dr Suresh Pal, Director, NIAEPR and NAAS Fellow followed by Dr P.K. Joshi, Director - South Asia, IFPRI and NAAS Fellow reiterated that creation and reforms of Agricultural Price Commission, Food Corporation of India, National and State Seed Corporation, Seed Act, Model APMC Act, National Market for Agriculture, Public-Private Partnership, Peoples Participation, and structural reforms undertaken in the past have been instrumental in fighting hunger and poverty. Lately, the Government has shifted focus on productivity and income of the farmers (doubling farm income by 2022), human capital development and social safety net programs (skill, information, health etc), risk management in agriculture (PM Fasal Bima Yojana), and equity concerns. Mr N.S. Randhawa, Executive Director, ICFA, highlighted the role of the Council in strengthening national and international linkages, particularly in facilitating exchange visits of students and faculty.

RECOGNISING EXCELLENCE

Fellows Elected in 2017

Section I: Crop Sciences

Dr Ryappa Ramappa Hanchinal

Chairperson, Protection of Plant Varieties and Farmers' Rights Authority, Ministry of Agriculture and Farmers Welfare, Govt of India, New Delhi

Dr Sabariappan Robin

Dean, School of Post Graduate Studies, Tamil Nadu Agricultural University, Coimbatore (T.N)

Dr Ajit Kumar Shasany

Senior Principal Scientist, Biotechnology Division, CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow (U.P.)

Dr Kuldeep Singh

Director, ICAR-National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi

Dr Narendra Pratap Singh

Director, ICAR-Indian Institute of Pulses Research, Kalyanpur, Kanpur (U.P.)

Dr Hari Deo Upadhyaya

Head, Genebank, International Crops Research Institute for the, Semi-Arid Tropics (ICRISAT), Patancheru (Telangana)

Section II: Horticultural Science

Dr Ram Krishna Pal

Director, ICAR-NRC on Pomegranate, Kegaon, Solapur (Maharashtra)

Dr Ram Roshan Sharma

Principal Scientist (Hort.), Division of Food Science & Post-harvest Technology, ICAR-Indian Agricultural Research Institute, New Delhi

Dr Bijendra Singh

Director, ICAR-Indian Institute of Vegetable Research, (Shahnshahpur), Varanasi (U.P.)

Section III: Animal Sciences

Dr Vinayagamurthy Balamurugan

Senior Scientist, ICAR-National Institute of Veterinary Epidemiology and Disease Informatics, Bengaluru (Karnataka)

Dr Tarun Kumar Bhattacharya

National Fellow, ICAR-Directorate of Poultry Research, Rajendranagar, Hyderabad (Telangana)

Dr (Ms.) Sunita Grover

Principal Scientist and Head, Dairy Microbiology Division; Incharge, Molecular Biology Unit, ICAR-National Dairy Research Institute, Karnal (Haryana)

Dr (Mrs.) G. Taru Sharma

Principal Scientist & Head cum Director, Centre of Advanced Faculty Training in Veterinary Physiology, Division of Physiology and Climatology, ICAR-Indian Veterinary Research Institute, Izatnagar (U.P.)

Section IV: Fisheries Sciences

Dr Sibnarayan Dam Roy

Director, ICAR-Central Island Agricultural Research, Institute, Port Blair (A&N Islands)

Dr A. Sait Sahul Hameed

Associate Professor & OIE Expert, C. Abdul Hakeem College, Melvisharam, Vellore District (Tamil Nadu)

Section V: Natural Resources Management Sciences

Dr Pratap Bhattacharyya

Principal Scientist, Division of Crop Production, ICAR-Central Research Institute for Jute and Allied Fibres, Barrackpore, Kolkata (W.B.)

Dr Gulshan Mahajan

Senior Agronomist, Rice Section, Department of Plant Breeding & Genetics, Punjab Agricultural University, Ludhiana (Punjab)

Dr Chandra Bhushan Pandey

Principal Scientist & Head, Natural Resources & Environmental Division, ICAR-Central Arid Zone Research Institute, Jodhpur (Rajasthan)

Dr Yashbir Singh Shivay

Professor and Principal Scientist, Division of Agronomy, ICAR-Indian Agricultural Research Institute, New Delhi

Dr Arvind Kumar Shukla

Project Coordinator, AICRP on Micronutrients and Pollutant Elements, ICAR-Indian Institute of Soil Science, Bhopal (M.P.)

Section VI: Plant Protection Sciences

Dr Pranjib Kumar Chakrabarty

ADG (Plant Protection & Biosafety), Indian Council of Agricultural Research, New Delhi

Dr Supriya Chakraborty

Professor, School of Life Science, Jawaharlal Nehru University, New Delhi

Dr (Ms.) Lata

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

Dr (Ms.) Irani Mukherjee

Professor & Principal Scientist, Division of Agricultural Chemicals, ICAR-Indian Agricultural Research Institute, New Delhi

Section VII: Agricultural Engineering and Technology

Dr Arjamadutta Sarangi

Principal Scientist, Water Technology Centre, ICAR-Indian Agricultural Research Institute, New Delhi

Section VIII: Social Sciences

Dr Narayan Bhaskar

Principal Scientist, Department of Meat & Marine Sciences, CSIR-Central Food Technological Research Institute, Mysore (Karnataka)

Dr Hukum Chandra

National Fellow, ICAR-Indian Agricultural Statistics Research Institute, New Delhi

Foreign Fellows

Dr Albrecht E. Melchinger

Full Professor of Applied Genetics and Plant Breeding, Seed Science and Population Genetics, Institute of Plant Breeding, University of Hohenheim, Stuttgart, Germany

Dr Patrick Sorgeloos

Emeritus Professor of Aquaculture, Laboratory of Aqaculture & Artemia Reference, Center, Ghent University, Ghent, Belgium

Pravasi Fellows

Dr Kshirod K. Jena

Principal Scientist, Plant Breeding Division, International Rice Research Institute, Metro Manila, Philippines

Dr Vijay K. Juneja

Lead Scientist (Microbiology), ERRC-USDA-ARS, 600 E. Mermaid Lane, Wyndmoor, PA (USA)

Associates

Dr Gajanan Behere

Senior Scientist (Agril. Entomology), Division of Crop Protection, ICAR Research Complex for NEH Region, Umiam (Meghalaya)

Dr Naveen Chandra Bisht

Staff Scientist IV, National Institute of Plant Genome Research, New Delhi

Dr (Ms.) Amritpal Kaur

Assistant Professor, Department of Food Science and Technology, Guru Nanak Dev University, Amritsar

Dr Amit Kumar

Scientist (SS), Animal Genetics, ICAR-Indian Veterinary Research Institute, Bareiliy (U.P.)

Dr Satendra Kumar Mangrauthia

Scientist (SS), Biotechnology Section, ICAR-Indian Institute of Rice Research, Rajendranagar, Hyderabad (Telangana)

Dr Manish Kumar Pandey

Scientist - Groundnut Genomics, Center of Excellence in Genomics, Research Program-Genetic Grains, International Crops Research Institute for the Semi-Arid Tropics, Patancheru, Hyderabad (Telangana)

Dr Vijay Kumar Prajapati

Assistant Professor, Department of Biochemistry, School of Life Sciences, Central University of Rajasthan, Ajmer (Rajasthan)

Dr Yashpal Singh Saharawat

Principal Agronomist and Country Manager, ICARDA-South Asia and China Office, New Delhi

Dr Nirbhay Kumar Singh

Assistant Professor, Department of Veterinary Parasitology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (Punjab)

Dr Sudhakar Srivastava

Assistant Professor, Institute of Environment & Sustainable Development, Banaras Hindu University, Varanasi (U.P.)

NAAS Awards for 2015-2016

Following awards were given during XIII ASC at UAS, Bengaluru on 21 February 2017 by NAAS

Memorial Awards

Dr B.P. Pal Award for Excellence in Agricultural Sciences	Dr (Ms.) Uma Lele , Independent Scholar, World Bank, Washington, D.C. (USA)
Dr K. Ramiah Award	Dr (Ms.) Shailaja Hittalmani , Professor & Discipline Head (GPB), UAS, GKVK, Bengaluru (Karnataka)
Dr K.C. Mehta Award	Dr A.N. Mukhopadhyay , Former Vice-Chancellor, AAU, Assam, "Sangini", 151 Akanksha, Lucknow (U.P.)
Dr M.S. Randhawa Award	Dr Mruthyunjaya , Former National Director, NAIP, G-502, NCC Urban Meadows 2, Yelahanka- Doddaballapur Road, Bengaluru (Karnataka)
Dr N.S. Randhawa Award	Dr M.S. Aulakh , Former Vice Chancellor, NDUAT, Faizabad, U.P., House 41-B, Rajguru Nagar, Ludhiana (Punjab)
Dr P. Bhattacharya Award	Dr D.N. Kamra , ICAR National Professor, Animal Nutrition Division, ICAR-IVRI, Izatnagar (U.P.)
Endowment Award	
Dr. (Ms) Prem Dureja Endowment Award	Dr (Ms.) Rintu Banerjee , Professor, Indian Institute of Technology Kharagpur (W.B.)
Recognition Awards	
Plant Improvement	Dr J.C. Rana, Head, Division of Germplasm Evaluation, National Bureau of Plant Genetic Resources, New Delhi
Plant Protection	Dr K.R. Kranthi , Head, Technical Information Section, International Cotton Advisory Committee, Washington DC, USA
Soil, Water & Environmental Sciences	Dr S.K. Chaudhari , Assistant Director General (SWM), Indian Council of Agricultural Research, New Delhi
Animal Sciences	Dr Parimal Roy , Professor & Head, CFAHS, Tamil Nadu Veterinary & Animal Science University, Chennai (Tamil Nadu)

Social Sciences	Dr Rajender Parsad , Principal Scientist, ICAR-Indian Agricultural Statistics Research Institute, New Delhi
Young Scientists' Awards	
Plant Improvement	Dr Rachit Saxena , Scientist, ICRISAT, Patancheru (Telangana)
Plant Protection	Dr P.L. Kashyap , Scientist, ICAR-Indian Institute of Wheat & Barley Research, Regional Station, Shimla, Himachal Pradesh
Soil, Water & Environmental Sciences	Dr Surender Singh , Scientist, Division of Microbiology, ICAR-Indian Agricultural Research Institute, New Delhi
Animal Sciences	Dr V.K. Prajapati , Assistant Professor, Central University of Rajasthan, Ajmer (Rajasthan)
Social Sciences	Dr R.K. Paul , Scientist, ICAR-Indian Agricultural Statistics Research Institute, New Delhi

FOUNDATION DAY AND AGM

(i) Presentations by Newly Elected Fellows

Newly elected fellows, 28 in number from different disciplines, made their presentations, spread over two days in different sessions. On afternoon of June 4, 2016, in session chaired by Prof Anupam Varma, the newly elected Fellows under Crop Sciences (6), Horticultural Sciences (3), Animal Sciences (4), and Fisheries Sciences (2), made their presentations before the entire fellowship of the Academy. There was active interaction / discussion on each presentation. On June 5, 2016 the session chaired by Dr. C.D. Mayee, the newly elected Fellows under Natural Resource Management Sciences (5), Plant Protection Sciences (4), Agricultural Engineering and Technology (2), and Social Sciences (2), made presentations about their work before the esteemed fellowship. The Fellowship had detailed interaction on all presentations. All these Fellows were admitted to the Academy at AGM ceremony held on June 5, 2016 and presented with Fellowship by the President.

(ii) Presidential Address

Dr S. Ayyappan delivered the Presidential Address on *AgrInnovation: Peasant to People*. He mentioned that agriculture is the largest private nano-enterprise in India, dominated by small farmers, who cultivate 44% of land, and contribute over 50% of total farm output. He underlined the need to plan for a different world in 2030, as envisioned in Sustainable Development Goals of UN and CoP21, for which a more productive, inclusive and sustainable agriculture, that strengthens rural livelihoods, ensures food and nutritional security, reduces demands on natural resources and builds resilience to climate change, is a prerequisite. Farming today needs location-specific, time-bound solutions for the uncertainties prevailing from 'weather to markets', with knowledge, innovations and skills.



Dr S Ayyappan delivering the Presidential Address

In his address he advocated for partnership approach, significantly emerging of new breed of Farm innovators in the country, adding to the list of progressive farmers, lead farmers and expert farmers. He mentioned that innovations in different areas of agriculture, upon examination, revealed the insights that the farmers had, with problemsolving approach in each practice, can be called 'FInnovations'. This he stated brings out a new possibility of extension, emphasizing on the farmer-to-farmer technology transfer and learning across farms, commodities and systems. Emphasizing that it was an opportune time to harness the potentials of the innovations, validate them on one hand, and add value on the other, for fast tracking agricultural development in a comprehensive manner.

(iii) Foundation Day Lecture



Dr V.K. Saraswat, Member (Science), NITI Aayog, Government of India, delivered the Foundation day Lecture on "Second Green Revolution in India" on June 05, 2016. At the outset, Dr Saraswat reviewed the status of Indian agriculture and among the challenges, he listed limited natural resources, growing demand for diversified food and making farming remunerative. He highlighted that variability and untapped potential in our 15 distinct agree dimatic genes existing yeast R&D

Dr V.K. Saraswat addressing the Fellowship distinct agro-climatic zones, existing vast R&D network coupled with ongoing rural transformation were opportunities to be harnessed. He mentioned that India's agriculture GDP growth was better than that of many other countries and in combination with allied sectors it contributes to 54% of total employment, meaning thereby that agriculture is still the prime employer. He highlighted many positives of first green revolution that indeed was a journey from ship to mouth towards self-sufficiency in food production. But he mentioned that in recent years some negatives of green revolution have been noticed, the most important according to him, was resultant regional imbalance in crop planning and mismatch with natural ecology. He stressed the need for crop- centric investment and strong financial support on agriculture research in the country. Referring to food grain productivity during 2002-03 and 2013-14, he advocated for new agenda viz., genetic enhancement - GM crops/GMOs; soil health, organic farming, and better handholding with farmers through outreach programmes, farmers' participatory research and evaluation. Emphasizing on the need for second green revolution (SGR), Dr Saraswat listed key dimensions viz., diversified crops / enterprises / practices; optimum utilization of resources / inputs; renewed focus on R&D / knowledge and technology; better marketing and returns. Next green revolution, he mentioned, will be driven by precision farming, use of nanotechnology, IoT (internet of things), farm mechanization, use of quality seeds with appropriate interventions of fertilizer usage, water use efficiency, nutrient management, disease control coupled with value addition including processing and marketing. He mentioned that as a part of its strategy for second green revolution, India must permit GM crops with appropriate safeguards, shift to high value crops, lay emphasis on livestock and fisheries and provide social respectability to agricultural workers. The eastern states of the country, he mentioned, will drive the SGR that will be small and marginal farmer-centric, ensuring more profit. In conclusion, Dr Saraswat appealed that the agricultural scientists must make dedicated efforts to see that SGR takes place and to this end, the NAAS as think tank can extend valuable support.

(iv) Excerpts from the Minutes of the 23rd AGM



The 23rd Annual General Body meeting (AGM) of the Academy was held on June 5, 2016 at A.P. Shinde Symposium Hall, NASC, New Delhi under the Chairmanship of Dr S. Ayyappan, the President. The meeting was attended by 196 Fellows and before transecting any business a two minute silence was observed as a mark of respect to deceased Fellowships (Dr T.N. Ananthakrishnan, Dr I.C. Mahapatra, Dr S.Z. Qasim, Dr P. Joshi, Dr K.L. Sahrawat, Prof S.K. Sen, Dr M.V. Rao, Dr R. Pandey, Prof C.V. Subramanian) subsequent to the last AGM.

The President welcomed the distinguished Fellowship and mentioned that the year 2015 was the International Year of Soils, and on this occasion Academy brought out a publication on 'State of Indian Agriculture – Soil'. Further, the year 2016 being International Year of Pulses the Academy organized a Strategy Workshop on 'Towards Pulses Self-sufficiency in India'. The President also referred to two other important events, viz., the Silver Jubilee of the Academy celebrated during 2-4 June, 2015 and the Golden Jubilee Celebration of Green Revolution, organized on 27th November, 2015. This important event of the Academy was graced by Hon'ble Union Agriculture Minster and doyens of Indian Agriculture, Prof M.S. Swaminathan, Prof N.G.P. Rao, Late Prof M.V. Rao, Dr E.A. Siddiq apart from past Presidents, Vice-Presidents, Members of EC of the Academy including fellowship, senior officers/faculties from ICAR / Institutes / SAU's, State Departments, Government of India, NGO's, farmers and students.

Prof M.P. Yadav, Secretary, NAAS made a detailed presentation on various activities carried out by the Academy during the year 2015-16. He stated that during the period, the Executive Council met four times to deliberate on various issues; the Academy organized seven Brainstorming Sessions and five Regional Chapters - Ludhiana, Karnal, Jodhpur, Hyderabad and Kochi organized different activities during the period. He also provided detailed report on Silver Jubilee Celebration of the Academy and organization of Golden Jubilee of Indian Green Revolution. Dr K.K. Vass, Editor of the Academy, presented the Editors report and informed the house that the Academy brought out 9 policy papers, 2 strategy papers, 4 special publications, apart from quarterly NAAS-NEWS and other publications during the year. Dr B.S. Dwivedi, Treasurer, presented the statement of accounts of the Academy including the audited report for the year 2015 - 16, which was duly approved by the house. Dr P.K. Joshi, Foreign Secretary, presented the plan of linking NAAS with other international academies and proposed to explore the possibility of presenting NAAS views on global initiatives. The Annual Report for 2015-16 of the Academy was presented by Dr K.V. Prabhu, Secretary, NAAS that was approved by the House.

All agenda items listed for the business session was deliberated upon, and accorded approval by the fellowship. The AGM was briefed about the XIII Agricultural Science Congress on the theme 'Climate Smart Agriculture,' scheduled to be organized in February, 2017 at Bengaluru under the Convenership of Dr H. Shivanna, Vice Chancellor, UAS, Bengaluru.



Admission to Fellowship

Dr K.V. Prabhu, Secretary, conducted the formal admission ceremony of the newly elected Fellowship during the year 2016. Respective Conveners of the Sectional Committees read out the citations of the Fellows. Thereafter, the President admitted the Fellowship to the Academy, 25 fellows were admitted in person, and 4 including 1 under "Parvasi category" were admitted in absentia. The President also presented

certificates to newly selected 8 Associates in person and 2 in absentia. The Vice-chancellor / representative of Kerala University of Fisheries & Ocean Studies, Kochi ; Professor Jayshanker Telangana State Agricultural University, Hyderabad, Telangana; University of Agricultural Sciences, Bengalore, Karnataka; Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura, U.P. were presented Institutional Membership Certificates by the President.

(v) General Discussion

The esteemed fellowship participated in general discussion and the suggestions made pertained to: Greater focus on soils and microbes; Climate Smart Agriculture, to include Entrepreneurship Courses; Food Science as a separate section in NAAS; Doubling farmers' income; Consultancy services from the Academy; Efforts towards strong databases and quality data generation; Press meets by the Academy; Organizing presentations by newly elected Fellowship in two parallel sessions and template for uniform presentations; Impact of Policy Papers; Extension models and Human Resource Development in specific areas; Private Agricultural Universities; Organization of workshops in colleges in line with other Science Academies; Preparing roadmaps from Policy Papers; and other related issues.

PUBLICATIONS

Policy Papers

- (i) Policy Paper 78: Reservoir Fisheries Development in India: Management and Policy Options
- (ii) Policy Paper 79: Integration of Medicinal and Aromatic Crop Cultivation and Value Chain Management for Small Farmers
- (iii) Policy Paper 80: Augmenting Forage Resources in Rural India: Policy Issues and Strategies
- (iv) Policy Paper 81: Climate Resilient Livestock Production
- (v) Policy Paper 82: Breeding Policy for Cattle and Buffalo in India
- (vi) Policy Paper 83: Issues and Challenges in Shifting Cultivation and its Relevance in the Present Context
- (vii) Policy Paper 84: Practical and Affordable Approaches for Precision in Farm Equipment and Machinery

Status/Strategy Papers

- (i) Strategy Paper 2: Towards Pulses Self-Sufficiency in India
- (ii) Strategy Paper 3: Strategy for Transformation of Indian Agriculture for Doubling Farm Income and Improving Farmers Welfare
- (iii) Strategy Paper 4: Sustaining Soybean Productivity and Production in India
- (iv) Strategy Paper 5: Strengthening Agricultural Extension Research and Education -The Way Forward

Policy Brief

(i) Policy Brief 1: Policy Brief to Accelerate Utilization of GE Technology for Food & Nutrition Security and Improving Farmers' Income

Newsletter

NAAS-News, Vol. 16, Nos. 2 to 4 and Vol. 17, No. 1 (quarterly)

Journal (published by Springer India Pvt. Ltd.)

NAAS official Journal 'Agricultural Research' Vol. 4, Nos. 2 to 4 and Vol. 5, No. 1 (quarterly)

Other Publications

- (i) Proceedings of XII Agricultural Science Congress
- (ii) Presidential Address on *'AgrInnovation: Peasant to People'* delivered by Dr S. Ayyappan at Foundation Day
- (iii) Foundation Day Lecture on *Second Green Revolution in India* by Dr V.K. Saraswat, Member (Science), NITI Aayog, Government of India
- (iv) National Consultation Proceedings: Up-scaling System of Rice/Crop Intensification (SRI/SCI)
- (v) NAAS Year Book and Planner

EVENTS AND MEETINGS



President Prof. Panjab Singh addressing the Fellowship

New Year Get-together

Academy organized a get-together of Delhi based Fellows at NAAS complex on January 2, 2017 it was chaired by Prof Panjab Singh, President. Others present on the occasion were Prof R.B. Singh, Past President, Dr T. Mohapatra, Secretary, DARE and DG, ICAR, Prof Anupam Varma, Vice-President, Prof M.P. Yadav, Past Secretary, Dr K.V. Prabhu, Secretary, Dr J.K. Jena, Secretary, Prof V.K. Gupta, Past Editor, and Dr V.K. Bhatia, Editor. Dr Prabhu extended a very warm welcome to the new President and to all distinguished Fellows and introduced to the house, the new members of EC including the newly elected Fellowship and associates present on the occasion.

Prof Panjab Singh, President of the Academy also welcomed the Fellowship and greeted them with a New Year 2017 wishes. He also thanked Fellowship for bestowing him the responsibility as the President of the Academy. He pointed out that the Academy is capable to extend strong knowledge support to ICAR and to the government especially for the policy makers. He further stressed that the Academy needs to match its programs and activities to fulfil the objectives of various government programs for development of agriculture. The President prioritised five areas viz., (a) simultaneous increase in production, protection and resources, needing innovative technology and defined investment priorities; (b) serious efforts for enhancement of pulses and oilseeds production; (c) strong monitoring mechanism and appropriate review on government's national crop insurance scheme, procurement of agriculture produce at MSP etc.; (d) arresting the declining enthusiasm among teachers and researchers in education and research; (e) production of trained and skilled manpower right from farmer level and upward. He emphasized that the Academy should find mechanism to get involved

with two important initiatives of the government viz., (i) More crop per drop of water, and (ii) Doubling farmer's income in next five years. He also pointed out that there are ways to fulfil these gigantic tasks as the Academy has enormous strength of talent. He also appraised the house about activities planned and progress made on the organization of the XIII ASC at UAS, Bengaluru during February 21-24, 2017.



Release of NAAS Publications

On this occasion Academy's publications, viz., strategy/policy papers, NAAS Yearbook 2017, NAAS-NEWS October-December 2016, and NAAS Planner 2017 were released. Prof R.B. Singh, Past President, in his remarks conveyed New Year Greetings to all Fellowship, extended hearty welcome to the President Prof Panjab Singh and thanked Dr S. Ayyappan, Immediate Past President for his significant contribution in promoting the Academy activities during his tenure of three years. He also appreciated the work of the entire secretariat for attending to day to day activities of Academy. He stressed and supported the correct thinking of the government's two initiatives on more crops per drop of water and doubling of farmers' income. Finally he advocated a full synergy between ICAR/DARE and Academy to decide the pathways of different activities for reaching to the unreached. Prof M.P. Yadav, Past Secretary and Prof V.K. Gupta, Past Editor in their remarks thanked the Academy for providing them an opportunity to work for NAAS activities and appreciated the support received from EC members and secretariat staff.

Dr T. Mohapatra, Secretary, DARE and DG, ICAR wished everyone a very happy and prosperous New Year 2017. He also congratulated New President, Secretary, Editor, Fellows and Associates. He emphasized on ICAR and NAAS relationship, lauding the role of NAAS in providing guidance to government and scientific committees. He pointed out that NAAS can play a very vital role of extending advisory services to government in accelerating the process of implementation of the developmental programs, which in turn will enhance the visibility of NAAS. He however, cautioned NAAS to chose topics very carefully so to avoid repetition and should have only novel actions for implementation. He desired that ICAR should be true beneficiary of NAAS.

He pointed out that Fellowship should not be complacent on quality but constantly improve the benchmark for electing Fellowship. He also mentioned that rating of the journals should be very stringent.

Several Fellows expressed their views in the open house discussion and gave valuable inputs. President in his concluding remarks assured that all the suggestions and views of the Fellowship would be deliberated upon to churn out the important ones for establishing a close linkage with government. The programme ended with a vote of thanks proposed by Dr J.K. Jena, Secretary to all the dignitaries, distinguished Fellowship, members of executive council and members of staff of academy secretariat.

Executive Council Meetings

During the year 2016-17, four meetings were held on (June 4, 2016, September 17, 2016, November 22, 2016 at New Delhi while meeting of Feb 20, 2017 was held at UAS, GKVK, Bengaluru, during XIII ASC. Some important items considered and decisions taken during the meetings are elaborated as under:

96th Meeting

The 96th meeting of the Executive Council (EC) was held on June 04, 2016, in the Academy Secretariat and attended by 17 EC members and one special invitee from UAS, Bengaluru. In the business, the ATR of 95th meeting of EC was approved and confirmed with minor suggestions. Regarding holding of XIII Agricultural Science Congress, Dr D.P. Kumar, Director of Education, UAS, Bengaluru, briefed the EC about the arrangements being made by the University for organizing the XIII Agricultural Science Congress at Bengaluru. The EC also appreciated the outcome of two days' Strategy Workshop: Towards Self-sufficiency of Pulses in India held on April 7-8, 2016, and accorded approval to the general agenda items placed for consideration.

97th Meeting

The 97th meeting of the Executive Council was held on 17 September 2016 in the Academy Secretariat. In the business the recommendations of Sectional Committees and the Conveners Group for finalization of Academy Fellowship including Foreign and Paravasi / Associateships for the year 2017 were presented by Prof. Anupam Varma. EC also deliberated in detail on the revised Guidelines about election process of Office Bearers/EC Members, submitted by Dr C.D. Mayee committee, and were approved unanimously by the EC for further consideration of the General Body in its next meeting to be held in June 2017. The EC placed on record the efforts made by Prof Anupam Varma, Chairman, Committee Members and others in bringing out the Policy Brief-1 entitled "To Accelerate Utilization of GE Technology for Food & Nutrition Security

and Improving Farmers' Income". The EC desired that the publication of Status / Policy papers may be expedited. It was reiterated that a draft policy paper / status paper may be submitted within three months of holding the brainstorming session. The EC accorded post facto approval for award of Institutional Membership of the Academy to already approved institutions / organizations.

98th Meeting

The meeting held on November 22, 2016, was chaired by Dr S. Ayyappan, President, NAAS. It was attended by 15 EC members including Prof R.B. Singh, the immediate Past President. Dr H. Shivanna, Vice-Chancellor, UAS, Bengaluru and Convener XIII ASC was a special invitee. He presented the update and progress regarding organizing the XIII ASC. The EC noted the results of ballots for election of Office Bearers and EC members, to various vacant positions in EC with effect from 01.01.2017, and ratified the election of the Fellowships.

99th Meeting

The 99th meeting of the Executive Council (EC) was held on February 20, 2017 at UAS, GKVK, Bengaluru. The meeting was chaired by Prof Panjab Singh, President, NAAS. Dr H. Shivanna, Vice-Chancellor, UASB and Convener, XIII ASC also attended this meeting as special invitee. He briefed the members about the final arrangements, different events and programme of the Congress. EC approved the constitution of the sectional committees for election of fellows / selection of associates for the year 2018. The programme for AGM, filling up of casual vacancies for EC, revised guidelines for developing status/strategy paper/ policy brief and proposed changes in NAAS-Yearbook format were deliberated and approved. The EC also nominated conveners for a few regional chapters.

NAAS Regional Chapters: Conveners Meeting

In the afternoon of February 22, 2017 the meeting of NAAS Regional Chapters Conveners and EC Members was held at UAS, Bengaluru during XIII Agricultural Science Congress and Chaired by the President, Prof Panjab Singh and Co-chaired by the Secretary, Dr K.V. Prabhu. It was attended by the conveners of various regional chapters, members of EC and other special invitees. The note of President on the "NAAS Future Role" circulated earlier to all conveners/Fellowship was discussed at length. The responses on note received from Fellowship were debated and new suggestions of the conveners present in the meeting were discussed in detail that resulted in emergence of many useful action points. Main focus was to develop strategy to create general awareness about the technical strength of NAAS among different stakeholders including policy makers at regional and national level. In this connection, NAAS headquarters will initiate communication with concerned agencies and subsequently regional chapters will follow it up. The exact mechanism to follow-it up will be formulated shortly.

Journal Score Committee

The committee with Prof P.L. Gautam as chairman revised the NAAS score for different non-impact factor journals received by the Academy and scores allotted to these journals were uploaded on NAAS web-site to be effective from 1.1.2017. It may be mentioned that these scores are primarily for the use of Academy to evaluate applications received for election of NAAS Fellowships and Associates.

NAAS-Short Term Studies

NAAS-sponsored a short-term desk review on "A Decade of Research in Developing Water-wise Technologies for Various Crops in India", to Dr S.K. Gupta, Fellow of Academy. The review has been completed and report has been submitted by him. The Academy got the report examined by Dr. T.B.S. Rajput, Emeritus Scientist, Water Technology Centre, Indian Agricultural Research Institute and based on his observations, the report has been accepted by the Academy and main recommendations from it will be published separately in due course.

Programmes Planned for 2017

Brainstorming Sessions / Workshops/ Discussions

- Strategy Workshop on Vegetable Oil Economy and Production Problems in India (Convener/Chair: **Dr C.D. Mayee**)
- Strategy Workshop on Conservation Policies for Hilsa and Mahseer (Convener: Dr K.K. Vass)
- Strategy Workshop on Accelerating Seed Delivery Systems (Convener: Dr K.V. Prabhu)
- Status Paper on Saving the Harvest (Convener/Chair: **Prof Anupam Varma**)
- Policy Brief on Crop Residue Burning in North-West India (Convener: Dr Yadvinder Singh)
- Policy Brief on Mitigating Land Degradation (Convener: Dr V.N. Sharda)

FINANCIAL STATEMENT

The main source of generating funds for the Academy is Grant-in-Aid received from the Department of Agricultural Research and Education (DARE), New Delhi. During the year 2016 17, Grant-in-Aid of Rs. 121 lakh was received. The Accounts of the Academy are audited by Chartered Accountants appointed with the approval of the General Body. The Utilization Certificate for the year 2016-17 has been submitted to the DARE.

A brief Audited Statement of Accounts and Auditor's Report for 2016-17 is annexed with the report as Annexures I and II.

ACKNOWLEDGMENT

The Academy gratefully acknowledges the Department of Agricultural Research and Education and the Indian Council of Agricultural Research (ICAR), Delhi for their continuing support to its programmes, and for extending the financial 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 sent to them for review. Several Fellows also contributed their services to other activities of the Academy such as Annual General Body Meeting, Brainstorming Sessions, Strategy Workshops, Symposia and conducting programmes on Public lectures, interaction meetings, etc. The Academy gratefully acknowledges the services of each Academy Fellow and other staff involved in above activities during the year 2016-17. The Academy puts on record the appreciation to Dr H. Shivanna, Vice-chancellor, UASB and Convener of XIII-ASC and his entire team of officers for the support and facilities extended in impressively organizing and holding all the events in connection with the congress at UAS-GKVK, Bangalore.

Annexure-I

Saluja & Associates

Chartered Accountants



Head Office : 69-Desh Bandhu Gupta Road, Jolly Building, Pahar Ganj, New Delhi-110055 Tel. : 011-23617870-23628613 Fax : 011-23520631 URL : Web:www.salujaandassociates.com email : saluja@salujaandassociates.com

AUDITOR'S REPORT

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, NEW DELHI as on 31st March, 2017 and the annexed Income and Expenditure Account for the Year ended on that date. These financial statements are the responsibility of the management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with the auditing standards generally accepted in India. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatements. Our audit includes examining on a test basis, evidence supporting the financial transactions and disclosures in the financial statements. Our audit also included assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

We further report that:

- 1. We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit.
- 2. In our opinion, proper books of account, as required by law have been kept by the Academy, so far as it appears from our examination of those books.
- 3. The Balance Sheet and the Income and Expenditure Account dealt with by this report are in agreement with the books of the accounts of the Academy.
- In our opinion, the Balance Sheet and the Income and Expenditure Account dealt with by this report, comply with the Accounting Standards, to the extent applicable.



- 5. 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 thereto give a true and fair view:
 - (i) In the case of Balance Sheet, State of Affairs of the Academy as at 31st March 2017,
 - (ii) In the case of Income and Expenditure Account, of the excess of Income over Expenditure of the Academy for the period ended on that date arrived on the basis of cash/receipt basis of accounting as disclosed in the method of Accounting followed by National Academy of Agricultural Sciences.

For Saluja & Associates Chartered Accountants

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(V.K.Verma) Partner M.No. 017742

Place: New Delhi Dated 11/05/2017

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NATIONAL ACADEMY OF AGRICULTURAL SCIENCES

Accounting Policies and Notes to Accounts Forming Part of the Balance Sheet as on March 31, 2017

- 1. Method of Accounting
 - The Academy is following cash basis of accounting. Income and Expenditure is therefore recognized on cash/receipt basis.
- 2. Investments
 - (a) 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.
 - (b) Income from investments has been recognized on cash/receipt basis.
- 3. 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 1961, read with Rules made thereunder.

- 4. Income tax Provision and contingent Liabilities:
 - (a) The Income Tax Department has rejected the claim of benefits of Rs. 2,04,25,123/u/s 11(2) towards accumulation of Income for specified purposes for the assessment year 2015-16 and raised a demand of Rs. 67,93,450/- after adjusting the refund claim of Rs. 12,07,583/-. An appeal against the rejection of the claim of benefits u/s 11(2) is being filed.
 - (b) During the year under consideration a sum of Rs. 2,29,28,412/- is again proposed to be accumulated u/s 11(2) of the Income Tax Act, 1961.
 - (c) Provision for Taxation has not been considered necessary in view of the acceptance of the claim for exemption U/s 11 of the Income Tax Act, 1961 by the Income Tax Department and keeping in view appeal against rejection of claim of benefits u/s 11(2) is being filed.

5.	Payments of Auditors	31/03/2017	31/03/2016
	Audit Fee and expenses	38667/-	36068/-

- 6. Others
 - a) The cost of Publications has been charged off in the year in which such expenditure is incurred.
 - b) The income from contribution from fellowship fee has been accounted for on cash basis.
 - c) During the financial year 2016-17, the academy has received the Grant-in-Aid of Rs. 1,21,00,000/- and Rs. 2,50,000/- from D.A.R.E. and Indian Council of Agriculture Research (ICAR) respectively and the same has been utilized.
 - d) The account of RITES Limited who have supplied of chairs in FY 14-15 has been settled based on the Account statement received from them during the year.
 - e) The necessary action to reconcile the defaults of Rs. 24,370/- as appearing on the Income Tax Website is still pending.

For Saluja & Associates **Chartered Accountants** working (V.K. Verma) Partner M.No.017742

Place : New Delhi Dated : May 11, 2017 **National Academy of Agriculture Sciences**



Annexure-II

NATIONAL ACADEMY OF AGRICULTURAL SCIENCES

BALANCE SHEET AS ON 31.03.2017

LIABILITIES	AMOUN	IT (Rs.)	ASSETS	AMOUR	NT (Rs.)
CAPITAL FUND Opening Balance Add: Transferred from Accumulated Fund Add: Excess of Income over Expenditure during the year Less: Funds transferred to Specific Reserve Fund	13,56,00,092.25 84,74,776,95 1,76,72,968,14 2,29,28,412.28	13,88,19,425.06	FIXED ASSETS Opening Balance Additions during the year Sales during the year Depreciation for the year written off	2,63,39,646.79 6,48,331.00 (29,48,559.02)	2,40,39,418.77
SPECIFIC RESERVE FUND	0 24 00 465 20		Deposits in Approved Securities		21,19,51,541.62
Add: Addition during the year Less: Utilized during the year	9,24,30,103,20 2,29,28,412,28 84,74,776,95	10,69,43,800.59	CURRENT ASSETS Bank Balances		38,51,805.63
ENDOWMENT FUND Opening Balance Received during the year	10,00,000.00 10,00,000.00	20,00,000.00	Cash Balances		42,149.00
<mark>CURRENT LIABILITIES</mark> Tarina (TCI)		14,272.00	ADVANCES Advances with NAAS Regional Chapters and for lecture at SAU (Srinagar)		6,33,884.00
Performance Security Misc Liability		87,016.00 9,960.00	Tax Deducted at Source		73,55,674.63
TOTAL		24,78,74,473.65	TOTAL		24,78,74,473.65

As per our report of even date attached

For Saluja & Associates Chartered Accountants (V.K.Verma)

(V.K.Verma) Partner M.NO.-017742 Place: New Delhi Dated: May 11, 2017



National Academy of Agricultural Sciences



INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 315T MARCH, 2017 NATIONAL ACADEMY OF AGRICULTURAL SCIENCES

EXPENDITURE	AMOUNT (Rs.)	INCOME	AMOUNT (Rs.)	
To Expenditure towards NAAS activities	1,65,45,346.00	By Grant-in-Aid from D.A.R.E.	1,21,00,000.00	
To Depreciation	29,48,559.02	Less: Grant-in-Aid refunded to D.A.R.E against unspent balance of FY 15-16	(65,259.00)	1,20,34,741.00
To Excess of Income over Expenditure transferred	1,76,72,968.14	By Interest on Investments		1,43,14,183.66
		By Contribution from Subscriptions, Publications and Other receipts		1,05,67,948.50
		By Contribution from ICAR for Golden Jubilee programmes		2,50,000.00
		4. 4		3
Total:	3,71,66,873.16	Total:		3.71.66.873.16

As per our report of even date attached

For Saluja & Associates Chartered Accountants Chartered Accountants (V.K.Verma) Pather Mono-017742 Place: New Delhi Dated: May 11, 2017

Б FILSIN Secretary 3 Treasure India

National Academy of Agricultural Sciences

Annexure-III

EXECUTIVE COUNCIL

Position	2016	2017
President	Dr S.Ayyappan	Prof Panjab Singh
Past President	Prof R.B.Singh	Dr S. Ayyappan
Vice-President	Prof AnupamVarma	Prof AnupamVarma
Vice-President	Dr C.D. Mayee	Dr C.D. Mayee
Secretary	Dr K.V.Prabhu	Dr K.V.Prabhu
Secretary	Dr M.P.Yadav	Dr J.K. Jena
Foreign Secy	Dr P.K. Joshi	Dr P.K. Joshi
Editor	Dr K.K.Vass	Dr K.K.Vass
Editor	Dr V.K.Gupta	Dr V.K.Bhatia
Treasurer	Dr B.S. Dwivedi	Dr B.S. Dwivedi
Member	Prof S.P.Adhikary	Prof S.P.Adhikary
Member	Dr K.M.Bujarbaruah	Dr K.C. Bansal
Member	Dr J.K. Jena	Dr Arvind Kumar
Member	Dr M.Mahadevappa	Dr K.N. Ganeshaiah
Member	Dr N.H. Rao	Dr N.H. Rao
Member	Dr T. Mohapatra	Dr T. Mohapatra
Member	Dr D.P. Ray	Dr D.P. Ray
Member	Dr C.S.Prasad	Dr C.S.Prasad
Member	Dr (Ms) Chandrika	Dr (Ms) Chandrika
	Varadachari	Varadachari
Member	Dr A.K.Singh	Dr R.K. Singh
Member	Dr K.K.Singh	Dr S.N. Jha
Member	Dr B.Venkateswarlu	Dr B.Venkateswarlu
ICAR Nominee	Shri Chhabilendra Roul	Shri Chhabilendra Roul

SECRETARIAT

Shri H.C. Pathak, Executive Director Shri Miraj Uddin, Budget & Accounts Executive Ms. Minu Tiwari Shri P. Krishna Shri Umesh Rai Shri Jai Singh Shri B.L. Yadav Shri Kamal Singh

LIST OF ACRONYMS

ASC	Agricultural Science Congress
AAU	Assam Agricultural University
APMC	Agricultural Produce Market Committee
ASRB	Agricultural Scientists Recruitment Board
ATARI	Agricultural Technology Application Research Institutes
CFTRI	Central Food Technological Research Institute
CMFRI	Central Marine Fisheries Research Institute
CRIDA	Central Research Institute for Dryland Agriculture
DAC & FW	Department of Agriculture, Cooperation & Farmers Welfare
DARE	Department of Agricultural Research and Education
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Production
GIS	Geographic information system
ICAR-RCER	ICAR Research Complex for Eastern Region
ICFA	Indian Council of Food and Agriculture
IFPRI	International Food Policy Research Institute
IFS	Integrated Farming System
IIPR	Indian Institute of Pulses Research
IVRI	Indian Veterinary Research Institute
IIWM	Indian Institute of Water Management
ISDA	Indian Society of Dryland Agriculture
ISRO	Indian Space Research Organisation
JHU	Johns Hopkins University
KSM	Potassium Solubilising Microorganisms
MFPI	Ministry of Food Processing Industries
MSU	Michigan State University
NABI	National Agri-Food Biotechnology Institute
NAHEP	National Agricultural Higher Education Project
NABARD	National Bank for Agriculture and Rural Development
NBPGR	National Bureau of Plant Genetic Resources
NCS	National Consortium on SRI
NDRI	National Dairy Research Institute
NFSM	National Food Security Mission
NIAEPR	National Institute of Agricultural Economics and Policy Research
NITI Aayog	National Institution for Transforming India Aayog
NNP	Net National Product (NNP)

NRM	Natural Resource Management
NRSA	National Remote Sensing Centre
NSC	National Seeds Corporation Limited
PAU	Punjab Agricultural University
PPV& FRA	Protection of Plant Varieties & Farmers' Rights Authority, India
RKVY	Rashtriya Krishi Vikas Yojana
SAIS	School of Advanced International Studies
SAU	State Agricultural University
SCI	System of Crop Intensification
SDGs	Sustainable Development Goals
SIFFS	Small Indigenous Food Fish Species
SRI	System of Rice Intensification
STEAM	Science Technology Engineering Agriculture and Mathematics
STEM	Science Technology Engineering and Mathematics
TERI	The Energy and Resources Institute
UASB	University of Agricultural Sciences, Bengaluru

59.	Livestock Infertility and its Management	- 2013
60.	Water Use Potential of Flood-affected and Drought-prone Areas of Eastern India	- 2013
61.	Mastitis Management in Dairy Animals	- 2013
62.	Biopesticides – Quality Assurance	- 2014
63.	Nanotechnology in Agriculture: Scope and Current Relevance	- 2014
64.	Improving Productivity of Rice Fallows	- 2014
65.	Climate Resilient Agriculture in India	- 2014
66.	Role of Millets in Nutritional Security of India	- 2014
67.	Urban and Peri-urban Agriculture	- 2014
68.	Efficient Utilization of Phosphorus	- 2014
69.	Carbon Economy in Indian Agriculture	- 2014
70.	MOOC for Capacity Building in Indian Agriculture: Opportunities and Challenges	- 2014
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]	- 2015
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

Status / Strategy Papers

1.	Role of Social Scientists in National Agricultural Research System (NARS)	- 2015
2.	Towards Pulses Self-sufficiency 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

Policy Brief

1. To Accelerate Utilization of GE Technology for Food & Nutrition Security and Improving Farmers' Income	- 2016
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NAAS Documents on Policy Issues

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
10.	Globalization of Agriculture: R & D in India	- 2001
11.	Empowerment of Women in Agriculture	- 2001
12.	Sanitary and Phytosanitary Agreement of the World Trade Organization – Advantage India	- 2001
13.	Hi-Tech Horticulture in India	- 2001
14.	Conservation and Management of Genetic Resources of Livestock	- 2001
15.	Prioritization of Agricultural Research	- 2001
16.	Agriculture-Industry Interface: Value Added Farm Products	- 2002
17.	Scientists' Views on Good Governance of An Agricultural Research Organization	- 2002
18.	Agricultural Policy: Redesigning R & D to Achieve It's Objectives	- 2002
19.	Intellectual Property Rights in Agriculture	- 2003
20.	Dichotomy Between Grain Surplus and Widespread Endemic Hunger	- 2003
21.	Priorities of Research and Human Resource Development in Fisheries Biotechnology	- 2003
22.	Seaweed Cultivation and Utilization	- 2003
23.	Export Potential of Dairy Products	- 2003
24.	Biosafety of Transgenic Rice	- 2003
25.	Stakeholders' Perceptions On Employment Oriented Agricultural Education	- 2004
26.	Peri-Urban Vegetable Cultivation in the NCR Delhi	- 2004
27.	Disaster Management in Agriculture	- 2004
28.	Impact of Inter River Basin Linkages on Fisheries	- 2004
29.	Transgenic Crops and Biosafety Issues Related to Their Commercialization In India	- 2004
30.	Organic Farming: Approaches and Possibilities in the Context of Indian Agriculture	- 2005
31.	Redefining Agricultural Education and Extension System in Changed Scenario	- 2005
32.	Emerging Issues in Water Management – The Question of Ownership	- 2005
33.	Policy Options for Efficient Nitrogen Use	- 2005
34.	Guidelines for Improving the Quality of Indian Journals & Professional Societies in Agriculture and Allied Sciences	- 2006
35.	Low and Declining Crop Response to Fertilizers	- 2006
36.	Belowground Biodiversity in Relation to Cropping Systems	- 2006
37.	Employment Opportunities in Farm and Non-Farm Sectors Through Technological Interventions with Emphasis on	2006
30	MITC and Indian Auticulture: Implications for Policy and P&D	- 2000
20.	Who and industry splitations: Driver for Agricultural Propagative	- 2000
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