Asia-Pacific
Economic Cooperation

APEC Agricultural Technology Transfer Forum

Agricultural Technical Cooperation Working Group

November 2011

APEC Project: ATC 06/2010A

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Foreword

This report is a part of the APEC project, *Workshop on Building An Efficient Agricultural Technical Transfer Platform to Enhance APEC Food Security and Food Safety* (ATC 06/2010A). The theme of this Forum is “Strengthening Agricultural Technology Transfer for Food Security in APEC Region”. As agreed broadly, advanced agricultural technology will greatly help APEC member economies to ensure their food security. So this forum aims to brain storm knowledge on how to effectively facilitate agricultural technology transfer within APEC region, and add value in terms of building a more comprehensive and efficient agricultural technology transfer platform among APEC member economies, given the challenges of climate change, decline of arable land and increasing new technologies generated within the region. The forum was held at Beijing Friendship Hotel, Beijing, China in November 23-25, 2011. 4th China Advanced Agricultural Technology Exhibition was also held in parallel with the forum. 195 new cultivars, new technologies and new products were shown on the exhibition.

The forum was organized by Chinese Academy of Agricultural Sciences (CAAS) and Beijing Municipal Sciences & Technology Commission. Participants from 19 economies include government officials, representatives from international organizations, experts from the universities and the academies of agricultural sciences, business entrepreneurs, and discussed how to formulate new mechanism to restructure a more efficient and effective agricultural technology transfer system in APEC region.

Four aspects on agricultural technologies transfer were discussed in the two-day forum, they were: 1) Discuss policy environment, successful experiences, obstacles, challenges of agricultural technology transfer among APEC economies; 2) Discuss how to reduce the technical trade barriers and protect intellectual property when technology transfer occurs from developed to developing economies; 3) Provide a broader understanding on how to facilitate advanced agricultural technologies transferring among APEC economies; 4) Discuss the technology needs on food security with relevant stakeholders to reach consensus on the priority technologies. Finally, participants were invited to visit the National Modern Agricultural City for Science and Technology on November 25.

The proceedings and summary are attached at the end of this report and the main outcomes of this forum were obtained as expected. The distinguished participants and experts presented a lot of outstanding opinions and suggestions on the topics, which will facilitate and accelerate agricultural technology transfer to enhance APEC food security and food safety among APEC region.

Cai Huiyi, PhD
Project Overseer, Chinese Academy of Agricultural Sciences
caihuiyi@mail.caas.net.cn

Introduction

Despite remarkable success in reducing poverty, APEC region still suffers from lack of food insecurity and food unsafety. As agreed broadly, advanced agricultural technology will greatly help APEC member economies to ensure their food security. It's necessary to identify an efficient way to facilitate agricultural technology transfer within APEC region.

The theme of this Forum is "**Strengthening Agricultural Technology Transfer for Food Security in APEC Region**". This Forum aims to brain storm knowledge on how to effectively facilitate agricultural technology transfer within APEC region, and add value in terms of building a more comprehensive and efficient agricultural technology transfer platform among APEC member economies, given the challenges of climate change, decline of arable land and increasing new technologies generated within the region.

The objectives of this Forum are:

- Discussing the policy environment, successful experiences, obstacles, challenges of agricultural technology transfer among APEC economies
- Studying how to reduce the technical trade barriers and protect intellectual property when technology transfer occurs from developed to developing economies
- Providing a broader understanding on how to facilitate advanced agricultural technologies transferring among APEC economies
- Presenting the technology needs on food security with relevant stakeholders to reach consensus on the priority technologies and recommend the results to Ministerial Meeting

The main outcomes of this Forum are expected:

- Identifying gaps in science, technology and policy on the sector of agriculture to ensure the development of productive and sustainable agricultural systems
- Developing recommendations to policy makers and other stakeholders on steps to facilitate the agricultural technology transfer
- Discussing the new partnership between private and public institute on agricultural technology transfer and identify the role of private sector on agricultural technology transfer

Invited Speakers

Keynote Speakers

- Dr. Virginia R. Cardenas, Revisiting Rural Advisory Services in the Emerging Context of Agricultural Technology Transfer in the Asia-Pacific Region
- Dr. Andrea Sonnino, Food Security and the Contribution of Agricultural Innovation
- Dr. Elsie Quaite-Randall, Technology Transfer Practices in Universities: Strategies for Private Sector Engagement
- Dr. WANG Baoqing, Capacity Building and Technology Transfer in the Context of Global Governance
- Professor Paul C. B. Liu, Successful Factors for Intellectual Property Protection and Technology Transfer of Agricultural Technology
- Dr. Yan Aoshuang, The National Modern Agricultural City for Science and Technology
- Dr. Kasdi Subagyono, APEC Policy on Agricultural Technology Transfer: developing economies' perspective and experiences
- Dr. Jennie Shen, The Private Sector and Agricultural Technology Transfer
- Mr. Kyeongha Johan Kang, Performances and Challenges of Agri. Tech. Transfer for Food Security and Safety in Korea: Two Tracks
- Dr. XIA Jingyuan, Agricultural Science & Tech Extension in China
- Mr. Yale Layton, USA's Economy Report
- Mrs. Sugunya Athipanan, Thailand's Agricultural Technology Transfer: Successful Experiences
- Dr. HAN Guiqing, Application of Engineered Agriculture in Technology Extension and Promoting Regional Agriculture Development

Panellists

- Dr. Andrea Sonnino, Chief, Research and Extension Branch, Office of Knowledge Exchange, Research and Extension, FAO
- Dr. Koyama Osamu, Director, Research Strategy Office, Japan International Research Center for Agricultural Sciences (JIRCAS)
- Dr. Kasdi Subagyono, Director, Indonesian Center for Agricultural Technology Assessment and Development (ICATAD)
- Dr. Mei Xurong, Director General, Institute of Environment and Sustainable Development in Agriculture, CAAS
- Prof. Paul. C.B. Liu, Chairman of the Cornerstone Intellectual Property Foundation (CIPF); Emeritus Professor of Chengchi University in Chinese Taipei
- Dr. Jennie SHEN, Business Development Director, Pioneer China, Du Pont China Holding Co., Ltd.

- Dr. SONG Weiping, Vice President, Beijing DBN Technology Group Co., Ltd.
- Mr. Kyeongha Johan Kang, Director, Technology Evaluation Center, The Foundation of Agri. Tech. Commercialization & Transfer (FACT), Korea

Guest Speakers

- Professor WANG Xiaohu, Latest Agricultural Technology Development and Trend in China
- Professor QIN Fu, The Development of Agricultural Economy and Modern Agriculture in China

CV of Presenters

Dr. TANG Huajun

Vice President, Chinese Academy of Agricultural Sciences (CAAS)

Lead Shepherd, Agricultural Technical Cooperation Working Group (ATCWG) APEC

Dr. Tang Huajun is a research professor and Vice President of the Chinese Academy of Agricultural Sciences (CAAS), Beijing. Dr. Tang received his B.S.(1982) in agronomy from South-west Agricultural University, China, and M.S. (1987), Ph.D. (1993) with greatest distinction in Physical Land Resources from University of Ghent, Belgium. He was Director General of the Institute of Agricultural Resources and Regional Planning, CAAS from 1996 to 2007. Over the last decades, he has served as a consultant to a number of governmental agencies, nonprofit organizations and companies including, World Bank, FAO, UNESCAP. His research areas include land use and crop modeling; remote sensing and GIS applications; agri-regional development. He has published more than 100 papers in international and Chinese scientific journals and has received a number of awards and honors including the corresponding member of Belgian Royal Academy of Overseas Science, President of the Chinese Society of Agricultural Resources and Regional Planning.

Dr. YAN Aoshuang

Director General
Beijing Municipal Science and Technology Commission

Presentation title: The National Modern Agricultural City for Science and Technology

Dr. YAN Aoshuang has been the Director General of Beijing Municipal Science and Technology Commission since March 2009.

Received her Ph.D. degree in Radiation Technology from the University of Manchester and returned to China in 1995. Working on research and application of radiation technology, she set up academic cooperation both domestically and internationally, with multiple achievements and nearly 20 top level research papers published.

Appointed as the Deputy Director of Beijing Academy of Science and Technology in 2001, as the Deputy District Mayor of Fengtai District in 2003, and moved to Xicheng District in 2008.

Dr. CAI Huiyi

Director General, Feed Research Institute, CAAS
Project Overseer of APEC Agricultural Technology Transfer Workshop

Professor and Director of Technology Transfer Center of Chinese Academy of Agricultural Sciences(CAAS). Director of Feed Research Institute, CAAS. President of Feed Economy Committee, Chinese institution of Forestry and Animal Husbandry.

Major topics are focusing on Feed and Feed additives safety, Vitamin and Amino acid nutrition, Animal growth prediction model technology, Relationship between micro ecology and animal nutrition etc.

Dr. Virginiar R. Cardenas

Vice-Chancellor for Community Affairs,
Professor in Extension Education and Community Development,
Institute of Governance and Rural Development,
College of Public Affairs and Development,
University of the Philippines Los Banos

Presentation title: Revisiting Rural Advisory Services in the Emerging Context of Agricultural Technology Transfer in the Asia-Pacific Region

Dr. Cardenas has spent the last three decades of her professional life as a professor, researcher, extension practitioner, and advocate of people-centered extension/rural advisory services. Serving both as national and international consultant on extension education, rural social development, gender and development, and institution building/capacity development she has influenced systemic change in managing rural extension including risks and vulnerabilities affecting agricultural producers. She had devoted her career in developing community-based participatory rural development approaches and tools, capacity/institution building, networking and professionalizing extension services here in the Philippines and abroad. She founded the Philippine Extension Network, Inc. She was Vice Chancellor for Community Affairs of the University of the Philippines from November 2006- October 2011.

At present she is a member of the governing body of the Global Forum for Rural Advisory Services. She serves likewise as the Regional Network Coordinator of the Asia-Pacific islands Rural Advisory Services Network. Her efforts in rural development advocacy were recognized with numerous awards given by various sectors. She had published several articles on extension and had presented several papers in national and international conferences.

Dr. Andrea Sonnino

Chief, Research and Extension Branch,
Office of Knowledge Exchange, Research and Extension,
Food and Agriculture Organization of the United Nations (FAO)

Presentation title: Food security and the contribution of agricultural innovation

Mr. Andrea Sonnino is presently Chief of the Research and Extension Branch in the Office for Knowledge Exchange, Research and Extension, FAO, Rome, Italy. The Research and Extension Branch is responsible of the activities related to capacity development of national and regional agricultural innovation systems, including research, extension and communication for development plans and strategies. In his capacity of secretary to the FAO Working Group on Biotechnology, Mr. Sonnino coordinated and supervised FAO activities for collection, analysis and dissemination of information related to biotechnology, including the FAO Biotech Web site, the electronic forum on biotechnology, the Glossary of Biotechnology for Food and Agriculture, and FAO-BioDeC, a database of biotechnologies in use or in the pipeline in developing countries.

Mr. Sonnino contributed to the formulation and implementation of Technical Cooperation Projects for biosafety capacity building and biotechnology policy formulation in several countries, including Bangladesh, Benin, Bolivia, Dominican republic, Grenada, Kenya, Malaysia, Nicaragua, Paraguay, Sri Lanka and Swaziland. Furthermore, he backstopped two projects contributing to strengthening regional collaboration on biosafety in Asia and in Latin America (Mercosur).

Before joining FAO, Mr. Sonnino worked for more that 20 years at ENEA, an Italian Research Institute, with increasing levels of responsibility. His activity was mostly related to plant breeding and biotechnology, with special focus on potato and other root and tuber crops. He worked also as visiting scientists at the International Potato Center in Lima, Peru and as consultant for the United Nation system and for the European Commission in several developing countries in Latin America, Africa and Asia. During his scientific career Mr. Sonnino published more than 70 papers in international scientific journals, co-authored or edited 9 books, presented more than 50 papers to international scientific congresses, co-ordinated several international research projects, tutored the preparation of several graduation thesis, released 3 improved varieties and one patented biotechnology, and chaired the Breeding Section of the European Association for Potato Research.

Dr. Elsie Quaite-Randall

Head of Intellectual Property and Technology Transfer, International Rice Research Institute (IRRI)

Presentation title: Technology Transfer Practices in Universities: Strategies for Private Sector Engagement

Dr. Elsie Quaite-Randall recently joined IRRI as the head of Intellectual Property and Technology Transfer. For the last 5 years she has been the Executive Director of the McMaster Industry Liaison Office (MILO) at McMaster University in Ontario, Canada. In this role she is charged with transferring the discoveries and knowledge created at McMaster University, St Joseph's Healthcare and Hamilton Health Sciences to the private sector. Her office oversees the protection, commercialization, and licensing of new technology, as well as developing and negotiating collaborative research contracts with industry partners. MILO also provides space, support and services for students and faculty with who are interested in developing their own start-up company or joint venture. She has played an active role in several spin off companies, including Accelyst, Adiga Life Sciences, ProFit HR, CPR glove and ProSensus and is on the board of several CECRs and collaborative networks. She also is the PI of the C4 network, a technology transfer community in SW Ontario. This group, funded at both the federal and provincial level works together to create a collaborative environment for technology transfer offices to share expertise, best practices and contacts creating an integrated approach to technology transfer in the region.

Dr Quaite-Randall is also an adjunct associate professor in the Department of Biochemistry and Biomedical Science. One of her major teaching interests is to help science and technology students understand the intersection of business and science. She was recently awarded a grant from the Ministry of Economic Development in Ontario to host a one year course to teach students in the science, technology, engineering and math disciplines how to create a company based on their ideas.

Prior to joining McMaster University, Elsie was the Manager of IP commercialization in the Office of Technology Transfer (OTT) at Argonne National Laboratory in Chicago, Illinois, where she evaluated inventions made by researchers for their patentability and commercial potential. Elsie was responsible for identifying prospective partners both for research and development and commercialization opportunities.
Before joining academic administration, Dr Quaite-Randall was an active researcher in the field of protein biochemistry and structural biology at Argonne National Laboratory and UV induced DNA damage in crop plants in Brookhaven National laboratory in New York.

Dr. WANG Baoqing

President and Secretary-General, China Association for International Science and Technology Cooperation (CAISTC), Former Director-General, Administrative Office, Ministry of Science and Technology

Presentation title: Capacity Building and Technology Transfer in the Context of Global Governance

Dr. Wang Baoqing graduated from Dalian Institute of Technology in 1976 with his major in mechanical manufacture and obtained his PhD in Research Institute of Animals, China Academy of Sciences in 1997.

He had a working experience at China Academy of Sciences. He held a number of positions in Ministry of Science and Technology (MOST). He was appointed Deputy Director General of Department of Social Development in 1993 and then Director of National Office for Science and Technology Awards. Later, he was appointed Director General of the Executive Office of the Ministry of Science and Technology，and Director General of Department of Basic Research, and then Senior Consultant of the Department of International Cooperation, MOST .

He served as Minister Counsellor for Science and Technology, Chinese Embassy in London from 2003-2008.

He is now the president and secretary-general at China Association for International Science and Technology Cooperation (CAISTC).

Professor Paul C. B. Liu

Chairman of the Cornerstone Intellectual Property Foundation (CIPF); Emeritus Professor of Chengchi University in Chinese Taipei

Presentation title: Successful Factors for Intellectual Property Protection and Technology Transfer of Agricultural Technology

Professor Paul C. B. Liu is the Chairman of Cornerstone Intellectual Property Foundation (CIPF), the Emeritus Professor of Chengchi University in Chinese Taipei, Visiting Professor of Center of Genomic Medicine of Chinese Taipei University, and the Co-Director of the Institute for International Intellectual Property of Peking University (IIPP). He is also the President of Asia Pacific Legal Institute (APLI) and an adjunct professor of University of Washington.

Professor Liu served as the founding Director of the Graduate Institute of Intellectual Property (IIP) and of the Center for Technology Policy and Law at the Chengchi University in Chinese Taipei. IIP is the first graduate institute for intellectual property studies in Chinese Taipei and the only one established under the business school. Prior to the establishment of IIP, Professor Liu served as the Director of the Graduate Institute of Technology and Innovation Management (TIM).
Professor Liu founded the Association of Technology Managers in Chinese Taipei (ATMT) in the year of 2002 and served as the first President. He is the former President of Licensing Executives Society Chinese Taipei (2006-2010) and the Vice President for International Relations of Association of University Technology Managers (AUTM)(2008-2010).

Professor Liu is also an honorary professor at various universities and gives lectures at many institutions around the world, including Peking University, Chinese Academy of Sciences, Tokyo University and Waseda University in Japan, University of Washington, George Washington University, Massachusetts Institute of Technology in the United States. He is an Adjunct Professor at the Business School of University of Washington.

Professor Liu is widely regarded as the pioneer for many science and technology related issues and policy developments in Chinese Taipei and China.

Born in Chinese Taipei, Professor Liu has been living in Seattle, Washington area for more than 30 years before returning to his homeland. Professor Liu received a Bachelor of Laws from Chinese Taipei University, Bachelor of Science (in Mathematics), Master of Laws (LL.M.) and Ph.D. in Law respectively from University of Washington. His research ranges from intellectual property, industrial IP management, technology laws and computer laws.

Dr. Kasdi Subagyono

Director
Indonesian Center for Agricultural Technology Assessment and Development (ICATAD)
Presentation title: APEC policy on Agricultural Technology Transfer: developing economies' perspective and experiences

Studies and Degrees

1988 Agricultural Engineer (Spec.Soil Science). Faculty of Agriculture, Brawijaya University, Malang, Indonesia.

1991 International course on land drainage, August 19 – November 29, 1991, Wageningen, The Netherlands.

1996 Master in Soil Science. International Training Centre for Post-Graduate Soil Scientists, University of Ghent, Belgium.
Thesis: Water Use Efficiency and Available Water Capacity for Irrigated Corn in a Reclaimed Saline Soil

2003 Doctor in Geoscience (Hydrology). Institute of Geoscience. University of Tsukuba. Japan
Dissertation: Linking Runoff Process and Spatial and Temporal Variation of Water Chemistry in a Forested Headwater Catchment

Employment Record:

- From 1989 to 2003
  Researcher Staff of Soil and Water Conservation Division of Center for Soil and Agroclimate Research, Bogor
- From 1989 to 2005
  Head of Soil Conservation and Water Management Division of Soil Research Institute, Center for Soil and Agroclimate Research and Development, Bogor
- From 2005 to 2007
  Director of Indonesian Agro-climate and Hydrology Research Institute (IAHRI), Bogor
- From 2007 to present
  Director on West Java Assessment Institute for Agriculture Technology (West Java AIAT), Lembang-Bandung

Dr. XIA Jingyuan

Director General,
National Agro-tech Extension & Service Center
NATESC-MOA

Presentation title: Agricultural Science & Tech Extension in China

Dr. Jingyuan Xia is the Professor and Director-general of National Agro -tech Extension & Service Center (NATESC) of the Ministry of Agriculture (MOA) of China, mainly responsible for organizing the national agro-tech extension and service through agro-tech extension systems at different government's levels. He ever worked as the Professor and Detector-general of the China Cotton Research Institute (CCRI), mainly responsible for organizing scientific research in cotton nationwide. Dr. Xia obtained his BSc in Plant Protection from the Central China Agricultural University, Wuhan, China in 1981, got his MSc in Entomology from IRRI-UPLB, the Philippines in 1988, and hold his PhD in Production Ecology from Wageningen Agricultural University (WAU), the Netherlands in 1997. He has enriched experience in agro-research and extension, and gained great achievements in those fields.

Dr. Jennie B. SHEN

Jennie B. Shen, Ph.D, EMBA
Strategy & Business Development Director,
Pioneer China

Presentation title: The Private Sector and Agricultural Technology Transfer

Jennie B. Shen serves as Strategy & Business Development Director for DuPont business Pioneer Hi-Bred in China, which is based in Beijing. In this role, she is responsible for strategy planning, developing and establishing strategic partnerships with public and private sectors, and facilitating innovative collaborations to improve research productivity and farmers' profitability.

Jennie began her career at DuPont in 1989 as a Research Scientist in Ag Biotech. Since Pioneer Hi-Bred became DuPont's fully-owned subsidiary in 1999, as Project Manager, and then Strategy Director for DuPont's Agriculture and Nutrition Executive Vice President, Jennie has devoted all her efforts to optimizing biotech research strategy and process (6-sigma) and was instrumental in strategizing and implementing the Global R&D concept. In that role, she led the establishment of the first MNC biotech research Joint Venture (JV) (Beijing Kaituo DNA Biotech Research Center Co., Ltd.) in China, partnering with Beijing Weiming Kaituo Crop Design Center Co., Ltd. She currently serves on the Board of Directors for this research JV.

Before Jennie relocated to Beijing in 2011, she was the Business Development Director for Pioneer's Asia Pacific business. She established numerous germplasm and trait collaborations across various AP countries.

Jennie holds B.S. and M.S. degrees from National Taiwan University in Agricultural Chemistry and Horticulture, respectively. She earned her Ph.D. in Plant Molecular Biology from the University of Illinois, Urbana-Champaign, in 1989. Jennie also earned an Executive MBA degree concentrated in Finance, from the University of Delaware, in 1999.

Dr. MEI Xurong

Director and Theme Leader Scientist,
Institute of Environment and Sustainable Development in Agriculture, CAAS

Mei Xurong is the Director General and Theme Leader Scientist of the Institute of Environment and Sustainable Development in Agriculture (IEDA), Chinese Academy of Agricultural Sciences (CAAS). He is also the Standing Deputy Director General of Center for Water Resources and Conservation Technologies, CAAS and president of Chinese Society of Agrometeorology (CSA), China Association of Agricultural Science Societies (CAASS). He has been engaged in the researches of agricultural water utilization and management for more than twenty years, and specified in boundary layer vapor flux, SPAC water balance, crop water requirement and productivity, water and food security, etc. He has served in the expert panel of the key project of water-saving agriculture, funded by National High Technology Research and Development Program during the 10th five year plan period (2001-2005), and currently serves in the expert panel of key national project of controlling and managing water body pollution during the period of 2006-2020. He holds B.A. and M.S. in Agro-meteorology from China Agriculture University and Graduate School of CAAS, respectively. He received doctoral course of Soil Science in China Agricultural University and training on Water Management in Agriculture in Hebrew University of Israel. He is a standing member of academic committee of CAAS and lecturer on agricultural water resource management in the Graduate School of CAAS. He has published more than 70 academic papers and more than 10 books. The most recent works include the China Agriculture Environment (2011), Dryland Agricultural Technologies and Models (2009). The study he led on regional governance and integrated development of dry land farming in northern China was awarded the second prize of National Science and Technology Progress (2001). In recognizing of his achievements in the researches in water-saving agriculture and water resource management, he was granted government allowance (2001), the prize of “MOA Distinguished Young Experts”(2004) and the 1st Grade Distinguished Talent of CAAS(2006), Outstanding Contribution Prize for the National Science and Technology Program Implementation by the Ministry of Science and Technology (2011).

Dr. HAN Guiqing

Deputy Director of Agricultural Commission of Heilongjiang Province
President of Heilongjiang Academy of Agricultural Sciences

Presentation title: Application of Engineered Agriculture in Technology Extension and Promoting Regional Agriculture Development

Guiqing Han was born in May, 1954, graduated from grassland science department of Gansu Agricultural University in 1978. He is now holding the position of deputy director of Agricultural Commission of Heilongjiang Province; President of Society of Agronomy of Heilongjiang Province; PhD instructor of Gansu Agricultural University and Harbin Normal University; and Chief Scientist of grassland science.

In recent years, Prof. Han has organized more than 10 key projects such as Major Projects on Saline-alkali Soil Exploitation of FAO. And he has been awarded ministerial and provincial awards for progress of science and technology, and Heilongjiang provincial governor special awards. It is worth mentioning that the combination of agricultural science and technology cooperation between the academy and rural counties initiated by Mr. Han brought a revolution on the application of scientific research and practice, which has got strong feedback from agriculture research institutions nationwide.
Han has written more than 100 academic and administrative papers.

Mr. Kyeongha Johan Kang

Director, Technology Evaluation Center, The Foundation of Agri. Tech. Commercialization & Transfer (FACT), Korea
Name in full : KANG, KyeongHa (Christian Name : Johann)
Year of Birth : 1956 Sex : Male
City of residence : Suwon, Republic of Korea
Email : kkhj0529@paran.com

Presentation title: Performances and Challenges of Agri. Tech. Transfer for Food Security and Safety in Korea: Two Tracks

Educational Background

Ph.D. Rural Adult Education, Graduate School, Seoul National University, Korea (2000)
Thesis: Returns to Investment on Research and Extension in Korean Horticulture
M.S. Rural Adult Education, Graduate School, Seoul National University, Korea (1988)
B.S. Agricultural Extension and Agricultural Economy, College of Agriculture, Seoul National University, Korea (1978)

Work Experience

Sep. 2009 ~ Present: The Foundation of Agri. Tech. Commercialization & Transfer
Oct. 2008 ~ Sep. 2009: National Institute of Horticulture and Herbs
Mar. 2002 ~ Oct. 2008: National Institute of Agricultural Science and Technology
Jul. 1992 ~ Mar. 2002: Rural Development Administration
Sep. 1980 ~ Jul. 1992: National Institute of Rural Nutrition Improvement

Overseas Training & Conference Attended

Aug. 2007, Presentation of a paper, "Could Adoption of the Family Agreement on Farm Management (FAFM) Improve the Legal Status of Women Farmers in Korea?" in Asian Rural Sociological Association (ARSA) 3rd International Conference, China.

Dec. 2005, Presentation of a paper, "Is Japan a Niche Market of Korean Pear?" in Seminar on Agricultural Niche Marketing for Enhancing Competitiveness, Malaysia.

Dec. 2003, Discussion on "joint research project between RDA and IRRI: Enhancing the roles of the elderly and women in agriculture," the Philippines.

May. 2001, Presentation of a country paper, "Rural women as income generator in Korea," in international workshop on Income Generating Activities for Rural Families: Identification, Planning, and Implementation, Jordan.

Jul. 1999, Study on "public service reform" at Civil Service College, U.K.

Jan. to Jun. 1988. Post-graduate studies in "the International Course of Food Science and Nutrition for Community Health and Development" at International Agriculture *Centre, the Netherlands.*

Dr. Koyama Osamu

Director, Research Strategy Office, Japan International Research Center for Agricultural Sciences (JIRCAS)
Office address: 1-1, Ohwashi, Tsukuba, Ibaraki, 305-8686 Japan
Telephone: +81-29-838-6706
Fax: +81-29-838-6316
Email: koyama@affrc.go.jp

Education: Graduated from Faculty of Liberal Arts, University of Tokyo (Mar. 1979)
Majored in Economics and Human Geography

Specialization: Agricultural economics and development policy. Econometric modeling on global issues such as food security, trade and environment. Planning and management of international agricultural research.

Work Experience:

Mar. 2006 – Present: Director, Research Strategy Office, JIRCAS
Dec. 2002 – Mar. 2006: Director, Development Research Division, JIRCAS
Oct. 1993 – Nov. 2002: Development Research Coordinator, Head of Research Coordination Section, International Research Coordinator, Senior Researcher, JIRCAS
Sep. 1-30, 1993: Overseas Technical Cooperation Officer, International Affairs Department, Ministry of Agriculture Forestry and Fisheries (MAFF)
Sep. 1986 – Aug. 1993: Econometrician, Commodity and Trade Division, Economic and Social Policy Department, Food and Agriculture Organization of the United Nations
Apr. 1979 – Aug. 1986: Administrator, Structural Improvement Bureau, Economic Affairs Bureau and Food Distribution Bureau, MAFF

Other activities:

Lecturer at University of Tokyo, Japan (2005-present)
Lecturer at Chiba University, Japan (2006-present)
Member of the Task Force on the Strategy of Science and Technology Diplomacy of the Cabinet Office, Japan (2009-2010)
Lead Author, International Assessment of Agricultural Science and Technology for Development (IAASTD) (2005-2008)
Visiting Professor at Nagoya University (2006-2007)
Member of the Experts Committee on ODA for Adaptation to Climate Change, Ministry of Foreign Affairs, Japan (2006-2007)
Expert Member of the Council of Food, Agriculture and Rural Area Policies of the Japanese Government (2001-2004)

Dr. SONG Weiping

Vice President
Beijing DBN Technology Group Co., Ltd.
Associate research fellow;
PhD in Ecology, China Agricultural University

Song Weiping now acts as Vice President of Beijing DBN Technology Group Co., Ltd., also as Vice Secretary General with Chinese Association of Animal Science & Veterinary Medicine, Secretary General and Chief Supervisor with Small Animal Protection Association of Beijing Association of Animal Science & Veterinary Medicine. His researches mainly cover the ecology of animal husbandry, organic animal husbandry, ferment engineering and feed additives, IT of animal husbandry, prevention and control strategies for major diseases of animals, and so on. He once took charge of the “973” Program, National Science and Technology Support Program during “the Eleventh Five Year Plan”, together with technology programs of the Ministry of Science and Technology, State Reform and Development Commission, and Beijing City. He has published 30-plus articles and 10-plus monographs.

ADDITIONAL REPRESENTATIVES

- Mr. Yale Layton, Economic/Commercial Officer, Department of State, USA. *USA’s Economy Report.*
- Mrs. Sugunya Athipanan, Director, Agricultural Extension Research and Development Division, Department of Agricultural Extension. *Thailand’s Agricultural Technology Transfer: Successful Experiences.*
- Professor WANG Xiaohu, Director General, Department of Science & Technology, CAAS. *Latest Agricultural Technology Development and Trend in China.*
- Professor QIN Fu, Director General of Institute of Agricultural Economics and Development, CAAS. *The Development of Agricultural Economy and Modern Agriculture in China.*

APEC Agricultural Technology Transfer Forum

AGENDA

November 23-25, 2011

Beijing, China

Organizers: Chinese Academy of Agricultural Sciences (CAAS)

Beijing Municipal Sciences & Technology Commission

Venue: Beijing Friendship Hotel

APEC Project ATC 06/2010A

Wednesday, November 23, 2011	
08:00–09:00	Registration Venue: 1st Floor, Friendship Palace

Plenary Session

Venue: Ballroom, 2nd Floor, Friendship Palace

09:00–09:40	**Opening Remarks** Chair: Dr. TANG Huajun, Vice President of CAAS, ATCWG Lead Shepherd
09:00–09:10	Mr. ZHANG Taolin, Vice Minister, Ministry of Agriculture
09:10–09:20	Mr. LE Yucheng, Assistant Minister, Ministry of Foreign Affairs
09:20–09:30	Mr. JIA Jingdun, Director General, Administrative Office of National City of Modern Agricultural Science and Technology
09:30–09:40	Mr. XUE Liang, Senior Advisor, Chinese Academy of Agricultural Sciences (CAAS)
09:40–09:50	Opening Ceremony of Information Platform for Sci-tech Achievements Trade, the National City of Modern Agricultural Science and Technology
09:50–10:00	Coffee break
10:00–12:00	**Invited Speech** Chair: Dr. CAI Huiyi, Director General, Feed Research Institute, CAAS; Project Overseer of APEC Agricultural Technology Transfer Workshop
10:00–10:30	**Dr. Virginia R. Cardenas**, Vice-Chancellor for Community Affairs, University of the Philippines Los Banos **Presentation title**: Revisiting Rural Advisory Services in the Emerging Context of Agricultural Technology Transfer in the Asia-Pacific Region
10:30–11:00	**Dr. Andrea Sonnino**, Chief, Research and Extension Branch, Office of Knowledge Exchange, Research and Extension, FAO **Presentation title**: Food Security and the Contribution of Agricultural Innovation
11:00–11:30	**Dr. Elsie Quaite-Randall**, Head of Intellectual Property and Technology Transfer, International Rice Research Institute (IRRI) **Presentation title**: Technology Transfer Practices in Universities: Strategies for Private Sector Engagement

11:30–12:00	**Dr. WANG Baoqing**, President and Secretary-General, China Association for International Science and Technology Cooperation (CAISTC), Former Director-General, Administrative Office, Ministry of Science and Technology **Presentation title**: Capacity Building and Technology Transfer in the Context of Global Governance
14:00–16:30	**Invited Speech** Chair: Dr. ZHANG Lubiao, Director General, Department of International Cooperation, CAAS
14:00–14:30	**Professor Paul C. B. Liu**, Chairman of the Cornerstone Intellectual Property Foundation (CIPF); Emeritus Professor of Chengchi University in Chinese Taipei **Presentation title**: Successful Factors for Intellectual Property Protection and Technology Transfer of Agricultural Technology
14:30–15:00	**Dr. YAN Aoshuang**, Director General, Beijing Municipal Science and Technology Commission, China **Presentation title**: The National Modern Agricultural City for Science and Technology
15:00–15:30	**Dr. Kasdi Subagyono**, Director, Indonesian Center for Agricultural Technology Assessment and Development (ICATAD) **Presentation title**: APEC Policy on Agricultural Technology Transfer: developing economies' perspective and experiences
15:30–16:00	**Dr. Jennie Shen**, Business Development Director, Pioneer China, Du Pont China Holding Co., Ltd. **Presentation title:** The Private Sector and Agricultural Technology Transfer
16:00–16:30	**Mr. Kyeongha Johan Kang**, Director, Technology Evaluation Center, The Foundation of Agri. Tech. Commercialization & Transfer (FACT), Korea **Presentation title**: Performances and Challenges of Agri. Tech. Transfer for Food Security and Safety in Korea: Two Tracks
16:30–16:40	Coffee break
16:40–17:55	**Economy Report** Chair: Dr. FENG Dongxin, Deputy Director General, Department of International Cooperation, CAAS
16:40–17:10	**Dr. XIA Jingyuan**, Director General, National Agro-tech Extension & Service Center **Presentation title**: Agricultural Science & Tech Extension in China

17:10–17:25	**Mr. Yale Layton**, Economic/Commercial Officer, Department of State, USA **Presentation title**: USA's Economy Report
17:25–17:40	**Mrs. Sugunya Athipanan**, Director, Agricultural Extension Research and Development Division, Department of Agricultural Extension **Presentation title**: Thailand's Agricultural Technology Transfer: Successful Experiences
17:40–17:55	**Dr. HAN Guiqing**, President, Heilongjiang Academy of Agricultural Sciences **Presentation title:** Application of Engineered Agriculture in Technology Extension and Promoting Regional Agriculture Development
19:00–20:00	Dinner sponsored by Organizers (Buffet, Juheyuan Restaurant, 1st Floor, Friendship Palace)

Day 1–2

Wednesday, November 23 to Thursday, November 24, 2011	
09:00–17:00	**Advanced Agricultural Technology Exhibition** **Venue**: Ballroom, 2nd Floor, Friendship Palace

Day 2

Thursday, November 24, 2011

Session I: APEC Agricultural Technology Transfer Workshop

Venue: Ballroom, Building 1

Co-ordinator: Dr. GONG Xifeng, Deputy Director General, Department of International Cooperation, CAAS

09:00–12:00	**Seminar I:** **Topics of Discussion:** • Agri-tech Transfer in Climate Change and Food Security; • Technology Transfer Cooperation among APEC Member Economies **Chair:** Dr. Virginia R. Cardenas, Vice-Chancellor for Community Affairs, University of the Philippines Los Banos

	Panellists: Dr. Andrea Sonnino, Chief, Research and Extension Branch, Office of Knowledge Exchange, Research and Extension, FAO Dr. Koyama Osamu, Director, Research Strategy Office, Japan International Research Center for Agricultural Sciences (JIRCAS) Dr. Kasdi Subagyono, Director, Indonesian Center for Agricultural Technology Assessment and Development (ICATAD) Dr. Mei Xurong, Director General, Institute of Environment and Sustainable Development in Agriculture, CAAS
14:00–18:00	Seminar II: Topics of Discussion: • Intellectual Property in Technology Transfer; • Role of Private Sector in the Agri-tech Transfer Chair: Dr. Elsie Quaite-Randall, Head of Intellectual Property and Technology Transfer, International Rice Research Institute (IRRI) Panellists: Prof. Paul. C.B. Liu, Chairman of the Cornerstone Intellectual Property Foundation (CIPF); Emeritus Professor of Chengchi University in Chinese Taipei Dr. Jennie SHEN, Business Development Director, Pioneer China, Du Pont China Holding Co., Ltd. Dr. SONG Weiping, Vice President, Beijing DBN Technology Group Co., Ltd. Mr. Kyeongha Johan Kang, Director, Technology Evaluation Center, The Foundation of Agri. Tech. Commercialization & Transfer (FACT), Korea
18:00–18:05	Closing Remarks (Dr. Cai Huiyi, Project Overseer of APEC Agricultural Technology Transfer Workshop)

Session II: 4th China Advanced Agricultural Technology Exhibition

Venue: Ballroom, 2nd Floor, Friendship Palace

08:30–09:00	Ceremony of Award for Important Progress in Agricultural Technology Industrialization from 2010 to 2011
09:00–11:00	Invited Speech

09:00–10:00	**Presentation title**: Latest Agricultural Technology Development and Trend in China **Speaker**: Professor WANG Xiaohu, Director General, Department of Science & Technology, CAAS
10:00–11:00	**Presentation title**: The Development of Agricultural Economy and Modern Agriculture in China **Speaker:** Professor QIN Fu, Director General of Institute of Agricultural Economics and Development, CAAS
11:00–11:30	Award-winning Project Promotion and Partnering
13:30–17:30	**Promotion and Partnering**
	Latest Agricultural Technology Promotion and Partnering from Research Institutes **Participator:** CAAS, China Agricultural University etc.
	Technology Promotion and Partnering from Enterprises **Participator**: The Foundation of Agri. Tech. Commercialization & Transfer，Korea; Zhejiang Aofutuo Chemical Co. Ltd. etc.
	Technical Requirements of Agricultural enterprises **Participator**: Beijing DaBeiNong Technology Group Co., Ltd. etc.
	Promotion of Agricultural Service System for Intellectual Property **Participator**: Technology Transfer Center of Chinese Academy of Agricultural Sciences etc.
	Agriculture Fund Promotion **Participator**: Zhongnongke Agricultural Industry Development Fund etc.

Day 3

Friday, November 25, 2011	
09:00–17:00	**Field Trip** Visit the National Modern Agricultural City for Science and Technology

APEC Agricultural Technology Transfer Forum
Proceedings and Summary

APEC economies are seen as the heart of explosive growth for regional economic growth in the past years but many are burdened by overpopulation. There is a very wide diversity among member economies in agricultural/farming systems and levels of economic development. APEC region still faces serious problems in food security and food safety in the rural areas, a large proportion, which live only by agriculture and face global climate change.

Advanced agricultural technology will greatly help APEC member economies enhance food security and food safety. Innovation in agriculture can be a major source to meet the growing demands of population and urbanization. However, technology resources are not balanced within APEC region. Intellectual property rights and incentive issues and trade barriers problems still impede sharing advanced technologies; technology demand and supply information cannot be shared in time; sometimes the transferring process is time consuming and inefficient.

The APEC Agricultural Technology Transfer Forum was therefore structured to discuss to establish an efficient APEC agricultural technology transfer platform including analyzing the existing policy environment, sharing successful experiences and best practices, developing more efficient models and improvements to the investment environment of agricultural technology transfer among APEC economies and improving technology transfer mechanisms at governmental and institutional levels within APEC region to ensure that all economies could benefit in the future from available agri-technologies of food security and food safety.

The Forum was held from 23-25 November 2011 in Beijing, China by the Chinese Academy of Agricultural Sciences (CAAS) and the Beijing Municipal Sciences & and Technology Commission and included a plenary session and a workshop with more than 500 participants from 19 APEC member economies. The 4th China Advanced Agricultural Technology Exhibition was also held in parallel with the APEC Forum. Many of the participants were senior level officials and representatives from the agricultural extension services, academia, research institutions and agricultural enterprises. Mr. Tang Huajun, vice chairman of the Chinese Academy of Agricultural Sciences and the leader of the APEC Agricultural Technical Cooperation Working Group, chaired the meeting.

Ⅰ. Plenary Session:

This session focused on discussing the policy environment, successful experiences, current obstacles and challenges, so as to develop an effective and efficiency model of agricultural technology transfer and investment environment of agricultural technology transfer among APEC economies. It also provided an opportunity for developing economies to share the best successful practices and lessons, which highlighted the strengthening of international cooperation in agricultural technology, especially the reduction of technical trade barriers and protection of intellectual property rights when technologies are transferred from developed to developing economies.

Dr. Virginia Cardenas, Vice Chancellor for Community Affairs, University of the Philippines Los Banos, presented "Revisiting Rural Advisory Services in the Emerging Context of Agricultural Technology Transfer" .

Dr. Cardenas presented that the role of rural advisory services in the emerging context of agricultural technology in APEC Region. She stated that food security had been global concern because of the emerging realities of growing global population, declining quality of agricultural and natural resources, shrinking area of agricultural lands, unabated rural poverty and global climate change. Climate change and other forms of instabilities (social, economic, political, etc) had increased the risks faced by food producers, consumers, and distributors thereby affected their level of productivity, vulnerability and readiness to respond. Several measures including changing rural development pathways and institutional reforms are seen forthcoming. However, the readiness of our local institutions to respond effectively apparently remains uncertain.

Dr. Cardenas also discussed that farmer adaptations, such as switching crop varieties, introducing more suitable crops, or shifting from crops to grazing, can often be undertaken by individual farmers through the agricultural technology transfer process with an agricultural advisory service or agricultural extension. Hence, in recent years there has been renewed interest in agriculture as a key driver of development and poverty reduction to food and a calculated increase in population in 2050. It is the time to change context of agricultural technology. Technology transfer within the Agricultural Innovation System (AIS) is a key issue now. A new extension system is recognized as a strategic component of new institutional frameworks that may address climate change adaptation and mitigation, food security, and vulnerability. The complexity of extension in aligning itself to new demands and opportunities, new platforms in rural education, learning, exchange and coordination, requires more understanding of the process, and requisites of the "new extension" and the roles that local institutions play as well as their readiness to partner within a pluralistic type extension that characterizes most of APEC economies.

Dr. Cardenas emphasized again that innovative technologies are more and more important to the growing demands of demographic and social developments as well as changing consumption patterns. Technology is defined as process of moving technology from the source to its intended users. Research and development institutes and universities are the primary sources of technologies; extension delivery can be done by local governmental units, NGOs, and other rural advisory providers.

She recommended that we should speed up the delivery of an alternative system - AIS to the current research and extension process. AIS will examine and analyze the numerous conditions and relationships that promote innovation in agriculture. Different from a traditional top down system with a demand driven approach to agricultural R&D and a passive recipient of technology from public research institutions, the AIS new system places the farmer in the center of the agricultural system encircled by multiple participants including consumers, exporters, input suppliers, producer organizations, land and credit agencies and various government agricultural organizations. The idea is integration of all participants in the process of innovation within a total agricultural system.

Dr. Andrea Sonnino, Chief, Research and Extension Branch, Office of Knowledge Exchange, Research and Extension, Food and Agricultural Organization (FAO), presented "Food Security and the Contribution of Agricultural Innovation".

Dr. Andrea Sonnino stated that the global challenges of food insecurity are huge and over 925 million people are suffering from food insecure. Food demand is rising as result of population growth, increased per capita food consumption with unbalanced diet and rapid urbanization. The growing food demand must be met by mainly increased yields, but climate change and its extreme weather impacts pose a huge challenge. However, agriculture technology transfer is one of the key solutions to this crisis.

In the past, technology transfer was seen as a linear, top down style system between the researchers and the farmers who were passive recipients. This model worked well during the green revolution, but is slow, expensive and inefficient in the long run. Dr. Sonnino introduced AIS as a new model in which an interchange of technologies, practices and knowledge is learned by all the stakeholders who interact together and share the risks and benefits. The interaction of institutions and policies is driven by the market, the environment, resource availability, infrastructure, and political and normative factors.

He emphasized that the FAO and several other G20 sponsored organizations

have proposed the Tropical Agriculture Platform (TAP) which seeks to promote and ensure impact on international scientific partnerships for capacity building in agriculture. It is focused on bringing new products, processes and forms of organizations into new social and economic use. TAP has four components: 1) capacity and need assessments; 2) development of individual's capacities (exchanges of experts, fellowships, group training and learning resource development); 3) development of institutional capacities (collaboration between research institutions and organizational learning and change) and 4) information and knowledge sharing.

Dr. Elsie Quaite-Randall, Head of Intellectual Property and Technology Transfer, International Rice Research Institute – IRRI made the presentation "Technology Transfer Practices in Universities: Strategies for Private Sector Engagement".

Dr. Elsie Quaite-Randall outlined the intellectual property rights (IPR) process from initial discovery in universities laboratories through proof of concept to prototype products which can be sold in market by private sector firms to consumers, including the agricultural sector. The financial return of this technology transfer brings considerable funding ($2.4 billion in license fees) and prestige. Through careful negotiation with private firms and balanced contractual agreements, the universities can retain IPR to their discoveries and continue to do research as part of their basic role in society.

She emphasized that evaluation of the technical discovery was the most critical step of the process. Assessing the value of the potential product should be analyzed in terms of the market. Dr. Quaite-Randall explained that universities need to follow the technology transfer strategy of evaluating their new inventions, cooperating with commercial firms and other sponsors and then transfer the access to the Intellectual Property (IP) and technology into the public arena.

Dr. Baoqing Wang, President and Secretary-General, China Association of International Science and Technology Cooperation (CAISTC), reported "Capacity Building and Technology Transfer in the Context of Global Governance" .

Dr. Wang described Chinese position on technology transfer within the wider global context. Global governance is an aggregate of managing and solving global issues and other common concerns dealing with different public and private sectors. There are many participants, but governments play key roles. He believes that it should be a win-win process with cooperation, openness and best practices designed to bring shared benefits with the common

participators.

Many international organizations do not regard capacity building and technical transfer as main missions, but he believed that these should be scrutinized under framework of global governance. He recommended APEC to put capacity building into its priorities for the region.

Dr. Wang said that some of the multi-national companies could provide some technologies, but they use cheap labor and are not willing to transfer updated technologies or offer adaptable technologies to developing economies. He believes that IPR in agriculture should be transferred at lower or concessionary prices to developing regions or economies.

Dr. Paul C. B. Liu, Chairman of Cornerstone Intellectual Property Foundation (CIPF), presented "Successful Factors for Intellectual Property Protection and Technology Transfer of Agricultural Technology" .

Dr. Paul Liu stated that successful technology transfer required coordination of IPR which varies in laws and application depending on the specific economy. Creators of technological advances need financial gain to pay for their initial research work and apply funding to continue producing future technology innovations.

In recent years, applications for patents and trademarks to be protected by IPR have increased substantially. IP is dependent initially on technology and market incentives. Successful IP creation needs patentability of plant and animal technology advances and IPR depends on the laws and regulations in the various economies. Finally, IP management is dependent upon policy and any restrictions which influence potential technology transfer.

Professor Liu discussed several case studies that the process of IPR brought success to several companies. One Chinese Taipei firm used its technology to produce high quality grain dryer and solar water heater that rapidly gained up to 60% market share. Another firm created a vertically integration commercial operation that collected and 80% market share for colored chickens. The creators of new technology used the profits from their commercial success to increase their market share and continue development for future R&D innovations.

Dr. Liu pointed out that an economy's position on IPR often depends on its degree of economic development. On the first stage, an economy might pirate IP and copy it to produce cheap products. With the development of economy, there is a middle stage that half of the IP is copied from abroad and the other

half is self-developed and IP protection is sought. On the most economically developed stage, the economy will try to protect all of its self-developed IP.

Mr. Ping Zhang, Beijing Municipal Science and Technology Commission, China, presented "The National Modern Agricultural City for Science and Technology".

Mr. Ping Zhang outlined Beijing's efforts to advance agricultural technology through mobilization of the region's extensive intellectual, financial and other resources. Many other capital cities in major world powers have made extensive efforts for "green space," often with concurrent agricultural production. The Beijing District has a large farming area within its boundaries, and an agricultural population of 2.7 million people who produce considerable amounts of food. As the capital of the China, Beijing can utilize the area's scientific and technical organizations to upgrade the level of agricultural development and also attract international firms with new technology. To demonstrate new technology, one of the Beijing District had built agricultural technology demonstrations parks with Dutch irrigation systems; the large Beijing population provides a very accessible market for any agricultural products which are produced with the new technologies.

Dr. Kasdi Subagyono, Director of Indonesian Center for Agricultural Technology Assessment and Development, gave the presentation "APEC Policy on Agricultural Technology Transfer: Developing Economies' Perspective and Experiences".

Dr. Kasdi Subagyono said that APEC members need to make economic transformations, particularly in the agricultural sector, and move from a resource-based to an investment-based and then ultimately to an innovation-based economy. Agricultural development cannot be separated from the context of technology and innovation.

Technological innovation and agricultural development require the creation of appropriate technology. It requires the achievement of efficiency and effectiveness in aspects of the transfer and distribution systems of technical innovation. In APEC economies, there is diversity in creation and transfer process of agri-tech due to the difference of climate, political system, geographic characteristics, society/culture, and policies.

The mode of agricultural research development agency and the local provincial institute with further structures was used at Indonesia district level. The extension service receives assistance from universities and colleges, NGOs, farm groups and private sector organizations. Success of technology transfer depends on coordination with various providers of technology, local distributors and local government agencies.

Dr. Kasadi Subagyono also introduced successful extension service cases include the producing of higher fiber cassava flour, lemon grass used as bio fuel for trucks, cocoa production bettered by grafting.

Dr. Jennie Shen, Business Development Director, Pioneer China, DuPont China Holding Company, gave the presentation "The Private Sector and Agricultural Technology Transfer".

Dr. Jennie Shen outlined how private sector firm could bring innovation and new technology to solve specific agricultural improvement problems with governments and NGOs etc. To meet the growing demand for food, farmers must improve the efficiency of food production through various methods and means such as improving seed quality, equipment update and efficient fertilizer use. There is substantial potential to increase production, for example, China's corn production is 2/3 per acre of that of the U.S.

She described the role of the private sector in agricultural technology transfer and introduced Pioneer's business development model. Pioneer's approach to business development model consists of three pillars. The first pillar is Open Innovation, pursued by finding mutual value for both business and the community beyond corporate social responsibility. The second pillar is Technology Transfer involving products, inputs, people, knowledge and best practices globally. The third pillar is Capacity Building for farmers. Technology transfer to farmers means more than just agronomic information or products and it also involves market information, communications technology and financial risk management, etc.

She provided four projects in Australia, India, Africa and China to demonstrate Pioneer's approach to process technology transfer collaboratively which can build capacity of market access and consumer needs for farmers. Its goal is to increase the income level of small farmers by 60% in rural areas, also achieve a sustainable improvement to pursue their livelihood. These projects were implemented in partnership either with local NGO's or with Bill and Melinda Gates Foundation.

She emphasized in her conclusion that in Pioneer's experience, the key to technology transfer had been global innovation. In APEC region, the seed market holds tremendous growth potential. Urbanization and poverty alleviation are major drives for technology needs. A united front between public and private sectors based on collaboration through technology transfer would be the most effective way to deliver the innovations, products and knowledge that farmers need to feed the world today and future.

Dr. Kyeongha Johan Kang, Director, Technology Evaluation Center, the Foundation of Agricultural Technology Commercialization & Transfer (FACT), Korea, gave the speech on "Strengthening Agricultural Technology Transfer for Food Security in APEC Region".

Dr. Kang described the Korean development from a poor and war devastated economy in the early 1950's to a highly industrialized and manufacturing nation with highly developed agriculture. Mr. Kang believed that food security and food safety were important as a primary responsibility of a regional government because food security and safety could affect the level of human health and life directly and also the impacts on governmental policies.

In the early 1950's, Korea had little remaining infrastructure, few natural resources, and limited human capital. In 1960, President Park initiated national goals of self sufficiency in rice and creation of light industries. To improve rice production, the Rural Development Administration was established in 1962 to extend agricultural technology to the countryside. At the same time, the economy used foreign aid and capital, also imported technology and raw materials to develop manufacturing and earn dollars from exported goods. Investment was given to ensure that the overall human capital level was raised.

The agricultural technology transfer started in the 1960s with the green revolution and continued in 1973 with the Saemaul Undong, which sought to overcome difficulties from first oil shock. This program improved the level of life and changed people's ideas. It improved agricultural productivity and raised the income of young farmers through overall modernization of the economy.

Mr. Kang said that food security and food safety required the development of infrastructure, agricultural technology and institutional establishment. Agricultural technology is crucial to agricultural development as it create effective linkage between research and extension such as seed production and supply system, soil and nutrition management systems, breeding technology and post harvest management.

To spur technical dissemination, the cooperation between agricultural research and extension agencies can bring practical or appropriate technologies adaptable in the fields which are more urgent than transfer highly difficult technologies (pedal power is better where there is no or little electricity). This cooperation will also help to identify/solve problems at actual research and extension fields. The most important task is to provide appropriate and adaptable technology. Technology innovation cannot be successful unless there first exists basic infrastructure (good roads, fuel for machines, ability buy basic items such as seeds & tools).

Dr. Jingyuan Xia, Director General, National Agro-tech Extension and Service Center (NATESC), made the report on "Agricultural Science & Technology Extension in China".

Dr. Xia described the substantial agricultural extension system and how it helped in technology transfer within China and prospects for future reform.

As one of the largest countries in the world, China grows huge amounts of crops and livestock and has the world's biggest agricultural extension system. Also in China, there are numerous agricultural universities and research institutes. To increase the quantity and quality of food and agricultural products, science and technology has played a key role in this effort for long time. Agricultural technology expanded to increase rice production when the green revolution began in the 1960's and breed hybrid rice in the 1970's. Bio-technology improvements began in the 1990's. The increase in science and technology grew from 27% in the early 1980's to 52% in 2000-2005.

In general, improvements began with transformations in crop varieties through hybridization, integration and industrialization. Cultivation efficiency was improved through mechanization, simplification, promotion of standardization. The high efficiency pesticides with low toxicity were utilized to keep soil balance. The key point was focused on working efficiency, better resource use and land use efficiency.

Dr. Xia pointed out that the Chinese agricultural extension service needed to be reformed. He highlighted the government reform strategy which will include new methods of delivery, greater education levels of both farmers and extension service staff, rapid changes in communications such as internet, improved organizational structures and new types of technology research all spur reforms. One key reform will be a move from a top-down approach to a bottom-up approach which recognizes that the farmer is key partner for successful food production growth. There will be a shift from a technology based extension system to a farmer based one. China is not alone in making reforms to its agricultural extension service. These reforms are similar within APEC economies.

Mr. Yale Layton, Economic/Commercial Officer, U.S. Department of State, presented "USA's Economy Report" .

Mr. Yale Layton explained the long history of central government support in the U.S. for agriculture. The U.S. Congress established land grant universities in 1862 and then specifically created an extension program in 1887. While the number of farmers in the U.S has decreased over the years, but the

tremendous amount of food products grown by the remaining farmers is astonishing. The private sector performs 2/3's of agricultural research today in the U.S. and many of new technologies come from private sector. There are four important elements which are needed to maintain improvements in agriculture: 1) IPR, 2) tax and credit, 3) framework for new technology and 4) rules of law/legal system.

Dr. Sugunya Athipanan , Director of Agricultural Extension Research and Development Division, Department of Agricultural Extension, gave the presentation "Thailand's Agricultural Technology Transfer: Successful Experiences".

Dr. Sugunya Athipanan introduced Thailand's agricultural extension organizations which serve for farmers on agricultural technology transfer to increase food production.

Thailand established the Department of Agricultural extension in 1967. This Department seeks to increase the capacity of farmers, local organizations and community enterprises in the production and management of agricultural products to meet domestic food demand, and also conduct agricultural extension research and development.

The Department was composed by a central administration with six regional offices with further division of sub offices in provinces and districts in order to provide direct assistance to farmers as much as possible. This extension effort to bring assistance to the farmers continually has developed over many years. From 1967 to 1975, the mode was one extension agent serving for 4,000 farm families with the goal to assist with loans for irrigation and teach better production techniques.

During 1978 to 1992, by the assistance of World Bank, the Department organized home economists and brought more training and improvements of technologies to farmers. This period also focused on human resource development for extension personnel and farmers. In 1999, there was further decentralization at the sub-district levels which were designed to provide better information at local level to farmers and improve their skills. In 2011, the emphasis was the participatory approach and analytic thinking process.

The Thailand government stresses that community development starts locally. The government supports the local farm community to realize their natural resources, respect their customs and recognize local knowledge and make best advantage of that knowledge.

Dr. Guiqing Han, President, Heilongjiang Academy Agricultural Sciences

(HAAS), presented on "Application of Engineered Agriculture in Technology Extension and Promoting Regional Agriculture Development".

Dr. Han introduced the success cases in promoting expansion of agricultural production through technology transfer in Heilongjiang Province. The contributions and capacities of the agricultural research systems of the developed economies were also introduced. To speed scientific and technology innovations with technology transfer, HAAS has made great effort in systemic engineering and farmer training, demonstrating expert working stations, scientific and technology demonstration parks. The new way to agricultural development resulted in speeding up application and extending agri-tech transfer.

Agriculture technology transfer rates in Heilongjiang province increases from 30 to 70% from 2003 to 2010. There was an increase in sowing areas of improved plant varieties from 90 to 98 %. The famous high yield potato varieties were supported by the government. Overall, the contribution rate of science and technology grew from 48% to 60%.

Engineered agriculture changed agriculture production modes and the farmer's life style from the traditional understanding of rural economic development to an agriculture batch production system including cultivation, fertilization etc.

Some major messages emerging from these sessions included:

1. A brand new economic and scientific framework requiring a new, more complex model for transferring technology among APEC economies should be set up. The policy support including regulations and procedures of agricultural technology transfer is necessary. All participants agreed that our old agricultural extension service needs to be reformed. As Dr. Xia, Jingyuan (Director General of NATESC/China) pointed out: the new model of agri-tech transfer include new methods of delivery knowledge, improving education levels of farmers and extension service staff, rapid changes in communications such as internet, improved organizational structures and new types of technology. One key reform will be a move from a top-down approach to a bottom-up approach which recognizes that the farmer is key partner for increasing food production. All the speakers emphasized that the agricultural innovation system (AIS) was the new model in agricultural technology transfer process. It will be an effective model of agri-tech transfer among APEC economies.

2. A new extension system – AIS is recognized as a strategic component of new institutional frameworks that may provide the foundation for successful and efficiency implementation of the technology transfer and address climate change adaptation and mitigation, food security, and vulnerability. The complexity of the extension in aligning itself to new demands and opportunities, new platforms in rural education, learning, exchange and coordination, requires more understanding of the process, and the roles local institutions playing as well as their readiness to partner within a pluralistic type extension that characterizes in most of the APEC economies. The interaction in the AIS is between the institutions and policies which are then driven by the market, the environment resource availability, infrastructure, science & technology and political and normative factors.

3. One of the key strategies for agri-tech transfer in APEC economies among developing economies is capacity building which is based on the farmer/local community. It can be our pillar to address our common issues and enhance the innovation system. This capacity building would have, first, an enabling environment; secondly, an institutional developing/strengthening policy and thirdly, human capital. If individual economy lacks the institutional structures, the framework to receive and distribute the inputs of agriculture, the improved quality and quantity of transfer material will be useless. Farmers must have many skills, not just technologies, but also the leadership and facilitation to be successful in the technical innovation process. If the transfer fails, the major challenges of food security and climate change will not be resolved for the common good.

4. Agri-tech transfer needs to identify the gap between availability and application for farmer. Farmers seek profitability and simplification to handle the technologies. The new technology transfer should have a proper and prepared structure with political/communal support available to ensure that the inputs will be effectively utilized. The philosophy of “local is better” should be adopted and every effort should be made to ensure that the ultimate recipient of the technology transfer – the farmer is full and willing participant from the very initial stages. The farmer needs to participate from beginning of the technology transfer process.

5. The first step of agri-tech transfer is to determine what is the inherent risk and inherent cost. And before starting the innovation we should analyze what benefits will be brought to the farmer and what is the technology appropriate to the needs and conditions of the farmer. The cooperation of agri-tech transfer will also make partner economy staff to identify/solve problems at actual research and extension fields. The most important task is to provide appropriate & socially adaptable technology. Technology innovation cannot be successful unless there first exists basic infrastructure (such as good roads, fuel for machines, ability buy basic items such as seeds & tools).

6. Many speakers highlighted that international efforts are important but they

must work in partnership with many APEC members and others from other regions. Private/public partnership is also important, and the private sector is always touted as bringing more efficiency to the table. However, sometimes there are cases where the private sector is not interested in a certain field so the public sector may have to push the technology development. It is agreed that the public-private partnerships can open innovation, technology transfer and bring value to farmers.

7. Many speakers stressed that Intellectual Property Rights (IPR) must be protected to promote the continuing flow of innovation development. Over time, with the development of economy, the private firms will change from copying technology simply to self development of technology and finally seek IPR protection actively. But in the developing economies, there is a need for NGO and/or economic assistance to provide IP which can start the process of agricultural technology transfer.

Ⅱ. Workshop

Implementing this workshop could help APEC developing economies obtain advanced agricultural technology and hence using these technologies to improve their food security and food safety situation. This workshop finally helps achieving APEC goal of “Enhancing APEC Food Security” and will benefit APEC region as a whole.

Simply transferring technology is not enough — economies which received the technology must be able to apply it and combine it with domestic technology advances. The workshop analyzed the status quo and challenges of agricultural technology transfer on food security and food safety within APEC region, combined with background analysis and opinion. The main themes of this workshop are as follows:

- **Agri-tech Transfer in Climate Change and Food Security;**
- **Technology Transfer Cooperation among APEC Member Economies;**
- **Intellectual Property in Technology Transfer;**
- **Role of Private Sector in the agri-tech Transfer;**

The opening discussing of the workshop covered a number of issues in each of the main themes. Specific recommendations for each of the issues were made to help the APEC economies to ensure the development of productive and sustainable agricultural system and facilitate agricultural technology transfer.

Seminar I:

- **Agri-tech Transfer in Climate Change and Food Security;**

- **Technology Transfer Cooperation among APEC Member Economies**

There is common agreement that climate change will produce devastating effects on the agricultural production. Within the APEC region, the islands around the Pacific Ocean may be suffered from rising sea levels and serious flooding. However, the panel members coming from the economies which face the prospect of increased serious flooding and related salinity impacts need great assistance from the APEC region for technology transfer measures to mitigate these problems.

Regional cooperation on studying the effects of climate change and the adaptation to climate change within APEC region is necessary. A problem recognized is that it is difficult to locate funds to invest in research on climate change and its potential impacts. The continually decreasing public sector investment and the private sector's focusing on short term profits lead to serious challenges in the future in APEC region.

Indonesia is popularizing weather principals to farmers so that they can learn about the increasingly unpredictable and extreme weather variations that will change crop scheduling and reduce production. Rising sea levels also bring special problems. Indonesia has started agri-tech transfer programs in this area and helped farmers to solve the problems brought by increased rainfall and poor drainage. Any help from technology transfer would greatly influence food security.

The workshop participants represented a diversity of their primary corps in their respective economies. Economies like Indonesia, the Philippines and Viet Nam may be interested in technology transfer to protect their rice corps while China and other economies will seek protection for wheat and horticulture corps and other coastal regions seek help for their fisheries. It was agreed that a regional inventory of the current impacts on agriculture by climate change is needed to determine future remedial actions.

The increasing cost of petroleum products also has tremendous effect on the agricultural sector such as the high usage of gasoline for food machinery and food drying/processing and transportation to storage and final consumer. Any technology transfer which can use locally based energy systems, such as small scale wind and solar energy production are of great importance and positive impact in the rural community. Alternate energy forms could be an important element to alleviate the negative effects on food production caused by climate change.

A consensus can be collected from the workshop for a variety of recommendations around the following common themes:

1. It is urgent to build a centrally-financed regional research center on climate change and the impacts resulting for a variety of negative factors on food production. These factors include: rising sea levels on coastal farming areas and supporting infrastructure; rising salinity levels; greater flooding of producing paddies and fields; shortened cropping seasons due to variations in rainfall and timing; transportation connected to farm inputs (such as fertilizer and seeds) and concerns about bio-diversity due to climate changes. An inventory by individual economy would best help APEC members to alleviate the impacts of climate change.

2. One of the key strategies for agri-tech transfer in APEC economies is capacity building which is based on the farmer/local community. It can be our pillar to address our common issues and enhance the innovation system. This capacity building would have, first, an enabling environment; secondly, an institutional developing/ strengthening policy and thirdly, human capital. If individual economy lack the institutional structures, policies/frameworks and political support to receive and distribute the outputs of agriculture, technology transfer will be useless.

3. The traditional extension services of the individual economy have continually improved their internal structures and modified the manner in which they cooperate and collaborate with the organizations (NGOs, educational institutions, other government entities and private sector firms) to share the technology transfer innovations. Now it is the time to change the context of agricultural technology into a more efficient innovation system such as Agricultural Innovation System.

4. It is all agreed that regional efforts as well as private/public partnership are important among APEC members. Investigating potential technology transfer for alternate energy systems such as wind, solar and others can help individual farmers or cooperatives to develop local energy to meet their demands.

5. One of the elements of agri-tech transfer is to identify the availability and application of the technologies for farmer. Farmers seek profitability and simplification to accept the technologies. Technology transfer should have a proper and prepared mode with political/communal support available to ensure that the inputs will be effectively utilized. The philosophy of “local is better” should be adopted and every effort should be made to ensure that the ultimate recipient of the technology transfer – the farmer is a full and willing participant from the very initial stages. The farmer needs to participate from beginning of the technology transfer process.

6. Cooperation between agricultural research and extension agencies can bring practical or appropriate technologies adaptable in the fields which are more urgent than transfer the complex technologies (pedal power is better where there is no or little electricity). This cooperation will also bring partner economy staff to identify/solve problems at actual research and extension fields. The most important task is to provide appropriate & socially adaptable technology. Technology innovation cannot be successful unless there first exists basic infrastructure (good roads, fuel for machines, ability buy basic items such as seeds & tools).

Seminar Ⅱ:

- **Intellectual Property in Technology Transfer;**
- **Role of Private Sector in the Agri-tech Transfer;**

Many universities, especially in the U.S. and Canada, have moved the emphasis from strictly teaching to scientific research. Each university finds its suitable ways to establish partnership with private firms. And license fees are the important financial resources for the universities. Piracy will discourage new research of agricultural technologies.

A consensus can be collected from the workshop for a variety of recommendations around the following common themes:

1. There is no “free lunch” and IPR is the most important part need to be considered when agricultural technology is transferred.

2. Universities and private sector firms need to cooperate together to speed the technology transfer. The universities need to prepare the strategies of IPR and cooperative ventures with private firms. Private firms need to follow the latest discoveries and technologies of the research institutes. A united front between public and private sectors based on collaboration through technology transfer would be the most effective way to deliver the innovations, products and knowledge that the farmers need to feed the world today and in the future.

3. The participants suggested that the establishment of an APEC Agricultural Technology Transfer Center in Beijing may be one means to continue the momentum for spreading IPR knowledge and enlisting the private sector to participate more closely in technology transfer within the region. The Center could be funded by APEC economies or donors, private firms of developed economies. We believe that APEC economies can work together to find methods to solve the technology barriers in order to accelerate the agricultural technology within APEC region.

Ⅲ. 4th China Advanced Agricultural Technology Exhibition

Over 250 agriculture sector companies from the APEC region participated in the 4th China Advanced Agricultural Technology Exhibition which was held in parallel to the forum. The Exhibition highlighted 195 recent Chinese technology advances in new animal and plant varieties, new agricultural technologies and new products from different fields such as crop production, animal breeding, agricultural products processing, soil fertility, water conservation and agricultural mechanization. Over 181 posters were placed in the exhibition hall to describe the firms and their accomplishments. The exhibition also provided the opportunity for Chinese technology innovators to meet companies and to discuss the financing support to bring discoveries to the market face to face. A large contingent of Korean technology innovators introduced and promoted their potential products for development in the Chinese market. The exhibition aimed to promote regional cooperation in agricultural technology transfer and to attract more private sector participants. From the large number of participants and the agreements achieved, we can say that the goals of the exhibition were successfully obtained.