

Report on

Collaborative Workshop on

Harnessing Agricultural Education and Research for
Rural Development

On

19 – 21 December 2011

Venue: Ball Room, Hotel Radisson Blu Dwarka New Delhi

19 December 2011

Inaugural Session

Chief Guest: Mr. V. N. Gaur, CEO, Food Safety and Standards Authority of India (FSSAI)

At the Dais:

1. Dr. Arvind Kumar, Deputy Director General (Education), Indian Council of Agricultural Research (ICAR), India
2. Dr. R. K. Mittal, Assistant Director General (EPD), Indian Council of Agricultural Research (ICAR), India
3. Mr. Gary Robbins, Director, Office of Food Security, USAID/India
4. Prof. K. V. Raman, Associate Director (Special Projects), International Programs, College of Agriculture and Life Sciences, Cornell University, Ithaca, New York, USA
5. Prof. C. S. Prakash, Professor, Plant Molecular Genetics, Tuskegee University, Alabama, USA
6. Prof. C. Ramasamy, National Project Coordinator, Agricultural Innovation Partnership, India
7. Mr. K. Vijayaraghavan, Chairman, Sathguru Management Consultants Pvt. Ltd., India

Inaugural-cum-Technical Session

The inaugural-cum-technical session started with remarks by Prof. C. S. Prakash. At the outset, he welcomed Mr. V. N. Gaur, the chief guest of the function. He then welcomed the delegates from across the globe and appreciated AIP's efforts in bringing a knowledgeable gathering together to address global issues during the three-day period. He welcomed the representatives from the African nations. He also welcomed the USAID representatives who have been actively involved in the planning and execution of the project right from its inception. He appreciated the efforts of all public and private partners without whom this meet would not have been possible.

AIP – Education and Extension – Objectives, Project Plan and Deliverables by Prof. K. V. Raman and Mr. K. Vijayaraghavan

After Prof. Prakash's inaugural speech, Prof. Raman and Mr. Vijayaraghavan spoke on AIP's education and extension objectives, project plans and deliverables. The presenters highlighted that education and extension activities should focus on industry-ready graduates. The presenters talked about improving food availability, nutrition and health of the poor in the rural areas, as this would impact the overall standard of living in India. Both the speakers focused on the key components associated with improving agricultural education at Banaras Hindu University (BHU) and partner state agricultural universities. They remarked that these efforts could later be extended to Africa as well.

Remarks by Mr. Gary Robbins

Mr. Robbins spoke on agricultural education and food security. Referring to the possibility of a green revolution (due to technology-led innovation) in agriculture in the next few decades, he said that agricultural education and research should focus on dealing with challenges that global changes around us could throw on the way. He emphasized that both education and extension activities should focus on

improving the livelihood of the farmers and their standards of living by improving the agriculture system. Mr. Robbins also spoke about AIP's contribution towards state agricultural universities (SAUs) to improve agricultural knowledge, education and extension programs. He said that the partners in the AIP project can work together to address global issues.

Remarks by Mr. V. N. Gaur

Mr. Gaur emphasized the scope and need of tremendous improvement in the food processing industry and ways to develop new technologies to enhance the food value chain. He also emphasized the need to introduce the food security bill in India so that food can be made available to a larger segment of population deprived of food. Mr. Gaur added that the technologies that we develop should be tailored to maximize value addition and farmers should inculcate good agricultural practices. The farm produce should be converted into products to reach people as well as mitigate hunger.

Reforms in Agricultural Education (special address) by Dr. Arvind Kumar

Dr. Kumar thanked Sathguru Management Consultants and USAID for organizing the three-day program. He also thanked all the participants and faculty from leading national and international institutes for being a part of the session. He made his observations on the Indian economy, the twelfth five-year plan and how the Indian government is taking initiatives to enhance the agricultural system. Dr. Kumar also spoke on enhancing the agricultural sector to attend to the needs of the small and marginal farmers. This would be a big boost to the Indian agricultural system.

Vote of Thanks by Dr. C. Ramasamy

Dr. Ramasamy thanked Dr. Kumar on behalf of AIP for sharing his knowledge and experiences. He thanked Mr. Robbins for his insights into the future of agriculture. He thanked Mr. Gaur for his comments on the importance of food safety. He thanked Prof. Prakash for welcoming the gathering. He then thanked Prof. Raman and Mr. Vijayaraghavan for introducing the AIP project. He thanked the faculty, deans and university partners from the land-grant universities for being a part of the conference as well as helping implement the AIP project. He also thanked the Vice Chancellors from Tamil Nadu Veterinary and Animal Sciences University, Dr. Panjabrao Deshmukh Krishi Vidyapeeth and Punjab Agricultural University for attending the workshop. He thanked the participants from Africa for being a part of the event.

Sharing the US Experience in Strengthening Agriculture Education by Prof. Thomas Rost

Prof. Thomas Rost, Professor Emeritus, Plant Biology and International Programs, University of California, Davis shared his thoughts on the Global Horticulture Bank. He emphasized the need for strong curricula and enhanced training and extension materials to enhance employability among students in the agricultural sector. There was also a need to provide well-trained and highly qualified faculty and excellent teaching methodologies with accurate syllabi, hands-on laboratory and field experiences, and leadership and team work experiences. Prof. Rost also shared his thoughts on advanced programs in UC Davis that help students determine long- and short-term objectives.

Issues and Strategic Approaches to Strengthening Agricultural Education in India by Dr. R. K. Mittal

Dr. R. K. Mittal, Assistant Director General (EQR), ICAR, made observations on the role and importance of ICAR in agricultural education in India. He focused on the professional and financial

support by ICAR to the state agricultural universities. The professional support aimed at coordinating reforms by providing a common platform for discussion on curriculum and academic regulations. The financial support focused on the financial constraints faced by the SAUs and ICAR's role in providing financial assistance to these universities. This would help promote knowledge and marketing skills as well as acquire enterprise management capabilities in this sector.

The presentations were followed by discussions among the participants on introducing new and advanced courses for the Indian students as well as training the faculty members on the contemporary and superior methodologies that are being used elsewhere in the world. In order to attract students towards the agricultural sector, it is necessary that there are better opportunities for them when they graduate.

Technical Session: Faculty Development

Venue: Ballroom, Hotel Radisson Blu Dwarka New Delhi

Chair: Prof. Baldev Singh Dhillon, Vice Chancellor, Punjab Agricultural University

At the Dais

1. Mr. K. Vijayaraghavan
2. Prof. Thomas Rost
3. Prof. Max Pfeffer

Speakers

1. Dr. Stefan Einarson
2. Dr. Mary Ochs
3. Prof. Venkat M. Mayande
4. Prof. C. Ramasamy

Prof. Baldev Singh Dhillon started the session by welcoming all the speakers. He then called upon Prof. Max Pfeffer to share his thoughts.

Land-grant Universities and Global Scientific Capacity for Agriculture by Prof. Max Pfeffer

Prof. Max Pfeffer, Senior Associate Dean, Cornell University, emphasized the need for developing an agricultural curriculum to build resource capacity in order to take full advantage of emerging opportunities and to meet rural challenges. Prof. Pfeffer spoke on one of the main objectives of AIP, which is to make use of the latest technologies during the process of knowledge dissemination to the farmers. He also appreciated AIP partners like the University of Georgia, Cornell University, University of Illinois, Tuskegee University, The Ohio State University and University of California, Davis for creating a common ground for the land-grant mission.

Library as a source for enhancing faculty learning and teaching excellence by Dr. Stefan Einarson & Dr. Mary Ochs

Dr. Stefan Einarson, Director, Transnational Learning and the head of IT for International Programs, College of Agriculture and Life Sciences, Cornell University and Dr. Mary Ochs, Director, Albert R. Mann Library, Cornell University, discussed how the library could be an important resource for

enhancing faculty learning and teaching excellence. They also focused on faculty development and the skills that librarians need to manage libraries effectively. They emphasized using interactive technologies, e-learning and experimentation and flexibility as a part of the teaching-learning experience. The library's multifaceted role in supporting quality education and research was highlighted during the discussion. The presenters said that this could be done by enabling libraries to serve as technology centers in serving as intellectual hubs for engaging with information.

Curriculum and faculty capacity building needs of state agricultural universities and private affiliated agricultural colleges

Prof Mayande elaborated on the demand and supply chain of agricultural education in India. He emphasized that the agriculture, dairy and horticulture sectors are growing by 3% – 5% annually. Prof. Mayande highlighted the increasing demand of graduates from the agricultural sector in both public, private and R&D sectors and in the extension activities. He added that the SAUs are adding about 30000 graduates every year. Prof. Mayande stressed on the lack of educational infrastructure, financial support and other setbacks where the agricultural sector needs to cope. He also referred to changes like globalization that have impacted agriculture. There are new areas of development in nanotechnology, biotechnology, GPS/GIS applications, climate changes and adaptations, etc., that are effecting agriculture as well. Speaking on curriculum development, Prof. Mayande said that there was a need to modernize agricultural curriculum, introduce new degrees, diploma programs and certificate courses. He also stressed on the need to focus on modernizing learning methodologies like blending classroom teaching with online learning, collaborative teaching-learning methodologies, e-learning, experiential learning and collaborative learning. Prof. Mayande concluded his presentation by saying that there was a need for Indian agriculturists to grow by shifting and changing, developing new skills and attitudes for capacity building.

Curriculum and faculty capacity building needs of sate agricultural universities and private affiliated agricultural colleges by Prof. C. Ramasamy

Dr. C. Ramasamy, National Project Coordinator, AIP, discussed curriculum and faculty capacity-building needs of state agricultural universities and private affiliated agricultural colleges. His presentation was based on supply and demand in agricultural education. He focused on the present status of agricultural education and the need for modernization. He discussed the sub-systems introduced in agriculture like agribusiness systems, animal systems, biotechnology systems, etc. He also talked about blending modern teaching tools with traditional methods. Dr. Ramasamy discussed the drawbacks of Indian agriculture and the ways to overcome them using technology.

Concurrent Technical Sessions

Session I: Progress in Food Science Curriculum Development and Human Resource Needs

Venue: Ballroom 1, Hotel Radisson Blu Dwarka New Delhi

Co-chair: Prof. Syed Rizvi, Professor, Food Science Engineering, International Professor, Food Science, Cornell University

At the Dais

Prof. Syed Rizvi

Prof. Baldev Singh Dhillon

Speakers

Prof. Rakesh Singh

Dr. Alok Jha

Dr. Samsheer Singh

After welcoming everyone to the gathering, Prof. Rizvi requested the first presenter, Prof. Rakesh Singh, to make his presentation.

Current and future trends in food science curriculum in US land-grant universities by Prof. Rakesh Singh

Prof. Rakesh Singh, Head of the Department, Food Science and Technology, University of Georgia, talked about the basis and need for the Food Science curriculum and the learning outcomes of the course. Referring to the key requirements for IFT approval, he alluded to the standards that courses need to adhere to. He also discussed in detail the courses in the US land-grant universities and compared the different courses in the universities and the key requirements for each course. He also referred to the objectives and the expected outcome of each course. Prof. Singh stressed that while it was necessary to look at traditional learning modules, it was also important to design courses as per industry needs. He emphasized that teachers and students in all universities need to update their knowledge on emerging trends in food science and technology, and that students should possess good communication skills to express themselves.

Strengthening food science curriculum at Banaras Hindu University (BHU), Varanasi by Dr. Alok Jha

Dr. Alok Jha, Professor and Head of the Department, Animal Husbandry and Dairy Science, BHU, made a presentation on the current trends in food science education in India. He underscored the need for establishing a world-class educational center in the field of food science and technology. Dr. Jha emphasized curriculum development programs that could help students enhance their skills through in-plant training.

Strengthening food science curriculum at Sardar Vallabhbhai Patel University of Agriculture and Technology (SVPUAT), Meerut by Dr. Samsheer Singh

Dr. Samsheer Singh, Professor, Agricultural Engineering and Food Technology, SVPUA&T, emphasized using new technologies to face the challenges of the future. He indicated the necessity for imparting technological knowledge and entrepreneurial skills to enhance economic returns in small businesses. He emphasized hands-on-training for students to develop practical knowledge and skill sets.

Prof. Rizvi remarked that there is an urgent need to enhance the quality of agricultural education in India which will in turn improve the quality of the students. He added that the agricultural students should have more exposure to the field-level activities that involve crop production and distribution. The students need to be more passionate about learning agricultural practices and agri-entrepreneurship. There is also an urgent need to lay emphasis on interdisciplinary courses in agricultural studies for students to comprehend every facet of agricultural systems used worldwide. Prof. Rizvi also stressed on the need to have short-term hands-on industry experiences for the students for about 2 months rather than year-long experiences in the agriculture industry. A shorter work experience would help the students maintain a balance between their job and studies.

Session II: Progress in agriculture science and biotechnology curriculum development

Venue: Ballroom 2, Hotel Radisson Blu Dwarka New Delhi

Co-chair: Dr. Rattan Lal, Professor of Soil Science, School of Environment and Natural Resources, The Ohio State University

At the Dais

1. Mr. K. Vijayaraghavan
2. Prof. J. P. Srivastava
3. Dr. Rattan Lal

Speakers

1. Dr. Prasanta Kalita
2. Prof. J. P. Srivastava
3. Prof. H. B. Singh
4. Dr. Anil Sirohi, Dean, College of Biotechnology, SVPUA&T

Current and future trends in agriculture science and biotechnology curriculum in US land-grant universities by Dr. Prasanta Kalita

Dr. Prasanta Kalita, Associate Dean, International Programs, University of Illinois, discussed current and future trends in agricultural science and biotechnology curriculum in US land-grant universities. He elaborated on how students could learn basic science and research in the areas of molecular biology and biotechnology, and the need for students to learn pest management, agro-ecology, crop agribusiness and related subjects. Studying these inter-related areas could lead to groundbreaking innovations and research studies. His presentation also focused on enhancing students' learning skills and the five stages of team development, active listening skills as well as inquiry-based learning.

Dr. Kalita introduced the academic units at the University of Illinois. He emphasized how the faculties and curriculum was set up to provide students of the various programs with a multidisciplinary experience. The faculty members of the University of Illinois are expected to show as much rigor in teaching as in scientific research.

Dr. Kalita emphasized the importance given to inquiry based learning and incorporating an experiential pedagogic strategy at all stages of the learning process. There is primary focus on problem based learning to ensure the development of key capacities in the students. To illustrate these he showcased the case history of the project for the characterization and remediation of toxic metals in waste water reuse for agricultural irrigation that was set up at the Govind Ballabh Pant University of Agriculture and Technology at Pantnagar.

During the post presentation discussion Prof. K. V. Raman raised the issue of how the University of Illinois was able to offer more to the students by way of learning with just 120 credits as opposed to Indian institutions in which a narrower curriculum required as much as 160 credits. He speculated that the Indian schools seemed to teach to complete syllabus requirements rather than offering students something of value. Another issue that was raised was the lack of formal soft skills training in most Indian institutes. The delegates from the Indian universities clarified that while currently there were no credits for soft skills programs, this has been incorporated in the reformed curriculum.

Progress at BHU on strengthening agricultural science and biotechnology curriculum including gender and other crosscutting issues by Dr. J. P. Srivastava and Dr. H. B. Singh

Dr. J. P. Srivastava, Professor and Head, Department of Plant Physiology & Dr. H. B. Singh, Professor, Department of Mycology and Plant Pathology, BHU, focused on the features of US education and its merits. They said that incorporating the US teaching-learning methodologies could mean providing more freedom to teachers to teach and evaluate students. At the same time, students should also be given choices to select courses across the departments. The presenters also recommended restructuring Rural Agriculture Work Experience (RAWEX) and experiential learning programs in Indian agricultural universities. They added that certificate courses in bio-pesticide management and plant health would boost the career opportunities of the students.

Dr. Srivastava presented the reformed curriculum for the Institute of Agricultural Sciences. He stated that a certain level of caution was exercised with regard to e-learning in order to ensure that the curriculum stayed relevant and was not too diluted. He also emphasized the enhanced focus in the curriculum for soft skills such as communication. He further stated that the new curriculum place greater importance in training graduates to meet industry requirements and that private enterprise consultation was built into designing the curriculum components. He highlighted some of the effective approaches adopted at the university that has ensured that students receive a well rounded course. These include:

- Establishing base strategies to cater to a wide range of learning styles
- Linking learning theories (cognitive science) to pedagogic practice
- Bringing real world perspectives to classrooms
- Stimulating and guiding students
- Providing soft skills in communications and team development

Progress at SVPUA&T on strengthening agricultural science and biotechnology curriculum including gender and other crosscutting issues by Dr. Anil Sirohi

Dr. Anil Sirohi, Dean, College of Biotechnology, SVPUA&T, discussed the deficiencies in the areas of agriculture, biotechnology, food science and animal science curricula in India. He stressed the need for effective experiential learning modules. Dr. Sirohi also proposed Students Applied on Farm Agricultural Research (SAFAR) programs for students. The objective of this program is to engage students in hands-on learning experiences with a focus on national and international developmental issues. These programs would also help students develop case studies and learning materials to complement classroom learning, and provide better career opportunities in sectors like NGOs, rural banks, private organizations, etc. Dr. Sirohi presented a curriculum that covered the requirements for the colleges of Agriculture, Biotechnology and Animal Sciences. There was greater focus on student needs in the curriculum and the students were allowed to select what they required within a modular framework.

During the final summing up by the Co-chair of the session, the concern that there was no course on soil science in the curricula that were presented and that this was a lacunae that had to be addressed, particularly in the present day.

Session 3: Progress in animal science curriculum development & human resource needs

Venue: Terrace Lounge, Hotel Radisson Blu Dwarka New Delhi

Co- chairs: Dr. Nar Kaji Gurung & Dr. K. M. L. Pathak

At the Dais

1. Dr. Nar Kaji Gurung
2. Dr. K. M. L. Pathak
3. Prof. D. C. Rai
4. Dr. Archana Arya

Speakers

1. Dr. Nar Kaji Gurung
2. Prof. D. C. Rai
3. Dr. Archana Arya

Current and future trends in animal and dairy science curriculum in US land-grant universities by Dr. Nar Kaji Gurung

Dr. Nar Kaji Gurung, Assistant Professor, Animal Science and Associate Director, Tuskegee University, discussed current and future trends in animal and dairy science curriculum in US land-grant universities. He focused on the land-grant concept of education that focuses on teaching practical skills in agriculture and mechanical arts. His presentation also explained the objectives of the department of animal science and its interconnectedness with other departments like food science, fiber science, biochemistry and veterinary science. Dr. Gurung also highlighted the importance of understanding animal behavior and well-being, nutrient and environmental management and sustainability. Dr. Gurung explained how a laboratory animal science course for students could guide students in the care of animals.

Progress at SVPUAT on strengthening the animal and diary science curriculum by Dr. Archana Arya

Dr. Archana Arya, Assistant Professor in the Department of Animal Science, SVPUA&T, discussed the progress on strengthening the animal and diary science curriculum at SVPUA&T. She referred to the different ways to solve the complex problems of animal enterprise management as well as encourage learners to pursue an array of career interests. She emphasized that students should acquire relevant knowledge in the field of breeding, nutrition, physiology and management so that they are 'industry-ready'.

Curriculum Development in Animal, Dairy & Veterinary Science under AIP Program by Prof. D. C. Rai

Prof. D. C. Rai, Professor, Department of Animal Husbandry and Dairy Science, BHU, provided an overview of the Indian dairy sector and touched upon its contribution towards India's GDP. Dr. Rai briefly reviewed dairy education and curriculum development in animal science in India. Dr. Rai stressed the need to create awareness programs for clean milk production, hands-on training and experiential learning modules for students.

Session 4: Progress in overcoming gender issues in curriculum development

Venue: Board Room, Hotel Radisson Blu Dwarka New Delhi

Co-chairs: Dr. Cathy Rakowski & Dr. C. Devakumar

At the Dais

1. Dr. Cathy Rakowski
2. Dr. C. Devakumar
3. Dr. Shubha Rao

Speakers

1. Dr. Cathy Rakowski
2. Dr. Shubha Rao

Current and future trends in gender issues in agricultural curriculum in US land-grant universities by Dr. Cathy Rakowski

Dr. Cathy Rakowski, Associate Professor, Women's Studies and Rural Sociology, The Ohio State University, discussed current and future challenges in gender issues and underscored the need for incorporating gender studies in agricultural curriculum and how the gender issues in agriculture ought to be handled in the curriculum. She presented her views on organic farming and marketing, environmental activism and management and other related topics. She also spoke on human rights, women empowerment, gender equity, environmental awareness, etc.

Progress at BHU and SVPUAT on strengthening gender courses in agricultural curriculum by Dr Shubha Rao

Dr. Shubha Rao, Professor and Director, Center for Women Studies, BHU, talked about the inclusion of more female students in agricultural extension studies. She emphasized the dissemination of new technologies to farmers without showing disrespect for their traditional knowledge.

20 December 2011

Session: India and US – Historical and Future Involvement in Higher Education and Agricultural Research

Venue: Garden before Indian Agricultural Research Institute (IARI) Library, IARI, New Delhi

At the Dais

1. Dr. Rajiv Shah, Administrator, United States Agency for International Development (USAID)
2. Prof. M. S. Swaminathan, M. S. Swaminathan Research Foundation (MSSRF)
3. Prof. S. Ayyappan, Deputy General, Indian Council of Agricultural Research (ICAR) & Secretary, Department of Agricultural Research and Education (DARE)

On the second day of the collaborative workshop, a special program was convened by USAID and AIP partners at Indian Agricultural Research Institute (IARI), New Delhi, where Dr. Rajiv Shah, 16th Administrator, USAID, Prof. M. S. Swaminathan, Chairman, M. S. Swaminathan Research Foundation (MSSRF), and Dr. S. Ayyappan, Director General, ICAR & Secretary, DARE, addressed the audience. Dr. Rajiv Shah delivered a brief speech on Indo-US relations in agricultural education and extension and emphasized the need for mutual cooperation. Prof. Swaminathan discussed India's journey from insufficiency to self-sufficiency in food grain production. Dr. Ayyappan emphasized on future challenges in the field of agriculture and ways to overcome them by strengthening agricultural education in India that will also benefit farmers in the long run.

After the tea break, the group proceeded to Plant Auditorium for participation in panel discussion.

Panel Discussion: Agricultural Education and Extension as Drivers – Preparing for the Future

Venue: Plant Pathology Auditorium, Indian Agricultural Research Institute

Chair: Dr. S. Ayyappan (DG-ICAR, Secretary-DARE)

At the Dais

1. Prof. David Hansen
2. Prof. Max Pfeffer
3. Prof. C. S. Prakash
4. Mr. K. Vijayaraghavan
5. Dr. Arvind Kumar
6. Dr. K. D. Kokate

7. Dr. Swapan Dutta
8. Mr. B. B. Singh
9. Mr. Asim Parikh

In the IARI campus, there was a panel discussion on how the agricultural extension system in India could be developed to provide maximum benefit to the farmers. The panel consisted of representatives from US Partner Institutes of AIP, ICAR and private sector partners like Tata Chemicals Ltd. (TCL) and Coca-Cola India. Dr. K. D. Kokate, Deputy Director General (Agricultural Extension), ICAR, talked about opportunities for public-private partnerships in agricultural extension systems. Dr. Kokate also emphasized industry linkages with agricultural universities and how this would benefit both students and farmers. Mr. B. B. Singh (TCL) and Mr. Asim Parikh (Coca-Cola India) expressed their interest in collaborating with agricultural colleges and universities in India. They also talked about how private players are keen to work closely with public sectors, farmers and rural entrepreneurs in technology delivery processes.

21 December 2011

Technical Session: Human Resource Needs in Agriculture Extension

Venue: Ball Room, Radisson Blu Hotel New Delhi Dwarka

Co-chairs: Dr. V. V. Sadamate, Advisor (Agriculture), Planning Commission & Prof. David Hansen, Senior Fellow with the Association for Public and Land-grant Universities (APLU), Washington, D.C., USA

At the Dais

1. Dr. K. D. Kokate
2. Mr. B. B. Singh
3. Prof. Syed Rizvi

Revamping public sector extension – new initiatives

Dr. K. D. Kokate, Deputy Director General (Agricultural Extension), ICAR, talked about the ups and downs of Indian agriculture. He spoke on the agricultural extension system, how it functions and how Indian agricultural universities could help the system work more efficiently. Dr. Kokate referred to a few institutes like the Agriculture Technology Management Agency (ATMA) and Krishi Vigyan Kendra that focus on technology to improve agriculture. Dr. Kokate discussed several issues faced by the agricultural extension system in India that are a result of using ineffective tools and techniques, market competition and knowledge gaps. He shared his views on future approaches that include knowledge-sharing among institutions, capacity building, building social capital, and translational research.

Private sector efforts in agricultural extension

Mr. B. B. Singh, Assistant Vice President (NPD & Training), Tata Chemicals Limited, spoke on the introduction of a new Tata fertilizer plant, last year in India. The fertilizer that was introduced became an instant hit among the farmers, as it helped them increase their yield. He further said that there were plans underway to start about 20 more plants by 2012. Mr. Singh spoke about the Urea Deep Placement Technology (UDP) that was imported from Bangladesh and how it increased yield by 20%. He also

shared his thoughts on the benefits of keeping the farmers posted on factors that affect crop production. Mr. Singh talked about 'Hello Krishi', a service that provides crop-related information to the farmers over mobile phones. This is a useful way of informing farmers about the weather conditions and other suitable information useful to them.

Preparing professionals for food process industry extension and outreach

Prof. Syed Rizvi emphasized on training professionals for the food processing industry in India. He shared a brief history of the agrarian society in the US. He spoke about the land-grant universities and their mission of providing information to the farmers that could benefit society. Apart from this, the extension service by the federal government, the state governments and the local agencies are also meant to benefit society. Prof. Rizvi highlighted the impact of the corporate extension service, its impact and how each sector (the private and the public) contribute in improving agriculture. He also shared his views on the goals and needs of the food processing industry in India.

Technical Session: Technology Translation and Agri-Entrepreneurship

Venue: Ball Room, Radisson Blu Hotel New Delhi Dwarka

Chair: Dr. Shashank Mauria, Assistant Director General (Intellectual Property & Technology Management), ICAR

Speaker

Mr. K. Vijayaraghavan

Entrepreneurship, business incubation and guidance support in agricultural education curriculum, technology translation and commercialization

Mr. Vijayaraghavan spoke on the use and benefits of creating entrepreneurs. He talked about the importance of technology in solving problems in agriculture in developing regions. He also mentioned different kinds of technologies that were still not ready to be absorbed in the local markets under present circumstances. He emphasized making technologies more accessible to the farmers. He gave an example of the Cornell-Sathguru model that is well-blended industry-academia collaboration. In conclusion, he mentioned that US land-grant universities and Indian universities should work more closely together to provide better technologies and products.

Panel Discussion: Preparing skilled human resources for organizations in the private sector and building entrepreneurship

Participants

1. Mr. Jeetendra Kumar, Vice President and Head, Life Science Incubator, ICICI Knowledge Park
2. Kalpana Sastry, Head, Agricultural Research Systems Management and Policies (ARSMP) Division, National Academy of Agricultural Research Management (NAARM)
3. Prof. K. V. Raman, Associate Director (Special Projects), International Programs, College of Agriculture and Life Sciences, Cornell University, Ithaca, New York, USA

Dr. Sashank Mauria began the discussion by highlighting the important role private institutions need to play in every aspect of the agri-business chain. He spoke of viable opportunities for developing skilled

human resources for the private sector. He described the working groups that have been appointed to help develop innovations in seed and planting material, diagnostic kits, biotechnological products and farm machinery.

He shared the experiences of Costa Rica University where they are trying to produce student graduates with entrepreneurship skills and industrial rating. The primary question was how long they would have to keep their students on the campuses? The courses are very expensive. If the financial mechanism was established, it would be easy to adjust the curriculum. In the existing situation, the private and public sectors will have to wait for a longer time. They need to address this situation soon.

After Dr. Mauria's remarks, Mr. Jeetendra Kumar added two more points about the private and public sector participation. He spoke on agricultural universities that could become more approachable to these organizations in setting up an agri park as they have big campuses. The universities could also donate their land to these organizations and help them create a great eco system for greater collaborations between academia and industry.

Dr. Senthil added few more points to what Mr. Jeetendra Kumar spoke. He referred to the Indigenous Technology Knowledge (ITK) validation system and the university, which is a part of it. He said that under the Network Address Translation (NAT) project and the World Bank project, there's a provision to validate ITK using Technology Assessment Refinement. Dr. Senthil talked about the contributions of the state agricultural universities and ICAR towards ITK validation, and how this has become a practice today. He highlighted on the need to produce skilled human resource and how the government permitted them to enhance the National Skill Development program and benefit around 50 million youth by 2020.

Vote of Thanks

Mr. Vijayaraghavan concluded the session by thanking all the participants for sharing their ideas during the three-day workshop. He thanked ICAR for being a part of the AIP workshop, IARI for providing the venue and the Indian and US partners for supporting the event. Mr. Vijayaraghavan also thanked the Vice Chancellors from the different universities for attending the program. He thanked the African and US participants for enriching the program with their valuable inputs. He thanked the private partners for their sincere engagement and strengthening their bond with the public partners.