



डा. एस. अय्यप्पन

सचिव एवं महानिदेशक

Dr. S. AYYAPPAN

SECRETARY & DIRECTOR GENERAL

ICAR

@ 85

भारत सरकार
कृषि अनुसंधान और शिक्षा विभाग एवं
भारतीय कृषि अनुसंधान परिषद
कृषि मंत्रालय, कृषि भवन, नई दिल्ली 110 001

GOVERNMENT OF INDIA
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION
AND
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D.O. No. Secy. (DARE) & DG (ICAR)/2013/
Dated the 30th December, 2013

Dear Colleague,

Greetings to You and Your Family for a Happy, Innovative, Productive and a Prosperous New Year, 2014.

The year, 2013 is ending on a satisfactory note for Indian agriculture with a good monsoon, bright forecasts in the *kharif* and hopeful harvests in the *rabi* seasons. It was also a difficult time to address disasters ranging from landslides in Uttarakhand to repeated cyclones on the east coast, as also erratic monsoon and rainfall in the north eastern India, that were dealt with due alertness and the power of technologies. The good news is that the Economic Outlook 2013-14, released by the Economic Advisory Council to the Prime Minister, has shown 4.8 percent growth in the agriculture sector up from 1.9 percent, during 2012-13, contributing to an appreciable growth rate of the Indian economy.

Our Institutions continued to generate cost-effective farm technologies that are making a positive impact on the productivity and quality of farm produce. More than one hundred improved varieties/hybrids of different crops with potential for higher yields and enhanced tolerance/resistance to various forms of stress were released for diverse agro-ecological regions of the country. Rice varieties such as *Pusa Punjab Basmati 1509* with moderate resistance to leaf blast and brown spot diseases; HD 3059, a wheat variety resistant to all three rusts, including stem rust race Ug99; and bacterial-wilt resistant tomato variety, *Arka Rakshak* yielding over 90 tonnes/ha have brought cheers to the farmers. The NARS institutions produced over 11,835 tonnes of breeder seeds and 5,237 tonnes of quality planting material of major food and horticultural crops for faster spread of improved varieties. Crossbred pig (H₅₀G₅₀: *Hampshire* and *Ghungroo*) and a dual purpose rural poultry variety, *Srinidhi*, were developed to meet the growing demands for meat and poultry products. The birth of test tube yak calf *Norgyal*; female buffalo calf, *Mahima* from cloned mother buffalo; male buffalo calf, *Swarn* using seminal plasma of elite bull; and *Purnima*, a female calf cloned from *Karan-kirti*, a high yielding buffalo are the breakthroughs towards conservation and multiplication of elite animals. Sea cage farming with Sea bass and *Cobia* added a new dimension in fisheries towards enhanced utilization of coastal production potentials.

In our Way Forward of implementing new initiatives, the process for EFC/SFCs has started and the operational guidelines for the new programmes, Consortia Research Platforms, Extramural Funding and Performance Indicators of Institutes have been

formulated. Transfer Policy for ARS, Modified training programmes for Scientists, Revised KVK Guidelines and Format of Regional Committees with KVK Interactions and Innovative Farmers, Communication Strategy with NARS Institutional Hubs, Visiting Farmer Professors, Special Commemorative Days of Farm Innovators, Industry interactions and Agricultural Education Day are also in place. It is heartening to see that the Directors and Scientists In-charge of the Institutes and Centres well received the messages for change and brought in initiatives and innovations for enhanced efficiencies across the system. I would like to compliment you for your commitment and contributions in our endeavours at developing partnerships and teams to realize our dreams of a 'Happy Agriculture'.

We had the privilege of being addressed by the Hon'ble President of India, Shri Pranab Mukherjee, gracing the occasion of 85th ICAR Foundation Day as the Chief Guest on 16 July 2013. Hon'ble President called upon the scientific fraternity *'to work towards a technology-led path for development of agriculture and prosperity for the farming community'*.

In our efforts to forge strong public-private partnerships, we had Shri N.R. Narayana Murthy, Chairman Emeritus, Infosys Ltd., addressing the ICAR Directors' Conference on 19 March, 2013. He emphasized the importance of effective leadership in agriculture and called for greater involvement of youth in agriculture.

The ICAR remains actively involved in international partnerships and collaborations with advanced Agricultural Research Institutions, that have global reach and the local relevance. During the year that went by, we hosted the First Global Gene Bank Conference; 3rd meeting of the ASEAN-India Working Group on Agriculture and Forestry (AIWGAF); First Conference of Heads of Agricultural Universities and Research Institution of ASEAN Countries; CGIAR Fund Council Meeting; Pact-50, commemorating the 50th Anniversary of the First visit of Late Dr. Norman E. Borlaug to India; and the 5th Borlaug Global Rust Initiative (BGRI) 2013 Technical Workshop, to further strengthen and foster international research cooperation in agriculture. Some of the Firsts were the Indian YPARD (Youth Professionals in Agricultural Research for Development) and the Agri-Investors' Meet, that revealed the Agri-potentials in this country.

The coming Year 2014, is the UN-International Year of Family Farming, with an aim *'to stimulate active policies for sustainable development of agricultural systems-based farmer families, communal units, indigenous groups, cooperatives and fishing'*. This is of direct significance to Indian canvass, considering that 85% small and marginal farmers derive their livelihoods from agriculture, involving participation of family members. It is an opportunity for the NARES to focus on small farmers through outscaling research innovations that can transform them into agriprenuers, with an approach of *'Smart Farming for Small Farmers'*.

You are a partner in the recognition that the DARE/ICAR have received in terms of IS/ISO 9001:2008 certification. I am pleased to share with you that the DARE/ICAR became one of the first Departments in the Government of India to have this stamp for

implementing the Quality Management System. It is further gratifying to inform you that DARE/ICAR achieved a composite score of 97.6% for RFD for the year 2012-13. We are grateful to the Hon'ble Union Minister of Agriculture and Food Processing Industries and President of the ICAR Society, for his constant guidance, support and encouragement, which have enabled us to make a difference in Indian agriculture.

The untiring efforts of the ICAR Institutes in addressing the issues and chartering a science-led pathway for inclusive growth of farm and farming communities in the country, deserve appreciation. Challenges are many, as also Opportunities, and the way forward is to be responsive, proactive and innovative. Partnerships for Integration, Convergence and Synergy are what the 'Family NARES' and 'Team ICAR' stand for, in our cause to make Indian agriculture a proud profession of our farmers and a preferred destination for our youth.

As always, Let Us Give Our Best and I Wish You All the Best.

With regards,

Yours sincerely,



(S. Ayyappan)

Encl: DARE/ICAR Salient Achievements - 2013

Distribution:

1. Additional Secretary (DARE) & Secretary, ICAR; Additional Secretary & FA, DARE/ICAR.
2. DDGs; ND, NAIP; ADGs; National Coordinators; Principal Scientists, Senior Scientists; Directors, Project Directors; Deputy Secretaries, Under Secretaries of DARE/ICAR Headquarters.
3. Directors of ICAR Institutes/Directorates/Bureaux/NRCs; Zonal Project Directors; Project Coordinators.

For kind information:

1. PS to AM.
2. Chairman, ASRB; Members, ASRB; Secretary, Controller of Examinations, Deputy Secretary, Under Secretary, ASRB.
3. President, National Academy of Agricultural Sciences, New Delhi.
4. Vice-Chancellors of State Agricultural Universities/Central Agricultural University.
5. Secretary General, IAUA, New Delhi.
6. Directors of CG Institutes in New Delhi.
7. Chief Executive Officer, AgrInnovate India Ltd., New Delhi.



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

SALIENT ACHIEVEMENTS- 2013

1. Natural Resource Management

- Undertook 33 explorations in 16 states and collected 1,722 plant accessions, including 322 wild species
- Added 266 herbarium specimens to the National Herbarium of Cultivated Plants
- Cryostored for long-term storage, 5,414 accessions of orthodox seed species and 112 of non-orthodox species in the National Gene bank
- Restored red rice land races from long term storage at National Gene Bank to the farmers' fields in Chamba district of Himachal Pradesh
- Prepared climatic vulnerability atlas of the country and district level contingency plans for mitigating climatic variability in different agro-climatic regions
- Validated a biophysical calibrated model, APSIM (Agricultural Production Systems Simulator) to evaluate the impact of climate change on rice productivity under different levels of nitrogen in Meghalaya
- Developed a national catalogue of methane production potential of different feed resources
- The agro-ecological sub-region map of black soil region was revised by incorporating the latest soil database, newly calculated length of growing period data and quantitative drainage map
- Soil erosion map of Punjab developed at 1:250000 scale using soil resource inventory and soil loss data
- Prepared Geographical Information System based soil organic carbon map of six north-eastern states (Assam, Manipur, Meghalaya, Nagaland, Sikkim and Tripura)
- Devised low-cost and easy-to-use five-panel customized leaf colour chart for nitrogen management in rice
- To prevent volatilization losses, urea was coated with pine oleoresin for slow release of nitrogen that also provided 440g zinc, 132g copper, 212g silica and 87.7 kg nitrogen/ha to the crops from an application dosage of 200 kg/ha

- Enhanced growth performance by feeding of nitrate, 3% of dry matter intake to buffaloes, reduced 34% methane production by 15% and increased feed conversion efficiency by 10%

2. Productivity Enhancement

- Produced 11,835 tonnes of breeder seeds, 14,984 tonnes of foundation seeds, 22,281 tonnes of certified seeds, 14,939 tonnes of truthfully labelled seeds and 5,237 tonnes of quality planting material
- Released 104 new improved varieties/hybrids of major crops for different agro-climatic regions
- Released an early-maturing rice basmati variety, *Pusa Punjab Basmati 1509* with moderate resistance to leaf blast and brown spot diseases; a late sowing wheat variety HD 3059 and the large seeded (>30g/100 seeds) *kabuli* chickpea variety, CSJK 6, moderately resistant to root rot and tolerant to wilt
- Released a new red skinned advance potato hybrid 2001P-55 with a potential yield of 300-350 q/ha and moderately resistant to late blight for the eastern plains of Bihar, West Bengal, Assam, Odisha and Jharkhand
- Released bacterial wilt, TLC V and *Alternaria*-resistant tomato *Arka Rakshak* yielding over 90 tonnes/ha
- Developed and released a variety *Swarna Vaidehi* of makhana (*Euryale ferox* Salisb.), with a production potential of 2.8-3.0 t/ha, almost two fold higher than the productivity of traditional cultivars
- Recommended for release eight superior varieties of white button mushroom (DMR-Button-03), brown button mushroom (DMR-Button-06), paddy straw mushroom (DMRO-247, DMRO-484), shiitake mushroom (DMR-Shiitake-38, DMR-Shiitake-388), milky mushroom (DMR-Milky-334) and *Macrocybe gigantean* (DMR-Macrocybe-01)
- Identified Ajmer Fenugreek 3 yielding 1288 kg/ha, for national release
- Standardized and commercialized tissue culture protocol for oil palm
- Standardized protocols for hydroponics in green fodder production
- Developed Crossbred pig (H₅₀G₅₀: *Hampshire* and *Glunagroo*) and a dual purpose poultry variety, *Srinidhi* potential to lay 140-150 eggs per year
- Produced 63,857 frozen semen doses of Murrah bulls
- Developed diagnostic techniques for contagious ecthyma, PPR, Japanese encephalitis in pigs, Bovine picobirna virus, Avian influenza, Marek's disease and Q fever
- Spawning of *Cobia* in recirculation aquaculture system, with a survival rate of over 86%; and farm made feed enabling sea bass production of 2.7 tonnes/ha/year, for bio-prospecting in mariculture
- Developed PCR and RT-PCR-based diagnostics for detection of *koi herpes virus* (KHV) and spring viraemia of carp (SVC)

3. Cutting Edge Science

- Blast resistance gene Pi 54 incorporated into major rice varieties viz., *Pusa Basmati-1*, *Swarna* and BPT 5204
- Sequenced whole mitochondrial genomes of great snakehead, *Channa marulius* (NCBI accession no. KF420268), magur, *Clarias batrachus* (accession no. KC572134) and pangas, *Pangasius pangasius* (accession no. KC572135)
- Decoded the genomes of the cultivated tomato (*Solanum lycopersicon*) and its closest wild relative, *Solanum pimpinellifolium*, in part with International Consortium
- Achieved major breakthrough in the form of world's first test tube yak calf *Norgyal*; female buffalo calf, *Mahima* from cloned mother buffalo; male buffalo calf *Swarn* using seminal plasma of elite bull; and *Purnima*, calf cloned from *Karan-kirti*, a high-yielding buffalo
- Developed first comprehensive microarray chip to improve rumen function and reduction in emission of methane from buffalo rumen

4. Mechanization and Post-Harvest Management

- Supplied 5139 prototypes of farm machinery
- Developed tractor-operated multi-row seed-cum-ferti drill that places seeds at 50 mm and fertilizers at 50 to 150 mm depth and saves time and labour
- Motorized bunch-harvesting back-pack mounted tool for oil palms to harvest 15 bunches/hour at the height of 6 m
- Designed multi millet thresher with a capacity of 50 kg of *kutki*-grains per hour has 95% de-hulling efficiency and can handle crops at high moisture content
- Developed bullock-drawn wedge-plough, weighing 13 kg and 0.025 ha/h capacity for tillage and puddling on narrow terraces of hilly region of Sikkim
- *Makhana* popping and decorticating machine with capacity of 35-40 kg/h of raw wet nuts/h with 90% popping efficiency developed
- Developed a prototype mobile fish vending unit suitable in urban/municipality areas with proper waste disposal
- Developed cryogenic grinder to improve quality of spices' powder
- Designed foldable plastic box for reducing post-harvest losses during transportation of fruits such as sapota and custard apple
- Standardized protected cultivation technology for off-season tomato and cucumber, with income potential of Rs. 250-400/m²
- Developed sweetened functional soft cheese from buffalo milk
- Developed 44.8 m cutaway top belly shrimp trawl to reduce fish by catch and designed a 10 kg capacity fish meal plant

5. Technology Assessment, Refinement and Transfer

- Made 2,174 technological interventions in 4,159 locations in cropping systems, drudgery reduction, farm machineries and other areas; 1.43 lakh extension programmes through electronic and print media
- Demonstrated technology-led agriculture innovation systems for improving livelihood security in 91 backward districts of the country to about 1,43,000 poor farming families
- Demonstrated climate resilient technologies in 100 most-vulnerable districts under NICRA
- Trained over 4,000 staff from KVK with emphasis on modified agricultural extension reforms, participatory impact monitoring and assessment
- Involved 96 tribal farmers in Purulia and Bankura districts for seed production of jute, rice and mustard
- Organized a Knowledge Sharing Meet at ICAR NEH, Barapani, focusing on the portal 'KIRAN' for sharing the technologies
- Adopted sea cage farming by families of *Sidi* African tribes, living on Veravel coast, Gujarat
- Integrated farm interventions in Bali island of Sunderbans, West Bengal
- Commercialized 82 technologies/products based on NAIP research; 51 new rural industries piloted, and over 3800 ha area of farmers' agricultural land brought under sustainable land management practices
- Established 91 public-private partnerships in 203 NAIP supported sub-projects, including three with GEF support
- First Agri-Tech Investors' meet during 18-19 July, 2013; Transferred 58 technologies, including 30 technologies developed under NAIP, to private entrepreneurs with a licence fee of over Rs. 3.2 crore

6. IP Portfolio Management

- Granted 161 patents Indian Patent Office from 25 institutes
- Granted registration certificates for 138 varieties by PPVFRA, taking the cumulative total to 469
- Licenced the technology of tissue culture of oil palm and related knowhow for commercialization by AgrInnovate India Ltd. of the DARE/ICAR
- Filed 83 patents taking the cumulative figure to 826 applications from 68 ICAR institutes
- Filed/registered 14 copyrights
- Filed 33 trademarks from 16 and 17 design applications from 31 institutes

7. HRD and Capacity Building

- Over 100 scientists trained overseas in advanced techniques, and Research Managers in globally known institutions for Leadership Capacity Building
- Proposed CAU for Bundelkhand region
- Developed e-courses for seven bachelor degree level programs in agriculture, horticulture, veterinary science, home science, fishery science, dairy technology, and agricultural engineering.

8. Partnership and Linkages

- Hosted the 3rd meeting of the ASEAN-India Working Group on Agriculture and Forestry (AIWGAF)
- First Conference of Heads of Agricultural Universities and Research Institution of ASEAN Countries
- Pact-50, commemorating the 50th Anniversary of the First visit of Late Dr. Norman E. Borlaug to India; and statue of Dr Borlaug at NASC unveiled by the Hon'ble Union Minister of Agriculture & Food Processing Industries
- 5th Borlaug Global Rust Initiative (BGRI) 2013 Technical Workshop, to further strengthen and foster international research cooperation in agriculture
- First Exchange visit of ASEAN and Indian farmers under the ASEAN-India Cooperation

9. Information, Communication and Publicity Services

- Developed a web-based portal to facilitate access to information on plant genetic resources conserved at the National Gene Bank
- Launched *Buffalopedia* (<http://www.buffalopedia.cirb.res.in>), an online database-cum-interactive information dissemination system on buffalo production
- Agropedia (<http://www.agropedia.net>), with extensive knowledge maps for Rice, Wheat, Pigeonpea, Chickpea, Sugarcane, Litchi, Groundnut, Sorghum, Safflower, Vegetable-pea
- Established the first supercomputing hub for Indian Agriculture (ASHOKA) at IASRI, New Delhi to provide access to biological computing resources
- Provided on-line access for over 3,000 scholarly journals to 142 CeRA member NARS institutions throughout India
- Developed software "Web Generation of Experimental Designs Balanced for Indirect Effects of Treatments" that generates three classes of Neighbour Balanced Block Designs and eight classes of Crossover Designs at www.iasri.res.in/webdbie

- Developed web-based relational database consisting of 865,210 microsatellite markers present in the whole genome sequence of goat, <http://cabindb.iasri.res.in/goat/>
- Launched Facebook page of ICAR to develop a dialogue and share the vast knowledge resources of agricultural research and development amongst masses

10. Organizational and Management Reforms

- DARE and ICAR recognised as one of the first Departments with IS/ISO 9001:2008 certification for Quality Management System
- DARE/ICAR achieved 97.6% composite Score of RFD for the year 2012-13
- Finalised implementation guidelines for Consortia Research Platforms and Extra-Mural Funding, new initiatives of ICAR
- Recognized excellence in research, teaching and extension with 79 awards under 16 different categories, including 10 women scientists
- Awarded to IISR, Lucknow, the Indira Gandhi *Rajbhasha Puraskar*, 2012-13: Second Prize - '*IKSHU*' *Rajbhasha Patrika*

11. New Institutions

- Hon'ble Union Minister of Agriculture and Food Processing Industries laid foundation stone for the National Institute of Biotic Stress Management, Raipur
- Foundation Stone laid for the new College of Agriculture, CAU at Pasighat, Arunachal Pradesh by the Hon'ble Union Minister of Agriculture and Food Processing Industries
- New Administrative Building of NRC on Pomegranate, Solpaur inaugurated by the Hon'ble Union Minister of Agriculture and Food Processing Industries
- Five new KVKs; three in Jammu & Kashmir and one each in West Bengal and Arunachal Pradesh, raising the number of KVKs in the country to 636.
