

**SOYCON – 2014: International Soybean Research Conference**  
**on “Mitigating Productivity Constraints in Soybean for Sustainable Agriculture”**  
**Organized by Society for Soybean Research and Development (SSRD)**  
**and Directorate of Soybean Research, Indore, Madhya Pradesh, India**  
**22-24 February 2014, Radisson Blu, Indore**

*Inaugural speech was delivered by Hon’ble Secretary, DARE and DG, ICAR Dr. S. Ayyappan and Chief Guest of the function*

Dr Ayyappan applauded the record growth rate of 4.6 % by agriculture sector in the country in 2013-14. He expressed the happiness for estimated record food grain production of 263 million tons in 2013-14 and expected that a target of 300 million tones is not far from our reach. He also stressed upon the need for due coverage to agricultural achievements in media so as to promote agriculture as an enterprise among future generations. Director General suggested the new Public –Private- Partnership (PPP) paradigm. In addition to already known PPP, he laid new greater emphasis as Protein, Profit and Prestige in the larger interest of growth of agriculture in general and soybean development in particular. He recounted his personal experience with soybean as fish feed and also talked about father of nation, the great Mahatma Gandhi’s special interest in soybean and organic farming. Hon’ble Director General elaborated upon the food value chain associated with soybean and its importance and untapped potential as the cheapest source of protein. Dr. Ayyappan informed the august gathering about Council’s openness to all new technologies including GM crops. He hoped that we will soon surpass China in soybean production and gave a target of 20 million tones by 2020.

Among Special Guests of the function, Dr. A. K. Singh, Vice Chancellor, Rajmata Vijayaraje Sindia Krishi Vishwa Vidyalaya, Gwalior put forth the scenario of climate change in years to come. He talked about carbon, water and nitrogen footprints of crops. In his speech he laid emphasis on surface water conservation and narrow paired row planting of the soybean for enhancing the productivity of crops in general and soybean in particular.

**Dr. D.P. Singh**, Vice Chancellor, Devi Ahilya Vishwa Vidyalaya, Indore highlighted importance of soybean in state’s economy and talked about possible adverse impact of climate change on production and productivity of soybean.

**Dr. J.S. Sandhu**, Agriculture Commissioner, Government of India applauded current agricultural growth in Madhya Pradesh and progress made in growth of soybean in the country and in the State. He also applauded the efforts of State Department of Agriculture and ingenuity of the Farmers in overall agricultural growth. He emphasized the benefits of soybean cultivation in improving soil fertility. He informed the gathering that soybean fixes almost 70 % of total nitrogen fixed by all legumes. He also elaborated the good growth in seed replacement rate and quantum of quality seed production in soybean.

Inaugural session was graced by notable presence of Padma Shri Kutty Menon, Dr. S. P. Tiwari, former DDG (Edn.), ICAR, New Delhi, Dr. B. B. Singh, ADG (O&P), Dr. G. S. Chauhan, ADG (Seeds), Dr. P. S. Bhatnagar, Former Director, NRCS, Dr D. N. Sharma, Director, State Agriculture Department, Government of Madhya Pradesh, Dr. H. S. Yadav, Director Research Services, RVSKV, Gwalior, Dr. V. N. Shroff, Former, Dean and number of officials from sister ICAR institutions, Agriculture College, State Agriculture Department, NGOs, representative from industries, students, farmers from different parts of country including a representative from Argentina, leading soybean scientists from USA, Hong Kong, Korea, Taiwan, Egypt and media persons. Inaugural session came to end with formal vote of thanks.

This followed the Key Note Speech by Dr. S. P. Tiwari, Former Vice Chancellor, S. K. Rajasthan Agriculture University, Bikaner, Rajasthan and Former Deputy Director General (Education), ICAR, New Delhi, India on “Raising the Yield Ceilings in Soybean-An Indian Overview”. In his address, he underlined that apart from soybean’s contribution towards socio-economic well-being of central Indian farmers, it has also established some models such as futures exchange, global trade facilitation, use of ICTs towards technology adoption and domestic trade, *etc.* all which are worth emulating. He further stressed upon that nation-wide comparisons of the yields under improved technology and farmers’ practices have elucidated a sizeable yield gap that is being bridged by adopting existing technology but the concurrent increase in genetic yield potential is also imperatively needed more so, as the yield gap cannot be fully bridged in a rainfed crop like soybean. He further emphasized that concerted efforts are needed for broadening the genetic base and enhancing genetic potential for yield by hauling in productivity genes and associated characters. Use of new plant breeding technologies, as found appropriate and feasible, should be promoted by research centres both in public and private sector alike for breaking the yield barrier in case of Indian soybean. Dr. Tiwari also expressed that concurrent efforts in promoting new agronomy along with suitable farm machinery, management of biotic stress and enhancing seed availability are also imperative. Domestic utilization of de-oiled cake is increasing, yet food uses are scanty. He lauded the lines recently developed for food uses and emphasized the need of utilization strategy to promote specialty soybean and market the various products nationally and globally.

Soycon-2014 also provided a platform in the form of **Farmers’ Forum**, wherein a number of farmers shared their experiences and feelings. Farmers in general raised their expectations for improved availability of quality seeds and extra choices of new varieties. Farmers also raised the issue of inadequate profit sharing by industry with them. Farmers also were willing to have secondary agriculture based initiatives and requested guidance for that.

Soycon -2014 during its three day researchers’ conclave is covering the theme areas of Genetic Improvement, Crop Husbandry Approaches, Insect-pest and diseases, Secondary agriculture Initiatives, Soybean Processing, Marketing and Policy Issues, Technology Dissemination, Food Uses of Soybean, *etc.* The lead papers are presented by the well known researchers like Dr. Scot Jackson, University of Georgia, Dr. Madan Kumar Bhattacharya, Iowa State University, Prof Hon-Ming-Lam, Chinese University of Hong Kong, Dr. Craig Gundersen, University of Illinois, Dr. Ramakrishnan M. Nair, AVRDC, Dr. E. Nafziger, University of Urbana, USA and Dr. Savithry Natarajan, USDA, Maryland.

More than 400 delegates comprising researchers, government officials, farmers, industry representatives and students registered for the conference. The conclave included three key note addresses from renowned soybean scientists:

- *Dr. S. P. Tiwari, Former Vice Chancellor, SK Rajasthan Agriculture University, Bikaner, Rajasthan and Former Deputy Director General (Education), ICAR, New Delhi, India on “Raising the Yield Ceilings in Soybean-An Indian Overview”*
- *Dr. Scott A. Jackson, Director, Center for Applied Genetic Technologies, University of Georgia, USA on “Genomic Approaches to Understand and Exploit Variation in Soybean”*
- *Dr. E. D. Nafziger, University of Illinois, Urbana, Illinois, USA on “The Great, Worldwide Soybean Experiment of the Past 100 Years; What Have We Learned?”*

In addition, there were 17 expert lead speakers covering various aspects of soybean improvement, production, utilization, marketing and processing. More over, the conclave during 3 days of deliberations would have 76 oral presentations and 305 poster presentations.

The conference is deliberating upon following areas to conceptualize and formulating strategies for “Mitigating Productivity Constraints in Soybean for Sustainable Agriculture”.

- Soybean Genetic Resources- Genome-wide variation from the wild to the cultivated and its implications to study on germplasm of soybeans. Genomic approaches to understand and exploit variation in soybean,
- Using whole-genome-sequencing information for genetic studies of wild soybeans,
- Challenges and opportunities in the improvement of soybean protein quality and characterization of major genes for seed protein content in soybean,
- Application of proteomic tools in assessment of soybean protein variance,
- Biotechnological interventions for management of insect pests of soybean,
- Biological control of root rot, stem rot and purple stain of seed in soybean,
- Integrated approach for nutrient management including microbes for enhancing soybean productivity and improving soil health,
- Plant protection challenges for enhanced productivity of soybean,
- Novel management approaches for managing diseases in soybean,
- Alleviating food insecurity: The role of soybeans,
- Genetic improvement of vegetable soybean and development of specialty soybean,
- Secondary agriculture initiatives,
- Current status of the soybean industry and its future, and
- Options and scope for soy-food uses.

#### **Following points have emerged from deliberations**

- To harness the full yielding potential of soybean, a road map has been devised comprising of filling the technology gaps in terms of improved varieties, region specific production technologies and protection modules. Availability of quality seed of improved varieties should also be enhanced,
- A need was felt for inclusion of more number of parents in crossing programme and to increase the size of selection base,
- Allele mining among core and sub-core sets of soybean germplasm,
- A need for more liberal exchanges of soybean germplasm,
- Exploitation of wild species of soybean for broadening the genetic base and development of global gene bank database which would have information on all the soybean accessions,
- Proteomics and metabolomics for analysis of seed storage protein, allergens and transgenics,
- Proportion of expenditure on cultivation of soybean is declining on productive and protective inputs, which calls for strategic actions for sustainability,
- While phenotyping for resistance a need to characterize the pathotype/biotype was also felt,
- There is scope and expertise available to apply biotechnological approaches for insect management is plenty in the country and needs to be utilized urgently. Bt toxin should be evaluated against soybean insect pests,
- Balanced nutrient management with integrated approach encompassing useful microbes is able to maintain soil health at par with organic management, with higher yield levels,
- Promising microbes identified for biofertilization and biofortification to be further field evaluated and formulated for general use,

- Native isolates of entomopathogenic fungi available with different workers has to be exchanged and evaluated,
- There was a consensus on not to recommend pesticides that do not have label registration with CIB & RC and not to use pesticides of same mode of action in repetitive manner,
- Dr. Craig Gundersen advocated that to alleviate the amino acid malnutrition in nutrient deficient countries, 50 g soya flour along with 200 g rice could be given for children 8 years and above,
- Soybean sprouts have more bio-availability of nutrients,
- For *tofu* making ohmic heating has been found to be higher yielding but lower textural properties than conventional and microwave heating methods,
- India along with Argentina and Brazil has significant competitive advantage in export of soybean at present and is to be capitalized,
- Proportion of expenditure on productive and protective inputs is declining in soybean cultivation, which calls for strategic action for long term-sustainability,
- A model on successful execution of use of e-technology network for pest management in Maharashtra should be adopted to address the pest problems in other states,
- Several plant products have been found effective in pest management and further basic research and research on formulating commercial products is necessary,
- Special attention is needed to abridge technology and information gaps at ground level to enhance the productivity of soybean crop,
- Cropping systems keeping in view the diversification of crop and varieties is to be promoted to sustain the agriculture,
- Conservation tillage is better option to boost up soil organic carbon levels in the soil and maintenance of soil health, and
- *In-situ* surface water conservation technologies are to be capitalized to combat water stress to crop and concerted efforts are needed to develop soybean varieties with resistance to deficit and excess moisture conditions.