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From the President's Desk

Water Crisis - A Management Issue

A delayed monsoon has awakened fears of "Water Shortages" coupled with the drinking water crisis faced by the Chennai residents, has highlighted seriousness of the whole issue. It is possible to physically transport and supply drinking water to any locality/ region. Ten million litres of water per day were being transported by train to quench the thirst of Chennai residents. Only 20 hectares of paddy fields would be covered with 5 cm of standing water once with that much water as 1 cm ha of water is equivalent to one lakh litres of water. Therefore, one can easily grasp the impossibility of transporting water for agricultural use by train or by any other means when drought occurs. But if even 1 cm ha irrigation water is saved, 275 litres/day are made available as drinking water for almost 150 persons per day. It is quite interesting that Dr Thomas Fuller way back in 1732 very succinctly put it – "We never know the worth of water till the well is dry". And by the time this happens it is already too late. Every time it is predicted that monsoon would be sub normal or on the lower side, a lot of hue and cry is raised regarding saving of water and water conservation but all that is washed away by the first showers of rain and we are back at square one until the next monsoon shortfall prediction.

India has developed one of the largest irrigation infrastructures in the world, with more than 68 m ha of net irrigated area (48% of total cultivated area), which is next only to China. Irrigation development played a crucial role in ensuring food security. However, the average productivity in the irrigated systems (~3 t/ha) is considerably lower than the potential. It is not only the demand–supply mismatch in the major and medium irrigation projects but also the fact that the gap between the irrigation potential created and utilized has been widening continuously, which stands at more than 25 m ha today. Top priority should be given to bridge this gap which is the main focus of the Accelerated Irrigation Benefits Programme (AIBP) now being pushed by GoI. The achievements in this programme until 2016 were around 50 per cent. This programme genuinely needs "acceleration".

It is estimated by the World Resources Institute that by 2040, the number of countries likely to face extremely high water stress would be around 33 which will include 15 spread out in the Middle East, most of Northern Africa, Pakistan, Turkey, Afghanistan and Spain. Many countries will face high water stress. High water stress implies that ratio of withdrawals to available water ranges between 40 to 80 percent and this list will include India, China, Southern Africa, USA and Australia. Another report has indicated that groundwater extraction at the global level increased by 22 percent between 2000 and 2010, while that of India's increased by 23 percent during the same period. The report also highlighted that India uses the largest amount of groundwater amounting to 24 per cent of the world's total, which was more than that of China and the US put together. India also exports 12 per cent of the ground water and is the third largest exporter of groundwater. The ground water levels of 54 per cent of the country's wells are declining and

it is feared that 21 major cities will run out of water as early as next year which will have a direct impact on around 100 million population.

The other issue is the low water use efficiency of surface water resources. There have been a plethora of studies regarding all aspects of water management and solutions proposed to tackle water related problems but if the results of a study by CWC (2016) are considered the overall surface water use efficiency is a meager 36% of 35 major and medium irrigation projects in the country, which points to the abysmal state of the irrigation projects developed at a huge cost of the exchequer. Wastage of water is not only a loss of this precious natural resource but also leads to environmental degradation. However, this report also has a silver lining as it has also brought out the fact that there are major and medium projects that have registered an overall water use efficiency of around 60%. One can recall at this stage, the statement made by the National Commission on Integrated Water Resources Development(NCIWRD, 1999) that to meet the agricultural water requirements in 2050 we need to achieve 60% and 75% efficiency in surface water and ground water use, respectively. The National Mission on Water, one of the missions in the Government's National Action Plan on Climate Change, had put a target of achieving increase in Water Use Efficiency by 20 per cent by 2017 i.e. end of XII Plan. It has been said that we can meet our food production targets with the current level of water available if we can attain the efficiency levels mentioned earlier. All this points out to only one solution and that is to start using water as efficiently as possible. Agriculture sector is consuming almost 80 per cent of fresh water resources and a simple calculation indicates that if we increase the agricultural water use efficiency by even 10 per cent, the availability of water to the other more competing sectors like industrial, domestic etc., would be enhanced by 40 per cent.

Water is a resource which does not recognize geographical or sectoral boundaries when it flows or is utilized. But separate ministries/departments exist which looked at this resource from the developmental and utilization aspects. A typical example is that although agriculture sector is the major consumer of water (~80%), its development and utilization was the responsibility of the Ministry of Water Resources. Likewise, the Central Ground Water Board dealt with ground water development and the Ministry of Water Resources (Department of Land Resources) and National Rainfed Area Authority (NRAA) dealt with watershed development i.e. rainfed areas, although the precipitation (rainfall), surface water and groundwater are all part of the Water Cycle. This silo-type of functioning obviously had inherent limitations.

The Government of India on July 01, 2015 approved the Pradhan Mantri Krishi Sinichai Yojana (PMKSY) to address the shortcomings in implementation in a holistic manner. The major objective of PMKSY is to bring convergence of investments in irrigation at the field level, expand cultivable area under assured irrigation, improve on-farm water use efficiency to reduce wastage of water, enhance the adoption of precision-irrigation and other water saving technologies, per drop more crop, enhance recharge of aquifers and introduce sustainable water conservation practices by exploring the feasibility of reusing treated municipal waste water for peri-urban agriculture and attract greater private investment in precision irrigation systems.

Water productivity and water foot prints are now being used as a parameter for quantifying how efficiently we are using water. The other terminology is the amount of green (it refers to the soil moisture from precipitation), blue (it refers to surface and groundwater) and grey water (it is polluted water and will play an important role in adding to future water resources for meeting irrigation requirements) that is consumed in producing various commodities. Almost all estimates indicate that a non-vegetarian diet has a larger water footprint than a vegetarian diet. Some interesting figures are as follows. The global average water footprint of chicken meat is about 4330 litres/kg. Its water footprint is smaller than the footprints of meat from beef cattle (15400 litres/kg), sheep (10400 litres/kg), pig (6000 litres/kg) or goat (5500 litres/kg). Interestingly, the Global Average Water Footprint of Milk is 1020 litres for one litre (85% green, 8% blue, 7% grey). The global average water footprint of Potato is 290 litres/kg (66% green, 11% blue, 22% grey) while Potato chips consume 1040 litres of water per kilogram. In effect we are eating "water", referred to as *virtual water*, many times more than "drinking". We take pride in earning a huge amount of foreign exchange by exporting Basmati rice and in 2014-15 e.g., 3.72 million tonnes of basmati rice was exported. Each kilogram of irrigated rice consumes 3000 litres of water, so in other words, India virtually exported more then 10 trillion litres of water.

NITI Aayog (2018) has recently come up with an index, Composite Water Management Index (CWMI), to quantify the performance of various states as to how they are managing their water resources. It is a holistic approach and the performance is quantified based on nine indicators, which take into consideration augmentation /restoration of water sources, supply/demand management in irrigated and rainfed areas, efficient on farm water use, rural/urban water supply/sanitation as well as policy and governance. The initial reports have indicated that most of the states have done well in the infrastructure-related themes of 'Major and medium irrigation' and 'Watershed development' and have also enacted policies corresponding to the recommendations within the 'Policy and governance' theme. However, the critical themes of 'Source augmentation' (Groundwater), 'Sustainable on-farm water use practices', and 'Rural drinking water' are lagging behind. Most states have achieved less than 50% of the total score in the augmentation of groundwater resources, highlighting the growing national crisis. Given the fact that agriculture accounts for 80% of all water use, this underperformance, as discussed in the analysis of low performers above, poses significant water and food security risks for the country. CWMI is certainly a step in the right direction. States should be asked to develop a strategy to recover the operation and maintenance cost of the irrigation projects as the first step and gradually move to charging for water use on volumetric basis, provide incentives to farmers who adopt water efficient technologies and factor in the role of water as a provider of ecosystem services.

The challenge of water scarcity in India can be tackled primarily by focusing on the agriculture sector. The choice of the agricultural production system needs to be matched with ecology and water availability in that region/sub-region. Needless to mention that there is a plethora of field evaluated and validated technologies available that can easily address the challenges and meet the targetted water use efficiency desired today be it rainfed or irrigated agriculture. The need now is to upscale these technologies on war footing. For instance, the simple intervention of laser levelling can save 15-20% of water applied. It also enhances the nutrient use efficiency - another sector on which the Government spends a huge amount as subsidy. In spite of the Govt.'s all out promotion of pressurized irrigation systems (40 -70% water savings), the coverage is only about 12 m ha out of a potential of 69.5 m ha. There is an urgent need to increase the water storage be it through rain water harvesting (*in situ* as well as *ex situ*), tanks and large reservoirs to ensure water security of the nation.

(Panjab Singh)

108th Executive Council Meeting

The 108th Executive Council (EC) meeting of the Academy was held under the Chairmanship of Prof Panjab Singh on June 4, 2019. The Executive Council deliberated and approved the composition of new NAAS Journal Score Committee (NJSC) for assigning NAAS Score to scientific journals effective from 1st January 2020. The evaluation proforma and the guidelines will be revised and uploaded on Academy's website for inviting application for scoring of non-IF journals based on the recommendations of NJSC. EC stressed that the Strategy/Policy papers to be brought out by the Academy must clearly spell out the actionable points with a plausible roadmap. Further, the offer of Vice-Chancellor, BHU to host the XV Agricultural Science Congress in February 2021 was accepted considering the location, accessibility and facilities available at this premier institution. It was suggested that XV-ASC be scheduled in the third week of February, 2021 in consultation with the host university. The EC opined that the Vice-Chancellor, BHU and Director, Institute of Agricultural Sciences may be the Convener and Organizing Secretary of the XV ASC, respectively. The EC approved the nomination of Dr A.K. Patra, Dr Sudhakar Pandey and Dr S.K. Pandey as new convenors of Regional Chapter of Bhopal, Varanasi and Lucknow, respectively. It was decided that both Foreign and Pravasi fellowships be continued as before, however, modified guidelines defining the eligibility and election procedure for Foreign and Pravasi Fellows were approved for greater clarity in nominating the deserving persons. Accordingly, EC also approved the proposal to shift the names of Fellows of Indian origin elected earlier as Foreign Fellows to the list of the National Fellows (if they are now based in India) or Pravasi Fellows (if based outside India) as the case may be. The EC recommended the proposal for approval of AGM to increase the annual intake of Associates from 10 to 12, following the section-wise distribution to encourage young scientists.

Section	Annual Intake
Crop Sciences	2
Horticultural Sciences	1
Animal Sciences	2
Fisheries Sciences	1
Natural Resource Management Sciences	2
Plant Protection Sciences	2
Agricultural Engineering and Technology	1
Social Sciences	1

The EC reviewed four new themes viz. Zero Budget Natural Farming, Subsidies in Agriculture, Expansion of Agricultural Universities and MSP for Farm Produce proposed for organising Brain Storming Sessions during the year 2019 as per the recommendation of Program Committee. It was agreed to organise Brain Storming Session on Zero Budget Natural Farming with Dr H.S. Gupta as the Convener in near future. However, it was felt that a final decision to convene BSS on Subsidies in Agriculture and MSP for Farm Produce may be taken after the outcome of the deliberations of the forthcoming BSS on Loan Waiving versus Income Support Schemes: Challenges and Way Forward scheduled for 24th June, 2019. Regarding BSS on Expansion of Agricultural Universities, the EC felt that the proposed BSS may be put off to a later stage. The following new programmes were agreed:

i) Strategy Paper on Food Borne Zoonotic Diseases.

ii) Strategy Paper on Tropical Wilt Race-4 in Banana Cultivation.

iii) Strategy Paper on Bio-fortification.

iv) Policy Paper on Improving Livestock through Artificial Insemination.

Programmes Held

Meeting of the Conveners of Regional Chapters

A meeting the Conveners of NAAS Regional Chapters was held on June 04, 2019 under the Chairmanship of Prof Panjab Singh, President, NAAS. The President welcomed the participants and highlighted the need to strengthen the Regional Chapters to manifest and intensify the activities of Academy. He advised NAAS chapters to focus on the issues relevant to agriculture at the regional level and establish links with the State/Central Govt departments and explore possibilities of utilizing the experience and expertise of the NAAS Fellowship located in their region. The President appreciated the recent initiative of Hyderabad Chapter to compile a directory giving specialization and contact details of the entire Fellowship in the region. Subsequently, the progress and financial activities of the Bengaluru, Chennai, Hyderabad, Karnal, Kolkata, Mumbai, Lucknow and Varanasi Chapters were appraised by their respective conveners. The Regional Chapters were also advised to keep updating the Secretariat about the activities planned and undertaken for coverage in NAAS News. It was also decided that from now onwards annual meeting of the all Conveners will be held, preferably in the forenoon of 4th of June preceding the AGM of NAAS,

in which the NAAS-Chapters would present their activities. It was also suggested that the new Conveners of the following Regional Chapters may be nominated as follows:

i. Regional Chapter - Bhopal : Dr A.K. Patra in place of Dr K.K. Singh

ii. Regional Chapter -Varanasi: Dr Sudhakar Pandey in place of Dr B. Singh

iii. Regional Chapter - Lucknow: Dr S.K. Pandey in place of Dr P.S. Pathak

Presentation by Newly Elected Fellows

The newly elected Fellows of the Academy made their presentations in the afternoon of June 4, 2019 in two sessions before the full house of the Academy Fellowship. The Session-1, which was chaired by Dr A.K. Srivastava, Vice President and co-chaired by Dr J.K. Jena, Secretary, 13 Fellows from the sections of Crop, Horticultural and Animal Sciences made presentations of their work, besides the presentations of two foreign fellows. The Fifteen Fellows elected in the sections of Fisheries, NRM, Plant Protection, Agricultural Engineering and Technology and Social Sciences presented their work in Session-II that was chaired by Dr A.K. Srivastava, Vice President and Dr T. Mohapatra, Vice President and co-chaired by Dr Anil K. Singh, Secretary of the Academy. All the presentations were deliberated with many valuable inputs by the house.

Annual General Body Meeting

The 26thAnnual General Body Meeting (AGM) of the Academy was convened on June 5, 2019 at NASC, New Delhi under the Chairmanship of Prof Panjab Singh, President of the Academy and was attended by 212 Fellows. The AGM was graced by Past Presidents, Past Vice Presidents and a number of former senior peers and office bearers of the Academy. A 2-Minute silence was observed by the entire house as a mark of respect prior to initiation of business, in the memory of esteemed Fellows, namely, Dr J.S. Kanwar, Prof H.Y. Mohan Ram, Dr S.V.S. Shastry, Dr H.K. Jain, Dr S.K. Mukerjee, Dr S.R. Poonia and Prof V.S. Vyas since last AGM meet. Thereafter, Dr J.K. Jena, Secretary, NAAS welcomed the dignitaries present on the dais and also Fellowships and Associates present in the GB meeting. The President of the Academy, Prof Panjab Singh also welcomed all the esteemed Fellowship assembled including newly elected Fellows and Associates to the Academy for the Annual General Body meeting. Thereafter, the proccedings of the meeting started with the presentation of the detailed Secretary Report by Dr J. K. Jena, Audit and Accounts Report by Dr R.K. Jain, Editors' Report by Dr V K Bhatia and Foreign Secretary Report by Dr U.S. Singh and Action Taken Report by Dr Anil K. Singh. All these reports including Annual Report 2018-19, Audited Accounts were accepted and adopted by the house after brief interaction by the Fellowship. The AGM also lent its approval to some of the important decisions taken by EC since last AGM that included appointment of auditors for the year 2019-20, selection of Associates under all sections with annual intake of 12, holding of XV ASC at BHU, Varanasi in February, 2021, continuance of Pravasi and Foreign fellowship as per guidelines in vogue and proposed activites of the academy during the year.

The esteemed Fellowship actively participated in general discussion and made suggestions on many pertinent issues confronting agriculture, some of them are as under:

i. Enhance number of Fellowship under NRM section from existing 5 to 7.

NAAS Fellowship at AGM Meet

Prof Panjab Singh welcoming the Fellowship assembled for AGM

ii. NAAS Guidelines on Mentoring Scheme need to be followed up for implementation in institutions for higher education under NARES.

iii. Need to increase the time slot for the presentations by newly elected Fellows. The newly elected Fellows may be requested to focus on the work they have cited for the election as NAAS Fellow.

iv. Develop links of NAAS with other National Science Academies and those located in Africa and BIMSTEC countries.

v. Initiate deliberations on Convergence of R&D Schemes, Agricultural Start Ups, Livestock numbers and the carrying capacity, especially with regard to economic viability, Look/Act East Policy, Policy for Artificial Insemination in indigenous cattle etc.

The President thanked the Fellowship for raising important issues and assured to get the points examined and initiate appropriate action, wherever required.

Admission of the Fellows / Associates

Dr J.K. Jena, Secretary conducted the formal admission ceremony of the newly elected Fellowship and Associateship during the year 2018. 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 them to the Fellowship of the Academy and presented the certificates to the following under different sections:

Newly elected Fellow receiving Fellowship Certificate from the President

Fellowship

Section I: Crop Sciences

1. Dr Bakshi Ram
2. Dr Ravish Chatrath
3. Dr Kunwar Harendra Singh
4. Dr Swarup Kumar Parida
5. Dr Sudesh Kumar Yadav
6. Dr Raman Meenakshi Sundaram

Section II: Horticultural Sciences

1. Dr Arun Kumar Singh
2. Dr Debasis Pattanayak
3. Dr (Ms) Kambham Madhavi Reddy

Section III: Animal Sciences

1. Dr Devendra Tarachand Mourya
2. Dr (Ms) Sushila Maan
3. Dr Amrish Kumar Tyagi
4. Dr Bhupendra Nath Tripathi

Section IV: Fisheries Sciences

1. Dr Priyabrat Swain
2. Dr Basanta Kumar Das

Section V: Natural Resources Management Sciences

1. Dr Pawan Kumar Joshi
2. Dr Anup Das
3. Dr Dinabandhu Sahoo (*in Absentia*)
4. Dr Tapas Kumar Das
5. Dr Tapan Jyoti Purakayastha

Section VI: Plant Protection Sciences

1. Dr Sunil Kumar Khare
2. Dr (Ms) Neera Singh
3. Dr Mukesh Kumar Dhillon
4. Dr (Ms) Rashmi Aggarwal

Section VII: Agricultural Engineering & Technology

1. Dr Krishna Pratap Singh
2. Dr C. Anandharamakrishnan

Section VIII: Social Sciences

1. Dr Ranjay Kumar Singh
2. Dr Akhilesh Chandra Kulshreshtha

Foreign Fellows

1. Dr Abdelbagi M. Ismail (Kenya)
2. Dr Hosahalli Ramaswamy (Canada)

Newly elected Foreign Fellow receiving Fellowship Certificate from the President

Associates

Name, Section

1. Dr R. Deb, Animal Sciences
2. Dr B.S. Gotyal, Plant Protection
3. Dr P.L. Kashyap, Plant Protection
4. Dr Neeraj Kumar, Fisheries Sciences
5. Dr C.O. Mohan, Fisheries Sciences
6. Dr B. Parameswari, Plant Protection
7. Dr A.K. Parihar, Crop Sciences
8. Dr R. Ranjan, Animal Sciences
9. Dr Sarika, Social Sciences
10. Dr S. Sood, Crop Sciences

Institutional Membership:

The President presented NAAS-Institutional Membership Certificates to the following Institutions:

1. Bihar Animal Sciences University, Patna.
2. Mahatma Phule Krishi Vidyapeeth, Rahuri.
3. Maharashtra Animal and Fishery Sciences University, Nagpur.
4. Institute of Bioresources and Sustainable Development, Imphal.
5. Sher-e-Kashmir University of Agricultural Sciences & Technology, Srinagar.

Presidential Address

Prof Panjab Singh, President, NAAS delivered the Presidential Address on "Feeding 1.7 billion" in the 26th AGM. In his Address, he highlighted that feeding the ever growing population and simultaneously sustaining or improving limited natural resources is a major challenge before the agricultural

science and farming community. He stressed the need to adopt an integrated approach to various sectors of agriculture *viz.,* food grain crops, horticulture (fruits and vegetables) and forestry, livestock and fisheries, process engineering and machines as against the major tilt towards food crops over observed in very recent past for Doubling farmer's income and sustaining food and nutritional security. In this context, he delineated population, agricultural and food scenario, area and productivity of different crops, farming systems, profile of energy consumption, potential of horticulture, livestock and fisheries sector, agroforestry etc. to address the challenges. He emphasized on large scale adoption of input use efficient agricultural technologies as the real key to feeding not only India but also the world. He urged to set-up a national mission on precision agriculture including livestock & fisheries with a mandate to utilize cutting edge tools and technologies like Remote Sensing, Drones, Sensors, Decision Support Systems, Robotics, Artificial Intelligence, Internet of Things (IoT), Biotechnology (CRISPER, Gene Editing) etc. to ensure sustainable nutritional security for the 1.7 billion Indian by 2050.

The proceedings of AGM concluded with a vote of thanks from Dr Anil K. Singh, Secretary, NAAS. He expressed gratitude to Prof Panjab Singh, President, NAAS for providing dynamic leadership to implement the mandate and to the esteemed Fellowship for their continued support and active participation in the events organized by the Academy. The contributions of various Committees, Editors and Treasurer of the Academy were gratefully acknowledged. The Secretary also thanked the staff of NAAS Secretariat for efficient discharge of assigned duties and responsibilities.

Foundation Day Lecture

In the afternoon of June 5, 2019, Foundation Day Lecture on "Can India's Success in Agriculture Benefit Africa?" was delivered by Dr Peter Carberry, Director General, International Centre for Research in Semi-Arid Tropics. He applauded the contribution of agricultural science to the success of agriculture and society in India and globally that contributed a significant reduction in the number of people living in extreme poverty in India. He expressed his disappointment over the typical articulation on agriculture today, and into the future, consistent with a largely negative narrative with little acknowledgement of success despite the decadal contributions of R&D and the continual innovations that have enabled the world to largely feed itself today. In this context, he referred to the tendency for today's researchers to start with an overriding narrative of downside context, often cited without full appraisal. He was of the view that such poorly argued and attributed assertions

must be challenged. Dr Carberry expressed a concern over the current promotion of Zero Budget Natural Farming (ZBNF) which, according to FAO implies farming without using any credit, and without spending any money on purchased inputs. He called upon the scientists and the Academy to portray the successes of society and articulate the associated challenges balanced by our current knowledge. He concluded with the hope that India's national initiative to offer greater South-South Collaboration to support development pathways will benefit African farmers and consumers and progressed further.

Brain Storming Sessions

Vertical Farming

A Brain Storming Session on Vertical Farming (VF) was organized by the Academy on April 11, 2019 under the Chairmanship of Prof Panjab Singh, President, NAAS. The session was convened by Prof Brahma Singh, former, OSD (Hort.), Rashtrapati Bhawan, New Delhi with Dr T. Janakiram, ADG (Hort.), ICAR, New Delhi, as Co-convener. A number of experts/scientists/planners, both from public and private sector, attended the session. Prof Brahma Singh presented the global status of available expertise on different facets of VF of vegetables, ornamental horticulture, micro greens, mushrooms, plant-nurseries, hydroponic-fodder, poultry, fisheries, orchids and herbs. He also highlighted the great potential of this technology, especially for the urban and peri-urban areas, with supplementary inputs. from experts like Dr K.L. Chadha, Dr H.P. Singh, Dr Anand K. Singh and Dr Pritam Kalia. The consensus emerged on the action points after a day-long in-depth deliberations included

1. Promotion of vertical farming, as a climate combative and an important future farm technology in India.
2. Innovative research and human resource development to make the vertical farming technology amenable to wide range of Indian conditions. The technology be partitioned and perfected for all (small, medium, large farm holders and land less) both in urban and rural areas and major national highways under open as well as semi and fully controlled environment with simple and sophisticated (LEDs, sensors, controlled environment etc.) technologies.
3. Relevant research and educational institutions (ICAR, SAUs and others) in the country must contribute to the development of vertical farming through affordable, economic and sustainable vertical production protocols.
4. Development of policy guidelines for promotion of vertical farming in India, particularly for the fast-expanding Urban India.

The programme was concluded by Dr Anil K. Singh, Secretary, NAAS with vote of thanks to the chair, conveners and participants.

Loan Waiving versus Income Support Schemes: *Challenges and way forward*

In recent years, loan waivers have emerged as the prominent policy instrument for addressing the issue of agrarian distress in India. The expansion of the loan waiver policy and the emerging income support schemes has prompted serious discussions and commentaries in the on-going economic and policy discourses in India. In view of the seriousness and complexity of these issues, the National Academy of Agricultural Sciences (NAAS) organized a one-day Brain Storming Session on "*Loan waiving versus income support schemes: Challenges and the way forward*" on 24th June 2019 to deliberate on the efficacy of loan waivers in detail and explore the other alternative options to deal with agrarian distress efficiently and effectively.

The session was Chaired by Prof Panjab Singh, President of NAAS and attended by a galaxy of eminent scholars, policy makers, and farmers' representatives. Besides base

paper by Dr P. K. Joshi, Convener of BSS, the presentations by other experts included the efficacy of farm loan waivers, advantages and challenges of income support schemes and farmers' perspective on agricultural subsidies, loan waiving and income support. Several policy options and strategies were proposed to support farmers and ensure sustainable and inclusive agricultural growth in India. Some of the recommendations emerged during the deliberations included: (i) Need to evolve differentiated strategies to cater the requirement of different categories and regions of farmers; (ii) SWOT analysis for loan waiving and income support schemes; (iii) Emphasize on assured markets, prices and risk aversion plans instead of loan waiving; (iv) Exercise loan waiving very cautiously and exceptionally only in really distressed situation; (v) Direct income support as a better option, but not at the cost of long-term investment in agriculture (vi) Adequate emphasis on technology and market driven agriculture for higher productivity, lower costs to raise farmers' income; (vii) Requirement of structural reforms in land, labour, credit and commodity markets for long-term sustainable agricultural growth; and (xiii) Gradual transfer of some of the subsidies and ineffective programs to increase their investment in agriculture and reduce production and market risks.

Enhancing Science Culture in Agricultural Research Institutions

A Brain Storming Session on "*Enhancing Science Culture in Agricultural Research Institutions*" was organized at the Academy on June 25, 2019. The workshop was Chaired by Prof Panjab Singh, President, NAAS and Convened by Dr N.H. Rao to address recent concerns about aligning the science culture in public agricultural research institutions towards research of higher quality, relevance and impact.

The workshop was attended by 26 participants representing NAAS, ICAR Institutes, CGIAR, SAUs, IITs, CSIR, DBT, and others.

The background paper presented by Dr Rao provided a perspective on the evolution of science culture to present times in institutional contexts, and proposed a framework for enhancing the science culture defined by its core attributes, and the drivers of change for agricultural research. The following key points emerged from the discussions during the workshop:

1. Science culture can be defined in terms of its three core attributes - research integrity, scientific creativity, and scientific integrity.
2. Science culture needs to be nurtured, not managed through a joint effort by individual scientists, research institutions and external stakeholders to ensure and sustain it in research organizations.
3. The Agricultural research needs to be not only interdisciplinary but also a convergence of all the four paradigms of science (theory, experiment, modelling and simulation, and data driven knowledge discovery), with the co-evolution of problems and solutions in continuous cycles with feedbacks programmed into the research and technology transfer processes. Research institutions can be an ideal ecosystem for scientific creativity and innovation, provided the leadership prioritizes the creation of such a working environment.
4. Traditional passive apprenticeship model of nurturing young researchers by association with established research groups and mentors over extended periods is not sufficient in the current context of institutional expansion, research needs, and multiple demands on both mentor and mentee's time.
5. Present personnel policies and performance evaluation systems encourage side steping questions of research relevance, research and scientific integrity, and scientific creativity in pursuit of short term career objectives.

Keeping the above in view, enhancing the science culture in agricultural research institutions requires fast tracking active adoption of research integrity practices, scientific creativity and continuous learning, a scientific integrity policy code of conduct for access and use of scientific information and knowledge for public policy, improving the science communication and performance evaluation, recruitment, and incentive systems to reflect on research excellence, quality/ rigour, creativity, learning, risks/uncertainties, and intellectual and innovation impact from the research.

Experts Meet on National Soil and Land Use Policy

The National Academy of Agricultural Sciences constituted a Core Group for preparing the National Soil and Land Use Policy at the behest of Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Govt. of India. The Core Group had four regional consultation meetings with agricultural scientists from NARES, representatives from line departments and progressive farmers at Bengaluru, Kolkata, Bhopal and New Delhi. The draft report prepared by the Core Group was uploaded at the website of NAAS and discussed at the

experts group meeting convened under Chairmanship of President, NAAS on April 13, 2019 at New Delhi, in the wake of an enhanced recognition of the fragility of natural resources and their significance in overall well-being of the mankind, public interest in restoration and maintenance of these finite resources in the recent past. The recommendations in the areas of policy measures,structural reforms, operational interventions and regulations for initiating appropriate action by the concerned agencies were discussed and finalized. The policy framework envisages efficient use of soil, land and water resources, so that their inherent use potential is handed over undiminished to posterity. It was felt that the draft document will meet the expectations of the DAC&FW in devising soil and land use programmes for sustained growth and development of agriculture sector with the ultimate goal of "Greening India" leading to sustainable land use systems and environment security.

Seminar on Social Transfers to Revitalize Rural India and New Delhi Launch of Global Food Policy Report 2019

Amid the hustle and bustle of the world's largest democracy going to polls, the IFPRI launched its Global Food Policy Report (GFPR) 2019 at New Delhi, on the sidelines of a day-long policy seminar on *Social Transfers to Revitalize Rural India*, on April 26, 2019 jointly organized with the National Academy of Agriculture Sciences and the Indian Council of Agricultural Research.

IFPRI's new Director for South Asia, Dr Shahidur Rashid, emphasized that India and the entire region have made incredible progress on food security front since 1970s. He expressed a need to now refocus rural development policy to address emerging issues such as those related to climate change, urbanization, prevalence of rural poverty, and strategies to deal with them. Dr Shenggen Fan, IFPRI Director General recalled that challenges to ensure food security and reducing poverty have evolved over the last few years and need to be addressed based on data and evidence in a way that nobody is left behind. Dr P.K. Joshi, IFPRI Senior Adviser focused on the continuous malnutrition leading to high child mortality, stunting and wasting besides the acute problem of anaemia among women; agrarian distress, and lack of basic amenities in rural areas, as major challenges that need immediate attention. Drawing on the report for specific lessons for India, Dr Mahendra Dev, Director and Vice-Chancellor, Indira Gandhi Institute of Development Research, emphasized on the requirement to focus on six key areas viz. rural non-farm sector; investments in basic infrastructure; empowering women; promoting information technology; social transfers to rural household; and governance and implementation efficiency for rural development in India. Dr Suresh Pal, Director of the ICAR-National Institute of Agricultural Economics and Policy Research, underlined the importance of strengthening rural-urban links for rural revitalization. Summing up the proceedings of the panel, Dr Raj Paroda, Founder and Chairman, Trust for Advancement of Agricultural Sciences (TAAS)called for urgent attention to achieve UN Sustainable Development Goals (SDGs) by India to be able to achieve these goals faster globally.

International Collaboration under South-South Cooperation

A meeting on the Role of NAAS in International Collaboration under South-South Cooperation (SSC) with focus on Africa and BIMSTEC was held on 18th June 2019 in NAAS Secretariat under the Chairmanship of Prof Panjab Singh, President, NAAS. The meeting commenced with a brief background by Dr Anil K. Singh, Secretary, NAAS, about potential opportunities for agricultural research and higher education for development in countries of Africa and BIMSTEC with suitable interventions of NAAS for the cause. The President highlighted that the major strength of the Academy is the highly competent, multi-disciplinary and experienced human resource that could be utilized for the benefit of African and BIMSTEC countries towards capacity building, institutional and human resource development. The participants shared their working experience and expressed views about different modes of International Cooperation for development. Dr Arun K. Joshi, Country Rep, CIMMYT, India and MD, BISA cited several examples of international cooperation in ARD. The potential area of cooperation suggested were Capacity Building, Seed & Breed, Water Management, Digital Agriculture, Institutional and Policy Arrangement. Based on our long connection with African countries, NAAS needs to explore what can be done there on these areas of interest to both India and Africa. A possible way could be to connect with CG centres or BISA in their activities in Africa and vice versa. CIMMYT-BISA will be happy to assist NAAS in this regards. The Secretary, NAAS, proposed a vote of thanks to the Chair and the participants for their valuable inputs

Activities of Regional Chapters

Hyderabad Chapter

A meeting of Fellows and Associates of NAAS based in Hyderabad was held on 4th April, 2019 at ICAR-NAARM, Hyderabad to discuss emerging issues related to Agricultural Research, review the on-going activities and plan future activities of NAAS Regional Chapter, Hyderabad. The meeting was attended by a total of 22 Fellows and 4 Associates of NAAS belonging to the States of Telangana and Andhra Pradesh. Prof Panjab Singh, President, NAAS and Dr Anil K. Singh, Secretary, NAAS graced the occasion.

During the meeting, Prof Panjab Singh, President, NAAS felicitated Dr P. Appa Rao, Vice Chancellor, Central University of Hyderabad and Fellow, NAAS for the prestigious B.N. Mehta Award of NAAS. Dr Raman Meenakshi Sundaram, Principal Scientist (Biotechnology), ICAR-IIRR, Hyderabad and Associate, NAAS was also felicitated for being elected as Fellow of the Academy in the last year.

President, NAAS addressing the NAAS Regional Chapter Meeting

Two eminent NAAS Fellows gave their perspective on a couple of contemporary issues concerning the agricultural sector. Padmashri Prof E.A. Siddiq, Hony. Professor, PJTSAU and former, DDG (Crop Sciences), ICAR delivered a talk on *"Way Forward for Genomics in Agriculture: Policy Needs"*. Prof Siddiq highlighted the achievements in terms of significant increase in food production and productivity in last sixty years and called for redressal of nutritional security in the right perspective through modern technologies. As far as transgenic approach is concerned, Prof Siddiq opined that even though the technology has tremendous potential in tapping the genetic variation in the entire biological gene pool, the major impediment are policy issues related to the bio-safety and regulation of genetically modified (GM) products. He was hopeful that the proposal of the Union Government to constitute a Biotech Regulatory Authority of India will turn out to be a positive step in this direction to address the regulatory and policy issues related to GM crops. He complemented NAAS for being always at the forefront in terms of addressing the policy issues with respect to regulation and cultivation of GM crops.

Dr Anil K. Singh, Secretary, NAAS gave a talk on "*Drought proofing policy in India*". Dr Singh highlighted the steps taken by ICAR and Govt. of India with respect to drought proofing agricultural production like contingency plans, relief employment in rural areas, water resource management at both macro and micro levels, fine-tuning institutional response coupled with input subsidies during the period of drought.

Prof Panjab Singh in his remarks as a chief guest of the meeting complemented the talk given by the eminent speakers and appreciated each of the expert members for their contribution to charting the actionable points on the identified theme areas. He also lauded the efforts of the Regional Chapter under the leadership of Ch. Srinivasa Rao, Director, NAARM for its dynamism and multi-pronged activities.

He opined that resource use efficiency of various crops needs significant improvement and value addition can play a vital role in increasing the income of farmers. He also mentioned that NAAS is a vocal advocate for popularization of GM crops in the country and has been contributing in building the opinion and a favourable ecosystem towards this, in the past three decades.

Dr Ch. Srinivasa Rao briefly summarized the actionable points that emerged during the discussion and called for greater support from the Academy for strengthening its activities. The meeting ended with the formal vote of thanks by Dr Raman Meenakshi Sundaram, Treasurer, Hyderabad Regional Chapter of NAAS.

Group Photo of the Participants of the NAAS Regional Chapter Meeting

Ludhiana Chapter

The Ludhiana Chapter of the National Academy of Agricultural Sciences(NAAS) organized a lecture on '*Self Propelled Active Living Matter*' from a renowned scientist, Dr Jatinder Vir Yakhmi, FNASI, the former Associate Director of Physics

(BARC), on April 11, 2019 at Punjab Agricultural University, Ludhiana. The lecture was attended by Dr B.S. Dhillon, Vice Chancellor PAU and Convener of the Ludhiana Chapter, NAAS Fellows, Deans, Directors and officers from the PAU, faculty from GADVASU and the PAU and by the students.

Dr Yakhmi shared that the quest for new functional material is moving increasingly from conventional high-technology material like steel and plastics towards the study of the large variety of remarkably robust and hierarchical material used by Nature in the living world in the 21st century. Bio-material with diverse characteristics is produced by Nature by adopting different arrangements and combinations of the same universal motifs. With the increasing availability of new tools to investigate the structure of all forms of matter at the smallest levels (sub-nano scale), there are attempts obviously to examine if one could design autonomous active matter, with capability of self-propulsion, using nature's principles of self-assembly and self-organization. Through examples from the living world, he discussed research and trials on the development of artificial muscles for movement, bionic and magnetic devices that can be linked to brain and heart signals, simulation of lung surfactant films, synthetic material with homeostatic abilities and creation of an entire living organ grown from lab created cells. Dr Yakhmi concluded that with capabilities of self-organization, self-repair and self-replication, Nature's assembly doesn't make a mistake and this is the difference between man and nature.

Padam Shri Dr B.S. Dhillon, Vice Chancellor, PAU applauded mind boggling multidisciplinary knowledge of Dr Yakhmi incorporating physics, chemistry, biochemistry and cell biology. He presented a memento to Dr Yakhmi as a token of gratitude.

Soft Skills for Attaining Excellence in Agricultural Research and Education

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India has the world's largest scientific workforce in terms of science graduates it churns out every year. However, the quality of its science is dismal. The important findings that emerged from our researches on attitudinal and behavioral attributes of those excelling in science (Chhonkar, P.K. *NAAS News 11(4) 3-5* 2011; Chhonkar, P.K. Dr N.S. Randhawa Memorial Lecture *J. Indian Soc. Soil Sci. 59:67-73,* 2011) were that those excelling in science attributed their success to attitudinal factors (96.2%), positive attitude (83.2 %), and 90.6 per cent to their happy family life. No amount of world class physical infrastructure alone will deliver unless matched with highly motivated and trained manpower by Prof M.S. Swaminathan aptly termed as the " *human software infrastructure*".

What we understand by excellence?

The humans despite their most developed brain, can still get confused between excellence and mediocrity. Those who have excelled did not aim at it. The truth is that the excellence they achieved was in fact a direct consequence of their self-motivation, inner urge and an insatiable hunger for seeking new knowledge. History of science is a witness to the fact that at times, search for truth or 'science' because of rational thinking came in conflict with the religion and philosophy since both these were the part of monarchial prerogative. Science and scientists continued to receive patronage and freedom to express their views from progressive and open minded monarchs and kings. However, situations arose when scientific findings started influencing the affairs of the state and sometimes due to very radical views came in direct conflict with it. Hence, Socrates was accused of corrupting young minds and was forced to drink poison In recent times the example is the controversy surrounding GM crops.

The excellence in science or innovative ideas get support and patronage from the rulers and politicians world over, it therefore became essential for scientists to clamor around the ruling class to garner support for funding and priority for execution of their projects on grounds of economic urgency to better governance, or lifestyle of the masses. Garnering funds thus became the major activity and the search for truth got pushed into background. In the country, scientists' career advancement unfortunately got linked more not for doing good science and creating new knowledge but to the amount of funds mobilized. In any peer review exercise this aspect is unfortunately overemphasized.

Qualities needed for excelling in science

Love of science and an insatiable curiosity are two most important characteristics of a person likely to excel in science. He must have spirit of adventure, dissatisfied with prevailing ideas he does not tread a known path. His imagination is fired by the prospects of finding something never found out by anyone before. As in any other profession, a high intellect, willingness to work hard and tenacity of purpose are essential characteristics for a person to excel in science. But what more which has come to focus in recent times are the qualities called soft skills which include non-cognitive skills among others –motivation, positive attitude, optimism, zeal, diligence etc. These are the non-cognitive skills which unlike IQ are amenable to training i.e. can be significantly improved through the help of a trainer or a coach.

Discovering the Discoverers: Panacea for attaining excellence

A person's ability at research can not be judged by written examinations as these tend to judge information gatherers rather than thinkers. While it can not be disputed that a strong knowledge base is essential for excellence, those adjudged brilliant at the conventional examinations are at times prove to be very poor researchers. There are examples of some extraordinary and well known scientists who made poor showing at examinations. Einstein could not pass an entrance examination for admission into a polytechnic school. A student who is reflective and critical is at disadvantage in accumulating information as compared to a student who accepts everything and anything which is told without reservation.

The best course for identifying promising research talent is by giving the candidate an opportunity to work under a scientist of known standing. This system is akin to the traditional guru-shishya parampara (teacher-disciple bonding). One favorable indication of the youngster to show real desire to take up research career is by taking up steps for getting a research position rather than looking for greener pastures like all India services. Best research workers thus tend to select themselves.

Accountability leads to excellence

Accountability is linked to excellence as it propels an individual or a group to work and produce results. Whether excellence is achieved or not is another matter. There are different levels of accountability such as individual, group, institutional, organizational and on the part of a nation, depending upon the level at which it is perceived and assessed. I would like to simplify and clarify using an example; what is the accountability of a teacher to the nation with respect to education? A teacher must teach proficiently and make it comprehensible to his students, ignite eagerness in their minds, motivate and inspire them to learn more. The teacher himself must be abreast with latest developments in his area of specialization (irrespective of the level he is involved in teaching) to improve his knowledge and in the words of Late Dr Sarvapalli Radhakrishnan- "*A teacher must himself remain a student life-long".*

Awards and incentive for attaining excellence

The scientists do not get large monitory compensation for their labour. They should therefore be generously granted public recognition and appreciation for research. The men and women of science are fascinated by the mental challenge of the unknown and delights in exercising their mental prowess to find explanations for the same.

The main incentives for research leading to excellence are a strong desire for creating new knowledge, satisfying creative instinct and curiosity and a strong desire of feeling of importance by gaining recognition. The desire to see one's name in the publications and getting credit in the scientific community is one of the most important incentives in research. In applied research, there is an additional desire to achieve public good impacting and improving quality of life, which brings intense sense of satisfaction and happiness.

Some psychologists hold the view that best work emerge under adversity and mental stress may act as a stimulant. There are examples to show that desire to impress certain individuals who did not believe in their competence acted as an incentive to achieve excellence.

Are funding agencies responsible for mediocrity?

Funding agencies have the responsibility for not only to fund research but to promote excellence. Funding and evaluation or monitoring is accomplished through a peer review which is very important component for bringing about excellence. Unfortunately, it has got mixed up with factors like friendship and other extraneous considerations not connected with excellence. If the system fails it is because of the failure of 'Peers' who either fail to rise to the level of competence, impartiality or both.

India has a culture where friendship, community affiliation and contacts play an important role in camouflaging merit. This attitude prevents an honest operation of peer review systems leading to mediocrity.

A good 'peer' review system requires that the reviewers judiciously evaluate the merit of the proposed project or achievements in the project. The 'caliber' of these scientists must have been recognized irrespective of the positions they occupy. However, barring a few disciplines, there are not enough such people available therefore only a few are found to be repeatedly involved in several decision-making events. The funding agencies also do not want easily to include up coming scientists in the review process obsessed as they are with the 'halo' effect.

Soft skills intervention for increasing out put and quality

Factors which reduce work out put and lower quality can be broadly grouped into two categories:

a. Laziness which is lack of desire to work for which there could be many reasons such as
   - *Fear of failure,*
   - *Lack of motivation,*
   - *Lack* of *job satisfaction and*
   - *Belief that work does not pay*

b. Fatigue: It's caused by stress, anxiety/worry, sleep deprivation, frustrations, marital conflicts and unhealthy life style leading to poor health. These are all amenable through soft skills and /counseling.

The Flow: Neurobiology of Excellence

Flow is emotional intelligence at its best harnessing emotions in the service of performance and learning. In flow the emotions are just not contained and channeled but energized and aligned with the task at hand. In this state, one is utterly absorbed in what one is doing paying undivided attention to the task. There are ways to enter flow by focusing sharp attention on a task at hand preferably one that slightly taxes their ability. Practicing meditation could also possibly help in getting into flow. Swami Vivekanand's phenomenal memory and sharp intellect could be attributed to his practicing meditation. When in flow difficult is made easy and the most challenging tasks are done with minimum expenditure of mental energy with lessening of cortical arousal. When the brain is operating at its peak efficiency as in flow (another word for trance?), there is a precise relationship between active areas in the brain and the demands of the task. In this state even hard work can be refreshing or replenishing rather than draining and tiring.

Intelligent Quotient (IQ) vs Emotional Quotient (EQ)

The brain related cognitive skills are controlled by IQ (Stanford-Benet scale) and non-cognitive skills (emotional factors) determines EQ. The IQ is widely accepted measure of intelligence that determines scholastic achievements. It has proved its worth and has been extensively used for the past eight decades. A high IQ guarantees your success in school while a high EQ guarantees your success in life. Studies by Prof F. Heckman, a Noble Laureate and founder President, School of Human Development Studies at the University of Chicago indicates that non-cognitive skills (*positivity, persistence, perseverance, diligence, ambition, zeal/enthusiasm and ability to concentrate*) determines professional excellence rather IQ. The more good news is that you can improve your EQ through training but not IQ . Soft skill development programmes concentrate on improving EQ. If high IQ personnel train and improve their EQ score they go through the roof.

The family: Panacea for success

In our study on excellence in science, 90.6 % respondents attributed their success to their happy family life. A happy family catalyses professional growth. Therefore it is important that there is a work-life balance. Workholism will prove counter productive in long run. For a happy family, the *Panch Sheel* (the five points) to remember are;

i. *Give quality time* to your family members . This includes outings and holidays. Playings with kids. Avoid taking work to home. Remember that family that eats together stays together.

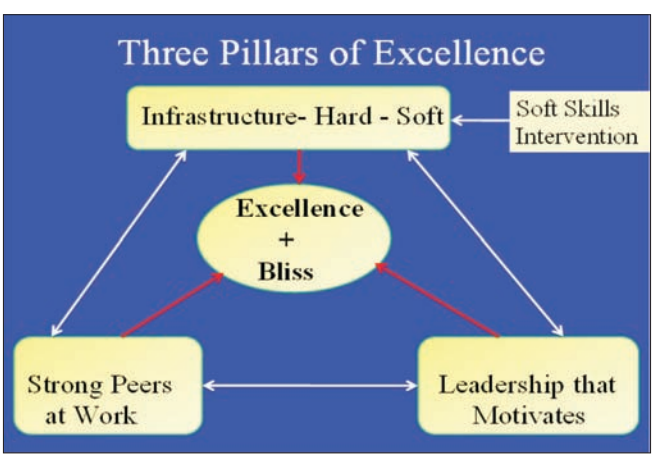
ii. *Take periodical breaks* to be with the family including long holidays visiting relatives, family friends, historical and religious destinations.

iii. *Mutual trust* is the key word. Mistrust is the major cause of family discord. More you trust less the chance of betrayal and if the trust is absolute betrayal is also ruled out absolutely.

iv. *Improve communication skills* as most hurt is caused due to bad communication and language. This will help you to avoid making a political statement later that "I never meant that" but the damage has been already done.

v. *Show your love and speak out*. Don't keep it in your heart say it. Small gestures go a long way in bonding. Don't say that it is not in our culture.

The corporate spend lot of funds on the training of the staff to hone their soft skills leading to increase productivity and profitability. However this has not caught the imagination of research / education institutions. A conceptual model involving interaction of the three components of excellence (hard and soft infrastructure + work force + leadership) is depicted below:



It is recommended that soft skills development programmes should be conducted on the lines it is done in corporate which will go a long way in improving productivity and attaining excellence. The course module may cover following topics:

How to attain excellence in science?

Session I

Excellence and happiness; How to be happy at work? ; The web of happiness-sorrow-success-excellence. Factors contributing to excellence; Physical fitness; Motivation- The driver for higher achievement; Improving visibility- Publication/ Art of articulation; De-toxing work life; overcoming work related stress.

Session 2

Striking a work-life balance; Group/Team work; Developing qualities for leading group; Making the group click; Role of creativity in science success; Building confidence and destroying fear; Time management

Improving work place and home environment for attaining excellence.

Session 3

Causes of reduced science out put; Fatigue as a factor bringing down productivity; daily energy plan for higher productivity; Mind diet; sleep and fatigue; combating stress; conquering worry; way to peace and happiness; anger/ hostility and its management; Dealing with difficult colleagues at work place

Session 4

Developing positive attitude; making work place environment driving to excellence; Using positive spiral for success; Handling relationship in a group; Science and solitude; The family : Panacea for success- Happy family catalyzing professional growth; Making home life happier; Dealing with work holism Problem of both spouse working ;The Epilogue; Three pillars of excellence;

Physical and Mental fitness for attaining excellence

Session 5

Fitness and why you need it; Fitness priorities ; Motivation for new life style; Reducing tension & learning to relax; Improving concentration & stamina; Mental gymming; Exercising the brain for enhancing cognitive faculties; The game: Comprehending visuals.

Each session may be of 50 min. duration with a a break of 10 min in between the sessions. The programme can be done in one day or half day on two successive days with the minimum dislocation of existing work schedule including teaching.

Awards and Honours

Prof Panjab Singh, President, National Academy of Agricultural Sciences and Chancellor, Rani Lakshmi Bai Central Agricultural University, Jhansi was conferred Doctor of Science *(honoris causa)* for his outstanding contribution in the field of agriculture by the Assam Agricultural University, Jorhat during its 21st Convocation held at the Jorhat campus on May 4, 2019.

Fellows Views

Biological Waste to Biomedical Wealth

Reconstruction of the total external ear in human being either congenital or acquired caused by malignancy, leprosy, post burn deformity remains one of the most difficult challenges in reconstructive surgery. The auricle and helix is of cosmetic importance to many patients even though this can be concealed by hair. Further, nose is one of the most important parts of face aesthetically, drawing attention when it is either attractive or ugly. Augmentation rhinoplasty is one of the most challenging procedures for plastic surgeons, especially when used to correct congenital large nasal dorsal defects such as saddle nose and flat nose and also some acquired deformities. The ideal implant material for use in nasal augmentation surgery remains controversial. It was hypothesized that surrounding a permanent implant with acellular animal choncal cartilage would encourage wound healing and prevent implant extrusion, especially in the potential event of implant exposure. Because of acellular nature of cartilage by chemical treatment and consequent biocompatibility testing, this may serve the necessity of bulk quantity as well as requisite shape as per need for correction of ear deformities and rhinoplasty in human patients. Accordingly, a low cost, safe, biocompatible animal cartilage for surgical implantation in human patient has been developed by Department of Veterinary Surgery and Radiology, West Bengal University of Animal and Fishery Sciences, Kolkata under a DBT funded project. The developed decellularized animal cartilage had been applied successfully in human rhinoplasty and microtia patients with effective outcome. The research work had tremendous outcome in human plastic and reconstructive surgery with a very low cost material and has societal benefits.

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Forthcoming Programmes

Topic	*Convener(s)*	*Proposed Date*
Brain Storming Session on Zero Budget Natural Farming	Dr H.S. Gupta	21.8.2019
Strategy Workshop on Tropical Wilt Race-4 in Banana Cultivation	Dr (Ms) Rashmi Agarwal / Dr R.K Jain	25.9.2019
Brain Storming Session on Big Data Analytics	Dr Rajender Parsad	10.10.2019
Strategy Workshop on Potential of Non-Bovine Milk	Dr M.S. Chauhan	11.10.2019
Brain Storming Session on Payment for Ecosystem Services	Dr P.S. Birthal	31.10.2019
Strategy Workshop on Food Borne Zoonotic Diseases	Dr A.K. Srivastava	21.11.2019
Brain Storming Session on Improving Livestock Through Artificial Insemination.	Dr A.K. Srivastava	6.12.2019
Strategy Workshop on Bio-fortification	Dr U.S. Singh	7.12.2019

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Obituaries

Dr Hari Krishan Jain

(1930 - 2019)

Born on 28 May, 1930 in Gurgaon, in the Indian state of Haryana, Dr Jain graduated with Hons in Botany from the University of Delhi in 1949 followed by an associateship from the Indian Agriculture Research Institute (IARI) in 1951. He pursued his doctoral studies at the Aberystwyth campus of the University College of Wales. He started his career as a cytologist at IARI in 1956 and worked there till his superannuation from service as Director in 1983. In 1984, he became associated with the International Service for National Agricultural Research of the Consultative Group for International Agricultural Research (CGIAR) where he served as the Deputy Director General. Later, he continued his academic life at Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur till he was appointed as the Chancellor of the Central Agricultural University, Imphal.

Dr Jain served as a member of the Scientific Advisory Committee (SAC-C) to the Government of India (1982–83) and the Uttar Pradesh State Planning Commission (1978–80) and chaired the Food and Agriculture Committee of the Bhabha Atomic Research Centre (1980–83), the Indian chapter of the Man and the Biosphere Programme of the UNESCO (1978–83) and had been a member of the advisory Committee on Biotechnology of the Department of Science and Technology (1982–83). He was elected as an Emeritus Scientist of the Council for Scientific and Industrial Research in 1993. He also served as the Vice President of the National Academy of Agricultural Sciences from 2009 to 2011.

Dr Jain received the Shanti Swarup Bhatnagar Prize for Science and Technology in 1966 for his contributions to biological sciences. The ICAR also awarded him the Rafi Ahmed Kidwai Award the next year. He was awarded the Padma Shri in 1981 and the Borlaug Award in 1982 besides several other prestigious laurels. Dr Jain was elected as a fellow of the Indian National Science Academy and the Indian Academy of Sciences, the National Academy of Sciences, India and the National Academy of Agricultural Sciences. The Indian Agricultural Research Institute and Central Agricultural University, Imphal honored him with the degree of Doctor of Science *(Honoris causa)*.

Dr H.K Jain breathed last on 8th April, 2019. In the demise of Dr Jain, the NAAS has lost an esteemed Fellow and an internationally famed agricultural scientist and acclaimed administrator. The entire Fellowship mourns his sad demise and pays homage to the departed soul.

Dr Soni Ram Poonia

(1942 - 2019)

Born in Rampura, Punjab, India on 1 October 1942, Dr Poonia was Educated at GV School Sangaria, Rajasthan 1955-60; SKN College of Agriculture, Jobner, Rajasthan, 1960-64; Punjab Agricultural University, Ludhiana/Hisar 1964-69; B.Sc. 1964; M.Sc. 1966; Ph.D. 1970. He started his professional journey as Assistant Professor, 1970-75 and subsequently served as Associate Professor 1975-80, ICAR National Fellow, 1980-83, Chief Scientist, Water Management/Professor 1983-92, Head of Soils Department, 1992-95, Dean College of Agriculture, 1997-2000, and ICAR Emeritus Scientist 2003-05 at CCS Haryana Agricultural University.

He was awarded the Rafi Ahmad Kidwai Memorial Prize Award in the year 1982-83 for his outstanding research contribution in the field of soil science. He was Fellow of NAAS and Indian Society of Soil Science. His research areas included Soil Chemistry, Agricultural Water Management, and Soil Pollution.

Dr Soni Ram Poonia breathed his last and left for heavenly abode on April 12, 2019. In the demise of Dr Poonia, the NAAS has lost an esteemed Fellow and an acclaimed agricultural scientist and administrator. The entire Fellowship mourns his sad demise and pays homage to the departed soul.

Editors: Dr V.K. Bhatia and Dr Kusumakar Sharma

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