NAAS NEWS

RESEARCH, EDUCATION AND TECHNOLOGY POLICY FORUM

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From the President's Desk

Agricultural Prices, Procurement Policy and Farmers Distress

Agriculture, an important sector of the Indian economy, plays a vital role in the society. Recently, instances of perishable produce like milk and tomatoes being dumped, unpaid bills for sugarcane, protest-walks by the farmers, all speak of the on-going desperation and distress of farming community. Farmers have been demanding *freedom from debt* and remunerative prices through several platforms. They carry on farming against all odds, fighting risks in production, weather and disasters, credit, market and above all a victim of inappropriate prices and procurement policies, the crucial factors behind the farmers' distress. Farmers face price uncertainties due to fluctuations in demand and supply owing to bumper or poor crop production and speculation and hoarding by traders. Ensuring remunerative prices to farmers and procurement of agricultural commodities by the government agencies are the two key government interventions which significantly impact farmers' income in India. Price policy for agricultural commodities seeks to ensure remunerative prices to the farmers for their produce with a view to encourage higher investment and production, and at the same time to achieve the balance between the interest of producers and consumers, besides control of cyclical and seasonal fluctuations of price rise to the minimum extent. The Minimum Support Price (MSP) announced by government is supposed to protect the farmers from selling their produce below MSP either due to exploitation by big market players or due to a bumper harvest by promoting growth and efficiency of farmers. It has been observed that procurement of food grains, particularly rice and wheat, has increased significantly over time in absolute terms. Despite the fact that the intensity of procurement as a proportion of total production has increased over years mainly to ensure availability of food grains for Public Distribution System (PDS), the farmers' income not only remained relatively low as compared to those in the non-farm sector, but also the disparity between farm and non-farm income widened over time. The reasons, among others, are cost of production inputs surpassing the produce prices and no assured procurement of produce. Therefore, in the wake of persisting agrarian crisis, the adequacy of the present agricultural price and procurement policy calls for reorientation and scrutiny.

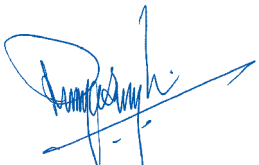
There is an ongoing debate on the effectiveness of MSP and procurement policy in raising the farmer's welfare in the country. The debate is getting intensified with farm prices of several commodities falling below their minimum support prices in 2016-17 and 2017-18 and farmers have been left to fend for themselves. Therefore, it needs to be understood that just announcing higher MSPs does not ensure higher price

realization by the farmers. Although, the Government of India announces MSPs for 23 commodities, its implementation is effective mainly for four crops: wheat, paddy, cotton (modestly) and sugarcane (for which mills are legally bound to buy cane from farmers at prices fixed by government). For other commodities, the announcement of MSPs is indicative and its implementation remains only on paper. There is a large regional variation in the extent of procurement of even paddy and wheat as the entire operation is concentrated in a few surplus states and efforts are restricted to a subset of farmers. About 90% of total wheat procurement comes from three states namely Punjab (42%), Madhya Pradesh (25%) and Haryana (23%) and 62% of paddy from four states namely Punjab (25%), Telangana (13%), Chhattisgarh (12%) and Andhra Pradesh (12%). In fact, farmers, in general, are not for MSP as the cost of production inputs has gone up at a faster pace than the MSP. It appears that the MSP in operation since 1965, has outlived its utility because it has neither proved effective nor economical; perhaps, it is time to move to some other mechanism like the much talked about 'price deficiency payment mechanism', in which the farmers will be directly paid the difference between MSP and the price they receive. Time only will tell the impact of the mechanism on the farming and the farmers, especially the small and marginal ones since much of the success and failure in our country is due to good or poor governance mechanism where, unfortunately, politics plays a dominating role. It is expected that this mechanism would prevent unwanted stock building (large part of which is only wasted for lack of storage and processing facilities) and provide price incentives to farmers in all the regions and crops considered important for MSP. No wonder, the Agricultural Situation Assessment Surveys show that most of the farmers in the country are not even aware of the existence of MSPs and there is considerable variation across states and regions.

Despite its limited reach, the agricultural policy has been partially responsible for rapidly increasing output of wheat and rice and has succeeded in alleviating food grain shortages. But simultaneously, the price policy in the last five decades has virtually distorted the cropping pattern between wheat and rice supplies on the one hand and rest of the crops on the other. It has also contributed in putting pressure on the scarce natural resources. The cultivation of rice in Punjab and Sugarcane in Maharashtra are examples of major paradox, where water intensive crops are being cultivated in the midst of water crisis. The above discussion brings forth one issue very clearly that ensuring remunerative prices to the farmers is critical but only the price support cannot be a panacea to overcome agrarian crisis and improve farmers' economic conditions. The Government has to look beyond price and procurement and focus on supply side constraints, thereby, removing the structural barriers, along with developing and strengthening infrastructure for sustainable agricultural growth in the country. It is worth mentioning that non-price factors, namely inputs, technology and institutions, play a fundamental and dominant role in agricultural growth. Therefore, structural reforms are critically needed in land, commodity and input markets. Land ceiling laws must be revisited and liberal land leasing laws must be enacted to promote contract farming. Similarly, the restrictions remaining on the domestic movement, storage and processing of agricultural commodities must go and barriers to the import of farm technology should be removed. Institutional arrangements such as Contract Farming, Farmers Producers' Organizations (FPOs), and Cooperatives by providing farmers easy access to markets, minimizing price risks, and reducing marketing and transaction costs, can play a pivotal role in enhancing the farmers' income. Consistency in agricultural trade policy and forward-looking approach for participation in the global agricultural market is also imperative. Along with these measures, the credit and investment in agriculture sector has to be continuously increased to enhance the farmers' income.

Further, it is also visualised that the agrarian stress is more prominent amongst marginal and small farmers because they lack economic, financial, infrastructure, education and skills capabilities, which are essential for boosting agricultural income. It is seen that one of the crucial causes of farmers' distress are the Agriculture Produce Marketing Committees (APMC) established to ensure that farmers are not exploited by intermediaries when they market their produce. The *Mandis* by these committees have achieved the opposite, they have become tainted by middle-men, colluding to fix auctions, charging double commissions from both farmers and purchasers, refusing to give the farmers the receipts they need to get bank loans, and benefitting from the restrictions placed on farmers' ability to sell their produce elsewhere. Realizing the *Mandi* problem, the Central Government last year passed a new less restrictive marketing act, which may serve as a model for State Governments to follow. Now the Cabinet has approved the setting up of the National Agriculture e-Market, a national *e-mandi*, to facilitate on-line trade, payments and receipts. They can establish efficient prices and should eliminate middlemen who collude to fix prices. But even if *e-mandis* spread rapidly, will they help the small and marginal farmers who are so often left behind? They already count for very little. When governments forgive loans, many of them do not benefit because they are in the hands of money-lenders, not banks. The marginal and small farmers are worst hit by lack of storage, they can't afford to mechanize, and receive little or no help in adapting to new technologies. There is a likelihood that they may again fall into the hands of middle-men who offer to represent them in the market. Thus, there is a need to make markets more flexible to handle even paltry amount of produce of small and marginal farmers without the help of middle men.

Another reason of distress among farmers is on account of Wholesale Price Index (WPI) for primary food items and manufactured food products. The WPI of primary food items is not growing enough to ensure adequate income to farmers. Recently, it is even seen that the difference in the annual growth of primary food items and manufactured food products is going down at a faster rate. This aspect needs to be studied from general marketing of the manufactured food products so that proper price of the primary food items can be ensured to the farmers at large. It is imperative to course correct the agriculture pricing and procurement policies including some of the Governments flagship schemes viz. Skill Development, Fasal Bima Yojna, Pradhan Mantri Krishi Sinchai Yojana, Soil Health Card, Rashtriya Krishi Vikas Yojana, National Food Security Mission etc. with active monitoring. Acknowledging farmers crisis and doubling or more of farmers income will improve the lives of about 70 million rural people and transform the framework of nation building. In my opinion there is no short cut and no other way to achieve holistic reforms in agriculture and tackle agrarian woes.



(Panjab Singh)

104th Executive Council Meeting

The 104th Executive Council (EC) meeting was held on June 4, 2018 in the Academy Secretariat. In this meeting, the Executive Council approved the minutes of 103rd meeting. The action taken report was deliberated and the progress was noted with satisfaction. The Executive Council expressed appreciation on the concept of Mentoring Scheme and Science Communication Strategy. The Council was informed that the Academy has written letters to the Vice-Chancellors of PAU, Ludhiana and AAU, Jorhat to implement these schemes on pilot scale. Regarding issue of NAAS Rating of Journals, the EC reiterated that the present guideline is to continue as stipulated for 3 years. It has also been agreed that the further course of action would be decided only after receiving the recommendations of the Journal Score Committee. The report of Committee constituted for framing Guidelines for Regional Chapters was discussed. The Committee took note of the number of Fellows in each region and their activities and recommended merging of some of the Regional Chapters and also creating some new Chapters to improve the visibility of the Academy. EC also approved the Annual Report 2017-18 of the Academy and the Audited Statement of Accounts for the year 2017-18 and recommended the appointment of M/s Virender K Gupta & Co., New Delhi as Auditor of the Academy for 2018-19. The President reviewed at length the arrangements being made by the Organizing Committee for organizing the XIV Agricultural Science Congress at New Delhi. It was also decided that, Dr R.A. Mashelkar, Former DG, CSIR may be approached to deliver Dr A.B. Joshi Memorial Lecture. Finally, the EC approved the Eligibility Criteria for Recognition Awards to make it open to all scientists as is being done for other Awards of the Academy. Executive Council also finalized the programmes for 2018.

Presentation by Newly Elected Fellows

The newly elected Fellows of the Academy made their presentations in the afternoon of June 4, 2018 in two sessions before the full house of Academy Fellowship. Dr C.D. Mayee, Vice President and Dr J.K. Jena, Secretary chaired and co-chaired the Session-I, respectively. In this session, 13 Fellows elected in the disciplines of Crop, Horticultural and Animal Sciences, one Pravasi and one Foreign Fellow made presentations of their work. The Fifteen Fellows under the disciplines of Fisheries, NRM, Plant Protection, Agricultural Engineering and Technology and Social Sciences presented their work in Session-II, which was chaired by Dr A.K. Srivastava, Vice President and co-chaired by Prof Anil K. Singh, Secretary. All the presentations generated lot of discussions and many valuable inputs were given to the presenters.

Newly elected Fellow presenting his work in First Session

Newly elected Fellow presenting her work in Second Session

Programmes Held

Annual General Body Meeting

The 25thAnnual General Body Meeting (AGM) of the Academy was convened on June 5, 2018 at 9.30 A.M. at A.P. Shinde Symposium Hall, NASC, New Delhi under the Chairmanship of the President of the Academy, and attended by 221 Fellows. The AGM was graced by Past Presidents including Prof V L Chopra and Prof R.B. Singh and a number of former senior peers and office bearers of the Academy. A 2-Minute silence was observed by the entire house prior to initiation of business, as a mark of respect in the memory of esteemed Fellows, namely, Dr Arun Kumar Sharma, Dr Lalji Singh,

Prof Panjab Singh welcoming the Fellowship assembled for AGM

NAAS Fellowship at AGM Meet

Dr Y.L. Nene and Dr B.R. Barwale, who left for their heavenly abode since last AGM held in 2017.

The President welcomed the esteemed Fellowship assembled for the AGM and conveyed felicitations on the World Environment Day being organized with the theme "*Beating Plastic Pollution*". He also welcomed all newly elected Fellowship and Associates to the Academy.

The meeting started with the presentation of Secretary's report by Dr J.K. Jena, Audit and Accounts report by Dr B.S. Dwivedi, Editors' report by Dr V.K. Bhatia, Foreign Secretary's report by Dr P.K. Joshi, and Action Taken Report by Prof Anil K. Singh. All these reports including Annual Report-2017-18 and Audited Accounts were accepted and adopted by the house after brief interaction by the Fellowship. The AGM also accorded its approval to some of the important decisions taken by EC that included appointment of new auditors, guidelines for Regional Chapters, organisation of XIV Agricultural Science Congress at Delhi in the year 2019, and change in the eligibility criteria of NAAS-Recognition Award. The Fellowship were also appraised about the salient recommendations of the NAAS Review Committee that was chaired by Dr C.R. Bhatia, Former, Secretary, DBT.

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

1. The newspapers and other print media often carry news about agriculture in the country that, at times, is unfounded and misleading. The Academy should respond to such news items appropriately and present a realistic picture, especially to enhance public awareness and remove any apprehensions.
2. The Academy needs to give attention to start-ups in agriculture. There are 62 start-ups in agriculture at national level. In order to highlight the initiative, it was suggested that a session on start-ups may be included in the forthcoming XIV-ASC.
3. Globally, 5th June is celebrated as World Environment Day, which coincides with AGM of NAAS. Therefore, it will be befitting tribute to environment awareness if NAAS also plan some special activity as a part of the AGM programmes. The President may pledge Fellowship on Foundation/Environment day to restore/ sustain environment.
4. A concern was expressed over the number of Fellowship nominations from North-east states that remain very low, despite a large number of universities and research institutions located in the region.
5. A suggestion was made by Fellowship to raise the number of Fellowship in the NRM section from 5 to 7. Regarding the criteria to elect new Fellows, a careful evaluation was needed to see that the papers are relevant to agricultural research.
6. It was suggested that the Academy should look into some of the important issues such as: Rising number of stray male animals that are now invading the crop fields; Need to make agricultural education more skill oriented; Develop a science based formula for fixation of MSP of major food crops; Academy's view on the Model Act of Contract Farming, and farm loan waivers that are running into thousands of crores. Recognizing the role of organised agricultural markets to boost farmers' income, Agriculture Market Revolution was suggested as a theme for XV ASC.

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:

Newly elected Pravasi Fellow receiving Fellowship Certificate from the President

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, the

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:

Crop Sciences

1. Dr Girdhar Kumar Pandey
2. Dr Sharat Kumar Pradhan
3. Dr S.V. Sai Prasad
4. Dr Brij Bhuwan Singh
5. Dr Vinod
6. Dr Chinnusamy Viswanathan

Horticultural Sciences

7. Dr Sudhakar Pandey
8. Dr A.T. Sadashiva
9. Dr Sanjay Kumar Singh

Animal Sciences

10. Dr Rajan Sharma
11. Dr Putan Singh
12. Dr Ram Ran Bijoy Singh

Fisheries Sciences

13. Dr Kajal Chakraborty
14. Dr Joseph Selvin

NRM Sciences

15. Dr P.C. Abhilash
16. Dr Siba Prasad Datta
17. Dr R. Dinesh
18. Dr Vinod Kumar Singh
19. Prof I.S. Thakur

Plant Protection

20. Dr Dharam Pal Abrol
21. Dr S.C. Bhardwaj
22. Dr Nawal Kishore Dubey
23. Dr P.D. Kamala Jayanthi

Agricultural Engineering & Technology

24. Dr Navin Kumar Rastogi
25. Prof Virendra Kumar Tewari

Social Sciences

26. Dr (Ms.) Seema Jaggi
27. Dr R.K. Paul

Pravasi Fellows

28. Dr S.C. Babu
29. Dr R.K. Singh

Foreign Fellows

30. Dr Andreas Graner

Newly elected Foreign Fellow receiving Fellowship Certificate from the President

Dr Samit Kumar Nandi as Fellow and Dr Govindjee as Pravasi Fellow were admitted *in absentia.*

The President also presented certificates to the following newly elected Associates:

Associates

1. Dr P.V. Behare
2. Dr Vishnu Kumar
3. Dr G.P. Mishra
4. Dr J.K. Tiwari
5. Dr S.K. Upadhyay
6. Dr V.K. Vikas

Institutional Membership:

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

i) Rani Lakshmi Bai Central Agricultural University, Jhansi.
ii) Assam Agricultural University, Jorhat.
iii) Central Agricultural University, Imphal.
iv) Indira Gandhi Krishi Vishwa Vidyalaya, Raipur.

Presidential Address

Prof Panjab Singh, President, NAAS delivered the Presidential Address on "Agriculture: The Driver of Inclusive Growth". In his address, he dwelt on the contribution of agriculture at the national level in providing food, nutritional and livelihood security to millions of farming families, accounting for 17% of the Gross Value Added, 12% of the national exports and engaging over 50% of the national workforce. Prof Singh emphasized that technology and investments in R&D are main drivers of agricultural growth and that the returns to investment in agriculture are among the highest. He called for better infrastructure, technologies and markets to promote food

Prof Panjab Singh, President, NAAS delivering Presidential Address during AGM

processing, product development and value addition of the farm produce. He deliberated on the need to enhance investment to the level of atleast 1% of AgGDP in the immediate future to meet ever increasing national food demand and also to improve farmers' income. President highlighted some of the priority areas for investments in Agriculture Research and Development (AR&D) as under:

- A distinct focus on conservation of natural resources:
  - Rain water management wherein every drop of water has to be saved. It is now not uncommon to see that the areas that witness floods also are faced with drought like situations soon after the receding of floods. Water will be the most limiting factor in agriculture. Therefore, water storage and conservation, recharge of ground water, and water bodies have to be given top priority.
  - Soil health management will be crucial and it will be a major challenge to sustain the fertility and production potential of the soils.
  - Biodiversity conservation and utilization-in all forms, floral, faunal and microbial.
- Promotion of rain fed and dry land agriculture through technological interventions on more than 50 per cent of the rain dependent agricultural lands. Integrated farming with emphasis on livestock component is desirable.
- Climate change will have far reaching consequences for agriculture and therefore, adaption and mitigation approach to combat the problem needs emphasis.
- Diversification, involving crop, horticultural, livestock and fisheries, for sustainable growth and also minimising the risk arising out of climate change effect.
- Processing and value addition to produce for enhancing farmer's income and reducing post-harvest losses at farm level.
- Research on modern tools and technologies viz. precision farming, biotechnology, nano-technology, novel fertilizers, microbe-based interventions, mobile-based apps (ICT), weather forecast at sub-block level etc. need to be used in promoting agriculture.
- Enhancing use of Drones, Robotics, Space technology, ICTs and Artificial Intelligence (AI) applications in agriculture.
- Improving advisory services and forecast and forewarning systems especially to regulate farm production and avoid distress sales.
- Pricing mechanism for farm produce and prior price announcement and sale of produce through network of e-markets and other village level markets.
- Higher investment in agriculture R&D to generate advanced technologies and meet the food challenges of the future growing population

He underscored the paradoxical situation in the country having enough food production, food availability, accessibility, markets and consumption, but, the producer of food is in distress. There is no other industry where the production units run into losses when the market environment is favourable. He requested the Fellowship and all stakeholders to seriously think and analyse the situation and suggest remedial steps to make farming more remunerative. He cautioned that knee jerk reactions will not take the country anywhere**.** He was of the view to adopt a holistic approach to address the various problems and issues from production to consumption by involving all stakeholders simultaneously and not one after the other. He concluded that Indian agriculture is characterized by a very vast agro-ecological diversity in terms of natural endowments, rainfall, land forms, soils, climate, biodiversity, socio-economic levels of farming communities, etc. and therefore, "one size fits all" approach cannot work and each situation has to be dealt with separately and comprehensively. The Address was circulated among the Fellowship / Associateship and widely appreciated.

Foundation Day Lecture

Mr Erik Solheim, Executive Director, United Nations Environment delivered the Foundation Day Lecture on *The Future of Food and Farming: Ideas for a Changing World* in the afternoon of June 5, 2018. He highlighted the need for urgent action in the global food system to make it sustainable whilst adapting to climate change to satisfy growing world population as critical resources such as water, energy and land become increasingly scarce. He emphasized to redouble efforts to address hunger, which continues to affect a large population worldwide. He was

Mr Erik Solheim, Executive Director, United Nations Environment delivering Foundation Day Lecture

of the view that deciding how to balance the competing pressures and demands on the global food system, is a major task facing policy makers. He made a strong case for governments, the private sector and civil society to continue to prioritise global food security, sustainable agricultural production, reform of trade and subsidy, waste reduction and sustainable consumption. He concluded that many challenges facing farming and food will require decision-making that is fully integrated across a diverse range of policy areas which are all too often considered in isolation, and for action to be based on sound evidence.

Activities of Regional Chapters

Inauguration of NAAS-Varanasi Chapter

Inaguration of NAAS-Varanasi Chapter

Prof Panjab Singh, President, NAAS with Dr A.K. Srivastava, Vice-President, NAAS inaugurated the office of NAAS-Varanasi Chapter on 2nd May 2018 located in the campus of ICAR-Indian Institute of Vegetable Research, Varanasi. The NAAS-Regional Varanasi Chapter will have parts of Eastern and Western U.P. and Bundelkhand. The inaugural function marked the presence of several eminent NAAS fellows and scientists like Dr Kirti Singh, Former Chairman, ASRB, New Delhi, Prof Ram Badan Singh, Former President, NAAS, Dr Gautam Kalloo, Former Vice Chancellor, JNKVV, Jabalpur, and Dr I.S. Solanki, ADG, ICAR, New Delhi.

In his inaugural address, Prof Panjab Singh, President, NAAS emphasised on the need for development of entrepreneurship and investment from the private sector in agriculture for opening better opportunities for the farmers and achieve the target to increase their income. He expressed confidence that NAAS-Varanasi Chapter would be helpful as a bridge between researchers and the farmers. In this context, he cited the example of FAARD Foundation which helped in registration of 12 Farmers Producer Cooperatives engaged in dairy farming, milk processing, vegetable farming and marketing in eastern U.P. to ensure better price for their produce.

Dr A.K. Srivastava, Vice President, NAAS in his address highlighted the main objective of NAAS Regional Chapter at Varanasi being to identify the farmers' problems in the region, and to offer science led solutions by organizing need based programmes for different stakeholders.

Prof R.B. Singh, Former President, NAAS; Dr Kirti Singh, Former Chairman, ASRB, New Delhi; Dr Gautam Kalloo, Former Vice Chancellor, JNKVV, Jabalpur, and Dr I.S. Solanki, ADG, ICAR, New Delhi also addressed the gathering.

The regional chapter also organized Kisan Kalyaan Divas to mark the inauguration under the aegis of Gram Swaraj "Sabka-Sath, Sabka-Gaon, Sabka-Vikash" which was attended by scientists of ICAR-IIVR, Varanasi, BHU, 50 farmers of this region and 5 representatives of FPOs.

Dr Bijendra Singh, Director, ICAR-IIVR, Varanasi and Convener, NAAS, Varanasi Chapter welcomed and thanked all dignitaries, scientists, Fellows and farmers present during this function and briefed about the achievements of the institute.

Haryana Regional Chapter, Karnal

Haryana Regional Chapter of NAAS at Karnal organized an invited lecture by Dr P.S. Birthal, ICAR-National Professor, ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi on 19th September 2017 at NDRI campus, Karnal on "**Economic Viability in Indian Agriculture: Challenges and Perspectives".** The session was attended by more than 100 participants including Directors of ICAR institutes, NAAS Fellows and Associates, Scientists, Research Associates, Research Fellows and Students. Dr A.K. Mohanty, Principal Scientist, NDRI and Treasurer, Haryana Regional Chapter welcomed the delegates. Dr M.L. Madan, Convener of Haryana Regional Chapter, NAAS in his brief remarks highlighted the importance of economics in Agriculture. Dr Birthal delineated various factors like declining size

of landholdings, rising cost of production, increasing frequency of extreme climatic events and poor prospects of employment outside agriculture responsible for farmers' distress, despite the fact that agriculture supports more than half of the population in India. He welcomed the move to double farmers' income and stress given to agriculture by Government of India in its two consecutive budgets of 2016-17 and 2017-18 in the wake of growing agrarian distress, which may disturb socio-political equilibrium and nation's food security.

Prof Birthal also covered the economic viability in terms of output of land, labour, efficient use of resources and cost benefits for farm/farmers, besides policy choices and different ways to enhance the farmer's income and profitability. Dr M.L. Madan, Convener of NAAS, Haryana Regional Chapter, Karnal in his concluding remarks discussed about the micro and macro agricultural economy and explained that viability of farm operations will be maintained by a harmonious connection between consumer and producer. He stressed on the utilization of natural and other resources in a balanced way to achieve the target of economic upliftment of the farming community.

Dr A.K. Mohanty, Treasurer and local Secretary extended a vote of thanks to the chair and participants.

Brainstorming Sessions

Strategic Workshop on "Harnessing Full Potential of A1 and A2 Milk in India" (Convener: Dr A.K. Srivastava)

Brainstorming Session on Harnessing Full Potential of A1 and A2 Milk in India, in progress

The Academy organized one day Strategic Workshop on "Harnessing full potential of A1 and A2 milk in India" at NAAS complex, New Delhi on 19th May 2018. On behalf of NAAS, Dr Anil Kumar Srivastava, Vice President of NAAS and Chairman, Agricultural Scientists Recruitment Board (ASRB), convened the strategic workshop to have an in-depth discussion on this issue among various stakeholders, and to devise a framework and strategy for deciding a future road map on A1 and A2 milk in India. The workshop was chaired by Prof Panjab Singh, President, NAAS and Co-chaired by Prof R.B. Singh, Former President NAAS. More than 70 eminent scientists, policy makers and peer groups, industry, NGOs and social activists from various organization involving NAAS, ICAR, SAUs, Department of Animal Husbandry, Indian Dairy Association, BAIF, AMUL and NGOs dealing with promotion of indigenous milk participated in the Workshop. Notable among the participants were Prof P.K. Uppal, Former Advisor, Govt of Punjab; Dr G.S. Rajorhia, President, IDA; Dr Girish Sohani, President of BAIF; Dr M.L. Madan, Former DDG, ICAR; Dr M.P. Yadav, Former Director, IVRI; Dr A.K. Mishra, VC, GBPUA & T, Pantnagar; Dr Gurdial Singh, VC, LUVAS, Hisar; Dr C. Vasudevappa, VC, NIFTEM, Sonepat; Dr A.M. Paturkar, VC, MAFSU, Nagpur; Dr C. Anandharamakrishnan, Director, IIFPT, Thanjavur; Dr Rameswar Singh, VC, BASU, Patna; Dr Kusumakar Sharma, Former ADG, ICAR; Dr Inderjeet Singh, Director, CIRB, Hisar; Dr R.R.B. Singh, Director, NDRI, Karnal and Dr M.S. Chauhan, Director, CIRG, Makhdoom.

The workshop involved nine scheduled presentations by invited scientific experts working in the relevant areas followed by views of individual participants on A1 and A2 milk. At the outset, Dr A.K. Srivastava, Chairman ASRB and Convener of the Workshop flagged the issue with his presentation on *Genesis of the concept of A1 and A2 milk*. He apprised the participants giving a comprehensive overview of various facets of A1 and A2 milk. In his presentation, Dr Srivastava informed the house that there are more than 800 breeds of cattle (*Bos taurus* and *Bos indicus*) in the world. Domestication of cattle took place 10000 years ago and in the beginning, all milk was A2 type. Later the genetic mutation took place in A2 milk around 8000 years ago leading to generation of A1 beta casein genetic variant in cattle that produced A1 type milk. In the late 90s, due to cross breeding of indigenous cattle (*Bos indicus*) with *Bos taurus* in India, introgression of A1 allele took place in the crossbred cattle. Although A1 and A2 beta casein variants were known for last 25 years, its significance was not known till 1993. Implications of A1 and A2 milk on human health were reported by researchers from New Zealand in the year 1993 while studying the incidence of Type 1 diabetes. Dr Srivastava also detailed the mechanism of action of BCM7 and how its opioid effect may influence human health. Subsequently, the presentations by invited speakers were held that included *Demographic pattern of beta casein variants in India in terms of A1 and A2 milk* by Dr Monika Sodhi, Principal Scientist, NBAGR, Karnal; *Health and nutritional attributes of A1 and A2 milk* by Dr Ashok K. Kale, Professor, Ulhas Patil Medical College, Jalgaon, Pune; *Impact of A1 and A2 milk on health* by Dr Y.S. Rajput, Emeritus Scientist, NDRI, Karnal; *Myths and*

facts about A1 and A2 milk by Dr Narayan Hegde, Trustee, BAIF, India; *Genomic methods for analysis of A1 and A2 milk*' by Dr S. De, Principal Scientist, NDRI, Karnal; *Protein based methods for analysis of A1 and A2 milk* by Dr A. K. Mohanty, Principal Scientist, NDRI, Karnal; and *Strategy for animal breeding in India with special reference to A1 and A2 milk* by Dr D.K. Sadana, Ex-Principal Scientist, NBAGR, Karnal. The speakers presented the overall views on recent advances in the respective areas of their presentation. After the presentations by various speakers, Prof Panjab Singh, President, NAAS in his brief remarks expressed full satisfaction and complimented the speakers for their very well structured and informative presentations. He suggested that the proposed strategy paper must include all science based information on implications of A1 and A2 milk and invited suggestions of various participants to express their perceptions and views. Majority of the participants were of the opinion that in-depth research needs to be undertaken to ascertain the myths and facts associated with the effect of A1 and A2 milk on human health in India. Prof R.B. Singh, Past President, NAAS, in his remarks appreciated the efforts of the organizers for making the workshop a success with highly structured presentations and very valuable suggestions and views given by the participants. He also suggested that while the perceptions on A1 and A2 milk need the attention of every one, all socio-economic factors need to be put together including strategies involved in humanizing the science. He was of the view that accelerated genetic improvement of indigenous cattle should be focused with far greater investment in research. Prof Panjab Singh, President, NAAS in his concluding remarks stressed the need to carry out research about the various implications of A1 and A2 milk on human health, besides a strategy paper need to be brought out on behalf of NAAS with detailed information on the on-going research on A1 and A2 milk worldwide and strategies that India should follow in future. The workshop concluded with vote of thanks to the chair and the learned participants.

Strategic Workshop on "Rumen Microbiome and Amelioration of Methane Production" (Convener: Prof D.N. Kamra)

Brainstorming Session on Rumen Microbiome and Amelioration of Methane Production, in progress

NAAS organized a strategic workshop on "Rumen Microbiome and Amelioration of Methane Production" on June 25, 2018 under the Chairmanship of Prof Panjab Singh, President, NAAS. The meeting was attended by 19 Scientists/Professors including Dr Anil Kumar Srivastava, Vice President of NAAS and Chairman, ASRB; Prof R.B. Singh, Former President, NAAS; Dr Rameswar Singh, VC, BASU, Patna; Dr B. Prakash, ADG (ANP), ICAR; Dr Kusumakar Sharma, Former ADG, ICAR and Dr Raghvendra Bhatta, Director, NIANP, Bengaluru. Prof D.N. Kamra, Former ICAR-National Professor and Convener of the workshop welcomed the participants and delineated the importance of the strategic workshop in the wake of growing concern over the contribution of ruminants to methane emission. He also expressed the urgent need for enhancing the extraction of energy from lignified crop residues through rumen manipulation for a more profitable and green livestock production. Three lead papers on microbial diversity, methanogenesis and metagenomics of the rumen were presented. The microbiome of cattle and buffalo indicated that with conventional techniques, the microbial diversity was much lower as compared to that by metagenomic technique. Methane production from livestock in India varies widely from 7.25-18.4 Tg per year. Various states were responsible for different levels of methane depending upon the number and type of animals. It was appraised that a large number of feed additives like e.g. methane analogues, antibiotics, inophores, unsaturated fatty acids and inorganic terminal electron acceptors like sulphate, formate, nitrate etc. have potential to inhibit methanogenesis, but majority of them are either toxic for animals or to the microbes responsible for methanogenesis. However, plants like *Bergenia crassifolia, Emblica officinalis, Peltiphyllum peltatum, Populus deltoides, Quercus incana, Rheum undulatum, Terminalia belerica, Terminalia chebula,* phyto-leaves such as Som and Jamun *Allium sativum, Coriandrum sativum, Eucalyptus globulus, Foeniculum vulgare, Mentha piperita, Ocimum sanctum, Populus deltoides* and *Syzygium aromaticum* contain secondary metabolites (tannins, saponins, alkaloids, essential oils etc.) that have anti-methanogenic activity. Among more than 100 plants containing secondary metabolites, only about 50% of the plants have a potential to inhibit *in vitro* as well as *in vivo* methane emission by the rumen microbes. Although plant secondary metabolites are effective against methane emission and protozoa growth in the rumen, but some of them also have adverse effects on feed degradability and nutrient utilization by the ruminants. Inter-species/breed differences were also reported between the microbiome of the animals. It was hypothesized that more H_2 production contributed to higher methane emission in cattle/buffalo as compared to yak. Even in cattle and buffalo there are high and low producers of methane. It was also reported that a non- methanogen, tammar wallaby *(Macropus eugenii*) harbours unique gut bacteria that produces only one-fifth of methane produced by cattle.

It was observed during the discussion that in last three decades the status of knowledge of rumen microbiology has changed dramatically with the discovery of anaerobic fungi, new genera of archaea and ruminophages. However, work on these organisms is still limited as only a handful of laboratories are venturing into this area worldwide. It was apparent from the research findings that Rumen Microbiome does not work in isolation and largely dependent on feed resources, climate and genetic make-up of the animal. Therefore, a standard operating procedure needs to be developed to conduct experiments and compare database. It was felt that Rumen microbiology needs to be an integral part of animal nutrition research. Therefore, it is necessary to reorient the PG syllabus of Animal Nutrition for greater exposure to students.

Prof Panjab Singh, President, NAAS in his concluding remarks observed that research on Rumen Microbiome and mitigation of methane production must contribute to the mission for effective utilization of lignified plants and production of animal protein with lesser effect on climate. He advised for an expanded research agenda to make economic exploitation of enormous diversity of rumen microbes for improvement in health and productivity of animals and to bridge the gap between the meta-genomic data generated for various livestock species and its functional application for better feed conversion by the animals. The workshop was concluded with a vote of thanks to the Chair and distinguished participants by Dr Raghavendra Bhatta, Director, NIANP and Co-Convener.

5th Meeting of GTWG-SA Validation Workshop of TIFAC

The Global Technology Watch Group-Sustainable Agriculture (GTWG–SA) Validation Workshop under the aegis of Technology Information Forecasting and Assessment Council (TIFAC) was organised jointly by National Academy of Agricultural Sciences (NAAS), New Delhi on 5th April, 2018. Prof Panjab Singh, President, NAAS welcomed Dr Anil Kakodkar, Chairman, TIFAC, Dr Prabhat Ranjan, ED, TIFAC and all esteemed NAAS Fellows to the Validation Workshop. He highlighted the issues related to Climate Change and its effect on sustainable agriculture in India and emphasized on the need for advanced and innovative technologies to tackle the associated problems. Dr Prabhat Ranjan shared his views on the project Technology Needs Assessment (TNA) and Global Technology Watch Group (GTWG) on climate change being implemented by TIFAC. He also stressed the need for advanced technologies such as artificial meat or cellular agriculture, vertical farming, sensor based technologies in future to reduce GHG emission and water consumption in agriculture sector. Dr Akhilesh Gupta, Scientist G/Advisor, DST appreciated the work done by TIFAC and successfully implementing the project. He was of the view that cost is a major barrier in the selection and implementation of technologies in India. He opined that agriculture, being a key sector in India for a large population, has to be more focused.

Dr Anil Kakodkar, Chairman, TIFAC shared his valuable thoughts with participants and mentioned that current farming practices may constrain sustainability in agriculture. He emphasized on the role of technology in agriculture sector for solving India specific problems in a time bound manner and dwelt on various issues/barriers like social, psychological, financial, risk management etc. confronting agriculture sector. Dr Kakodkar mentioned that feedback mechanism is an important tool for better improvement and time bound results, if leveraged by technology. He also cautioned that although biomass residue availability and production are showing upward trend, but no new agriculture residue processing plants are coming up in India. Dr Kakodkar flagged some of the potential areas for intervention such as application of solar energy/solar panel, solar pumps and use of saline water for better crop production and need of 'Climate Proofing' due to increasing frequency of extreme weather events. Subsequently Dr T. Mohapatra, DG, ICAR and Secretary, DARE who joined the workshop, appreciated TIFAC's initiatives in the area of climate change and hailed the support of NAAS by joining hands with TIFAC in organizing the workshop. Dr Mohapatra emphasized that with the help of proper crop management strategy and appropriate technologies, the emissions and pollution can be reduced. He stressed on the need for adaptation and use of energy on sustainability scale in agriculture sector. In this context, he highlighted the use of solar pumps to run heavy machines used in agriculture, energy production from agriculture waste, proper use of water and fertilizer, need of proper policy and compensation issues. He called for promotion of zero budget natural farming (organic farming), technology vulnerability assessment on regular time interval, climate resilience villages, furtherance of Krishi Vigyan Kendra, Inter department coordination system as important components of sustainable agriculture. Dr Gautam Goswami, PI, GTWG project mentioned that while scouting technologies, it was decided that besides climate change, sustainable livelihood component will also be taken into account so that climate change vulnerability is reduced. Later, Dr Himanshu Pathak, Chairman GTWG- Sustainable Agriculture group made a detailed presentation on the findings of the GTWG–SA group under various sub-sectors identified under agriculture including livestock, animal husbandry and fisheries. In response, detailed discussions were held where-in esteemed NAAS Fellowship actively participated and provided their valuable comments and suggestions. The summary of discussion points that emerged include multiple stress (flood, draught, salinity), non-conventional innovative technologies like drone for site specific application, use of biosensors for feed management, solar power for machineries, zero budget natural farming, microbial tools for methane mitigation from ruminants and from rice fields, vertical farming, inter-departmental coordination technology for salinity control, technologies for agricultural waste utilization, translation

from research to commercial technologies, capacity building, resource management, mapping of grasslands, crop improvement for better digestibility of residues to reduce methane emissions from livestock, semen sexing, productive biotechnology or cloning, use of crop residues for energy generation, water use efficiency, post harvest technology and reducing drudgery, development of quality and robust farm machinery, application of remote sensing technologies, prevention of residue burning. Prof Panjab Singh thanked all the participants, especially Dr Anil Kakodkar and appreciated the GTWG-SA groups work under the Chairmanship of Dr Himanshu Pathak. The workshop ended with thanks to chair and all the participants.

Awards & Honours

Honourable President of India, Shri Ram Nath Kovind Ji, presented Visitor's Award for Technology Development, 2018 to NAAS Fellow, Prof Ashwani Pareek, Jawaharlal Nehru University, New Delhi for developing Stress Tolerant Rice of the Next Generation (STRONG) that has the potential to enhance the income of rice farmers.

Dr CD Mayee, Vice President of the Academy and the President, South Asia Biotechnology Centre was bestowed with the Padma Bhushan Dr Karmaveer Bhaurao Patil National Award on the death anniversary of Dr Karmaveer Bhaurao Patil for his exemplary work in agriculture research and development. Dr Mayee received the award from former Union Agriculture Minister, Shri Sharad Pawar in the presence of Mrs Surpiya Sule, Mrs Hema Charudatta Mayee, Shri Ajit Pawar, Dr Anil Patil, Dr Bhausaheb Karale and other renowned educationists at Rayat Shikshan Sanstha, Satara on 9th May 2018.

Fellows Views

A New Initiative in Soil Carbon Research

Recent limited research suggests that even in the abundant presence of crystalline clay minerals, poorly crystalline allophanic materials (Fe and Al oxide minerals) cause much better SOC enrichment when soils are acidic, soil clays are hydroxy interlayered, and their clay surface area is decreased. Thus, a new research initiative is necessary to highlight the role of non-crystalline minerals and their presence in layer silicate minerals in SOC enrichment. The new knowledge on factors of OC sequestration may help in evolving novel land use protocols that would enhance the SOC status of the OC impoverished arid and semi-arid soils of the country. The expected novel land use systems can possibly be considered as a good/recommended/no regrets strategy as it would have potential to mitigate the adverse effect of climate change.

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Forthcoming Programmes

- Strategy Workshop on 'Management of Transboundary Movement of Pathogen and Pests' (Convener: Dr R.K. Jain)
- Status paper on 'Saving the Harvest' (Convener: Prof Anupam Varma)
- Strategy Workshop on 'Renewable Energy : A New Paradigm for Growth in Agriculture' (Convener: Dr O P Yadav)
- Strategy Workshop on 'Development and Adoption of Novel Fertilizer Materials' (Convener: Dr (Mrs) C. Varadachari)
- Policy Brief on 'Need for Uniform Policy on Fish Disease Diagnosis and Quarantine' (Convener: Dr P.K. Sahoo)

Change of Addresses

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Announcements

The NAAS in collaboration with the ICAR and IARI will be organising XIV Agricultural Science Congress (ASC) in New Delhi from February 20-23, 2019 on the theme "Innovations for Agricultural Transformation". The four day event will include technical sessions, plenary sessions, public lectures, farmers' sessions, poster presentations, inter-university student elocution contest, panel discussions and number of satellite meetings. The details are given on Congress web site http://www.14agricongress2019.in

Obituary

Prof (Dr) H.Y. Mohan Ram (1930-2018)

Professor Holenarasipur Yoganarasimham Mohan Ram, was born in Mysore, Karnataka, India on 24th September, 1930. He got his education at Saradavilas High School Mysore, 1941-46, Intermediate College, Mysore, 1946-48. St. Philomena College, Mysore, 1948-50, B R College, Agra, 1951-53, University of Delhi, 1953-59.

He started his career as Demonstrator in Botany, St. Philomena College, Mysore, 1950-51 and later served as Lecturer, 1953-61; Fullbright and Smith-Mundt Fellow, 1958-59; Research Associate, 1959-60, Cornell University, Ithaca, New York, USA; Reader, 1961-68 and Professor, 1968-95, University of Delhi; UNESCO-UNDP Senior Fellow, Gif-Sur Yvette, France 1970-71; UGC National Lecturer 1980; INSA Senior Scientist, 1996-2001; INSA Honorary Scientist, 2006-2010; INSA Jawarharlal Nehru Birth Centenary Visiting Fellowship, 1997.

Prof Mohan Ram was an unassuming botanist and an extremely thoughtful, hard working teacher fascinated by nature. His scientific contributions in botany have been profound with over 200 research papers besides several books he edited and a large number of PhD students whom he guided. An authority on tissue culture, Prof Mohan Ram researched on a wide range of subjects such as endosperm and its growth and culture, modification of flower sex expression in plants using plant growth regulators, physiology of inflorescences of lupine, gladiolus, chrysanthemum, calendula, marigold and flowers of carnation etc. Notable among his works was tissue culture and its application in some of the economically important species such as banana, legumes and bamboo. Today banana plants are being cloned through plant tissue culture and this is one of the most successful scientific achievements from India.

Prof Mohan Ram was the recipient of J C Bose Award, 1979; Om Prakash Bhasin Award, 1986; Sergei Nawashin Medal, USSR 1990; ISCA Birbal Sahni Birth Centenary Medal, 2001; Asiatic Society Gregor Johannes Bruhl Medal, 2002; ISCA Jawaharlal Nehru Birth Centenary Award, 2004; Vasvik Award, 2008; Aryabhata Medal, 2009; Indian Botanical Society Lifetime Achievement Award, 2012.

He was fellow of several professional societies and academies like Indian National Science Academy, 1979; Indian Academy of Sciences,1988; National Academy of Sciences, Indian Botanical Society and National Academy of Agricultural Sciences.1991.

Prof Mohan Ram was a great humanist with varied interest, beyond his first two loves - botany and his fellow researcher Manasi Ghosh whom he had married. Prof Mohan Ram breathed last on June 18, 2018. His death was received with shock and despair among his array of friends, students and other colleagues. In the demise of Prof Mohan Ram, the NAAS has lost an esteemed Fellow and an internationally famed botanist. The entire Fellowship mourns his demise and pays homage to the departed soul.

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

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