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Editors

Dr K.K. Vass
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From the President's Desk

Pulse of Pulses



In a paradigm shift from starch-to-protein in terms of prioritisation of both research and development in Indian agriculture, a 'Pulse Push' is evident, also commemorating 2016 as the International Year of Pulses. Pulses as a complement to cereals,

make one of the best solutions to protein-calorie malnutrition. Also, due to their multiple uses as agents of fixing atmospheric nitrogen, green manure and cover crops in short season cropping windows, breakfast grains and ingredients of speciality diets, pulses assume significance in our crop plans. India has been the largest producer as well as consumer of pulses in the world. The daily per capita availability of pulses currently is around 42 g, although low as per recommendations. It may however, be recognized that there are also other options of protein sources for consumers.

With over a dozen pulse crops including chickpea (40%), pigeonpea (15%), urdbean, mungbean, lentil, french bean, horse gram, field pea, moth bean, lathyrus, grown in different parts of the country, pulse production has witnessed an upward trend in the recent past and consistently remained over 17 million tonnes. While the imports continue, with the accomplishments of last few years and opportunities available for vertical and horizontal expansion of pulses, the future seems to be promising towards achieving self-sufficiency in pulses in the near future.

The pulse requirements of the country currently, by 2030 and 2050, are estimated at 22.5, 32.0 and 39.0 million tonnes, respectively. This necessitates an annual growth rate of over 2%, productivity enhancement of 80 kg/ha every five years, i.e., the level of 950 kg/ha by 2025 and 1,335 kg/ha by 2050. The yield gap in most pulses is attributed to their cultivation in poor and marginal lands with minimum inputs, 87% being rainfed. The geographical shift in pulse cultivation from the Indo-Gangetic plains to Central and Southern India, also brings out the need for micro-irrigation to enhance the pulse cultivation area. Along with being an important component

of farming systems, there is great scope for increasing the area as well as productivity of pulses in the rice fallow areas; and summer cultivation of mungbean in the wheat-based cropping system of northern India.

Important aspects to be addressed for enhancing pulse production are seed, irrigation and market, along with area expansion. There are a number of area and season-specific varieties, that are not only high yielding, but also resistant to most of the diseases and insect-pests, with a positive impact of 15-20% in yields. Further, post-harvest losses during milling, storage and transport need to be curbed, to realise the full potentials of the produce.

It was in this context, that a Strategy Workshop on Pulses in a value chain mode was organized during April, 2016, with a consortium approach. Bringing greater insight into the pulse production-consumption scenario in the country, with a global reference, an action plan emerged, that emphasizes restructuring plant types for higher productivity; pre-breeding for broadening the genetic base; increasing genetic gains through novel technologies; searching genes in wild and other crop species to achieve a breakthrough in pulses yield as well as resilience; enhancing biological nitrogen fixation through development of super nodulating plant types; bringing photo-thermal insensitivity and breeding short duration varieties; greater efforts at hybrid technology

in pigeonpea; enhancing seed and varietal replacement rates, with seed hubs; ensuring proper nutrient inputs along with bioinoculants; water management with micro-irrigation systems; scaling up IPM modules; realistic assessment of rice fallows for pulse cultivation; suitable farm mechanisation as well as varietal development for machine harvesting; vertebrate pest management; efficient storage structures and conditions to minimize storage losses.

With a focus on convergence of efforts from technologies to market access, a mission mode approach was delineated, with District-wise potentials, comprising aspects ranging from seed requirement up to the level of marketing. The event brought out a 360° analysis of issues; earlier experiences at enhancing pulse production over the years; linkages to be built from farm to the plate; partnerships, public-private, national-global; and imports *vis-a-vis* domestic production. This is a tribute to everyone contributing to pulses, so precious to this country, at a time when food and nutritional security is recognised as a major element of national security.



(S. Ayyappan)

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- The XIII Agricultural Science Congress, scheduled to be held at University of Agricultural Sciences, Bengaluru, during 07–10 February, 2017, will now be held during **21–24 February, 2017, at the University of Agricultural Sciences, Bengaluru.**
- The change of dates may please be noted. The venue of the congress remains the same.
- The theme of the Congress is CLIMATE SMART AGRICULTURE.
- The details of the Congress can be viewed at www.agricongress2017.in, which is being continuously updated with latest information.

96th Executive Council 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.

The meeting started with two-minute silence observed in the memory of Dr R. Pandey, esteemed Fellow, deceased since the last EC meeting. 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. The updated information on approved BSS and Fellowship nominations was placed for consideration.

Annual General Body Meeting

The 23rd Annual General Body meeting (AGM) of the Academy was held on June 05, 2016 at A.P. Shinde Symposium Hall, NASC, New Delhi under the Chairmanship of Dr S. Ayyappan, the President of the Academy. The meeting was attended by 196 Fellows. Before the start of the business session, a two minute silence was observed as a mark of respect to deceased Fellowships subsequent to the last AGM.

The President welcomed the distinguished Fellowship assembled for the AGM and shared felicitations of the World Environment Day. He mentioned that the year 2015 was the International Year of Soils, and Academy brought out a publication on 'State of Indian Agriculture – Soil'. Further, the year 2016 has been

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 pertaining to Academy's programmes and functioning. Dr Yadav informed that the Academy organized seven Brainstorming Sessions



declared as 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 and the Golden Jubilee Celebration of Green Revolution, organized during 2015.



(BSS). Besides this, Regional Chapters - Ludhiana, Karnal, Jodhpur, Hyderabad and Kochi organized different activities from time to time. Dr K.K. Vass, Editor of the Academy, presented the Editors report and informed the house that the Academy brought out nine policy papers, two strategy papers, four 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. Dr Joshi wished 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 and was approved by the House.

All agenda items listed for the business session were 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.

Dr K.V. Prabhu, Secretary, conducted the formal admission ceremony of the newly elected Fellowship and Associateship during the year 2016. Respective Conveners of the Sectional Committees and in their



absence, Secretary of the Academy, read out the citations of the Fellows. Thereafter, the President admitted the following Fellowship to the Academy:

Crop Sciences

Dr Niranjan Chakraborty
Dr M.K. Dhar
Dr Mukesh Jain
Dr A.K. Joshi
Dr Ashwani Pareek
Dr P.K. Trivedi

Horticultural Sciences

Dr S.K. Chakrabarti

Animal Sciences

Dr N.K.S. Gowda
Dr V.C. Kalia
Dr (Ms) Minakshi Prasad
Dr S.K. Singla

Fisheries Sciences

Dr K.K. Krishnani
Dr P.K. Sahoo

Natural Resource Management

Dr A. Arunachalam
Dr K.K. Bandyopadhyay
Dr M.L. Jat
Dr D.K. Sharma

Plant Protection

Dr V.K. Baranwal
Dr Bishwanath Chakraborty
Dr C. Ganesh Kumar
Dr R. Viswanathan

Agricultural Engineering and Technology

Dr N.S. Raghuwanshi
Dr R. Visvanathan

Social Sciences

Prof (Ms) Jamuna Prakash
Dr A.R. Rao

Dr A.K. Singh, Dr B.P. Singh, Dr A.K. Biswas as Fellows and Prof Hanu R. Pappu as Pravasi Fellow were admitted *in absentia*.

The President also admitted the following Associates to the Academy:

Dr S. Gopala Krishnan
Dr R.E. Masto
Dr S.K. Onteru
Dr S.K. Parida
Dr Raj K Setia
Dr Neelesh Sharma
Dr G. Venkatesan
Dr K.N. Viswas

Dr Arindam Datta and Dr A.K. Biswas were admitted to the Associateship *in absentia*.

Presidential Address

Dr S. Ayyappan delivered the Presidential Address on *AgrInnovation: Peasant to People*. He stated 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 emphasized that the present need is integrated, remunerative, speciality and secondary agriculture.



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.

In the partnership approach, it is significant to note that a new breed of Farm innovators has emerged in the country, adding to the list of Progressive farmers, Lead farmers and Expert farmers. Innovations in different areas of agriculture, when deliberated upon in a first meeting of its kind, revealed the insights that the farmers had, as well as the problem-solving approach each one brought to the practice, that we called 'FInnovations'. This brings out a new possibility of extension, emphasizing on the farmer-to-farmer technology transfer and learning across farms, commodities and systems. It is an opportune time to harness the potentials of the innovations, validate them on one hand, add value on the other, for fast tracking agricultural development in a comprehensive manner.

The meeting ended with vote of thanks to the Chair.

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. Among the challenges, Dr Saraswat mentioned about limited natural resources, growing demand for diversified food and making farming remunerative, while existing variability in 15 distinct agro-climatic zones, huge untapped potential, vast R&D network and 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 at the same time, hinting on some negatives as well, the most important according to him, was resultant regional imbalance in crop planning and mismatch with natural ecology.

In his address, Dr Saraswat dealt with issues pertaining to diversification in agriculture, widening gap in food and non-food expenditure, demand – supply dynamics, centrality of small farms and sustainability of green revolution. 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 GM crops / quality seeds with appropriate interventions of fertilizer usage, water use efficiency, nutrient management, rejuvenation of soil health, 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 service.

Programmes Held

Strategy Workshop on 'Towards Achieving Self-sufficiency of Pulses in India'

The strategy workshop on 'Towards achieving self-sufficiency of pulses in India' was organized by National Academy of Agricultural Sciences (NAAS) on April 7-8, 2016 at New Delhi, with Dr M.C. Saxena, Senior Advisor to Director General, ICARDA and Dr N.P. Singh, Director, Indian Institute of Pulses Research, Kanpur as Conveners. At the outset, Dr S. Ayyappan, President, NAAS welcomed all the dignitaries on the dias, 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.

Dr J.S. Sandhu, DDG (CS), ICAR, Dr Shyam Bahadur Khadka, FAO representative in India, Dr Gurbachan Singh, Chairman, ASRB gave valuable suggestions to improve the pulse production in the Country. Shri S.K. Pattanayak, Secretary, DAC & FW was of the opinion that ensuring life saving irrigation is the key to success in pulses besides increasing seed and varietal replacement rate and concerted efforts are required to bring pulses in newer areas. Dr David J. Bergvinson, DG, ICRISAT advocated the need for new and input responsive varieties, creation of seed hubs, farm mechanization, and building of buffer stocks.

Dr R.S. Paroda, Chairman, TAAS was of the view that there are three cradles of success for pulses, viz., pulses technology, policy support and partnership, and their integration can ensure Second Green Revolution for household nutritional security. He emphasized increasing seed replacement rate with new variety

seeds, public-private partnership, ensuring availability of micronutrients, life saving irrigation, and right price to the farmers for their produce, and promoting soybean in diets.

Dr Ramesh Chand, Member (Agriculture), NITI Aayog emphasized the need of defining self sufficiency in terms of actual need of pulses in the country and reducing the import burden. He expressed that while the country has done well in pulses sector in the last 40 years, production in pulses has not been stable always and therefore, sustenance in production is required to boost confidence. Five progressive pulses farmers viz., Sh Udaiveer, Sh Krishna Kumar, Sh Shailendra Singh, Sh Ram Prakash and Sh Vijay Singh were felicitated by the Chief Guest of the Session for their accomplishment in enhancing pulses productivity. The six technical sessions spread over two days were Chaired by Dr R.S. Paroda, Chairman, TAAS; Dr R.R. Hanchinal, Chairman, PPV&FRA; Dr A.K. Sikka, DDG (NRM), ICAR; Dr Gurbachan Singh, Chairman, ASRB; Dr A.K. Srivastava, Director and Vice Chancellor, NDRI; and Prof R.B. Singh, Immediate Past President, NAAS.

After detailed discussions, an action plan as well as a road map for achieving self sufficiency in pulses emerged with important recommendations on researchable issues and policy interventions that has since been published as NAAS Strategy Paper No 2.

Strategy Workshop on 'Transformation of Indian Agriculture and Improving Farmers Welfare'

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 03 June, 2016 with Dr Suresh Pal, Dr P.K. Joshi and Dr Anjani Kumar as Convenors. 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 workshop was organized in four sessions. The first session was devoted to understanding the functioning of government programmes and schemes, especially in the context of doubling farmers' income by 2022. The strategies for bringing desired transformation in Indian agriculture were deliberated in the second session. The third session dealt with institutional perspectives and needed resources for

accelerating the process of sustainable and inclusive agricultural growth. The last session highlighted the perspectives and prospects for establishing effective linkages among stakeholders, government agencies, NGOs, farmers and the private sector.



The recommendations pertained to: (i) Creation of non-farm 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.

Activities of Regional Chapters

Karnal Chapter

A special lecture was organized and delivered by Prof Nagendra P. Shah, The University of Hong Kong, Hong Kong on "How to write and how not to write research papers and strategies to improve citation and h-index" at ICAR-National Dairy Research Institute, Karnal on 22 February, 2016. Prof Shah spoke about the interrelations between citations, publications and h-index, and how they are important for job, promotion, career development, personal satisfaction and preparation of appropriate application for higher positions. He explained that h-index measures productivity and impact of published work of the scientist and research scholar. During his presentation,

he expressed that research paper should be interesting, relevant, and not contain any plagiarism. The research work should reflect novelty, originality and completeness. He thanked the Director, NDRI and Convener of the Chapter for organizing this lecture.



Another special lecture was delivered by Prof Sham S. Kakar, UL School of Medicine, University of Louisville, Kentucky, USA on “Stem cells in Regenerative Medicines and Tumorigenesis” on March 10, 2016. Prof Kakar explained the basic properties of stem cells like pluripotency, totipotency, differentiation, ethics etc. involved in using human stem cells and their use in therapeutic cloning. He expressed that his group is working on therapy for the ovarian cancers involving the destruction of cancer stem cells using various drugs. He informed that his group has tested anti-cancer drug Cisplatin as drug against ovarian cancer but got no significant success because of its toxicity. Now they have shifted their research towards Ayurveda, which is known to have least toxic effect and selected a natural drug Withaferin (WFA). They tested the effect of both drugs Cisplatin and Withaferin (WFA) in combination under *in vitro* system on A2780 cells. After various assays like apoptotic and cell migration assay, they found that the combination of two drugs has significant effect against cancer. Dr A.K. Srivastava, Director and Vice Chancellor, NDRI and Convener of the Chapter thanked Prof Kakar for delivering a very informative lecture.



Patna Chapter

A discussion meeting on ‘Agro-forestry for Rehabilitation of Water-Congested Ecologies of the Eastern Region’ was organized at ICAR-Research Complex for Eastern Region, Patna on April 05, 2016 under NAAS-Patna

Regional Chapter. In all, 65 participants representing ICAR institutes and SAUs of eastern states, Ministry of Agriculture and Farmers’ Welfare, World Agroforestry Research and CGIAR institutes attended the event and contributed substantially to the deliberations and discussions. Dr Gurbachan Singh, Chairman, ASRB, New Delhi, graced the occasion as the Chief Guest. Dr J.S. Samra, Former DDG (NRM) and CEO, National Rainfed Area Authority chaired the session and Dr P.L. Gautam, Vice Chancellor, Career Point University, H.P. and Former DDG (CS), ICAR was the Guest of Honour.



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, studies on ET potential of suitable tree crops for bio-drainage, establishment of seed and seedling bank of MPTs/shrubs suitable for shelter belt, boundary planting, wind break, diversification in aquatic crops and assessment of ecosystem services rendered by waterlogged ecologies.

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) Inter-institutional collaboration for maintaining germplasm of different fodder crops, agro-forestry 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.

Brainstorming Session

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”. The growing incidence and severity of droughts, heavy rains, floods, hailstorms, heat waves and other extreme events in the recent decade have raised



serious concerns about food security and livelihood options for the farmer community. He mentioned that the year 2015 has emerged among the worst years in India, characterized by large number of westerly disturbance in the beginning, leading to large scale devastation by hailstorms in northern, central and western parts. This was followed by low summer rainfall and thereafter leading to severe drought in almost 350 districts of the country. 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-convenor expressed concern that till date, the focus has been on food security and not on other aspects of sustaining the land and water resources, while the germplasm diversity is under threat. He suggested to focus efforts on ground water management and soil/water conservation under conservation agriculture framework. Land use planning must be relooked with long term goals instead of short term profit. Among the participants, Dr J.S. Samra opined that Cloud burst, cyclone, heat and cold waves issues must be addressed. Dr C.L. Acharya stated that now in the foothills of Himachal, hailstorms occur even in October with devastating effects. One observation is that the direct seeded rice matures early and sometimes escapes hailstorm as compared to transplanted rice. Dr B. Venkateswarlu said that hailstorm has become a pan India phenomenon. There may be a good association between global warming, aerosol densities, deforestation with occurrence of hail events which needs to be investigated. He also suggested the need for revised syllabus for disaster management and advocated for a vibrant collaboration with private sector to address abiotic stress management. 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 agro-eco 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 manifold; (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.

Change of Addresses

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Forthcoming Programmes

- Brainstorming Session on 'Strengthening Agricultural Extension Research and Education' scheduled to be held on July 9, 2016 at NAAS, New Delhi.

Obituaries



Dr Syed Zahoor Qasim, an internationally renowned Fishery and Oceanography scientist, the key proponent of Indian mission to Antarctica, promoter of aquaculture, and explorer of deep sea poly-metallic nodules in Indian Ocean, breathed his last on October 10, 2015.

Dr Qasim obtained M.Sc. (1951) from Aligarh Muslim University and Ph.D. (1956) and D.Sc. (1968) from School of Marine Sciences, University of Wales, UK. After returning to India, he got involved in teaching at the Department of Zoology, AMU; later as Professor, at Central Institute of Fisheries Education, Mumbai (1962). During his long career he held many coveted positions, including Assistant Director, International Indian Ocean Expedition, Cochin (1964); Director, ICAR-Central Marine Fisheries Research Institute, Cochin (1970); Director, CSIR-National Institute of Oceanography (NIO), Goa (1974); and Secretary to Government of India, Department of Environment (1981). He was the Leader of the First Indian Antarctic Expedition, which reached successfully on 09 January 1982 and hoisted the Indian Flag on the icy continent. He also held the position of Secretary, Government of India, Department of Ocean Development (1982-88); Vice-Chancellor, Jamia Millia Islamia - Central University (1989-91); Member (Science), Planning Commission, Govt., 1991-96; from (1996-2007) he was Chairman, Board of Governors, Delhi Institute of Technology and also Vice-Chairman, Society for Indian Ocean Studies; and from 2007 onwards he was Chairman, Centre for Ocean and Environmental Studies, New Delhi. He was Honorary Professor in four Indian Universities and received D.Sc. from the Universities of Andhra (1987), North Bengal (1992), Sri Venkateshwara (1993) and BHU (1995).

Dr Qasim was conferred with Padma Shri (1974), Rafi Ahmed Kidwai Award (1978), Lal Bahadur Shastri Award (1988), Padma Bhushan (1982), among other awards. He was the President of the National Academy of Sciences (India); General President of the Indian Science Congress (1993-94) and elected Fellow of the Indian National Science Academy; Indian Academy of Sciences; National Academy of Sciences; National Academy of Agricultural Sciences; the Third World Academy of Sciences and Environmental Science Academy.

Passing away of Dr S.Z. Qasim is a great loss to scientific community including fishery fraternity in the country. The Fellowship mourns the sad demise of one of the distinguished fellows and pays homage to the departed soul.



Prof C.V. Subramanian, born on August 11, 1924 in Ernakulam, Kerala left for heavenly abode on February 05, 2016. He had his schooling and College education in Ernakulam between 1931-39 and 1939-41, respectively, pursued his higher studies at Presidency College, Madras (1941-44); University Botany Laboratory, Madras (1944-47); Botany School, Cambridge, UK, Commonwealth Mycological Institute, Kew, UK (1950). Dr Subramanian obtained his Ph.D. in 1948 and D.Sc. in 1957.

He started his academic journey at the National Institute of Science and worked there between 1948-50; was Professor Plant Pathology at PG School, IARI (1958-60), occupied the position of Professor and Director, Centre for Advanced Studies in Botany, University of Madras (1964-85). Dr Subramanian, a legendary and distinguished scientist in the field of Mycology, made enormous contribution to the taxonomy of Indian Hyphomycetes and described 130 new genera of Hyphomycetous and Coelomycetous fungi. His conidiogenesis-based pragmatic system of classification of Hyphomycetes has been widely recognized.

Dr Subramanian was honoured with many awards and recognitions viz., CSIR Shanti Swarup Bhatnagar Prize, 1965; Birbhal Sahni Medal, 1972; ICAR Rafi Ahmed Kidwai Award, 1972-73; Jawahar Lal Nehru Fellow, 1976-78; MOEF Dr Janki Ammal National Award, 2000; to name a few. He was Fellow of many National and International scientific societies.

The entire Fellowship of Academy mourns the sad demise of one of the illustrious and distinguished fellows and pays its homage to the departed soul.



Dr R. Pandey, born on July 10, 1939 in Karahi Bhuwan in district Deoria, UP, left for heavenly abode on April 21, 2016 at Gurgaon.

Educated at BRD Inter College, Bhatpar Rani, Deoria, U.P., Dr Pandey did his B.V.Sc and A.H. and M.V.Sc. from UP College of Veterinary

Sciences and Animal Husbandry, Mathura (1957-64); Ph.D. from Punjab Agricultural University, Hisar in 1969; Post Doctoral Fellow from National Institute of Science of India, New Delhi during 1966-69. He worked as Post Doctoral Fellow, Department of Virology, Baylor College of Medicine, Houston, Texas, USA and Department of Microbiology, South Western Medical School, Dallas, Texas, USA from 1971-73.

Dr Pandey served as Lecturer, 1964-66; Assistant Professor, 1969-70; Associate Professor, Virology at HAU, Hisar, 1973-80; Professor-Infectious Diseases, University of Baghdad, Iraq, 1981-83; Professor and National Fellow, Virology, CCSHAU, Hisar, 1983-94. He made significant contributions for the progress of science while working at UP College of Veterinary Sciences and Animal Husbandry, Mathura; Punjab Agricultural University, Hisar 1973-80; Post Doctoral Fellow, National Institute of Science of India, New Delhi, 1966-69; Post Doctoral Fellow, Department of Virology,

Baylor College of Medicine, Houston, Texas, USA and Department of Microbiology, South Western Medical School, Dallas, Texas, USA, 1971-73.

Dr Pandey received several Awards/Honours and recognitions, including Rafi Ahmed Kidwai Award 1986-87; Editor "Progress in Veterinary Microbiology and Immunology", Volume Editor, "Progress in Vaccinology"; Editor, Indian Journal of Virology and Fellow of Indian Virological Society; National Academy of Veterinary Sciences, India and National Academy of Agricultural Sciences. He held the coveted position of National Professor of Virology, ICAR (1994-2003). Dr Pandey contributed significantly towards research in the areas of Animal Virology and Immunology of animal viruses.

The entire Fellowship of the Academy mourns the sad demise of one of its distinguished Fellow and pays homage to the departed soul.

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