

ANNUAL REPORT

2012-13



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

MESSAGE FROM THE PRESIDENT

The National Academy of Agricultural Sciences (NAAS), a credible think-tank and platform for science-policy interface, leads in promoting excellence and convergence of agricultural research (science), education and extension for the growth of national economy with a dynamic farm sector. In pursuance of this mission, the Academy has been organizing congresses, conferences, brainstorming sessions, consultations, lectures and dialogues on important research, innovation, development and policy issues, and communicating their outcomes to the concerned stake-holders towards promoting ecologically sustainable, economically vibrant and socially equitable agriculture.



Prof. R.B. Singh

This Report uniquely gives a succinct account of the Academy's activities during the year 2012-13 focused to meet the objectives. The highlight of the year was the XI Agricultural Science Congress on the theme '*Agricultural Education: Shaping India's Future*' organized during February 7-9, 2013 at OUAT, Bhubaneswar. Participated by leading educationists, academicians and thought leaders from India and also from Brazil, France, Japan, Netherlands, USA, World Bank, FAO and the CGIAR, truly a high level international event, the Congress adopted the Bhubaneswar Declaration, an agenda for transforming India's agricultural education system for accelerated, inclusive, gender-sensitive and sustainable agriculture-led growth and development as that will shape India's future in the fast-changing world, unleashing uncommon opportunities.

Another highlight of the year was the Academy's journey to the Supreme Court of India against TEC Interim Report recommending 10 years moratorium on GM crops, seeking liberation of science (Biotechnology) to serve the society. The Academy also played a leading role in strengthening science partnership in BRICS countries and had suggested that the BRICS alliance should become a powerful Group of Five (G5) in leading the fight against poverty, hunger and inequality by deploying tools of science, technology and innovation.

During the year 2012-13, besides the XI Agricultural Science Congress, the Academy organized seven brainstorming sessions, two interactive sessions and three lectures, including the profound Foundation Day Lecture by Prof. V.S. Vyas highlighting the need for augmenting food grain supplies by effecting changes in the quantum and composition of investment in agriculture, revamping the delivery systems and reexamining the research agenda. Several policy-informing publications, such as *Proceedings of X Agricultural Science Congress* entitled "*Soil, Plant and Animal Health for Enhanced and Sustained Agricultural Productivity*", Presidential Address on "*Millennium Development Goals: Promises to Keep*" delivered at the 19th Annual General Body Meeting, and Presidential Address on "*Agricultural Education: Shaping India's Future*" delivered at the XI Congress were brought out. Hopefully, these events and publications were helpful in re-emphasizing the centrality of the AREE4D system in transforming Indian agriculture.

Yet another initiative of the Academy during the year under report was a NAAS-PAAS (Professional Societies of Agricultural Sciences) dialogue on "Harnessing Multi-functionality of Agriculture". It had

suggested a paradigm shift in generation and diffusion of knowledge and technologies transcending disciplinary boundaries and in adopting a holistic approach to transform livelihood and economy. The need for strengthening scientific communication for informing veritable stakeholders, from policymakers to farmers, was emphasized.

I place on record my gratitude to the NAAS Executive Council, especially Prof. Lalji Singh and Dr. P.L. Gautam, Vice-Presidents; to Prof. Anwar Alam and Prof. N.K. Singh, Secretaries; Dr. S.M. Virmani, Foreign Secretary; Dr. C. Devakumar and Prof. P.K. Chhonkar, Editors; and Dr. Himanshu Pathak, Treasurer, for their guidance and untiring efforts. I am grateful to the Conveners of the brainstorming sessions and other events.

I must express my gratitude to Prof. Anupam Varma, Editor-in-Chief of the NAAS journal 'Agricultural Research', for his untiring efforts in bringing out all the issues in time and the high visibility that the journal has brought for the Academy.

My sincere thanks are due to the NAAS Secretariat Shri H.C. Pathak, Shri P. Pande, Ms. Minu Tiwari, Shri P. Krishna, Shri Umesh Rai, Shri Jai Singh, Shri Kamal Singh, and Shri Banwari Lal.

Finally, I am thankful to the ICAR for its financial support.



(R.B. Singh)

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ABOUT THE ACADEMY

Inspired by the vision of the late Dr. B. P. Pal, FRS, the National Academy of Agricultural Sciences (NAAS) was established in 1990. The Academy focuses 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 scientists 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 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 recognise 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 organisations 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.

Organs of the Academy

- ❖ The General Body: The General Body of the Academy is constituted by its Fellows.
- ❖ The Executive Council is the main policy and decision making body. It is assisted by different Committees to deal with various aspects of governance of the Academy.
- ❖ Five Regional Chapters of the Academy are functioning at Lucknow, Bhubaneswar, Hyderabad, Mumbai and Imphal.

PROMOTING ECOLOGICALLY SUSTAINABLE, ECONOMICALLY VIBRANT AND SOCIALLY EQUITABLE AGRICULTURE

XI Agricultural Science Congress

XI Agricultural Science Congress (ASC) under the aegis of National Academy of Agricultural Sciences, in collaboration with Indian Council of Agricultural Research (ICAR), was organized at Orissa University of Agriculture and Technology, Bhubaneswar from February 7-9, 2013. The theme of the Congress was Agricultural Education – Shaping India's Future. Over 750 *eminent scientists, policy planners, academicians, young researchers and students* from all across the country including a good number

of foreign delegates from Brazil, China, France, Japan, Netherlands and USA and from World Bank, FAO and CGIAR participated in the Congress and shared their expertise and experiences.

The Congress was inaugurated on February 7, 2013 by His Excellency Shri M.C. Bhandare, Governor of Odisha. Shri Debi Prasad Mishra, Hon'ble Minister Agriculture, Fisheries and Animal Resources Development, Government of Odisha, Dr. Simeon Ehui, Sector Manager, The World Bank, Dr. S. Ayyappan, Secretary, DARE and DG, ICAR and Dr. Mangala Rai, Past President, NAAS and Ex-Secretary, DARE and DG, ICAR were the Guests of Honour. Dr. D.P. Ray Convener of the Congress and former Vice Chancellor, OUAT, Dr. K. Pradhan, Co-Convener of the Congress and Chancellor of the Siksha 'O' Anusandhan University (SOAU), Bhubaneswar and Prof. S. S. Nanda, Dean, Extension Education and Acting Vice Chancellor, OUAT were also present. Prof. R. B. Singh, President, NAAS presided over the Inaugural Session.



His Excellency lighting the lamp



While emphasizing on various issues of concern regarding agriculture and agricultural education, the Governor of Odisha said that Indian agriculture is now facing far greater and newer challenges of global competitiveness, decreasing productivity with lesser input and natural resources, environmental unsustainability and climate change. In view of the problems and challenges faced for rapid industrialization and sustainability of agriculture-based economy in our country, quality assurance in higher education is getting centre-stage. His Excellency Shri Bhandare appreciated the role of agricultural technologies in sustaining food security to move towards freedom from poverty, hunger and malnutrition.

The Governor felicitated eminent and young agriculture scientists with NAAS awards and also released the Proceedings of the X Agricultural Science Congress.

Shri Debi Prasad Mishra, Hon'ble Minister Agriculture, Fisheries and Animal Resources Development, Government of Odisha stressed on the need to develop agriculture as a profitable venture and to ensure livelihood security. He also emphasized imparting skill and knowledge of modern technology to farmers for good returns.



Dr. G.S. Khush being felicitated by His Excellency



Dr. S. Ayyappan

Dr. S. Ayyappan, Secretary, DARE and DG, ICAR presented a vision for future of agriculture *vis-à-vis* challenges posed by the changing economic and industrial scenario of the country. He emphasized on the importance of innovation and entrepreneurship in agriculture that have potential to make agriculture more profitable and attractive as the career option for youth. He reiterated to improve the quality of higher agricultural education through accreditation process and to render it more objective. Referring to the proposal in the 12th Plan, he said, the accreditation process will be based on quantifiable parameters, revision and modification in the curriculum to improve quality and acceptability of the pass-outs in the job market and as agripreneurs.

Dr. Mangala Rai mentioned that there is a huge gap between the potential which we had inherited and the achievement that we have made. He emphasized that judicious use of resources is very imperative for food, nutrition, environment and livelihood security. He mentioned that agriculture is the biggest private sector and there is a need for mechanisms in investment, innovation and institution development with systems approach with interdisciplinary and inter-sectoral modes of operation.



Dr. Mangala Rai



Dr. Simeon Ehui



Prof. R.B. Singh

Dr. Simeon Ehui, Sector Manager, the World Bank in his remarks echoed about the different challenges ahead of a country like India in terms of providing food and nutritional security. He felt that there was a need for a committed visionary leadership in agricultural education as this could help eliminate stubborn malnutrition as well as in employing huge labour force. He emphasized on the training of the youth for more land-based activities and institutional linkages to achieve the targets.

Prof. R.B. Singh in his Presidential Address stated that the NAAS has been comprehensively addressing the most vital issues of strengthening and transforming agricultural education and human resource development as well as agricultural research-education-extension synergies for development (AREE4D) in a dynamic and mutually reinforcing mode. He emphasized on building a Green Economy to achieve pro-poor and pro-environment growth and to lift people out of poverty and improving international coordination for sustainable development by building an institutional framework. He also cautioned against the prevailing unsatisfactory performance of agricultural education system which he ascribed to the huge implementation gap and the lack of judicious monitoring, evaluation and accountability system. Inadequate and inconsistent funding and investment in agriculture education, research and extension and increasing indifference to the decline in the standard and quality of agricultural education had resulted in the erosion of human capital and sub-optimal outcomes from research, technology and innovation. Prof. Singh called for the necessary political will and commitment at various levels - national,

provincial, institutional and individual. Prof. Singh advised that education for agriculture in the 21st century should have the goal that every scholar becomes an entrepreneur or innovator. He was also of the opinion

TECHNICAL SESSIONS

- i. Achieving Excellence in Agricultural Education: Experience from across the World
- ii. Agricultural Research, Education and Extension Integration for Development (AREE4D): Status, Elements of Successes, Issues, Challenges and Prospects
- iii. Governance and Quality Assurance in Agricultural Education
- iv. View Points of SAU Teachers
- v. View Point of Students/ Elocution contest on Theme of the Congress
- vi. Investment and Institutions
- vii. Knowledge Sharing, Linkages and Partnership
- viii. View Points of Industry
- ix. Human Resources and Skill Development, Employability and Retention of Youth in Agriculture
- x. Monitoring, Evaluation and Accountability

that Regional Institutes on Food Safety and Security should be established to ensure availability of safe and nutritious food. He cited the Zero Hunger Programme of Brazil as a model not only for India but for the whole world. He concluded with the famous saying of Pandit Jawaharlal Nehru that “everything can wait, but not agriculture” and wished that we must bring ourselves back on track to resume the interrupted journey of SAUs for reshaping the agricultural education of the country.

Concurrently, an exhibition was organized to showcase the latest developments in agriculture and allied sectors in which a large number of agricultural research institutes, agricultural universities and entrepreneurs had participated. ICAR was the major player in the expo exhibiting frontier technologies, live samples and knowledge products.



*Hon'ble Chief Minister of Odisha
Shri Naveen Patnaik*

Agriculture - Led Poverty Alleviation

The Hon'ble Chief Minister of Odisha, Shri. Naveen Patnaik, chaired a Special Session on *Agricultural Research, Education and Extension for Nutritional Security*. Prof. R.B. Singh, President NAAS, Prof. Abhijit Sen, Member Planning Commission, Dr. Kul Gautam, Advisor, South Asia Food and Nutrition Security Initiative, World Bank, and Dr. Mahtab Bamji, Honorary Scientist, INSA addressed the Session.

Hon'ble Shri Patnaik alluded to the high overall GDP growth rate registered by the State during the past 10 years, increasing from 4 to 10 per cent, which is duly reflected in significant reductions in poverty in different regions and social groups, thus promoting an inclusive growth.

The Government's integrated approach involving irrigation, access to finance with low interest, providing quality inputs and creating marketing facilities has paid dividend through enhanced production of food grains and horticultural and agro-processed products. Expressing his concern about problems of physical, economic and social access to nutritional security, the Hon'ble Chief Minister highlighted the success of PDS, the thrust on *Bijli, Sarak and Pani*, the special focus on *Mamata Yojana* for pregnant mothers and mid-day meal programme for school children in the State. He appealed the scientists to concentrate on the development of crop and fruit varieties rich in vitamins and minerals, with special emphasis on quality rice, quality protein maize, pulses and oilseeds and to ensure nutrition from both plant and animal products, especially for small and marginal farmers through adopting integrated farming system. The Hon'ble Chief Minister gave high priority to the prevention of post-harvest losses, value-addition, and nutritional enrichment of food.

Prof. R.B. Singh highlighted that a high quality integrated agricultural education, research and extension system is a must for sustaining and further accelerating the food and agricultural



production revolutions in the country. Citing the proven role of bio-technology to counter the problems of malnutrition with special reference to Golden Rice and climate-resilient GM crops, he appealed the scientific community to harness the best of science for removing the unethical burden of malnutrition from the country and to foster global partnership to synergise agricultural development, human health and nutritional security. Prof. Singh urged the political leadership at various levels to empower science and scientists to judiciously serve the humanity at large.

Dr. Mahtab Bamji, giving an overview of the status of malnutrition in India, emphasized that awareness, access and affordability with respect to quality food, safe environment and primary health care are essential for achieving nutritional security. She urged that the strategy for providing solution to nutritional insecurity should encompass promotion of nutrition-oriented agriculture involving genetic engineering for bio-fortification, and homestead production of nutrient-rich vegetables, pulses and poultry.



Dr. Mahtab Bamji



Prof. Abhijit Sen

Dr. Kul Gautam remarked that hunger and malnutrition may be seen as violation of the human rights and require a multipronged approach for their redressal, including availability of food, enhanced livelihood, education, clean water, sanitation, women's empowerment, social protection and special focus on infants and child care. He underscored that a strong political commitment and leadership is required to remove poverty and inequality.

Prof. Abhijit Sen appreciated the commendable work done by the Odisha Government in reduction of poverty and illiteracy and in accelerating the agricultural growth. He called for greater attention to public distribution system, safe drinking water and overall sanitation.

Dr. Uma Lele, Independent Scholar and Former Senior Advisor, the World Bank, expressed concern about neglect of education in Indian context compared to research and extension and projected five key issues to improve the situation:

- ❖ Quality human capital,
- ❖ Interaction among research, education & extension,
- ❖ Collaboration considering dramatic changes at the global level,
- ❖ Inter-disciplinary problem solving education and research, and
- ❖ Public governance with accountability.

Identify the change leaders (Indian scientists working at global level) and utilize their experience and knowledge for development of agricultural education and research in India, she advocated.



Dr. Uma Lele

Elocution Contest – An Elocution contest on the theme was conducted by the Academy in six zones covering all the State Agricultural Universities in that zone. Twelve students who were the Winners and Runners-up at the zonal levels further participated at the National Elocution Contest held during the Congress. The following students bagged the first three prizes:

First prize: Ms. Neha Rajawat, RVSKVV, Gwalior

Second prize: Ms. Aparna Radhakrishnan, NDRI, Karnal

Third Prize jointly: Ms. Shweta Gupta, GBPUAT, Pantnagar and Mr. S.P. Subash, PAU, Ludhiana



Ms. Neha Rajawat

Valedictory Session: The Way Forward

The Valedictory Session was chaired by Prof. R.B. Singh with Prof. Abhijit Sen (Member Planning Commission) as the Chief Guest. Prof. Abhijit Sen was appreciative of the fact that the agricultural production has by and large become insulated from the vagaries of monsoon in the last decade. He attributed this productivity gain to the improved technologies and inputs developed by the scientific community. He therefore cautioned against despondency and too much of self-criticism about the state of art and exhorted the scientific community to rejoice the achievements of the record food production. He advised the participants to work together for solving complex and intricate problems in agriculture. Prof. R.B. Singh read out the Bhubaneswar Declaration which was unanimously adopted by the Congress.

Bhubaneswar Declaration

We, the academicians, innovators and development partners who participated in the XI Agricultural Science Congress on the theme **Agricultural Education: Shaping India's Future**, organized by the National Academy of Agricultural Sciences during February 7-9, 2013 at the Orissa University of Agriculture and Technology, Bhubaneswar, reiterate that to have a productive, efficient, sustainable, science-led agriculture in an agriculturally important country-like India, a sound agricultural education system has to be the main driver and decisive factor for achieving harmonious, economically-independent, socially, nutritionally and environmentally secure nation.

We all acknowledge the impressive contributions made by the institutions under the Indian Council of Agricultural Research (ICAR) and by the State Agricultural Universities (SAUs) in ushering in the Green, White, Blue and Yellow Revolutions, which transformed India from a ship-to-mouth food dependence to the contemporary Food Bill. India recorded an all-time high production of foodgrains in 2011-12, and has emerged as the world's leading milk producer, despite increase in vulnerability to intensifying volatilities of the climate change. The country has also succeeded in achieving an annual agricultural growth rate of about 3.5% during the past five years, which is higher than that observed since the past decades.

We have achieved impressive economical and agricultural growth, but still incidences of hunger, malnutrition and poverty are unacceptably high. Even inequality in income has increased, and country is far off the target of achieving the *Millennium Development Goal 1* of eradicating extreme poverty and hunger. By 2050, India will become the most populous country in the world, and the already stressed land, water and biodiversity

resources will be under greater pressure. We are also aware that global environment is radically changing, and this calls for a competitive, climate-resilient, multifunctional agriculture.

We all as well recognize fully that agricultural education, the foundation of the agricultural development, is internally facing challenging issues of poor governance, inadequate investment, disconnect among research, extension and education, lack of reforms and slow or no implementation of the adopted reforms, absence of meritocracy, and increased quality-deficit. And despite fast feminization of agriculture, the woman remains invisible in the approach to agricultural development.

We acknowledge that the ICAR has initiated many programmes to address these issues, but there is lack of co-ordination among them, and their implementation, efficacy and impact are yet to be felt.

As emphasized by the Hon'ble Prime Minister at the Centenary Science Congress on January 3, 2013, we firmly believe that agricultural transformation must be the top-most national priority for addressing veritable challenges of comprehensive livelihood security and for envisioning transformative changes in the agricultural education, research and extension to attract the best of the science and of the global and local knowledge in a partnership mode for managing sustainably local, regional and national needs.

We are determined to create new paradigms through the envisaged agenda for change for accelerated, inclusive, gender-sensitive and sustainable agriculture-led growth and development as that will shape India's future in the fast-changing world, unleashing uncommon challenges and opportunities, and we call upon the policy-makers, education leaders, Agricultural Research, Education and Extension for Development (AREE4D) managers and development partners to:

- ❖ Embrace agricultural education and AREE4D as an integral component of the national agricultural policy to ensure adequate, consistent and predictable investments in agriculture, especially education, research and extension in creating a world-class agricultural university system attuned to face challenges and opportunities over short, medium and long term,
- ❖ Ensure and institutionalize transparent governance, autonomy, meritocracy, dynamic assessment of human resource requirement, judicious allocation of resources, effective implementation, monitoring, evaluation, accountability and responsibility based system, and to minimize splitting and inbreeding,
- ❖ Pay focused attention to the standards, norms, and accreditation in quality agricultural education, create centres of excellence and institutes for agricultural education, science, knowledge, research, technology and innovation in an interdisciplinary and multifaculty mode,
- ❖ Identify national- and state- level public and private sector leaders with differentiated but reiterative responsibilities to work on the design and implementation of reforms and to develop a strong inter-ministerial and inter-departmental cooperation mechanism,
- ❖ Revamp teaching/learning processes and methodologies to attract best of talents and blooming young minds for nurturing them leading to a nation-wide programme on "Youth for Leadership in Farming", and
- ❖ Support India's proposed development of an active and continuous long-term relationship-based international cooperation, rejuvenate and dynamically strengthen initial very successful collaboration between Indian SAUs and US Land Grant Universities, and launch need-based South-South and South-North collaborations such as the Brazilian LABEX programme of scientific exchange.

Brainstorming Sessions

The following six sessions were held in the year under report:

Peri-Urban Agriculture (including Horticulture, Floriculture, Livestock, Fisheries and Fodder) (Convener: Dr. H.P. Singh)

Urban and Peri-urban population is on the rise and by 2050 this class of population will be about 850 million. Considering the requirement of this stretch of population, urban and peri-urban agriculture (UPA) is assuming paramount importance. With a view to develop a policy framework to encourage all the stakeholders for UPA, a Brainstorming Session (BSS) on 'Peri-Urban Agriculture (including horticulture, floriculture, livestock, fisheries and fodder)' was convened by Dr. H.P. Singh, former DDG (Hort), ICAR on April 14, 2012 under the aegis of the Academy. This session also covered discussion on landscape gardening, permaculture, roof gardening, turf gardening and vertical gardening. Safety and quality standards in terms of produce, cultivation practices, inputs, packaging and delivery were also deliberated. A Policy Paper encompassing all dimensions of UPA will be brought out by the Academy.

Management of Crop Residues in the Context of Conservation Agriculture (Convener: Dr. Himanshu Pathak)

The BSS was organized on April 16, 2012 at National Academy of Agricultural Sciences (NAAS) to discuss the potentials and problems of crop residue management in the context of conservation agriculture. The Policy Paper No. 58 was brought out based on the deliberations and recommendations. The Session concluded that residues can be gainfully utilized for conservation agriculture, livestock feed, composting, power generation, production of biofuel, mushroom cultivation and extraction of bioactive compounds using secondary agriculture technologies. Conservation agriculture, in which recycling of crop residues is a prerequisite, can be effectively practiced if region-specific, need-based crop residue management plans are developed taking into consideration the generation, demand, quality, feasibility and economics of residue management. Special attention is needed for the development of conservation agriculture models in rainfed agriculture, as they have not become popular unlike the irrigated systems.



Climate-resilient Agriculture (Convener: Dr A.K. Singh)

The BSS on this theme was organized on April 25, 2012 at the NAAS, New Delhi.



Prof. R.B. Singh chaired the Session and piloted the proceedings. Prof. Abhijit Sen, provided insights of the Planning Commission on the issues of climate change research and the need for increasing the use efficiency of resources as well as development of mitigating mechanisms to counter the extreme events. He reiterated that ICAR/NARS must integrate the climate change dimension in the ongoing research programmes.

Dr. S. Ayyappan, Secretary (DARE) & DG (ICAR) highlighted the importance of climate smart agriculture and called for appropriate roadmap. Dr. A.K. Singh, former DDG (NRM), ICAR in his lead presentation brought out various facets of climate-resilient agriculture and underlined the need for development of eco-friendly technologies to reduce or moderate adverse effects of intensive agricultural practices putting strain on environment.

The following elements of research and development in climate resilient agriculture were identified:

- ❖ Standardization of methodologies for climate smart agriculture
- ❖ Vulnerability assessment
- ❖ Exploring and documenting hard evidences and success stories
- ❖ Managing budgetary resources and channelizing investments
- ❖ Incentivizing adoption of resource conservation technologies
- ❖ Crop/weather insurance
- ❖ PPP and stakeholders participation
- ❖ Blending of traditional knowledge with modern tools
- ❖ Integrated crop-livestock management

Livelihood Security of Marginal and Sub-marginal Farmers (Convener: Dr. S.P. Ghosh)

The BSS was organised on June 18, 2012 and was chaired by Prof. R.B. Singh, President, NAAS. Three structured presentations were made:

- a) Technologies and management options, research needs, agricultural diversification, group farming in smallholder agriculture by Dr. S.P. Ghosh.
- b) Non-farming opportunities, social safety net programmes and policies for smallholder farmers by Dr. Ramesh Chand.
- c) Market linkage of smallholder farmers and innovations for greater involvement in agri-supply chain by Dr. P.K. Joshi.



Following the concept of Small-holder Farming Estates as suggested by the National Commission on Farmers (NCF), the session recommended that social mobilization (SHG formation), group capacity building (training & technology transfer) and credit support (micro credit, MCG) should be strengthened

and institutionalised. It further suggested that market orientation and value addition capacity of smallholder farmers should be enhanced for increasing their risk-taking abilities and integrating them into the market. Appropriate agricultural diversification, pro-poor value-chain development, contract farming and non-farm opportunities should also be promoted.

Genetic Improvement of Cereal Crops through Nif Genes and C_4 Pathway (Convener: Dr. S.K. Datta)

The BSS was convened by Prof. S. K. Datta, DDG (Crop Science), ICAR on October 30, 2012 at New Delhi under the aegis of the Academy. Eminent scientists from ICAR, other national and international institutions attended the session.



An effort to make cereal plants capable of biological nitrogen fixation, even if to the tune of 30% of their requirement, would be of great significance to maintain/improve soil fertility, plant productivity and environmental quality. Since there are homologies in the genome of legumes and cereals for genes involved in nitrogen fixing (nod factor), there is a possibility of exploring the nitrogen fixing ability in cereals.

The C_4 photosynthesis mechanism is more efficient than C_3 and it is realized that the important cereals like rice and wheat to be converted to C_4 mechanism. In crops like maize, C_4 pathway operates with Kranz anatomy, whereas in Hydrilla and Chenopods, single cell system exists for C_4 pathway. There is a need to search for highly active C_4 regulatory system in C_3 plants. Both single cell and two cell mechanisms need to be studied to explore the possibility of developing C_4 cereals. There are 5 major genes of C_4 now available which can be introduced into C_3 cereals to explore their expression in C_3 plants. A major germplasm screening work would be required to explore the C_4 genes in the C_3 cereals. Following areas were emphasized for taking up research projects:

1. Screen the available material for structural modifications for BNF and C_4 mechanism in rice and wheat.
2. Screening microbial strains for BNF in cereals.
3. Discovery of promoters and genes involved in BNF and C_4 pathway in cereals.
4. Study on plant - microbial interactions with respect to BNF.
5. Organelle transformation.
6. Genetic transformation of relevant C_4 genes into C_3 cereals.

Mastitis Management in Dairy Animals (Convener: Dr. A.K. Srivastava)

The National Academy of Agricultural Sciences organized a brainstorming session on “*Mastitis Management in Dairy Animals*” on October 31, 2012. Dr. A. K. Srivastava, Director, NDRI, welcoming the participants stated that mastitis ranks first among the diseases of dairy animals causing substantial loss to the dairy farmers and emphasized the importance of controlling mastitis. He also stated that the effect of mastitis, as earlier thought, is not restricted only to udder but it also affects the reproduction of the animal and even the fetus.



Prof. R.B. Singh, the President of Academy, urged that priority should be given to study the impact of mastitis on smallholder production systems as it may undermine the household nutrition of already undernourished population on one hand and socioeconomic impact on the other. He stressed that there is a pressing need to map (both temporal and spatial) the prevalence of mastitis across the country. He also advised to initiate research on identification of genome wide bio-markers linked with subclinical mastitis.

Information on epidemiology, etiology, public health aspects, udder immunity, bio-markers identification, antibacterial and herbal treatment for mastitis was analysed in detail. The session concurred the need to establish a separate body for further control of mastitis in dairy animals in India, on the lines of “National Mastitis Council” in USA and Canada to formulate, facilitate and coordinate research and development.

Dr. P. N. Bhat opined that species and breed variation in susceptibility and response to the mastitis treatment need to be studied. The session also felt the need to bring out a handbook on advances in mastitis management in dairy animals.

RECOGNIZING EXCELLENCE OF INDIVIDUAL SCIENTISTS

Fellows Elected in 2013

Crop Sciences

Dr. Subhra Chakraborty

Professor, National Institute of Plant Genome Research, New Delhi

Dr. J.V. Patil

Director, Directorate of Sorghum Research, Rajendranagar, Hyderabad

Dr. Manoj Prasad

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

Dr. J.S. Sandhu

Agriculture Commissioner, Department of Agriculture & Cooperation, Ministry of Agriculture, New Delhi

Dr. Debabrata Sarkar

Principal Scientist (Biotechnology), CRIJAF, Barrackpore, Kolkata

Horticulture Sciences

Dr. M.L. Chadha

Consultant, Haryana Farmers Commission, Hisar

Animal Sciences

Dr. K.M.L. Pathak

Deputy Director General (AS), Indian Council of Agricultural Research, New Delhi

Dr. R.K. Singh

Director, National Research Centre on Equines, Hisar

Fisheries Sciences

Dr. A.G. Ponniah

Director, Central Institute of Brackishwater Aquaculture, Chennai

Natural Resource Management Sciences

Dr. S.K. Dhyani

Director, NRC for Agroforestry, Jhansi

Prof. Ashok Kumar

Professor/Senior Maize Agronomist, CCS HAU Regional Research Station, Karnal

Dr. S. Kundu

Head, Division of Environmental Soil Science, IISS, Bhopal

Dr. A.K. Sikka

Deputy Director General (NRM), Indian Council of Agricultural Research, New Delhi

Dr. Ravender Singh

Head, Division of Agricultural Physics, IARI, New Delhi

Plant Protection Sciences

Dr. C. Chattopadhyay

Director, National Centre for Integrated Pest Management, New Delhi

Prof. A.R. Podile

Professor, Department of Plant Science, University of Hyderabad, Hyderabad

Dr. H.C. Sharma

Principal Scientist - Entomology, ICRISAT, Patancheru

Agricultural Engg. & Tech.

Dr. T.B.S. Rajput

Principal Scientist, Water Technology Centre, IARI New Delhi

Social Sciences

Dr. Anjani Kumar

Principal Scientist (Economics) - ICRISAT, NCAP, New Delhi

Prof. J.P. Tamang

Dean of School of Sciences; and School of Policy Planning & Studies, Sikkim University, Gangtok, Sikkim

Associates Selected in 2013

Dr. A.K. Bera

Animal Health

Scientist (Senior Scale), Veterinary Medicine, NRC on Yak, Dirang, West Kameng

Dr. M.S. Madhav

Plant Biotechnology

Senior Scientist (Biotechnology), Crop Improvement Section, Directorate of Rice Research, Rajendranagar, Hyderabad

Dr. Gulshan Mahajan

Agronomy

Agronomist, Rice Section, Department of Breeding & Genetics, PAU, Ludhiana

Dr. S.K. Pandey

Ecology and Environmental Sciences

Assistant Professor, Department of Botany, Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur

Dr. Supradip Saha

Agricultural Chemicals

Senior Scientist, Division of Agricultural Chemicals, IARI, New Delhi

Dr. Indranil Samanta

Animal Health

Assistant Professor, Department of Veterinary Microbiology, West Bengal University of Animal & Fishery Sciences, Kolkata

Dr. S.B. Shivachandra

Veterinary Microbiology

Senior Scientist, Division of Virology, Indian Veterinary Research Institute, Mukteswar, District: Nainital

Dr. R.K. Singh

Agricultural Extension

Senior Scientist (Agricultural Extension), Division of Technology Evaluation & Transfer, Central Soil Salinity Research Institute, Karnal

Dr. R.M. Sundaram

Plant Biotechnology

Senior Scientist (Biotechnology), Directorate of Rice Research, Rajendranagar, Hyderabad

Dr. S.K. Yadav

Plant Biotechnology

Senior Scientist, Biotechnology Division, CSIR-Institute of Himalayan Bioresource Technology, Palampur

Awardees for the Biennium 2011-2012

MEMORIAL AWARDS

Dr. B.P. Pal Award	Dr. G.S. Khush , <i>Adjunct Faculty, University of California, Davis, U.S.A.</i> (for the Biennium 2007-2008) Dr. S. Ayyappan , <i>Secretary, DARE & DG, ICAR, New Delhi</i> (for the Biennium 2009-2010) Dr. E.A. Siddiq , <i>Adjunct Professor, University of Hyderabad, Hyderabad</i>
Dr. K. Ramiah Award	Dr. M.L. Lodha , <i>Former ICAR Emeritus Scientist, IARI, New Delhi</i>
Dr. K. C. Mehta Award	Dr. B.V. David , <i>Former Director, Sun Agro Biosystem Pvt. Ltd., Chennai</i> and Dr. (Ms.) Gita Kulshrestha , <i>Former Emeritus Scientist, IARI, New Delhi</i>
Dr. M. S. Randhawa Award	Dr. K.D. Kokate , <i>DDG (Extension), ICAR, New Delhi</i> and Dr. (Mrs.) B. Meenakumari , <i>DDG (Fisheries), ICAR, New Delhi</i>
Dr. N. S. Randhawa Award	Dr. P.K. Chhonkar , <i>Adjunct Professor, IARI, New Delhi</i>
Dr. P. Bhattacharya Award	Dr. W.S. Lakra , <i>Director, CIFE, Mumbai</i>

RECOGNITION AWARDS

Crop Sciences	Dr. Ajay Kumar Parida , <i>Executive Director, MSSRF, Chennai</i>
Plant Protection	Prof. Wasim Ahmad , <i>Professor, AMU, Aligarh</i>
Soil, Water & Environmental Sciences	Dr. Gouranga Kar , <i>Principal Scientist, Directorate of Water Management, Bhubaneswar</i>
Animal Sciences	Dr. Jag Mohan , <i>Principal Scientist, Central Avian Research Institute, Izatnagar, Bareilly</i>
Agricultural Engineering & Technology	Dr. K.K. Singh , <i>ADG (PE), ICAR, New Delhi</i> and Dr. S.N. Jha , <i>Head, Agricultural Structures and Environment, CIPHET, Ludhiana</i>

YOUNG SCIENTISTS' AWARDS

Crop Sciences	Dr. Mukesh Jain , <i>Staff Scientist III, NIPGR, New Delhi</i>
Animal Sciences	Dr. Samiran Bandyopadhyay , <i>Scientist (SS), IVRI, Kolkata</i>
Agricultural Engineering & Technology	Dr. B.K. Tiwari , <i>Lecturer & Senior Consultant, Department of Food & Consumer Technology, Manchester Metro. Uni., U.K.</i>

ENDOWMENT AWARD

Shri L. C. Sikka Award	Dr. R.B. Rai , <i>Principal Scientist, Division of Pathology, IVRI, Izatnagar</i>
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PROVIDING ENABLING ENVIRONMENT FOR SCIENTISTS

Regional Chapters

Water Use Potential of Flood Affected and Drought Prone Areas of Eastern Region (Convener: Dr. B.P. Bhatt)

This brainstorming session was organised by the Academy at ICAR Research Complex for Eastern Region, Patna on May 14, 2012.

Prof. R.B. Singh chaired the Session and the other prominent participants included Dr. Peter Kenmore, FAO Representative, Dr. S.A.H. Abidi, former member, ASRB, and Prof. Anwar Alam, Secretary, NAAS. Dr. Bhatt highlighted the importance of eastern region for boosting agricultural production through second green revolution.



The following issues for improving water productivity in the eastern States were short-listed for action:

- ❖ Total water productivity needs to be studied in each State.
- ❖ Assessment of total water productivity of livestock including small ruminants
- ❖ Conservation of wetlands for biodiversity conservation
- ❖ Creation of ecological zone as per land configuration
- ❖ Agroforestry/ horticulture play an important role in improving water productivity and need to be integrated in farming systems.

Strategies for Agricultural Development in Hill and Plateau Region

The NAAS Regional Chapter of the Eastern Region organized this meeting on July 25, 2012 at ICAR Research Complex, Namkum, Ranchi. Convened by Dr. B.P. Bhatt the delegates included Dr. A.K. Singh, former DDG (NRM), ICAR. Dr. R. Ramani, Director, Indian Institute of Natural Resins and Gums, Ranchi, Dr. Ashwani Kumar, Director, Directorate of Water Management, Bhubaneswar and Dr. M.P. Pandey, Vice Chancellor, Birsa Agricultural University, Ranchi.



The following major researchable issues for development in this region were agreed:

- ❖ Participatory integrated watershed management by adopting soil and water conservation, structural and non-structural measures.
- ❖ Promotion of drip, sprinkler and other micro-irrigation methods.
- ❖ Development of topo sequence based land use plan and strategies to enhance land use productivity.
- ❖ Low-cost management of acid soils.
- ❖ Backward and forward linkages for quality seed and planting materials production including conservation and improvement of local breeds of livestock and poultry.
- ❖ Rehabilitation of waste and degraded land through agro-forestry/horticulture interventions.
- ❖ Development of low water-demanding, short-duration and acid soil-tolerant crop varieties.
- ❖ Biodiversity conservation and resource inventory of lesser known/underutilized crops, particularly for livelihood support of tribal farmers.
- ❖ Crop diversification with vegetables/fruits/lac culture in rain-fed upland ecosystem.
- ❖ Mechanization of small farm and reduction of post harvest losses.
- ❖ Development of women-oriented agricultural technologies.
- ❖ Crop insurance and risk management in upland farming situations, and awareness campaign for agricultural technologies/capacity building.

Coping with Droughts/Monsoon Aberrations through Mainstreaming of Government Schemes at Field Level

A Dialogue was organized jointly by Southern Chapter of NAAS and UAS Bengaluru on December 5, 2012 at the GKVK Campus, Bengaluru to deliberate the available technologies and schemes that can help in drought-coping and ways and means of better convergence among the on-going schemes for meeting the requirement of the farmers during droughts. Over 50 functionaries from different organizations from Andhra Pradesh, Karnataka and Tamil Nadu participated in the deliberations.



Dr. B. Venkateswarlu, Director, CRIDA, gave the background to the Brainstorming session and outlined the expected outputs as (i) identifying activities in different ongoing schemes for drought-proofing (ii) guidelines for convergence at the field level and (iii) Policy direction to mainstream drought mitigation strategies in State and national level planning.

Dr. V.S. Prakash, Director, Karnataka State Natural Disaster Management Centre (KSNDMC) analyzing the 2012 drought in Karnataka, narrated the initiatives of KSNDMC in establishing telemetric rain gauges

at *hobli* level and forecasting short-term rainfall probabilities using models developed by CMMACS. Dr. A. Rajanna, Director, Watershed Development Department, Government of Karnataka provided feed-back on the utility of trench cum bunding in watershed programmes in north Karnataka which helped in drought-proofing. The technologies developed in the southern dryland research centres were discussed for selection of suitable components for wide adoption in the context of drought-proofing during monsoon aberrations.

Intervention in Supreme Court against TEC Interim Report Recommending 10 Years Moratorium on GM Crops

NAAS viewed with serious concern the recommendations of Technical Experts Committee (TEC) appointed by the Hon'ble Supreme Court of India in the matter of Writ Petition (Civil) no. 260/2005 filed by Aruna Rodrigues & others (petitioners) versus Union of India & others (respondents) on the issue of research and development of GM crops in India. The TEC, in its interim report dated October 7, 2012, has recommended 10 years moratorium on the field testing of Bt and herbicide tolerant GM Food Crops in India on the biosafety grounds which according to the Academy is contrary to the experimental evidences established and recognized by the experts in the field of GM Technology and also contrary to the reports and findings published by the NAAS from time to time. The Academy being deeply committed to the promotion of ecologically and socio-economically sustainable agriculture through an advanced AREE4D system in the nation, has impleaded before the Hon'ble Court to pass appropriate orders in the matter.

After the publication of the TEC interim report, NAAS, through its legal counsel raised the matter before the Hon'ble Bench on October 29, 2012, and sought leave to place on record the relevant documents/works on the subject matter pertaining to Biosafety of GM Technology. The Hon'ble Bench was pleased to permit filing of the documents. The full set of affidavits along with relevant documents was filed and the plea was heard on November 9, 2012. It is a matter of great satisfaction that the Hon'ble Bench considered the scientifically rigorous plea of NAAS and returned the TEC interim report for re-examination in view of the objections. Also on the plea of NAAS and with the consent of all parties, the Honourable Court included Dr. R.S. Paroda, former NAAS President, as a new member of the TEC so that the issues related to agriculture can be addressed in a holistic manner. The NAAS President Prof. R.B. Singh, along with the members of the core committee, gave oral presentation before the reconstituted TEC on January 20, 2013 on **"Science- led Transformation of Agriculture towards Sustainable Livelihood Security: The Role of GM crops"**, allaying the undue fears of adverse effects of the Technology. The TEC is in the process of finalizing its report and it is hoped that the judgement will clear the hurdle of pursuing the safe and effective development of GM crops through science and technology.

PROMOTING LINKAGES WITH THE WORLD SCIENTIFIC COMMUNITY

Participation in the Meeting of Experts on Agro Products and Food Security of BRICS Countries held on August 27, 2012 in New Delhi

The Academy had ample representation in this meeting. The *Roundtable on Agro Products and Food Security: Status, Issues, Policies and Programme* was held under the chairmanship of Dr. S. Ayyappan, Secretary, DARE & DG, ICAR. Dr. C. Devakumar, the Co-ordinator of the meeting welcomed the delegates from Brazil, China, Russia, South Africa and the participants from various institutions and Departments of India. Dr. Ayyappan in his opening remarks provided the background information and objectives of the Roundtable. He urged the distinguished delegates to provide inputs for developing a BRICS Agriculture Roadmap for co-operation and collaboration. Food and Nutrition security is an issue of concern of global dimension. He said that though BRICS countries have diversity in farm production and agroindustrial scenario, there are complementarities and synergies that can be harnessed.

The country-wise presentations were taken up thereafter. Two presentations from India were made by Prof. R.B. Singh and Dr. S. Ayyappan, the President and Vice-president of the Academy, respectively. **Dr. S. Ayyappan** in his presentation on “*Agro Products and Food Security in India: Innovations in Research, Education and Extension in India*” graphically showed how Indian agriculture transited from traditional farming through Green Revolution to knowledge-based society and is in a position to harness science, technology and innovation. He showed comparative data of BRICS agriculture in terms of arable land area, irrigated area and export value of agro-products. India ranks first in the production of milk and pulses and second in horticultural produce and fish. He underlined the pressures of Indian agriculture in



terms of per capita land availability shrinking from 0.34 ha. to 0.12 ha. in the last 60 years and the loss of land resources to the tune of over 107 million ha. Indian agriculture is unique with five agro-eco-systems and 14 production systems with dry land farming as a major contributor. He also briefed about success stories of how India is coping with recurrent droughts with innovative measures involving key stakeholders. He made a special mention of the National Initiative on Climate Resilient Agriculture (NICRA) programme and the applications of nanotechnology, molecular plant breeding and OMICS. He also informed about the local initiatives in the formation of producer companies and farmers transforming into agripreneurs. He gave ample illustrations about value added products having nutraceutical properties, and the shining examples of cloning of buffalo and Pashmina goat using modern technology. The advances in the management of animal diseases and diagnostics, and innovative fish production were also highlighted. He briefed about the vast networks of Krishi Vigyan Kendras (Farm Science Centres), m-Krishi advising services, innovations in farm machinery and protected cultivation. The strong higher agricultural education system with 64 agricultural universities and over 200 private colleges engaged in capacity building and manpower base as well as the role of ICAR in ensuring bench mark quality assurance through need-based financial support were enumerated. The infusion of ICT platforms and tools in agricultural research, education and extension, and incubation of research leads to technologies and the new arm of ICAR (AgriInnovate India) were referred to.

He underlined the areas of cooperation in germplasm exchange, transboundary pests and diseases and capacity building (degree programmes, exchange visits, farmers, scientists and industry) in understanding the best practices of other BRICS countries. For addressing the global challenges such as climate resilient agriculture, high input use efficiency, conservation of natural resources, better exploitation of germplasm etc., BRICS countries may evolve a roadmap of co-operation and collaboration and formulate a strategic alliance with definite time lines, he suggested.

Prof. R.B. Singh, President, National Academy of Agricultural Sciences, India made a presentation about food security in India *vis-à-vis* global scenario. Talking of NAAS, he said, it is the only science academy in India which is holistic in integrating the crops, livestock and fisheries. The Academy has 527 Fellows including 49 foreign Fellows. He highlighted the objectives of the Academy and that the academy has so far brought out 54 policy papers on various issues informing policy planners and other stakeholders. It has also brought out many publications notable among them being the *State of Indian Agriculture*. The Academy also organizes biennial Agricultural Science Congresses. He invited BRICS countries for the XI Agricultural Science Congress on the theme of “*Agricultural Education: Shaping India’s Future*” to be held during February 7-9, 2013 at the historical city, Bhubaneswar, Odisha.

He highlighted that food grain production in India in a 30 years time period (1965-1995) has tripled and 80% of the gain was through yield enhancement. He attributed the success of Green Revolution to the harmonious symphony of technology, policies, services, political will and farmers’ enthusiasm. He appreciated the BRICS commitment to MDG-1. He called for coordinated efforts in enhancing the input use efficiencies in agriculture. He advocated the guiding triangle for ensuring food and economic security with environmental sustainability. He called for a paradigm shift in pursuing evergreen revolution with farming system centric approach. He wished that BRICS become a powerful group of five (G5) in leading the fight against poverty, hunger and inequality by deploying tools of science, technology and innovation.

PROMOTING LINKAGES WITHIN THE COUNTRY

NAAS-PAAS Dialogue

An interface meeting of the Professional Societies of Agricultural Sciences (PAAS) with National Academy of Agricultural Sciences (NAAS) on **‘Harnessing Multifunctionality of Agriculture - A Dialogue’** was organized by the Academy on September 10, 2012. Dr. I.P. Abrol and Dr. H. Pathak jointly convened this dialogue.



Introducing the topic, Prof. R.B. Singh, President of the Academy, in his welcome address reiterated the following objectives of the dialogue:

- ❖ To develop a shared perception of the emerging and expanded role of Professional Associations in meeting the challenges facing the community of agricultural scientists.
- ❖ To develop complementarity of the efforts/activities of ICAR, NAAS and Professional Associations to augment the objectives of the National Agricultural Research Systems (NARS).
- ❖ To identify a few priority areas of common concern for science, technology and innovations to boost the outcome in agricultural research and capacity building.
- ❖ To consider a structured way for regular exchange of views among the PAAS and the NAAS.

From the discussion, the following conclusions and recommendations emerged:

- ❖ There should be a paradigm shift in the generation and diffusion of knowledge and technologies transcending disciplinary boundaries and in adopting a holistic approach to transform livelihood and economy.
- ❖ Poor extension system, knowledge deficit of farmers, diminishing profitability of farming and low funding for agricultural research and education are the weak links needing remedial action.
- ❖ There is high multiplicity of Professional Societies, and most of them suffer from the lack of professionalism, dearth of financial resources and poor quality of their journals and other publications.
- ❖ The NAAS should backstop the Societies. It should jointly hold special sessions at regional and national levels, especially of young scientists and students, build the much needed leadership in science, promote scientific temper and excellence among the scientists, and strengthen science-society interface.
- ❖ NAAS and PAAS should synergize their efforts to enhance the role of science in informing policies, planning and programme implementation based on rigorous and transparent evidences. These bodies should forcefully express the scientific views and enhance the awareness of the masses.

A committee comprising Dr. Mruthyunjaya (Convener), Prof. Anupam Varma, Dr. P.L. Gautam and Dr. H.S. Gupta was constituted to develop practical guidelines for promoting NAAS-PAAS linkages and collaboration.

Co-sponsoring International Congress

The Third International Agronomy Congress on “*Agriculture Diversification, Climate Change Management and Livelihoods*” was held at the Indian Agricultural Research Institute, New Delhi, India, from November 26-30, 2012. The Academy was one of the co-sponsors. Key issues deliberated in the Congress included Agronomy, Ecology and Climate Resilience; Socio-economic and Livelihood Security; Integrated Farming Systems; Climate Resilient Farming System Intensification; Best Management Practices with Conservation Agriculture; Agricultural Innovations for Gender Empowerment; Agronomy and Genetic Improvement for New Yield Frontiers; Agronomy Education for Meeting Future Challenges; Adding Value to Farm Produce; Taking Agronomy to Farmers through Public Private Partnership and Agronomy Beyond Borders.

Taking stock on the technology capital to address issues of diversification, climate change management and livelihood security, and given the demand of increasing food production by 70 to 100 per cent by the year 2050 on one hand and the growing challenges of resource degradation, escalating input crisis and cost and overarching effects of global climate change on the other hand, the Congress had emphasized that the future sustained increases in food and agriculture production and productivity must largely come through the integrated genetic and natural resource management with high efficiency in use of land, water, nutrient and energy. Integrated nutrient, pest and weed management, precision agriculture, conservation agriculture and decision support systems and tools should be geared for promoting sustainable agricultural development.

PUBLISHING POLICY DOCUMENTS FOR THE ADVANCEMENT OF AREE4D

The following of publications were brought out during 2012-13:-

- i. Proceedings of X Agricultural Science Congress on the Theme “*Soil, Plant and Animal Health for Enhanced and Sustained Agricultural Productivity*”
- ii. Presidential Address on “*Millennium Development Goals: Promises to Keep*” delivered at Annual General Body Meeting
- iii. Presidential Address on “*Agricultural Education : Shaping India’s Future*” delivered at XI Agricultural Science Congress at OUAT, Bhubaneswar
- iv. Policy Paper 53 : Ecolabelling and Certification in Capture Fisheries and Aquaculture
- v. Policy Paper 54 : Integration of Millets in Fortified Foods
- vi. Policy Paper 55 : Fighting Child Malnutrition
- vii. Policy Paper 56 : Sustaining Agricultural Productivity through Integrated Soil Management
- viii. Policy Paper 57 : Value added Fertilizers and Site Specific Nutrient Management (SSNM)
- ix. Policy Paper 58 : Management of Crop Residues in the Context of Conservation Agriculture
- x. NAAS Journal ‘Agricultural Research’ Vol. 1, Nos. 2 to 4 and Vol. 2, No. 1
- xi. NAAS Year Book and Planner 2013
- xii. NAAS-News, Vol. 12, Nos. 2 to 4 and Vol. 13, No. 1
- xiii. Agricultural News (six issues)

OTHER ACTIVITIES PURSUING THE MANDATE AND OBJECTIVES

Transactions of the Executive Council

Some of the important items considered were as under:

- ❖ Review of implementation of Academy's programmes 2012-13 and formulation of proposed activities of the Academy for the year 2013-14
- ❖ Organizing XI Agriculture Science Congress at OUAT, Bhubaneswar
- ❖ Organizing XII Agriculture Science Congress – 2015 on the theme '*Sustainable Livelihood Security of Smallholder Farmers*' at NDRI, Karnal
- ❖ Adoption of (a) Annual Report and (b) Audited Statement of Accounts of the Academy for the year 2011-12
- ❖ Appointment of Auditors for the year 2012-13 and fixation of their remuneration
- ❖ Recommendations of Sectional Committees and the Conveners' Group for finalization of Academy's Fellows/Associateship for the year 2013
- ❖ Election of the (a) Office Bearers and Members of the Executive Council for the year 2013 and (b) Fellows 2013
- ❖ Calendar of activities of the Academy for the year 2013
- ❖ Revised guidelines for Election of Fellows
- ❖ Revised guidelines for Academy Awards
- ❖ NAAS intervention in Hon'ble Supreme Court against TEC Interim Report recommending 10 years moratorium on GM Crops
- ❖ Launching a Mentoring Scheme for harnessing the talent of the distinguished Fellowship to build up young generation for excellence in agricultural science and technology
- ❖ Proposal of the Academy to help in proper monitoring, evaluation and accountability in Research and Development projects undertaken by the ICAR and development departments as a third party evaluator
- ❖ Constitution of Journal Rating Committee for finalization of rating of Journals effective from 01.01.2014

Foundation Day

The Academy celebrated its Foundation Day on 4th June 2012 and organized Annual General Body Meeting on 5th June 2012. About 186 Fellows attended the Foundation Day celebrations and 19th Annual General Body Meeting, Scientific Sessions, Foundation Day Lecture and Business Session on June 5, 2012.

Newly elected Fellows of the Academy also presented their scientific contributions.



Prof. R.B. Singh

Presidential Address

Prof. R.B. Singh, delivered the Presidential Address entitled *Millennium Development Goals: Promises to Keep* which was scintillating and stirring the conscience of the august audience. He traced the concept of Millennium Development Goals (MDGs) designed by United Nations and adapted by 147 Member Nations in September 2000 at the Millennium Summit. The Millennium Declaration embodies the commitment to a series of 8 time-bound MDGs with lofty promise to free men, women and children from the “abject and dehumanizing conditions of extreme poverty”.

He concluded that the Millennium Development Goals established by the UN Millennium Summit in 2000 marked a global commitment of an unparalleled magnitude. This unprecedented common development agenda must have an equally unprecedented unified commitment on part of all concerned with humanity. Although all the eight separate goals are pillar of the same grand design, MDG1 to reduce poverty and hunger is critical to the success of the other MDGs. Equally complex and difficult is to achieve this goal as revealed by country performances.

Unfortunately, despite good progress, India is off-the-tract in meeting the goal. The global movement of reducing hunger and under-nutrition has shown that despite the huge challenge, there are some encouraging signs at the state, regional, national levels offering hope to achieve the goal within the next 5 to 7 years, if not by 2015. We must keep our promises to meet this utmost goal to realise the fulfilment of the other MDGs, Prof. Singh declared.

With only three years to go and a lot more ground to cover, we must doubly speed up the process, especially uptake of judiciously assessed interventions, enactment of concerned policies and scale-up and scale-out of best practices. Can the Fellowship of the Academy unify and focus its efforts to meet this most humane goal. “I am sure, the answer is ‘yes’. We can do it. We must do it”. Prof. Singh asserted in his soul-storming address.



Prof. V.S. Vyas

Foundation Day Lecture

The Academy’s Foundation Day Lecture (2012) was delivered by Prof. V.S. Vyas, Member, Economic Advisory Council to the Prime Minister. He touched upon various estimates of demand for food grains for the year 2020 and concurred with the projection of the Ministry of Agriculture to be around 281 million tonnes.

He concluded his lecture with the following remarks which echoed the sentiments of the NAAS Fellowship:

“If we have to set priorities, there are implications for scientists, for the farming community and for the Government. The scientists should have empathy for marginalized sections, which should go beyond warm sentiments to acquiring competence to address their problems.

Much greater attention has to be paid on educating farmers in the scientific way of farming. We just cannot assume that our farmers are the repositories of all knowledge. Like in every other field, they also need to be acquainted with relevant developments in science and technology. To face the challenges in augmenting food grain supplies we will have to change the quantum and composition of investment in agriculture, revamp the delivery systems and, re-examine the research agenda.”

Meetings & Lectures

New Year Get-Together

The Academy organized a get-together on January 1, 2013. Prof. R.B. Singh, the President of the Academy, Prof. V.L. Chopra and Dr. R.S. Paroda the Past Presidents, Dr. S. Ayyappan, Dr. P.L. Gautam, Prof. Anwar Alam, Dr. N.K. Singh, and other Office Bearers of the Academy and other distinguished Fellowship participated in the get-together. Six publications of the Academy were released during this meeting.



Lectures

Following two special lectures were organized by the Academy:

Dr. Ramesh Chand, Director, NCAP, Delhi on “*Role and Affects of Agricultural Subsidies in India*” on February 1, 2013

Prof. Peter H. Revan, President Emeritus, Missouri Botanical Garden, USA on ‘*Prospects of GM Crops for Comprehensive Food and Environmental Security*’ on February 4, 2013

PROGRAMMES PLANNED FOR 2013

Brainstorming Sessions

- ❖ Improving Productivity of Rice Fallows (*Convener: Dr. Masood Ali*)
- ❖ Nanotechnology in Agriculture: Scope and its Current Relevance (*Convener: Dr. J.C. Tarafdar*)
- ❖ Role of Root Endophytes in Agricultural Productivity (*Convener: Dr. Joseph Bagyaraj*)
- ❖ Sanitary and Phytosanitary (SPS) Measures in Fisheries (*Convener: Dr. T.K. Srinivasa Gopal*)
- ❖ Bioinformatics in Agriculture - Way Forward (*Convener: Dr. D.P. Singh*)
- ❖ Efficient Utilization of Phosphorus (*Convener: Dr. A. Subba Rao*)
- ❖ Together with Farm Industry (*Convener: Dr. Raj K. Gupta*)
- ❖ Role of Millets in Nutrition Security (*Convener: Dr. Mahtab S. Bamji*)
- ❖ Livestock Breeding Policy in India (*Convener: Dr. M.L. Madan*)
- ❖ Linking Farmers with Market (*Convener: Dr. Anjani Kumar*)
- ❖ Monitoring and Evaluation of AREE4D (*Convener: Dr. P.G. Chengappa*)
- ❖ Fuels from Biomass (*Convener: Dr. B.S. Pathak*)

Reviews / Workshops

- ❖ Hydroponic Fodder Production in India (*Conveners: Dr. H.S. Gupta & Dr. M.P. Yadav*)
- ❖ Carbon Economy in Indian Agriculture (*Convener: Dr. A. Subba Rao*)
- ❖ Mismatch among Agriculture Policies and Agriculture Development, and our 'Tall Claims and Farmers' Plight' (*Convener: Prof. Panjab Singh*)
- ❖ Choosing Leaders in Agri-research and Methods of Scientists Recruitment and Talent Search in Agricultural Teaching, Research and Extension (*Convener: Dr. C.D. Mayee*)
- ❖ Bio-drainage: An Eco-friendly Tool for Combating Water logging (*Convener: Dr. S.K. Chaudhari*)

SECURING AND MANAGING FUNDS AND ENDOWMENTS

Finance and Audit

The main source of funds for the Academy is the grant of Rs. 150 lakh received from the Indian Council of Agricultural Research (ICAR) in the year 2012-13. The Accounts of the Academy are audited by Chartered Accountants appointed with the approval of the General Body. Utilization Certificates up to the year 2012-13 have been submitted to the ICAR.

A brief Audited Statement of Accounts and Auditor's Report for 2012-13 is annexed with the report (Annexure I & II).

Acknowledgment

The Academy gratefully acknowledges the Indian Council of Agricultural Research for its generous and continuing support for its programmes, and for extending generous financial support since its inception. The Academy also places on record the cooperation and support in terms of logistics and grants received from other organizations.



Ashok Aggarwal & Co.
Chartered Accountants

Chamber No. 207-211, R.K. House,
WP-504, Shiv Market,
Ashok Vihar, Delhi-110052
Tel. : 27224924, 47068900
Telefax : 27466167
E-mail: info@caashokaggarwal.com

AUDITOR'S REPORT

The Members,
National Academy of Agricultural Sciences,
NASC Complex, DPS Marg, Pusa
New Delhi

We have audited the attached Balance Sheet of **NATIONAL ACADEMY OF AGRICULTURAL SCIENCES, NEW DELHI** as on 31st March, 2013 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 account of the Academy.
4. 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 document 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 2013,
 - (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.

For Ashok Aggarwal & Co.
Chartered Accountants
Regn. No. 005422N

Sachin Aggarwal
Partner
M. NO:-500156
Place : New Delhi
Dated : April 22, 2013



B. O. : Mahajan Market, Cheel Mandi, Amritsar-143001 Tel. : +91-9463665020

NATIONAL ACADEMY OF AGRICULTURAL SCIENCES
BALANCE SHEET AS ON 31.03.2013

Liabilities	Amount (Rs.)		Assets	Amount (Rs.)	
CAPITAL FUND			FIXED ASSETS		
Opening Balance	11,17,22,570.17		Opening Balance	3,47,21,838.66	
Add: Transferred from Accumulated Fund	1,43,49,135.83		Addition during the year	91,100.00	
Add: Excess of Income over Expenditure during the year	64,81,848.69		Sale during the year	-	
Less: Funds transferred to Specific Reserve Fund	1,69,49,555.26		Depreciation w/off	(36,37,730.17)	3,11,75,208.49
			Deposits in Approved Securities		13,00,43,270.04
SPECIFIC RESERVE FUND			CURRENT ASSETS		
Opening Balance	4,76,81,387.41		Bank Balances		24,27,713.05
Add: Addition during the year	1,69,49,555.26		Cash Balances		463.00
Less: Utilized during the year	1,43,49,135.83		ADVANCES		
			Tax Deducted at Source		22,39,151.69
Total		16,58,85,806.27	Total		16,58,85,806.27

As per our report of even date attached

Ashok Aggarwal & Co.

Chartered Accountants

- Sd -

Sachin Aggarwal

Partner

M.NO. - 500156

Place : New Delhi

Dated : April 22, 2013

National Academy of Agricultural Sciences

- Sd -

Treasurer

- Sd -

Secretary

NATIONAL ACADEMY OF AGRICULTURAL SCIENCES
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31st MARCH, 2013

Expenditure	Amount (Rs.)	Income	Amount (Rs.)
To Expenditure/contribution on Project Programmes	1,51,49,282.87	By Grant in Aid from ICAR	1,50,00,000.00
To Depreciation	36,37,730.17	By Interest on Investments	73,65,654.73
To Excess of Income over Expenditure transferred	64,81,848.69	By Contribution from Publications, Subscriptions and other receipts	29,03,207.00
Total	2,52,68,861.73	Total	2,52,68,861.73

As per our report of even date attached

Ashok Aggarwal & Co.
Chartered Accountants

National Academy of Agricultural Sciences

- Sd -

Sachin Aggarwal
Partner

M.NO. - 500156

Place : New Delhi

Dated : April 22, 2013

- Sd -

Treasurer

- Sd -

Secretary

EXECUTIVE COUNCIL

Position	2012	2013	Tenure
President	Prof R.B. Singh	Prof R.B. Singh	Dec 2013
Immediate Past-President	Dr Mangala Rai	Dr Mangala Rai	Dec 2013
Vice-President	Dr Lalji Singh	Dr Lalji Singh	Dec 2014
Vice-President	Dr S. Ayyappan	Dr P.L. Gautam	Dec 2015
Secretary	Dr Anwar Alam	Dr Anwar Alam	Dec 2013
Secretary	Dr N.K. Singh	Dr N.K. Singh	Dec 2014
Foreign Secretary	Dr S.M. Virmani	Dr S.M. Virmani	Dec 2015
Editor	Dr C. Devakumar	Dr C. Devakumar	Dec 2013
Editor	Dr P.K. Chhonkar	Dr P.K. Chhonkar	Dec 2014
Treasurer	Dr Himanshu Pathak	Dr Himanshu Pathak	Dec 2015
Member	Dr B.S. Dhillon	Dr B.S. Dhillon	Dec 2014
Member	Dr K. Gopakumar	Dr K. Gopakumar	Dec 2014
Member	Dr S.K. Datta	Dr S.K. Datta	Dec 2013
Member	Dr Gita Kulshrestha	Dr Gita Kulshrestha	Dec 2014
Member	Dr H.S. Gupta	Dr Renu Khanna-Chopra	Dec 2015
Member	Dr Raj K. Gupta	Dr Raj K. Gupta	Dec 2013
Member	Dr Biswapati Mandal	Dr Biswapati Mandal	Dec 2014
Member	Dr G. Kalloo	Dr T.A. More	Dec 2015
Member	Dr A.N. Mukhopadhyay	Dr Mruthyunjaya	Dec 2015
Member	Dr B.S. Pathak	Dr B.S. Pathak	Dec 2013
Member	Dr R.P. Singh	Dr S.N. Puri	Dec 2015
Member	Dr M.P. Yadav	Dr M.P. Yadav	Dec 2013
Member	Sh Rajiv Mehrishi, Secretary, ICAR	Sh Arvind Kaushal, Secretary, ICAR	(ICAR nominee)

SECRETARIAT

Shri H.C. Pathak, Executive Secretary

Shri P. Pande, Accounts Officer

Ms. Minu Tiwari

Shri P. Krishna

Shri Umesh Rai

Shri Jai Singh

Shri B.L. Yadav

Shri Kamal Singh

MEMORABILIA

The Academy condoles the demise of its following Fellows during 2012-13:

1. **Dr. S.N. Dwivedi**, expired in Apr 2012
2. **Dr. S.S. Guraya**, expired in Jul 2012
3. **Dr. P.S. Rao**, expired in Jul 2012
4. **Dr. V. Kurien**, expired in Sept 2012
5. **Dr. B.S. Narasinga Rao**, expired in Jan 2013

LIST OF ACRONYMS

AMU	Aligarh Muslim University
AREE4D	Agricultural Research, Education and Extension Integration for Development
ASC	Agricultural Science Congress
BNF	Biological nitrogen fixation
BRICS	Brazil, Russia, India, China and South Africa
BSS	Brainstorming Session
CCSHAU	Chaudhary Charan Singh Haryana Agricultural University
CGIAR	Consultative Group on International Agricultural Research
CIPHET	Central Institute of Post-Harvest Engineering and Technology
CMMACS	Centre for Mathematical Modelling and Computer Simulation
CRIDA	Central Research Institute for Dryland Agriculture
CRIJAF	Central Research Institute of Jute & Allied Fibres
CSIR	Council of Scientific & Industrial Research
DARE	Department of Agricultural Research and Education
FAO	Food and Agriculture Organisation
GBPUAT	Govind Ballabh Pant University Of Agriculture and Technology
GDP	Gross Domestic Product
GKVK	Gandhi Krishi Vignyan Kendra
ICAR	Indian Council of Agricultural Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IISS	Indian Institute of Soil Scienc
IVRI	Indian Veterinary Research Institute
KSNDMC	Karnataka State Natural Disaster Management Centre
LABEX	Laboratory Exterior (a programme of Brazil)
MDG	Millennium Development Goals
MSSRF	M.S. Swaminathan Research Foundation
NARS	National Agricultural Research Systems
NCAP	National Centre for Agricultural Economics and Policy
NCF	National Commission on Farmers
NDRI	National Dairy Research Institute
NICRA	National Initiative on Climate Resilient Agriculture
NIPGR	National Institute of Plant Genome Research
NRC	National Research Centre
OUAT	Orissa University of Agriculture & Technology
PAAS	Professional Societies of Agricultural Sciences
PAU	Punjab Agricultural University
PDS	Public Distribution System
PPP	Public Private Partnership
RVSKVV	Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya
SAUs	State Agricultural Universities
SHG	Self Help Group
SOAU	Siksha 'O' Anusandhan University
SPS	Sanitary and Phytosanitary
SSNM	Site Specific Nutrient Management
TEC	Technical Experts Committee
UAS	University of Agricultural Sciences
UPA	Urban and Peri-urban Agriculture