Reshaping Agriculture and Development in Southeast Asia

An Experts Consultation Forum

2 August 2018
Dioscoro L. Umali Auditorium
SEARCA Headquarters
College, Los Baños, Laguna
The Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) is one of the 24 regional centers of excellence of the Southeast Asian Ministers of Education Organization (SEAMEO). Founded on 27 November 1966, SEARCA is mandated to strengthen institutional capacities in agricultural and rural development in Southeast Asia through graduate scholarship, research and development, and knowledge management. It serves the 11 SEAMEO member countries, namely, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor Leste, and Vietnam. SEARCA is hosted by the Government of the Philippines on the campus of the University of the Philippines Los Baños (UPLB) in Laguna, Philippines. It is supported by donations from SEAMEO members and associate member states, other governments, and various international donor agencies.

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PROCEEDINGS
Table of Contents

Acronyms v
Experts’ Profiles viii
Executive Summary xx

Introduction 1
Toward Six Imperatives for the Future of Agriculture and Development in Southeast Asia 3

Session 1. Managing Climate Uncertainties and Water Scarcity 13
Session 2. The Promise of Information Technology (IT) 21
Session 3. Agro-industrial Value Chains and Integration of Smallholders 29
Session 4. Farm Tourism and Family Farming 37
Session 5. Toward a Comprehensive Agenda for Agriculture and Development in Southeast Asia 43

Appreciation and Closing Remarks 51

ANNEX: Directory 53

List of Tables

Table 1. Employment and percent contribution of agriculture to gross domestic product (GDP) 4
Table 2. Percent urban population in Southeast Asian countries 6
Table 3. Rice farm consolidation, Piddig, Ilocos Norte 32
Table 4. Universal Leaf Contract Growing, Isabela 33
Table 5. Lao Integrated Farms, Bansalan, Davao del Sur 33
Table 6. Challenges and opportunities in farm tourism (Gabor, 2018) 38

List of Figures

Figure 1. Rice loss due to floods (ha) 5
Figure 2. Rice loss due to diseases and pests and others (tons/yr) 5
Figure 3. The scenario on technology and data enabled agriculture 8
Figure 4. Gross Value Added per Worker, by Sector 10
Figure 5. Harmonizing agri-development in ASEAN 11
Figure 6. Number of companies/institutes in Taiwan’s PFAL industry 22
Figure 7. Sanan Sino-Science Photobiotech Co., Ltd. 23
Figure 8. Panasonic PFAL 23
Figure 9. Shenzhen Enlite Agricultural Science and Technology Co., Ltd. 24
Figure 10. Pathways to strengthening positions in the agricultural value chain within the four forms of inclusive chain development 35
## Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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</thead>
<tbody>
<tr>
<td>AAP</td>
<td>Automobile Association Philippines</td>
</tr>
<tr>
<td>ACIAR</td>
<td>Australian Centre for International Agricultural Research</td>
</tr>
<tr>
<td>AD</td>
<td>Agriculture and Development</td>
</tr>
<tr>
<td>AEP</td>
<td>Agribusiness Executives Program</td>
</tr>
<tr>
<td>AgTech</td>
<td>Agricultural technology</td>
</tr>
<tr>
<td>ARD</td>
<td>Agriculture and rural development</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td>ASF</td>
<td>Animal-sourced food</td>
</tr>
<tr>
<td>ASFCC</td>
<td>ASEAN-Swiss Partnership on Social Forestry and Climate Change</td>
</tr>
<tr>
<td>AusAID</td>
<td>Australian Agency for International Development</td>
</tr>
<tr>
<td>BSWM</td>
<td>Bureau of Soils and Water Management, Department of Agriculture, Philippines</td>
</tr>
<tr>
<td>CCAFS</td>
<td>CGIAR Research Program on Climate Change, Agriculture, and Food Security</td>
</tr>
<tr>
<td>CCEA</td>
<td>Center of Excellence for Controlled Environment Agriculture</td>
</tr>
<tr>
<td>CESD</td>
<td>Centre for Economic and Social Development</td>
</tr>
<tr>
<td>CGIAR</td>
<td>Consultative Group on International Agricultural Research</td>
</tr>
<tr>
<td>CHPFPA</td>
<td>Chung-Hwa Plant Factory Association</td>
</tr>
<tr>
<td>CIFOR</td>
<td>Centre for International Forestry Research</td>
</tr>
<tr>
<td>DA</td>
<td>Department of Agriculture, Philippines</td>
</tr>
<tr>
<td>DAP</td>
<td>Development Academy of the Philippines</td>
</tr>
<tr>
<td>DOST</td>
<td>Department of Science and Technology, Philippines</td>
</tr>
<tr>
<td>DOT</td>
<td>Department of Tourism, Philippines</td>
</tr>
<tr>
<td>ECSOM</td>
<td>Ecosystem-based, Community-centered, Sustainable-development Organization Management</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>FinTech</td>
<td>Financial Technology</td>
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<tr>
<td>FSF</td>
<td>Future Strategic Framework</td>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<tr>
<td>GiZ</td>
<td>German Corporation for International Cooperation</td>
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<tr>
<td>ICT</td>
<td>Information, Communication, and Technology</td>
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<tr>
<td>IoT</td>
<td>Internet of Things</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>IRR</td>
<td>Implementing rules and regulations</td>
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<tr>
<td>IRRI</td>
<td>International Rice Research Institute</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>ISIS</td>
<td>Institute of Strategic and International Studies</td>
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<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>JIRCAS</td>
<td>Japan International Research Center for Agricultural Sciences</td>
</tr>
<tr>
<td>JPFA</td>
<td>Japanese Plant Factory Association</td>
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<tr>
<td>MAP</td>
<td>Meat-alternative protein</td>
</tr>
<tr>
<td>MAT</td>
<td>Meat-alternative dinners</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>NEDA</td>
<td>National Economic and Development Authority</td>
</tr>
<tr>
<td>NGA/O</td>
<td>Non-government agency/organization</td>
</tr>
<tr>
<td>NTU</td>
<td>National Taiwan University</td>
</tr>
<tr>
<td>PAGASA</td>
<td>Philippine Atmospheric, Geophysical, and Astronomical Services Administration</td>
</tr>
<tr>
<td>PAKISAMA</td>
<td>Pambansang Kilusan ng mga Samahang Magsasaka (Philippine Farmers Association)</td>
</tr>
<tr>
<td>PCAARRD</td>
<td>Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development</td>
</tr>
<tr>
<td>PFAL</td>
<td>Plant factory with artificial lighting</td>
</tr>
<tr>
<td>PhilRice</td>
<td>Philippine Rice Research Institute</td>
</tr>
<tr>
<td>ProDev</td>
<td>Project Development and Management Department</td>
</tr>
<tr>
<td>RRSP</td>
<td>Risk Resiliency and Sustainability Program</td>
</tr>
<tr>
<td>SARAI</td>
<td>Smarter Approaches to Reinvigorate Agriculture as an Industry</td>
</tr>
<tr>
<td>SDG</td>
<td>Sustainable Development Goal</td>
</tr>
<tr>
<td>SEA</td>
<td>Southeast Asia</td>
</tr>
<tr>
<td>SEARCA</td>
<td>Southeast Asian Regional Center for Graduate Study and Research in Agriculture</td>
</tr>
<tr>
<td>SESAM</td>
<td>School of Environmental Science and Management</td>
</tr>
<tr>
<td>SLM</td>
<td>Sustainable Land Management</td>
</tr>
<tr>
<td>TEF</td>
<td>Tech-enabled Urban Farming</td>
</tr>
<tr>
<td>TIES</td>
<td>Technology, Innovation, Environment and Sustainability</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical and Vocational Education and Training</td>
</tr>
<tr>
<td>UA&amp;P</td>
<td>University of Asia and the Pacific</td>
</tr>
<tr>
<td>UNCCD</td>
<td>United Nations Convention to Combat Desertification</td>
</tr>
<tr>
<td>UPLB</td>
<td>University of the Philippines Los Baños</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VC</td>
<td>Value Chain</td>
</tr>
<tr>
<td>VCA</td>
<td>Value Chain Assessment</td>
</tr>
<tr>
<td>WOCAT</td>
<td>World Overview of Conservation Approaches and Technologies</td>
</tr>
</tbody>
</table>
Session 1. Managing Climate Uncertainties and Water Scarcity

Dr. Ana Doris Capistrano is Senior Advisor of the ASEAN-Swiss Partnership on Social Forestry and Climate Change (ASFCC), Senior Fellow of the Southeast Asia Regional Center for Graduate Study and Research in Agriculture (SEARCA), and Fellow of the Washington DC-based Rights and Resources Initiative (RRI). She was Director of Forests and Governance of the Centre for International Forestry Research (CIFOR) and Visiting Professor in Forest and Conservation Policy of Wageningen University, Netherlands.

She served as Ford Foundation’s Deputy Representative for India, Nepal, and Sri Lanka and Program Officer for Rural Poverty, Resources and Environment in Bangladesh. She was previously a post-doctoral fellow in Tropical Conservation and Development at the Center for Latin American Studies of the University of Florida, USA and was Instructor in Economics at the College of Development Economics and Management of the University of the Philippines at Los Baños (UPLB).

She has a PhD in Food and Resource Economics from the University of Florida, USA.

Dr. Bui Tan Yen joined CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS)-Southeast Asia as a science officer in September 2014. His main task is to coordinate CCAFS activities in Cambodia, Laos, Vietnam, and the Philippines, and manage and oversee the portfolio of the CCAFS program in Southeast Asian countries.

Dr. Yen previously worked at the Soil and Fertilizer Research Institute of Vietnam. In 20 years, working in agriculture and rural development, he joined and contributed to a number of international and national projects on soil and fertilizer science, GIS application, computer-based modelling, programming, land evaluation, land use planning, natural resource management, and climate change. He was author and co-author of a number of national and international publications in these fields.

He earned his BS and MSc degree in Soil Science from Hanoi Agriculture University. He obtained his PhD from Wageningen University, the Netherlands, in 2013, where he focused more on participatory and integrated research approaches.

Engr. Samuel M. Contreras is a Registered Professional Agricultural Engineer and research fellow of the Japan International Research Center for Agricultural Sciences (JIRCAS) in 2002-2003. He finished his Master of Applied Science in Natural Resources Engineering at Lincoln University, New Zealand in 1999. He was involved in several projects related to soil and water management as a Team Leader and has co-authored several technical papers in the same field.
Currently, Engr. Contreras is the Head of the Soil Conservation and Management Division, Bureau of Soils and Water Management. He also serves as the Science and Technology Correspondent to the United Nations Convention to Combat Desertification (UNCCD) and is involved in the formulation of the UNCCD’s Future Strategic Framework (FSF) as the Southeast Asia sub-regional representative to the Intergovernmental Working Group developing the FSF. He is likewise an active member of the World Overview of Conservation Approaches and Technologies (WOCAT), a global network of sustainable land management (SLM) specialists. In this capacity, he spearheaded the documentation of SLM practices in the Philippines using WOCAT tools and methodologies. In 2017, he was appointed as the Chair of the UNCCS Committee for the Review of the Implementation of the Convention for biennium 2018-2019.

**Dr. Sudhir Yadav** is a researcher with an interest in the full spectrum of basic, strategic, and applied research to unravel insights and develop water-smart technologies, a water governance framework, and engage in policy dialogues to help address challenges of food-energy-water nexus. Currently, he is leading IRRI’s outcome theme on developing environmentally sustainable solutions for rice-based systems.

As a scientist, his works are on the research and development of water and crop management in irrigated and rainfed lowland rice environments of South and Southeast Asia. He is also working on new water governance model, irrigation and drainage and designing and use of digital tools for sustainable water management.

Dr. Yadav has authored three book chapters, 26 peer-reviewed articles, 13 opinion articles, an extension manual, and many conference papers and proceedings. He was also a recipient of the John Allwright Fellowship of the Australian Centre for International Agricultural Research (ACIAR).

**Dr. Maria Victoria O. Espaldon** is a human geographer and Professor at the School of Environmental Science and Management (SESAM), UPLB. She was Vice Chancellor for Research and Extension of UPLB from 2011 to 2014, and Dean of SESAM from 2006 to 2011. Her major research works are in the areas of climate change adaptation, human dimensions of environmental changes, environmental and social impact assessment, program monitoring and evaluation, and ecosystem assessment.

Dr. Espaldon has published numerous articles on various subjects related to her expertise. She is the current program leader of the project Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines (SARAI), a nationwide agriculture program funded by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) of the Department of Science and Technology (DOST).
Session 2. The Promise of Information Technology

Dr. Karen Eloisa T. Barroga is Acting Deputy Executive Director for Development at the Philippine Rice Research Institute (PhilRice) that puts her in charge of designing and implementing development interventions, technology promotion and information dissemination, and capacity building and knowledge management for a competitive rice sector. Many of the interventions she led/piloted over the years have been institutionalized or scaled out. Some of these were IT-based. Karen earned her PhD degree from the University of Western Australia and recently, she also completed a Master’s Degree in Development Management from the Development Academy of the Philippines (DAP).

Mr. John Garrity is Senior Connectivity Advisor for Digital Inclusion within the Center for Digital Development in the U.S. Global Development Lab, United States Agency for International Development (USAID). Mr. Garrity leads USAID's operations on extending internet access and adoption through policy engagement and program management. This includes identifying and shaping policy and regulatory reform with respect to broadband internet expansion, engaging with various public and private stakeholders, leading in the technical aspects of developing and maintaining public-private partnerships around digital infrastructure investments and expansion, and assessing feasible technologies for last- and middle-mile infrastructure deployments, including identifying new, low-cost technologies that might replace current infrastructure.

Before USAID, Mr. Garrity spent 10 years at Cisco, most recently as Senior Manager of Policy Research, managing technology policy engagements, and defining appropriate policies to expand broadband infrastructure deployment. His first role at Cisco was as Manager of Emerging Market Strategy, responsible for advising Cisco’s emerging markets expansion strategy across 130 countries utilizing macroeconomic analysis and engaging in the public dialogue on the role of information and communications technologies. Prior to Cisco, Mr. Garrity was in the Corporate Strategy Group at World Bank and held previous roles at the Federal Trade Commission and in state government. He holds undergraduate and graduate degrees in Agricultural and Development Economics from The Ohio State University.

Mr. Roger F. Barroga is the manager of the FutureRice farm of the Philippine Rice Research Institute (PhilRice), which is a five-hectare smart farm located in Nueva Ecija. The farm was built in 2014, which serves as test bed of various ICT tools such as rice apps, automation tools, wireless sensors, monitors, and controls, and farm robotics and unmanned aerial vehicles (drones). The aim is to integrate ICT tools with farm machines and alternative energy to make farms productive, efficient, and competitive for future generations.
Mr. Barroga also leads the Information Systems Division of PhilRice, which is tasked to operate and maintain the corporate financial, human resource, supplies and property, physical plant, and project management information systems. This includes management of PhilRice’s communications network—both internet and telephone services. He finished his BS and MS in Development Communication from UPLB in 1986 and 1991, respectively.

Mr. Vicente N. Roxas is a Director of the Roxas Kalaw Foundation for the Eradication of Poverty, a non-profit organization that is committed to eradicating poverty in the Philippines through its Ecosystem-based, Community-centered, Sustainable-development Organization Management (ECSOM) approach. ECSOM measures and manages the delicate interdependence of the economic, ecological, and social elements of a community by employing technology to aggregate and utilize data to increase household incomes and spur community-driven economic growth through designing tailor-fit portfolios for rural communities.

Mr. Roxas currently serves as advisor to and director for several social and tech startups, and is also an officer of Bancom II, an investment banking consultancy firm.

Dr. Wei Fang is a professor and former chairman of the Department of Bio-Industrial Mechatronics Engineering of the National Taiwan University (NTU). He is also the director of the Center of Excellence for Controlled Environment Agriculture (CCEA) of NTU. He is the co-author of 16 text books translated three books and wrote one book related to plant factory. He was one of the international consultants for the Japanese Plant Factory Association (JPFA) and the chief consultant of Chung-Hwa Plant Factory Association (CHPFA) of Taiwan.

Dr. Fang is frequently invited to lecture and present his researches around the world. He is the inventor of 52 approved patents applied in Taiwan, China, Singapore, and the US. He also served as scientific committee member in several international symposia and editor in professional journals. He was elected number one among the top 10 agricultural experts of Taiwan.

Mr. Sven Yeo is a co-founder of Archisen, managing technology and business development. He has founded/co-founded several tech startups dealing with Cleantech and Internet-of-Things (IoT).

In his last previous venture, he served as the Chief Executive Officer of BioMachines, an IoT startup that developed a platform technology specializing in applications for agriculture and smart cities. Under his leadership, the company became profitable and generated revenue exceeding USD 1 M within the second year, and grew the team during his tenure. Their clients included research institutes, government agencies, and multinational companies in
Singapore, Malaysia, Indonesia, Thailand, and the US. Mr. Yeo graduated from Nanyang Technological University, Singapore with a Bachelor of Biological Sciences and is passionate about entrepreneurship, technology, and design.

Session 3. Agro-industrial Value Chains and Integration of Smallholder

Professor Paul P.S. Teng, PhD, is Managing Director of the NIE International Pte. Ltd. and Adjunct Senior Fellow of the Centre for Non-Traditional Security Studies, S. Rajaratnam School of International Studies, Nanyang Technological University, Singapore. He is concurrently Adjunct Professor of the Murdoch University, Australia and Senior Fellow of the Southeast Asian Regional Center for Graduate Study and Research in Agriculture headquartered in the Philippines.

His expertise is in food security, commercialization, and biosafety of crop biotechnology, agrotechnology innovations and bio-entrepreneurship, and sustainable development. He has over 30 years of experience from positions in international organizations (IRRI and Worldfish Centre), US universities (University of Minnesota and University of Hawaii), and the private sector. Professor Teng has visited more than 40 countries in support of development projects through consultancies with the World Bank, the Asian Development Bank, USAID, the German Corporation for International Cooperation (GIZ), the Asian Productivity Organization, and the United Nations Food and Agriculture Organization (UN FAO).

Prof. Teng has received numerous awards for his work, such as the Eriksson Prize in Plant Pathology bestowed by the Royal Swedish Academy of Science, an Honorary Doctor of Science from Murdoch University, Australia, and election as a fellow of the American Phytopathological Society, and The World Academy of Sciences.


Mr. Grahame Dixie is the Executive Director of Grow Asia, a multi-stakeholder partnership platform that catalyzes action on inclusive agricultural development in Southeast Asia. The platform convenes governments, farmers, non-government organizations (NGOs), and other stakeholders to co-create value chain initiatives focused on smallholder farmers and environmental sustainability of agriculture. Grow Asia was established by the World Economic Forum in collaboration with the ASEAN Secretariat.

Mr. Dixie joined the Grow Asia team based in Singapore in December 2016 and takes the helm of this unique regional partnership, which is already generating impact through national-level initiatives in five countries.
Mr. Dixie brings over 35 years of professional experience as a practitioner of agricultural development in over 75 countries, including an early career in the private sector. For the past decade, he served as the World Bank’s lead agribusiness advisor, where he was involved in the design and review of the World Bank's portfolio of projects linking smaller scale farmers to markets and agribusinesses. These programs, leveraging public and private investment, involved innovative financing and research on key issues. His work included advising World Bank teams globally on project design, emerging good practices and key trends in the food and farming sector, with a focus on market-orientated farming and multi-stakeholder partnerships. More recently, Mr. Dixie has served as an advisor to the Bill and Melinda Gates Foundation and the International Fund for Agricultural Development (IFAD).

Dr. Nerlita M. Manalili manages her own consultancy firm NEXUS Agribusiness Solutions, where UN FAO, World Bank, Japan International Cooperation Agency (JICA), Asian Productivity Organization, Asian Farmer’s Association, and Philippine line agencies (DA, DAR, DOST, DTI, and NEDA) are its clients. She holds a Doctorate in Business Administration and a Master’s in Business Administration from UP Diliman. She is a doctoral fellow of the research arm of the Matsushita Group of Companies of Japan, the Peace and Happiness for Prosperity. She earned her bachelor’s degree in Agribusiness Management from UPLB.

Her fields of specialization include Agro-industrial Development Planning; Enterprise Planning and Management; Agribusiness Investment Analysis; Value Chain Analysis, Market Access; Capacity Development; Strategic Planning; Project Development, Management and Impact Evaluation; as well as Policy Analysis. She was previously a regional adviser for Asia on market access of Belgian NGO VREDESEILANDEN (recently renamed RIKOLTO), research and development manager for SEARCA, and graduate faculty member of the UPLB College of Economics and Management, Agribusiness Department.

Her most recent consultancy engagements include serving as development specialist of UN FAO and DA-BFAR project Supporting Aquaculture Resources Mapping and Development Planning Through ICT-based Solutions;" project leader, NEDA project Governance Framework for Agribusiness Towards Rapid, Inclusive, and Sustainable Growth for the Philippines; and the component leader for the fishery sector of DAP and the DA-PCAF project titled Review of Laws and Regulations to Enhance Policy Environment Towards Agriculture and Fisheries Modernization.

Dr. Larry C.Y. Wong is visiting senior research fellow of the Centre for Economic and Social Development (CESD), Myanmar, and visiting Fellow of the Institute of Strategic and International Studies (ISIS), Malaysia. He has over 40 years’ operational experience in development and business planning and implementation, and policy analysis. His engagements continue to straddle both the public and private sectors. His key areas of expertise include developing and managing agribusiness value chains and trading networks at sector and firm levels, public-private-partnerships in agriculture, rural development, food security, regional integration, and sustainable development.
Dr. Wong is the co-founder of Myanmar Praxis Co Ltd.; senior advisor to Myanmar Rice Federation (MRF); senior advisor to Myanmar Agribusiness Public Corporation Limited; visiting senior research fellow, CESD, Myanmar; visiting fellow (former program director, Technology, Innovation, Environment and Sustainability or TIES, ISIS Malaysia; and member of the editorial advisory board, Asian Journal of Agriculture and Development.

He has been involved with Myanmar’s private and public sectors since 1997, when he headed BERNAS’ (a Malaysian, public listed, privatized former state trading enterprise) international ag-ro-food business. He has consulted for the World Bank, International Finance Corporation, Asian Development Bank, Asian Development Bank Institute, UNDP, FAO, United Nations Economic and Social Commission for Asia and the Pacific, International Food Policy Research Institute, USAID and IRRI, as well as governments and business conglomerates focusing on value/supply chains and trading networks, agribusiness, agro-enterprises, and food security in Malaysia, Myanmar, Vietnam, Lao PDR, Cambodia, Indonesia, Thailand, Guinea, Mozambique, Cuba, Mongolia, and Uzbekistan.

Dr. Rolando T. Dy is Academic Director and Founder of the University of Asia and the Pacific (UA&P) Agribusiness Executives Program (AEP). He lectures in the AEP as well as the UA&P Strategic Business Economics program. He is chair of the Agribusiness and Countryside Committee of the Management Association of the Philippines, and director of the Philippine Chamber of Agriculture and Food, Inc.

Dr. Dy and his team have done various industry, policy, and strategic studies, including benchmarking studies in Southeast Asia covering coffee, natural rubber, sugar, dairy, livestock, and poultry. They have also facilitated industry roadmaps for government agencies.

He has had stints in five countries, including Thailand and Malaysia, as project economist for an international development agency. He has authored three books on agribusiness: Agribusiness and Rural Progress: Actions for Poverty Reduction (2017), Agribusiness and Inclusive Growth. An Expert’s Advocacy (2015), and Food for Thought: How Agribusiness is Feeding the World (2009). He is also a regular contributor to the Management Association of the Philippines’ columns in Business World and Philippine Daily Inquirer, and the UA&P monthly magazine Food and Agri Business Monitor.

Dr. Dy earned his doctorate in management and his master’s degree in industrial economics from UA&P. He obtained his BS degree in metallurgical engineering from UP as a DOST grantee. He attended the International Faculty Program at the Instituto de Estudios Superiores de la Empresa (Institute of Higher Business Studies) Business School in Barcelona, Spain, one of the world’s leading business schools. He also took courses on agriculture policy and structural change at the Asia-Pacific Economic Cooperation Centre in Melbourne, Australia. Dr. Dy is a recipient of the UP Alumni Association’s Distinguished Alumnus Award in Poverty Alleviation and Rural Development in 2017, and of the National Service Award in Agribusiness by the UP Alumni Engineers in 2012. He hails from Davao del Norte.
Dr. Larry N. Digal is now Chancellor and Professor of the University of the Philippines Mindanao and was Dean at its School of Management at the time of the forum, where he taught managerial economics, agricultural marketing, price and policy analysis, strategic management, and quantitative economics. He finished his PhD and MS in Agricultural Economics at the University of Sydney in Australia and the Purdue University in Lafayette, Indiana, USA, respectively. He earned his undergraduate degree, cum laude, in the same field at UPLB and received the Gamma Sigma Delta Honor Society of Agriculture Gold Medal for Academic Excellence and the Joaquin Gonzales Gold Medal also for Academic Excellence.

He further received various awards in teaching and research. He won the Commission on Higher Education’s National Republika Award for publications (1st place, Social Science Category) and has been a UP scientist since 2011. He leads a research program on the economics of sustainable value chains. His research interests also include the industrial organization of agricultural markets, market power, and policy. He has published journal articles and books in these areas. Prior to joining the academe, he worked in government and in private sector in retail and agribusiness.

Dr. Bessie M. Burgos is Program Head for Research and Development at SEARCA. She leads the center’s research initiatives aimed at influencing policy directions, building research capacities, and promoting research activities in Southeast Asia, focused on inclusive and sustainable agricultural and rural development. From 16 February 2010 to 22 November 2012, Dr. Burgos managed SEARCA’s Project Development and Management Department (ProDev). As ProDev Manager, she led SEARCA’s efforts to package flagship projects in the areas of agricultural competitiveness and natural resource management, and generate external funding to fuel said projects. She supervised the provision of professional technical services to governments and member-agencies, and international donor agencies for high impact projects in agriculture and rural development.

Dr. Burgos earned her PhD in Science and Technology Studies from the University of Wollongong, New South Wales, Australia, and her Master of Management degree in Agricultural Business from UPLB.

Before joining SEARCA in February 2010, Dr. Burgos was the Director of the Technology Outreach and Promotion Division of DOST-PCAARRD. Her fields of expertise are research and development management, agribusiness management, technology transfer and commercialization, and intellectual property management. Dr. Burgos was conferred the 2012 College of Economics and Management Distinguished Alumna Award in Technology Management by the UPLB Alumni Association.
Session 4. Farm Tourism and Family Farming

**Mr. Tomas A. Cabuenos, Jr.** is senior advisor and national program manager of the GIZ Project titled *Improving Small Holder Coffee Farming Systems in Southeast Asia* (Indonesia, Philippines, and Thailand). The project involves the integration of the value chain perspective in the coffee sustainability program in partnership with the private firm Nestle. The main objective is to increase the production of coffee and to improve the overall economic viability of the farming system of smallholder coffee farmers.

Mr. Cabuenos is a seasoned project management consultant and rural development practitioner with wide range of expertise and experience. For the past 37 years, he has worked with various national government agencies and with projects funded by international development organizations, namely, the World Bank, the Asian Development Bank, the USA Millennium Challenge Corporation, GIZ, Australian Agency for International Development or AusAid (now the Department of Foreign Affairs and Trade), United Nations Population Fund, and Japan International Cooperation Agency (JICA), among others.

He has engaged in a wide range of consulting works that involve coordination and networking with national government agencies, local government units (provincial, municipal, and the barangay level), private (and business) organizations, and with NGOs.

He has provided technical leadership and strategic advice via his various consultancy projects in the fields of sustainable agriculture and rural development, climate change and resiliency, gender and development, population and development, water, sanitation and health, sustainable livelihood and microfinance, cooperative development, community-driven development, and good governance.

**Dr. Mina T. Gabor** was the founder and first president of the Center for International Trade Exhibitions and Missions, Inc., the export promotions arm of the Philippine Department of Trade and Industry. She was also the Philippine Undersecretary for Trade and Industry, and was Secretary of Tourism from 1995 to 1998.

She continues to work with her passion of promoting the Philippines through trade and tourism as the Founder and President of the International School of Sustainable Tourism, the only such school in Asia Pacific. As founder and president of the Philippine Small and Medium Business Development Foundation, Inc., she is currently involved in improving the status of the ASEAN master craft, artisans, and designers, and she is also the President of Automobile Association Philippines (AAP) Travel. Dr. Gabor is also a member of the board of the De La Salle-College of St. Benilde, an AAP director, and a columnist for Business Mirror (The BM Traveler).

Dr. Gabor is a recipient of the Philippine Legion of Honor Award, the highest award that the Philippine government bestows to an individual. As such, she is a reserve Lt. Colonel of the Philippine Army in recognition of her exemplary contributions to the development of tourism in the Philippines and of her outstanding performance as Tourism Secretary. She received a distinction award in Sustainable Tourism in June 2017 for her contribution to the
advancement of Philippine Tourism, given by the Rotary Club of Manila, the oldest Rotary Club in Asia. Earlier in the same year, she received a Tourism Award by Skål International. Further, the New York Travel Magazine named her as one of the top 35 women in travel worldwide.

Dr. Gabor’s advocacy for community-based rural tourism has paid off with the enactment of RA 10816, an act to develop farm tourism. Among her other advocacies are the development and promotion of faith-based tourism and ecotourism. She was instrumental in UN’s declaration of Ecotourism Celebration in 2002. Her long list of achievements and awards both in tourism and trade has made her a sought-after speaker in these areas of expertise.

Ms. Tan Thi Shu is a 32-year-old ethnic H’mong of Vietnam, who has been able to turn her dream of helping her people into reality. She founded and is the current Director of the Sapa O’Chau Travel Social Enterprise, the first tourist company run by H’mong ethnic minority people in Lao Chai commune. Under the community tourism model, Sapa O’Chau prioritizes the creation of jobs and learning opportunities for local children.

Ms. Shu was a simple village girl who lived with her parents in the mountains, and her family depended on the rice terraced fields for subsistence. Her parents could not afford to send her to school, and she dropped out at 3rd grade. Shu followed her mother to sell handicrafts to tourists in the streets, where she seized the opportunity to learn English from tourists. At night, she would make use of internet cafés to study more English. As Shu learnt sufficient English, she began to work as a trekking guide. At 19, she became a single mother but it did not stop her from building the first ethnic minority-owned homestay in her village for her widowed cousin in 2009.

Sapa O’Chau was established in 2007—O’Chau in the H’mong language means “thank you”. She developed the concept of Sapa O’Chau with four Australian friends, and then grew it into the only not-for-profit tour operator in Sapa. After covering costs, all the tourist income goes to support the community. Tours are the main income, not donations. In 2020, Shu started the Sapa O’Chau cooperative. This is the first boarding facility where the youth could board and study at the only government high school located in town. The youth also learned English from international volunteers and got their tour guide licences after a course with an NGO. Three years later, Shu established Sapa O’Chau Travel, the first ethnic minority-owned tour operator with international tour operator licence. Lonely Planet featured it.

In 2016, Ms. Shu landed on the cover of Forbes Vietnam’s “under 30” list. The same year, she helped Sapa O’Chau obtain international accreditation from World Responsible Tourism Awards 2016 (Silver) and World Tourism for Tomorrow Awards 2016 (Finalist). This year, Sapa O’Chau Travel Social Enterprise is formally renamed to reflect its new social enterprise status.

Ms. Shu was one of the model citizens commended by the Central Government, while Sapa O’Chau won the Blue Swallow award given by Vietnam Chamber of Commerce and Industry. It is a finalist for World Responsible Tourism-SDG 8 and 12, awaiting final results. Today, Sapa O’Chau has evolved from a charity tourism business into a business that trades beverages and brocade in the popular hill town of Sapa in northern Lao Cai province in Vietnam. The company is made up of four inter-connected parts: boarding facilities to help students who would otherwise not be able to complete their education due to financial or geographical limitations, a café, a H’mong handicraft store, and tours.
Ms. Gigi Pontejos-Morris made a personal segue into farming from pret-a-porter fashion industry while raising two boys, and homeschooling them between their family farm in the Philippines and teaching fashion design in Las Vegas.

She discovered that the high-end fashion industry was no different when planning, producing, and marketing high quality produce in the farm. Thus, her vision for their MoCa Family Farm became a reality. That reality also taught her the importance of risk management and led her to conceptualize Repurposing Strategy for Family Farms. After experiencing typhoons and calamities, she asserted that the reality of sustainability is one of the biggest challenges that every family farm faces. Repurposing Strategy is identifying family’s core priorities and planning business operations and activities around them. Family, farming, food, fun, faith, and education are the identified Morris family core priorities. This paved the way for the repurposing of their family farm, which eventually led to partnership and networking with other family farms at the national level.

Mr. JonJon B. Sarmiento, also known as “FJ or Farmer Jon” by many, is a person who has devoted himself to the advocacy of organic farming, upholding sustainability and harmony between man and nature. He owns the Kuatro Marias’ Agro-ecology Farm in San Narciso, Victoria, Oriental Mindoro, championing its technology and farming systems by means of integrated diversified organic farming systems over the years, during which people started to visit his farm. His initiatives as a smallholder has inspired and encouraged other smallholder farmers to join in the tourism industry, thus promoting farm tourism.

Mr. Sarmiento is the Manager of the Resilient and Sustainable Agriculture and Aquatic Development Program of Pambansang Kilusan ng mga Samahang Magsasaka (PAKISAMA). PAKISAMA is a founding member of the Asian Farmers Association since 2009, having been a member of the National Management Team that is in charge of the implementation of various internationally funded projects in 10 provinces, especially in post-Yolanda farm rehabilitation.

Mr. Sarmiento has engaged in community organizing, farm planning consultancy and development, sustainable livelihood project management, and as a resource speaker in various training programs. He received a Climate Leadership Award and the Mike Magalang Environmental Leadership Award conferred by the Climate Reality project of former US Vice President Al Gore. He completed the Saemaul Undong Leadership Course at Yeung Nam University in South Korea in 2014, the Certificate Course in Social Entrepreneurship at Ateneo De Manila University in 2010, and the Certificate Course in Sustainable Agriculture in Southeast Asia RTC-SEATSA in 2005.

Mr. Sarmiento is a happily married family man with four lovely daughters, who have served as his prime motivation to strive harder in life. As a farmer with great love for farming, the environment, and the Creator, he firmly believes that as Masanobu Fukuoka said, “The ultimate goal of farming is not the growing of crops, but the cultivation and perfection of human beings.”
Session 5. Towards a Comprehensive Agenda for Agriculture and Development in Southeast Asia

Dr. Cielito F. Habito, a Senior Fellow at SEARCA, is a Professor of Economics at the Ateneo de Manila University, where he is also a Senior Fellow and former Director of the Ateneo Center for Economic Research and Development (2001-2012). At the same time, he is Chairman of Brain Trust, Inc. and Operation Compassion Philippines. Twice-weekly, he writes the op-ed column No Free Lunch in the Philippine Daily Inquirer.

In 1992-1998, he served in the Cabinet of former President Fidel V. Ramos as Secretary of Socioeconomic Planning, heading the National Economic and Development Authority. In 1998, he was elected Chair of the Sixth Session of the United Nations Commission on Sustainable Development in New York. Prior to joining government, he was Professor and Chair at the Department of Economics, UPLB.

He had worked at the World Bank, Harvard University, Center for Southeast Asian Studies in Kyoto University, and Asian Development Bank Institute in Tokyo. The World Bank, Asian Development Bank, USAID, AusAid, JICA, United Nations Children's Fund (UNICEF), United Nations Environment Programme and other development partners have tapped his expertise to advise the government of the Philippines and of other countries in Asia-Pacific and Latin America. He has served in the boards of several companies, including First Gen, Manila Water Company, Metrobank, and Philsteel Holdings, among others. He holds a PhD and Master of Arts in Economics from Harvard University; Master of Economics from the University of New England (Australia); and Bachelor of Science in Agriculture (Major in Agricultural Economics), summa cum laude from UPLB.
A total of 75 participants, who included up to 50 distinguished experts, gathered on 2 August 2018 at College, Los Baños, Laguna, Philippines in an experts consultation forum organized by the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA).

They brainstormed on reshaping agriculture and development in Southeast Asia in the face of current and emerging issues and challenges.

The forum focused on current key thematic challenges and developments in agriculture and development: climate change adaptation and mitigation, with a slant on water scarcity; information technology-enabled agriculture; agro-industrial value chains and smallholder integration crossing national boundaries, and the role of contract farming, consolidated, corporative arrangements, and other inclusive business model options for smallholder agriculture; and farm tourism and family farming.

Forum chairs subsequently synthesized all the experts’ insights toward a comprehensive agenda for Southeast Asian agriculture and development.

To reshape agriculture and development in Southeast Asia, Professor Paul P.S. Teng first directed forum participants on a walk-through along Southeast Asia’s current shape and emerging developments. He drew attention to Southeast Asia’s dwindling agricultural land; high levels of food production for some crops, yet dependence on western hemisphere countries for feeds and wheat; changing and globalizing food diets; high prevalence of hunger and malnutrition in the face of increasing incidence of physiological diseases like hypertension and diabetes in the urban areas; and disturbances affecting food security becoming a norm, among others.

Prof. Teng subsequently outlined six imperatives to avail of opportunities and emerging developments: (1) embrace disruptive agricultural technologies (AgTech), including Financial Technology (FinTech) and new biology technologies; (2) build transformational leadership; (3) recognize the inevitable regarding limits to employability of the current generation of graduating students; (4) bridge the rural-urban divide; (5) promote harmony in cross-country governance; and (6) plan for the future of food by considering non-traditional food like those produced in the lab or food factories, and insects.

The panel discussions were rich with the depth and breadth of insights shared, where the discourse revolved around the primacy of smallholder actors in inclusive agricultural and rural development.

Among the many insights, the experts enlightened the participants on the importance of co-production of knowledge with smallholder farmers and capacity building that empowers them in the context of managing climate uncertainties and water scarcity. They also distilled lessons in governance and institutions within the various themes.

The forum featured current advances in IT applications in agriculture, such as plant factories with artificial lighting (PFAL), and challenges and opportunities including those related to their enabling policy. The expert panelists further shared on cases of successful value chains that are transforming agriculture in ASEAN, the important role of policy and governance to make this happen, how farmers prefer change agents and champions from within their ranks, and prospects for cross-country and inclusive regional value chains.
They elaborated on the value added by farm tourism and its emphasis on natural farming that promotes healthy soil, healthy plants, and developing healthy local culinary cuisine.

Among the numerous specific inputs, forum experts and participants drummed up a resounding call to integrate and put smallholder farmers at the forefront of program initiatives as champions, and to tap non-traditional stakeholders like the youth, and nutritionists and culinary experts.

They called for asset (land) reform coupled with capacity building and empowerment of smallholder farmers in agripreneurship, and intellectual property protection for cultural products in the context of farm tourism and ecotourism. They asserted the need for deeper, more layered assessment of the situation to provide better, comprehensive solutions in agriculture and development in the region.

Observations were made on how technology is reshaping how transactions are done, both locally and globally, transcending geographic and temporal boundaries—but it will now redound to collaborative and participatory interventions to update smallholder farmers’ capacities so that they can keep up with dramatic developments in modern agricultural tools.

Education and knowledge-sharing platforms at local and regional levels are crucial to transforming agriculture from the grassroots to regional communities for it to adapt to the modern digital information age.

Overall, the experts agreed that agriculture and development needs to transform and rise to flow from the bottom up—getting smallholder/family farms, and the youth to take center stage and drive development, cognizant of the emerging opportunities that show how agriculture, industry, and services can simultaneously catalyze the economy in an integrated fashion.
Background and Rationale

By 2050, the global population is projected to reach 10 billion, up from eight billion today. Large numbers of people entering the middle class, in countries like China and India, the Southeast Asian region included, and adopting middle-class eating habits—like consuming more meat, which requires more grain—only adds to the burden.

To close the food gap, worldwide farm productivity will have to increase by 60 percent in 2050. But increasing climate risks and uncertainties exacerbate Southeast Asia’s reduced ability to increase food production for its own growing population, given the degraded condition of its natural resource base, among other challenges such as its aging farm population and urbanizing food habits.

Against this backdrop of challenges, various stakeholders in 2014 asserted their analyses and solutions in the SEARCA 2nd International Conference on Agricultural and Rural Development in Southeast Asia (ARD 2014). From this conference, SEARCA harvested Farms, Food, & Futures: Toward Inclusive and Sustainable Agricultural and Rural Development in Southeast Asia, a book published in 2016, SEARCA’s 50th year. In the book, high-level ARD experts mapped, along the parameters of resilience, equity, and integration, their syntheses of the answers in the areas of productivity improvement, inclusive value chains, sustainability and poverty reduction, food security and food safety, institutions and governance, and regional cooperation and integration.

But the rapidly changing agriculture and development (AD) environment calls for constantly keeping one’s ears close to the ground to stay in tune with AD’s shifting landscape. Among the changes to contend with are: (1) technologies in agriculture and the internet of things (IoT) and their potentials in sustainable agricultural intensification; (2) China’s Belt and Road Initiative that physically links China with ASEAN countries across national boundaries, giving way to regional/cross-border value chains; and (3) the emergence of a new breed of educated family farmers, including farm tourism operators who are rediscovering agriculture as a venture or better lifestyle.

Yet, the uncertainties of climate change and of challenges to the inclusion and integration of smallholder farmers in the current movement toward agricultural transformation, remain as important challenges.

The one-day experts consultation forum on Reshaping Agriculture and Development in Southeast Asia aimed to draw out high-level analyses and scenarios to distill emerging opportunities and challenges that will yield collaborative arrangements for agriculture and development in the Southeast Asian region.
Objectives

In general, the experts consultation forum on Reshaping Agriculture and Development in Southeast Asia aimed to distill from current developments and emerging scenarios the opportunities and challenges for direction setting and strategizing toward an integrated AD agenda in Southeast Asia to proactively address these rapid changes.

Specifically, the regional experts consultation forum aimed for the following:

1. Analyze opportunities and challenges for agriculture and development in the Southeast Asian region in the next 5–10 ten years.
2. Calibrate the thrusts and themes where regional and national institutions and networks in Southeast Asia may collaborate and complement one another along the current and projected gaps/needs of the region in AD.
3. Recommend directions and innovative approaches in the pursuit of shared regional mandates, goals, and programs.

Forum Mechanics

The one-day forum was divided into four plenary thematic sessions and a synthesis session comprising panel presentations and open fora. In each panel, four to six experts each expounded his/her insights and any relevant information shared in response to the session chair’s key question/s. The open forum that followed each session allowed participants to distill the issues and developments further toward drawing regional directions and proposed initiatives in agriculture and development. The session chair was also an interlocutor who, as a thought leader, helped the panel and the participants tread the discussion productively to arrive at a comprehensive Southeast Asian agenda in AD.

Welcome Remarks

“Today’s forum aims to consolidate into a cohesive whole the latest developments and emerging issues which are currently dominating the discourse on agriculture and development in Southeast Asia. Through this platform provided by SEARCA, some of the foremost experts on the topic in the region have come together to discuss and offer their insights and experiences.

...Working together, let us all strive towards transforming the agricultural landscape of Southeast Asia into one of inclusivity, sustainability, and mutual growth and development.”

Dr. Fernando C. Sanchez, Jr.
Chair, SEARCA Governing Board

In the final session, the forum technical adviser and head interlocutor led the other session chairs/interlocutors of the first four plenary sessions in distilling the insights and in suggesting action points toward an integrated agriculture and development agenda for the region.
To have a clear idea of how to transform or reshape agriculture and development in Southeast Asia requires first looking at the current situation—because one cannot transform unless one knows where one stands at the moment. From this standpoint, we can then begin to look at the future, to begin the transformation process, for which a few ideas are proposed in this presentation.

From Current to an Envisioned Future: Taking Stock

In Southeast Asia, roughly 16 percent of land is for arable crops. Very broadly called “food security crops,” most of crop production here is devoted to rice and roughly 10 percent of the arable land is basically for export crops. The latter is seen in Malaysia and Indonesia, where crops are grown primarily for export and farm income. A worrisome trend (in Asia generally) is the loss of productive agricultural land due to conversion to non-agricultural use at roughly 3 percent a year. In some countries, the rate of conversion of agricultural lands to other uses is even higher. In terms of arable land per capita, which is an indication of production capacity, Southeast Asia has among the lowest in the world, at 0.11 ha, and this continues to go down. The simple arithmetic—population is growing, land for agriculture is declining—presents serious implications for food security and export-oriented farming in the region.

On the other side of the coin, Southeast Asia produces a lot of food—it is one of the top three producers in the world for a range of agricultural food products, such as rice and vegetable oils. But at the same time, we still depend on a lot of imports in the region, especially from the western hemisphere, i.e., North and South America. In particular, we import animal feed such as soybean, and we don’t produce enough wheat in relation to the changing diet of the middle class.

The Asian Development Bank (ADB) has also pointed out that we experience two faces of the problem in Asia—a high prevalence of hunger and undernutrition, yet in the urban areas, of overnutrition and non-communicable diseases such as diabetes and hypertension, experienced even by adolescents and young adults.

Declining contribution of agriculture to GDP in Southeast Asia. On the overall picture of agriculture, data shows a declining contribution of agriculture to
gross domestic product (GDP) every year. How do we deal with this declining contribution of agriculture to GDP? But more importantly, employment in agriculture continues to decline. However, we still see some countries where agriculture significantly remains a means of employment for its people, such as in Myanmar (53.2%) (ADB 2017). Government policy has to recognize what the data is saying and put in place measures for inclusiveness—essentially to bring these farm population players into the economy.

Dependency on cereal imports. Figures from FAO also point out ASEAN’s overall dependency on other regions or countries for cereals, with Singapore and Brunei being 100 percent dependent. On the other hand, five countries from the Mekong Subregion show negative ratios indicating that they export cereals. What is interesting is that another source of data points out that Indonesia, a rice-eating country, is going to become the largest importer of wheat this coming year at 12.5M tons (USDA/FAS). There is an increase in the number of mills to manufacture instant noodles, requiring a tremendous amount of wheat. These data present us with the question: as we reshape the current situation, how do we deal with numbers like this, and the fact that infrastructures are changing all the time? At the same time, crop yields are so variable, sometimes variably low, unfortunately—even for rice, the crop that so many Southeast Asian countries have so much experience with.

High variability in crop yields. The region has its best farmers who do very well. The question is, how do we empower all farmers to become “best farmers”? One of the imperatives is to apply technology. Comparing the production performance in Southeast Asian countries with the highest yields that have been attained in other regions—2.95–4.6 tons/ha for corn; 2.34–5.75 tons/ha for rice; and 1.33–1.73 tons/ha for soybean compared to 22.3 tons/ha for rainfed corn in Chile; 18 tons/ha for rice in China; and 10.8 tons/ha for soybean in Mexico and the US—we have much to dream about as we think about reshaping agriculture for development in this region.

Disturbances is the norm. The Southeast Asian region has one of the highest frequencies of expected severe weather

Table 1. Employment and percent contribution of agriculture to gross domestic product (GDP)

<table>
<thead>
<tr>
<th>Country</th>
<th>Employment in Agriculture, % of Total Employment, 2017 or Nearest Year</th>
<th>Agriculture % of GDP, 1990</th>
<th>Agriculture % of GDP, 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>-</td>
<td>0.98</td>
<td>1.2</td>
</tr>
<tr>
<td>Cambodia</td>
<td>64.3 (2014)</td>
<td>50.12</td>
<td>26.3</td>
</tr>
<tr>
<td>Indonesia</td>
<td>32.9 (2015)</td>
<td>17.55</td>
<td>14.0</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>72.2 (2010)</td>
<td>45.06</td>
<td>19.5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>11.4</td>
<td>14.89</td>
<td>8.8</td>
</tr>
<tr>
<td>Myanmar</td>
<td>53.2 (2015)</td>
<td>57.26</td>
<td>25.5</td>
</tr>
<tr>
<td>Philippines</td>
<td>27.0</td>
<td>19.14</td>
<td>9.7</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.1</td>
<td>0.34</td>
<td>0.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>31.2</td>
<td>10.01</td>
<td>8.3</td>
</tr>
<tr>
<td>Vietnam</td>
<td>41.8</td>
<td>38.74</td>
<td>18.1</td>
</tr>
</tbody>
</table>

Source: ADB Key Indicators (2017)
Figure 1. Rice loss due to floods (ha)

Source: ASEAN Food Security Information System (Q2 2014)

Figure 2. Rice loss due to diseases and pests and others (tons/yr)

Source: ASEAN Food Security Information System (Q2 2014)
Table 2. Percent urban population in Southeast Asian countries

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>% URBAN 2016 OR CLOSEST YEAR</th>
<th>POPULATION MID 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>77.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Cambodia</td>
<td>20.9</td>
<td>15.2</td>
</tr>
<tr>
<td>Indonesia</td>
<td>53.7 (2015)</td>
<td>258.7</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>39.7</td>
<td>6.6</td>
</tr>
<tr>
<td>Malaysia</td>
<td>74.8</td>
<td>31.7</td>
</tr>
<tr>
<td>Myanmar</td>
<td>29.2 (2015)</td>
<td>52.9</td>
</tr>
<tr>
<td>Philippines</td>
<td>44.3</td>
<td>103.2</td>
</tr>
<tr>
<td>Singapore</td>
<td>100.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Thailand</td>
<td>44.5 (2013)</td>
<td>67.5</td>
</tr>
<tr>
<td>Vietnam</td>
<td>33.9 (2015)</td>
<td>92.7</td>
</tr>
</tbody>
</table>

Source: ADB Key Indicators for Asia and the Pacific (2016)

... events, and Vietnam registering the highest rice production also has its share of these. Because of that, we see all kinds of disruptions to production. Figures 1 and 2 contain data from the ASEAN Food Security Information System, which, although a bit dated, show the fluctuations in production as affected by biotic as well as abiotic factors. In spite of their key roles in agricultural production, farmers are the biggest risk takers in the value chain. How may we address this challenge to sustain agriculture and move it forward?

ASEAN is fast urbanizing with a growing middle class. In the bigger development context, the fast rate of urbanization and its growing middle class is a driver to contend with in Southeast Asia, although this rate varies widely across countries (Table 2). Overall, Southeast Asia had a population of 634.5 M in mid-2016, 46.8 percent of which was urban. Urbanization needs our attention because it creates problems, at the same time, offering opportunities. Importantly, urban populations have the highest buying power among other sectors. In 2012, the middle class in ASEAN countries was estimated to have a disposable income of USD 16–100 per day. The estimated size of middle class in ASEAN by 2020 is 400 million—a powerful consuming class with high purchasing power that has the potential to influence our farmers’ production or our importations.

Changing trends in food and diet. The rise in income that accompanies urbanization, with the globalizing economies and cultures in the big cities, brings about trends/changes in food demand. More people don not cook anymore and instead they eat out or buy processed food. Their diets are personalized, and they consume more meat and less rice. Twenty years ago, at IRRI, scientists were making projections for the future about an impending shortage of rice. But societies do not remain static with respect to their demand for food. They change a lot, especially in response to income. In Korea today, average consumers are eating more wheat than rice.

Undernourishment remains at 10 percent. In spite of the progress in Southeast Asia, various data sources are consistent in citing that one in 10 people here are hungry or roughly undernourished. With all our vision for the medium and long term, is this acceptable to us? Underpinning these figures is the
percentage of household income spent on food. Singapore is lowest on household food expenditure in the world at about 8 percent. The Philippines averaged at 37 percent and Indonesia, 44 percent. The high percentage of household income spent on food means that any time there is an increase in prices, poorer families are affected by the reduced amount of food they can purchase.

This presentation skips the other issues that affect agriculture and development in Southeast Asia as other panel sessions will cover them in detail, namely, climate change and climate uncertainty, information technology in agriculture, agro-industrial value chains, and farm tourism.

The Transformation (Reshaping) Process—Opportunities and Action Imperatives

Given the above scenario, six imperatives, from a meta-view, are proposed for the future of agriculture and development in Southeast Asia:

1. Embrace disruptive agricultural technologies (AgTech)

This essentially means we ought to invest in AgTech\(^1\), referring to individual technologies or a combination of technologies related to farm equipment, weather, seed optimization, fertilizer and crop inputs, irrigation, remote sensing (including drones), farm management, and agricultural big data. AgTech is now one of the main drivers of agricultural investment that has made an impactful presence in America and Australia. The main AgTechs that we should be investing in, with their potential to make a great difference in farming production and farmers' lives, include the following:

- Farm management software, sensing and Internet of Things (IoT), including agricultural data capturing devices, decision support software, big data analytics, and new platforms that allow many farmers, especially from China and India, to participate.
- Robotics, mechanization, and equipment, including on-farm machinery, automation, drone manufacturers, and grow equipment.
- Novel farming systems such as indoor farms; aquaculture; and insect, algae, and microbe production (excludes consumer home grow kits).
- Novel seeds including biotech seeds, new breeding technique (NBT) seeds.
- Bioenergy and biomaterials including on-farm agricultural waste processing, biomaterials production, and anaerobic digesters (excludes supply chain companies).
- Agribusiness marketplaces including commodities trading platforms, online input procurement, and equipment leasing used by farmers.
- Farm-to-consumer e-grocery, which are online platforms for farmers to sell and deliver their produce direct to consumers.
- Miscellaneous including land management tech, financial services for farmers, etc.

According to FAO, the world will need another USD 265 billion a year of investment in AgTech up to 2050. This calls for mobilizing the private sector as well as public sector as an investment pool. Tech-enabled farming, most of which is urban farming, is starting to change Asia and ASEAN. This data-enabled agriculture

\(^1\) See Duss and Kolb in https://research.agfun-dernews.com/moorewarner/agtech-beyond-the-hype.pdf
is changing our culture and has potential for making agriculture more attractive to millennials.

With AgTech also comes FinTech, or computer programs and other technology used to support or enable banking and financial services. Basically, FinTech simply applies programming, but FinTech startups are the real deliverers of change in this global world of financing. They enable the brokering—between those who want to invest, taking this investment, and those who have the technology, including the public sector. So much of university research remains stagnant on the shelves, with only a small proportion getting translated into useful technologies. To get funding to move from research to a product requires a very strong interphase—but who is going to fund it? This is where FinTech comes in. Fortunately, we are seeing a strong emergence of FinTech entities all over the world. In Singapore, a lot of startup FinTech companies are quite successful. And they don't even invest in themselves; they invest in the region in support of agricultural technologies.

Also worth mentioning are biotechnology and other new breeding technologies (NBTs) from the new biology, which include gene-editing biotechnologies like CRISPR, TALENs, and zinc finger nucleases (ZFN). They possess the ability to edit native crop genes coding for important traits and generating non-transgenic plants. Genome-edited crops being improved include, soybean, maize, wheat, rice, potato, tomato, and peanuts. Today, some of the biotechnology crops like Bt eggplant and papaya varieties resistant to ringspot virus are already existent and, hence, are no longer new. They ought to be more fully utilized for their high potential impact on food production in ASEAN.
What NBT has done is it has democratized the process of using modern biotechnology across all labs—whether in wealthier or less developed countries. That’s a powerful force. Across Southeast Asia, we may then expect to see more engagement with these technologies.

2. Build transformational leadership

This second imperative is built on the premise that economic development is grounded on agricultural transformation, which lies at the core of poverty reduction, food security, and improved nutrition. The drivers of agricultural transformation are multidimensional, interrelated, and they change over time. First, there are elements of “transformation readiness”—changes to a country’s institutional framework, governing mechanisms, and political environment. Second, the quality of the national agricultural plan or strategy is critical. Lastly, there are drivers related to delivery mechanisms (McKinsey Center for Agricultural Transformation 2018).

Transformational leadership facilitates transformation readiness. The critical enabler to transforming millions of small- and medium-size enterprises into highly productive ones is a frontline “change agent” or extension worker that helps farmers modify their practices. There is now an initiative being hatched to creating a new set of expertise for smallholder farm management grounded on transformational leadership. It is empowering and requires, beyond knowledge and skills, a certain mindset.

3. Recognize the inevitable regarding employability of the current generation of graduating students

Ecoprosperity 2018, a recent conference of industry and thought leaders held in Singapore, asserted that while the 21st century is here, we observe unchanging unemployment rates among certain graduands and are increasingly concerned about the employability of college graduates. How well is the education sector adequately preparing today’s young people for the future workplace they will need to engage in? The importance of the four Cs has been asserted—these are considered the essential competencies that 21st century education should develop: critical thinking, communication, collaboration, and creativity.

One report has projected that nearly 50 percent of the knowledge that youths acquired during their first year of a four-year degree program will be outdated by the time they graduate. The same report stated that 46 percent of Asia’s employers have difficulty filling jobs, and only 40 percent of executives believe that new employees have the required job skills.

Living and working longer further magnifies these challenges—65 percent of children entering primary school today will have jobs that do not yet exist. In addition, workers will need to continue ensuring their relevance.

These only point to the importance of learning to learn and adapt to continuous workforce disruption. We specifically need to empower the next generation of agriculture graduates with skills that make them competitive and transferable.

Seven critical skills for the jobs of the future are worth noting:

- critical thinking and problem solving
- collaboration across networks and leading by influence
- agility and adaptability
- initiative and entrepreneurship
- effective oral and written communication

i. assessing and analyzing information

j. curiosity and imagination

Today’s young professionals capitalize on skills that transfer between vocations, and we observe an emerging economy of freelancers as “full-time part-timers.” In agriculture, a similar trend is the growing business of consulting for those who don’t farm or own a company.

4. Bridge the rural-urban divide

Figure 4 shows the wide gaps in gross value added per worker, with those for agricultural labor way below those for the urban counterparts in industry and services, the latter being highest of the three per World Bank analysis.

To address the income inequalities, government policy needs to put in place inclusiveness for smallholder farmers. How do we include farmers in the value chain and give more value to their products without harming the consumer? We still see a lot of poverty although Asia and ASEAN have their share of success stories in alleviating poverty. Urban farming is only one way to address the issue. It relates not just to having cities as a source of farming or fruit growing, but also to get a pocket of these people living in these cities to appreciate the importance of farming and the difficulties of farming.

The book _Food Matters_ (Teng and Foo 2018) is an example of a publication written for the general public for them to get a better appreciation of farming and where our food comes from; and the complex factors that go into food production before reaching our plates.

Figure 4. Gross Value Added per Worker, by Sector

Source: World Bank

Note: Author estimates based on GVA by sector and employment by sector
The book also debunks myths like cultured or farmed fish is not good, or that organic fruits and vegetables are more nutritious, and explains how our middle-income urban diets might be more detrimental to our health.

5. Promote harmony in cross-country governance

As we move towards our vision for ASEAN 2025 with its three pillars, we still see lots of conflict between countries that have tariff issues. How can we encourage harmonization across the region?

ASEAN member states need to think regional while acting local, and promote transferability of food approvals, harmonization of regulations, skill mobility, and seamless trade. Avenues for policy intervention include: (a) increasing the area farmed or arresting the decline in farm land; (b) supporting efforts at increasing food production in food surplus countries or food importing competitors; and (c) developing alliances with Asia’s food bowls.

Figure 5 presents the linkages toward harmonizing agri-development ecosystems in ASEAN.

6. Plan for the future of food

Today, agriculture is our main source of food. In the future, it may not be the main source of food, and plant factories are just the beginning. There are alternatives—food that doesn’t depend on agriculture or farming.

An example is the so-called USD 340,000 hamburger—a large burger from artificial meat manufactured in the laboratory. Further work has resulted in a dramatic drop in price—down to USD 350 and even USD 25 per hamburger using artificial meat. But now, there is a movement to produce meat alternatives, which are vegetable-based. For instance, some Singaporeans are familiar with what is called the meat alternative dinners (MAD), which contain vegetarian products that are actually highly palatable.

Part of the current thinking is also to mainstream unconventional food—insects have much potential as sources of human

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3 Political security community, economic community, and socio-cultural community.
food, for instance. Changing mindsets is key. Perhaps we should draw attention to what is more important and encourage economies to reduce their biowaste by just feeding them to insects, which in turn can provide protein for our diets.

**Concluding Remarks**

It is important to recognize the tremendous potential that ASEAN, with its three pillars and direction towards a single production base, presents for envisioning the future of agriculture. As a region, ASEAN or Southeast Asia has no trouble with food security. But there is not enough cross-country harmonization in our efforts, and SEARCA and its allies in the room should perhaps champion this.
Dr. Ana Doris Capistrano highlighted some trends that particularly affect land, water, and natural resources. She asserted that climate change is one of the most challenging issues that confront the world today, and it provides context both for our development and our future life here on earth. It is forcing us to rethink many of the solutions that we thought were solving our problems, only to find that they are in fact maladaptive and creating more complications, and perhaps, even new and more complex challenges for all of us.

One of the trends brought up was that agricultural land per capita is dwindling in Southeast Asia, but the reality is that agriculture is still a major driver of land use. Globally, 33 percent of farmlands are moderately or highly degraded.

On water resource degradation, a report from the FAO and the International Water Management Institute (IWMI) states that agriculture is one of the contributing factors to water resource degradation through input overuse and maladaptive intensification.

For instance, farmlands equipped for irrigation have doubled since the 1960s, and irrigated agriculture accounts for 70 percent of freshwater withdrawal.

Also, livestock has more than tripled since the 1970s, attributed to changing diets, modernization, urbanization, and greater demand for protein worldwide, especially in Southeast Asia. Aquaculture has increased twenty-fold since the 1980s, mostly in our region. Moreover, over 40 percent of the world’s population live in river basins classified to have degraded water or are suffering from water scarcity.

All of this intensification and demand for land is actually fueling resource degradation. Although two-thirds of our bioenergy worldwide still come from forest and from wood use, we are seeing that deforestation and degradation compromise our ability to provide sustainable energy sources.

The world recognizes these challenges and international conventions have been made in an attempt to address them. In fact, 2015 was a seminal year for many of the world’s ambitious efforts to solve our common problems, for instance, with the global climate agreement in Paris.

The Sustainable Development Goals or SDGs, a high-profile political agreement, is a powerful umbrella that provides context across countries and ensures that no one is left behind. We have targets to reduce deforestation, restore degraded
lands, increase biodiversity, and protect our ecological heritage, she said. “With agricultural transformation, we often focus on the technological frontier, more modern/sophisticated approaches, new/better-educated players, while often neglecting those on the ground. What about small family farms?”

Big farmers were thought to dominate the new frontier in agriculture, but it is actually small family farms that lead in forging the path forward, Dr. Capistrano further observed. When we talk about smallholder farms, these are the small-medium scale agricultural enterprises of under two hectares.

That may seem relatively small scale, but in aggregate, they produce 70-80 percent of our food. So collectively, they are the largest investors in the agriculture sector. They are beginning to gain visibility and recognition as they start to band together, and hopefully international groups such as the FAO will monitor them more systematically in the future.

Dr. Capistrano noted that one of the initiatives that set the target for inclusive development is the Bonn Challenge, which aims to restore 150 million hectares of degraded lands and forests by 2020.

This is significant in the sense that a lot of the targeted lands for restoration are unproductive, mostly wastelands, and if revived, could be the key to a more inclusive agricultural transformation for indigenous people, local communities, small farmers, and those who have no access to more productive resources.

The UN FAO funds a forest farm facility in Southeast Asia that is under testing and is being proven to be both economical and inclusive by being able to give back a proportion of the value chain shares to the communities.

The Role of Science in Addressing Challenges

Many researchers work together to help communities prepare for the future. According to Dr. Bui Tan Yen, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) has many research sections focused on technology and information, safety net service, and country policies.

Furthermore, technology is used not only for adoption but also to find/measure/mitigate emission. CCAFS works on advisory and transferring knowledge to communities and farmers in different countries and serves various organizations.

For its part, UPLB does what it can to harness the potential of science and technology in addressing climate change, Dr. Maria Victoria O. Espaldon said. Climate change is already a trend, with the Department of Science and Technology (DOST)-led remote sensing, Geographic Information System (GIS), and a lot of downloadable information available across various satellites circling the world.

Dr. Espaldon shared that DOST funded a small-scale UPLB project since 2015 with 11 pilot sites. The project sets up hubs to provide farmers with crop advisories, and tools to detect pests, drought-related diseases, and the early onset of rain. Such information impacts pest population. State universities and colleges (SUC) and local government units (LGU) can download a software that helps to easily identify pests.

UPLB is exploring smart agriculture, shifting paradigms, and focusing on how to get farmers to understand this information and making it relevant to their practice. To shift the paradigm in research extension, UPLB partners with
regional scientific organizations, LGU, and farm cooperatives. Solutions have to be multilayered, not one-size-fits-all.

Developments in addressing agriculture, climate change, and water scarcity also need policy support, since the extension system is centered on national government agencies or NGAs, but the problems are local.

Dr. Espaldon added that climate science does not only study climate history, but it also covers projections, especially in agriculture. The Risk Resiliency and Sustainability Program (RRSP) is a national government initiative being discussed. Climate change impacts are already being substantiated with data to help policymakers come up with strategies to combat its effects.

The session panel concluded that science and technology go hand in hand in the context of development. The following sum up what key roles science plays in creating solutions that address climate change and in water resource management:

1. Researchers actively create and share scientific studies and breakthroughs in the sector.
2. Various funding agencies support these scientific efforts to combat climate change impacts and resource management initiatives.
3. The academic community, especially those in extension work, find ways to make technology and knowledge transfer smoother and more practical for farmers and other stakeholders, both on the ground and in higher policymaking bodies.
4. Modern technology is being fused with traditional farming methods to improve productivity and sustainability, among other vital functions that science plays in AD.

Institutional Interventions / Remedies Employed

To improve climate change science and climate projections, the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) helps in this regard as agreed on in the Intergovernmental Panel on Climate Change (IPCC) and other conventions. A few scenarios are emerging in international discussions, such as those in policymaking, governments looking into low emission, high emission, etc., Dr. Espaldon shared.

According to Dr. Bui Tan Yen, Organizations such as FAO, World Bank, and the ADB, have carried out interventions in Southeast Asia, such as climate change projects and mitigation programs. Also, CCAFS Vietnam uses the landscape approach in many of its villages.

Engr. Samuel M. Contreras added that the Bureau of Soils and Water Management of the Department of Agriculture (DA-BSWM), the Philippines targets SDG 15, which urges countries to protect and restore the ecosystem. At the center of this is SDG 15.3—restoring degraded land and soil affected by flood and drought, as well as working towards land degradation neutrality, or the state where land quality remains stable and in peaceful scales, including ecosystems.

Geared towards land degradation neutrality, the Philippines established a baseline status of land degradation through: trench study and land cover (geospatial) analysis.

The geospatial analysis was done to create a 2030 baseline of how much croplands/grasslands are converted/degraded in response to food demand.
Problems Not Yet Addressed or Inadequately Addressed

The main program in SEA, according to Dr. Yen, is focused on increasing temperatures and on the side effects of rising sea levels. Some sea level problems have been mitigated, but some are still ongoing problems because of their unknown nature. In Vietnam, the government thought that they could control nature, so they built massive irrigation systems. But now, they have to do things differently because they have to harmonize with nature. Two years ago, the area surrounding Mekong Delta lost a significant number of crops and fruit trees in the southern part of Vietnam. The problem is in how to develop agriculture to cope with climate change harmoniously.

For Engr. Contreras, the most experienced sector in this regard are farmers, especially smallholder farmers. With Southeast Asia exposed to climate volatilities farming was likened to gambling—if the weather is great, water is abundant; if not, there’s drought; if too much, then there will be flood. Relative to addressing weather-related problems, farmers are concerned about the timeliness of irrigation release.

Water is the single constraint in food production. They’d ask, “when are farmers going to receive water, when crops are already suffering?” This is an issue that all stakeholders need to critically address—smallholder farmers’ concerns, as they are hardest hit by the changing climate. According to Engr. Contreras, “our land is not only thirsty, but it is also hungry for nutrients.”

Regarding technology in the Philippines, 24 technologies were documented, but the problem is that these technologies are dispersed and not readily accessible. Another problem is on how to maintain or reduce a no net loss to supply amidst the increasing food demand.

Dr. Sudhir Yadav further asserted that not all stakeholders (i.e., scientists, farmers, investors, etc.) see the problem of changing climate in the same way, and this presents a problem in seeking solutions for one integrated region.

In terms of technology, practices, and policies/solutions, these three dimensions are often isolated and treated separately instead of in a holistic/integrated manner. Policies are created in support of technology and of solutions as two different things. When talking of climate change, we focus too much on food security perspectives in terms of food production, but food security is not only about producing food; we also need to think about stocking food to prepare for any uncertainties that lie in the future.

On more traditional initiatives, Dr. Yadav noted a large gap among the following: water supply, demand, and consumption. For one, farmers don’t know when to get water. Governments have invested in infrastructure, but the interaction between behavior or practices and governance has yet to be leveraged.

He suggested applying more deliberately the ecology of behavior, particularly on aspects of water governance behavior—such as knowing when to get the water; bringing about accountability and transparency; area zoning of water supply and water demand; and using technology to reduce water demand, among other possible behavioral solutions.

Furthermore, there is a need to address pressing issues such as farmers’ competitiveness, aging, engaging the youth, and water issues. Solutions for these can be modelled from other countries, such as using machineries to make farming more efficient.
Policy Changes and Reforms Needed

Dr. Espaldon agreed with Prof. Teng’s assertion on the need to rethink how information is distributed. How can farmers understand this information and its relevance to their practice? Shifting the extension paradigm is now being looked into by partnering with national and local stakeholders.

The current system depends on the national government, but the problem is local. A rapid and serious look at multi-layered capacity building is recommended.

Engr. Contreras mentioned a few policies that positively illustrate the current shape of Philippine regulation concerning climate uncertainties and water scarcity:

- Climate Change Act of 2009 (Republic Act 9729)
- Philippine Disaster Risk Reduction and Management Act of 2010 (Republic Act 101211)
- Philippine Clean Water Act of 2004 (Republic Act 9275)

In Dr. Yadav’s expert opinion, water policies are very linear. There is an increasing demand for water, so the option is to reduce water demand. Dr. Yen added that there is also plenty of research on AD technology, but policy ought to integrate climate change in the research agenda.

Overall, smallholder farmers play a key role in climate and water solutions, and the discourse now needs to progress toward making local actors, themselves, agents of change, Dr. Yadav asserted.

Farmers are said to be the best extensionists themselves. The international community now needs to figure out how to include smallholder farmers in co-producing and disseminating knowledge.

Dr. Capistrano echoed the sentiment that the best extension agents are indeed the farmers themselves, and that high technology is not only for the highly educated. A bottom-up approach to development is key to reshaping the way we handle climate uncertainties and water scarcity. “It is not really problematic at the bottom, the problem lies at the top,” she said.

Regional Cooperation Across Southeast Asia

In mainland Asia, various countries share watersheds, so an integrated landscape approach is being used, regional action programs are crafted, regional partnership and actions converge, an enabling framework is developed, and resource and financing are mobilized, Dr. Capistrano said.

Engr. Contreras noted that various countries are addressing the Millennium Development Goals. Southeast Asian countries actively address the regional agenda, with evolving multilateral agreements. In the Philippines, the DA-BSWM leads in addressing land degradation.
He asserted a need to create a regional action plan/program that looks into an integrated landscape approach across countries in the region. Such a program may also cover education, development of a policy framework, capacity building, and financing, among others.

Dr. Yadav cited the success of a new policy adding rice seeds to a regional treaty that IRRI facilitated, called Seeds without Borders. IRRI gathered regional government and policy leaders and got seven countries to sign the seed-sharing agreement. Furthermore, a regional, multisectoral framework in agroforestry would have been approved by September 2018.

Dr. Capistrano closed the session with a call to reflect on an additional question: how do we develop a regional action program to address transboundary problems that bring about dangerous conflict?

Open Forum

Dr. Lucrecio L. Rebugio drew attention to the interrelationships among forestry (deforestation and degradation), agriculture (particularly water supply sustainability), and agricultural productivity. He suggested that these links point to a new approach to natural resource development: a landscape approach. It focuses on the interrelationship among various ecosystems. This area is not very well studied, and ecosystems should be analyzed individually and not so much on the interrelationships among these ecosystems.

Dr. Rebugio added that IRRI and SEARCA supported a small project on policy formulation and implementation in agriculture. It found that we do not have enough or the best relevant policies to institutionalize agricultural adaptation and mitigation, as well as not enough policies on water management—particularly for alternate water management technology, i.e., alternate water and drying technology.

The challenge is in translating these national policies into meaningful actions that effect changes at the local level. It will require institutional/structural change since technologies are available but dispersed, and so many agencies are concerned with extension—so local ordinances are needed to reinforce national policies on the ground to concentrate all efforts on implementing the desired policy/laws.

Dr. Yadav asserted that an incentive model sustains changes, as farmers will adopt what is sustainable. The incentive model is a key component when talking about uncertainties.
Ms. Tamara Palis-Duran, assistant representative of the UN FAO, shared that FAO recognizes that climate uncertainties are linked with natural resource conservation. She cited some of FAO’s relevant initiatives:

- Established the Early Warning, Early Action initiative—a group of government stakeholders tasked to come up with a plan for drought and typhoon in Mindanao.
- Identified triggers and what types of action government is doing to mitigate losses and damages.
- Established Disaster Risk Reduction and Management operation center.
- Linked with PAGASA.
- Developed FAO pilot areas.
- Applied pipeline conservation practices to farming and fishing, among others.

After sharing FAO’s institutional actions to address AD problems, Ms. Duran shared what FAO sees as gaps that need further support, such as: (1) helping LGUs process information to report to national agencies (for monitoring); (2) translating PAGASA information for farmers’ use; (3) scaling up the initiatives; (4) sustaining interventions throughout political changes in the country; and (5) disaggregating data required in monitoring attainment of the SDGs.

Mr. Jonjon B. Sarmiento shared how he designed a climate-resilient, organic farm in 2015. He learned about his farm’s strengths and weaknesses when hit by a typhoon twice. At that time, he received no government intervention or funding to help him bounce back from the calamity. He therefore strongly advocated for the provision of climate financing services, which may be allocated every year.

Though there is an abundance of agricultural technology, he questions who will fund them. Aside from technology
funding, the need for farmers’ insurance, especially for those involved in organic agriculture was also underscored by Mr. Sarmiento.

He further stressed that while farmers are the ones who act to address climate change and develop models for climate resiliency, there is no policy for farmers, at least not in the Philippines. The Philippine national land use act is still apparently in congress, so there is no policy yet that guarantees that a farmer’s land is secure from conversion. Furthermore, he said that reshaping agriculture is only seen on paper, but what is needed is actual transformations felt on the ground, at the farm level.

Dr. Espaldon agreed with the sentiments of Mr. Sarmiento that the extension model should really be based on the ground. Also, the topic of insurance for farmers is under discussion. UPLB is working with the Philippine Crop Insurance Corporation to soon launch a "more responsive and quicker crop insurance system to combat climate change so that a farmer can easily recover," she added.
Session 2. The Promise of Information Technology (IT)

**Session Chair:** Dr. Karen Eloisa T. Barroga  
**Panel of experts:** Dr. Wei Fang, Mr. Sven Yeo, Mr. Vicente N. Roxas, Mr. John Garrity, and Mr. Roger F. Barroga

To introduce the session, Dr. Karen Eloisa Tanzo-Barroga quoted Dr. Habito from his newspaper column *No Free Lunch* on an article titled “The Unfolding Revolution”:\(^1\)

“No Free Lunch on an article titled “The Unfolding Revolution”:

“The Fourth Industrial Revolution has begun, and economies and societies are changing at breathtaking speed.

We need to keep in step with it. Technological advancements—in artificial intelligence, robotics, self-driving vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy storage, quantum computing and the Internet of Things—are changing the entire social order. If we fail to account for it in our plans for the future, the world could pass us by, and our people will be the worse off for it.”

She also cited the G20 Agriculture Ministers’ Declaration 2017, "Towards Food and Water Security: Fostering Sustainability, Advancing Innovation," published after the meeting held on 22 January 2017 in Berlin, Germany, which acknowledged the significant role of ICTs for agricultural development.

Dr. Tanzo-Barroga narrated how the growth of mobile communications technology enabled access to various forms of extension and advisory services, such as weather and market advisories, information about production technologies, farm monitoring and management, and diagnostics.

For both agricultural supply and demand, mobile phones can reduce waste, make delivery more efficient, and forge closer links between farmers and consumers. Additionally, Internet of Things (IoTs) as applied in agricultural production is more precise because it makes use of sensors, robotics, and drones to automate or control processes.

These are used to ensure optimum sustainable production, produce more with less waste of resources, and also help in crops and animal health assessment.

Dr. Tanzo-Barroga further noted how IT is revolutionizing product development. Three-dimensional (3D) food printing allows for optimizing processing operations and promoting more healthy eating, she said. She cited modern, smart factory farms and blockchain technologies that offer a powerful type of secure database intended to support digitization, automation, and add value to commercial-scale farm operations.

Blockchain applications are also believed to improve the agricultural supply chain, helping farmers to capture real-time

\(^1\) https://opinion.inquirer.net/104404/the-unfolding-revolution
data to more effectively manage their crops and harvests and for regulatory compliance.

**How IT Tools Improve Efficiency in Agricultural Production**

According to Dr. Wei Fang, IT tools in agriculture have already existed for some time. What is recent is that these tools have become wireless, allowing better enabled climate/temperature sensors, and now, indoor farming experiences, possible. With indoor farming technology, such as PFAL or Plant Factories with Artificial Lighting, the seasons of the year no longer limit farm operations—farmers can choose what to plant and when to harvest.

PFAL is a food production system that transcends the effects of climate change. With this system, water consumption is low, and even if electricity consumption is high, it is still cost-effective with light-emitting diode (LED) technology that has become cheaper than before.

Examples of PFAL enterprises include Sanan Sino-Science Photobiotech Co. Ltd, which produces 1.5 tons of vegetable per day; Panasonic’s PFAL with two factories in China and one in Singapore; and Shenzhen Enlite Agricultural Science and Technology Co., Ltd. Dr. Fang shared his recommendations on how PFAL can “make us richer, greener, healthier, and happier.”

Asserting that PFAL is another form of real estate, he strongly endorsed promoting its supporting industries, namely, alliances within the PFAL industry and integrating related industries across the agriculture, manufacturing, and service sectors.

To revitalize the economy, there is not only a need to revive the traditional agricultural industries, but also promote the new IT-enabled PFAL industry. Dr. Fang mentioned that in Taiwan, the PFAL industry totaled 78 companies in 2013 and has grown to 134 companies in the last five years. PFALs are being promoted over traditional farms. They have replaced the market share for fresh
vegetables in Taiwan, while non-farm PFALs are meeting the export market demands, mainly in China and some parts of Southeast Asia.

A pessimistic view of PFAL vegetables is that they are high-priced, but Dr. Fang avers that on the other hand, PFALs are able to produce vegetables with high if not the best quality, with special and even unique rarity, and are definitely more beautiful in appearance.

The future of the PFAL industry is bright, he said, with the price of PFAL vegetables continuing to increase in recognition of their high value, and the cost of their installation and operation decreasing due to advances in the technology. With these assertions, Dr. Fang concluded that PFAL can make agriculture richer, greener, healthier, and happier—which makes for good food sense.

Figure 7. Sanan Sino-Science Photobiotech Co., Ltd.

Figure 8. Panasonic PFAL
Mr. Sven Yeo shared that as technological complexity rises, the cost of capital increases. There is a need for a scalable and investable business model in that scenario, he said. Archisen, his company, uses sensors in their greenhouses to collect and manage indoor farm data from raw data generation, organization, to meaningful insights. Yeo cited the following benefits to indoor farming:

- controlled agricultural environment;
- high water and fertilization efficiency;
- high production density; and
- shorter crop cycles.

He shared the view that IT presents a whole new set of opportunities for agricultural transformation, such as prices of goods going up, making agriculture a more attractive sector because it pays more. In Singapore, government support for the agriculture sector has transformed it into a manufacturing sector using digital tools.

Mr. Roger F. Barroga shared that though he was “not really a farmer,” he ventured into farming to test the viability of available technology and information in the sector. The Philippine Rice Research Institute (PhilRice) under the Department of Agriculture (DA) created a smart farm called FutureRice, which Mr. Barroga spearheads. PhilRice’s information systems division, also headed by Mr. Barroga, developed an application with the following features: a farm layout, task scheduler, recorder, closed circuit television (CCTV) monitoring, and an internet-connected farm. An artificially intelligent (AI) weed identifier was also developed. These apps help non-farmers like him try their hand in farming.
His department in PhilRice is now developing a roach detector/monitor. Such apps are affordable at only USD 5.00 to USD 10.00 to download.

The DA made rentable machines available to farms to address problems. Drone spraying was also introduced. Farmers are interested but are a bit skeptical as they are used to the traditional fume-spraying method that sprayed more fumes, although the new method is more efficient. For those off the grid, a mobile text/short message service (SMS) system is used.

Mr. Barroga narrated additional developments where IT is used to enhance farm operations:

- Historical data is processed using portfolio, landscape, and area-based approaches.
- The Philippine Rice Information System (PRISM) Project of IRRI, PhilRice, and DA assesses the situation on the ground, including the potential harvest every season. The project also assesses typhoon damage.
- IRRI and PhilRice Rice Crop Managers give precise fertilizer recommendations to farmers, i.e., what fertilizer to use, when to fertilize, and by how much.
- Drones and the AgriDoc app monitor the farm in the farmer’s absence. They also identify weeds from a picture taken of a weed. On the other hand, the Variety App sorts and yields information about new varieties.

Ensuring Equity Across Value Chain and Markets

Mr. Vicente N. Roxas said that there are three main phases that every healthy-functioning society passes through: (1) agrarian, (2) industrial, then finally, (3) an information society. According to him, the Philippines skipped the first two phases and jumped to the information age prematurely, has no major industries, and has the lowest rung of the information phase—call centers. While he observes that the Philippine economy basically depends on overseas Filipino workers (OFWs) and call centers, Mr. Roxas recommended going back to basics and starting over with agriculture, as well as taking advantage of disruptive technology to increase productivity.

The conventional way of developing a local community is usually through local community members functioning as labor, and using local natural resources to create products for export. This way, profits first go to the entrepreneurs/corporation, which then are funneled secondly to the communities via a trickle-down effect.

Noting that fishermen and farmers make up 70 percent of the world’s poverty sector, going back to basics means empowering smallholder farmers.

The Roxas Kalaw Foundation, where he serves as a director, seeks to eradicate poverty by introducing supply chains to promote wealth distribution, such as the case with one of their poverty-eradication partners in Talavera, Nueva Ecija. Here, his foundation created a milk supply chain by providing each household with two carabaos for milking, thereby converting them into farming households.

Collection centers are located in the town’s center or the poblacion and the marketing firm in the urban area. The supply chain prioritized catering to the local demand for carabao milk products to ensure that community needs are sustained, then surplus is exported.

In cases like these, the foundation integrates a supply chain in the community, and uses technology to track and analyze large volumes of data across all their community interventions.
The technology quantifies from general to the very minute details of the local economy, such as production-consumption data, its bio-capacity, and the ecological footprint toward reshaping a community from poverty to self-reliance through household farming. Unfortunately, in the Philippines, “the economic footprint far, far outweighs that of its bio-capacity,” Mr. Roxas observed.

But by going back to basics and empowering local households, perhaps solutions can be realized locally to address these growing problems.

Moreover, Mr. Roxas said that land developers drive growth, which in turn increase land prices, making it difficult for the agricultural sector to thrive.

Possible Pitfalls and Security Risks in using IT Tools in Agricultural Development

Some of the possible problems related to IT in agriculture that emerged in the forum were the following:

- obstacles to disseminating information to farmers
- low or lack of access to tools and/or connectivity
- risk that labor force will be disadvantaged by mechanization
- the digital divide between developed and underdeveloped countries
- the digital divide between traditional and younger farmers

Dr. Fang said that farmers need to know what to do with new IT developments such as IoT. They need to know how to process data; otherwise, technology will just be a waste of money. He stressed that technology is a tool and not a solution by itself, so the key is in understanding how to use technology.

An example is that in greenhouses, if the temperature sensor is not accurate, it should not be used. Data collected should also be used because just storing data does not make sense. He advised to interpret data in real time, and to compare it with information from other agencies or countries.

With regard to indoor farming, Yeo cautioned that:

- Technology/ICT system/infrastructure first needs to be in place.
- Data needs to be collected to manage the indoor farms.
- Power loss will cause economic losses, so the Philippines might not yet be in tip-top shape for such a farming style.

Mr. John Garrity added that the rising cost of technology and of communication affects ICT adoption. Technical optimism can also be a problem, or proposing a technology before careful analysis. An example was an intervention in Uganda in 2010-2011 where an excess of pilots was implemented. Further, when building these tools, “are we really providing people with the agency to use them—or are we creating another mechanism to exploit privacy/security?” he asked.

He went on to discuss the digital divide, saying that it is still significant and it contributes to income inequality among countries. He sees digital policies as key to addressing problems on the digital divide and in applying technology in AD.

On technological adoption barriers, Mr. Yeo added that in Indonesia, for instance, when technology is transferred from foreigners, the locals usually have an initial stigma/aversion to it from being wary of foreigners telling them what to do.
But they eventually get on board once they see the economic progress (i.e., their neighbors getting bigger houses, cars, etc.) that technology can bring.

Mr. Roxas also shared his foundation’s experience with addressing connectivity issues in schools and other sectors in the communities. Philippine investment is in the urban areas because data is coming from there.

IT needs to be formalized into the agricultural sector. He stressed that stakeholders are working independently, and that a common platform is needed to maximize the benefits of ICT for the future.

Youth Engagement in IT for Agriculture

The Internet is a huge opportunity for the youth as it shows them all the possibilities, according to Mr. Roxas. Farm tourism is more interesting/appelling to young people, and Mr. Garrity recommended to make AD technology accessible and usable for the youth.

Mr. Yeo added that when technology is used, productivity increases, the ability to pay is better, and the sector becomes more attractive and appealing for people to work in.

He observed that the stigma of farming is that it exposes one to the uncomfortable heat of the sun all day, and getting dirty is part and parcel of the occupation. But Archisen presents quite an opposite work environment—air-conditioned, uses high-tech, and presents other attributes that somehow change their image of farming. It might be best to showcase to the next generations an agriculture that is highly progressive/evolved, highlighting the new frontiers in AD relatable to their progressive, travel-oriented, and digital-nomadic lifestyle, i.e., farm tourism, smart farms, farming apps, indoor farming technologies, and the like.

In light of the youth’s declining interest in agriculture careers in the region, perhaps the youth’s perception of farming and agriculture needs to be reshaped from the drab, one-dimensional view that farming is only done outdoors, is difficult, and dirty—to a more elaborate view highlighting the modern, adaptable, and convenient/high-tech methods of delving into farming and agriculture in both urban and rural areas.

Open Forum

Citing the World Development Report on Agriculture for Development (2008) published by the World Bank, Dr. Larry C. Y. Wong asserted that in relation to globalization and focus on industry, processing and not just production, will play a big role vis-à-vis the whole value chain.

He then cited the 2015 issue of the World Development Report titled “Mind, Society, and Behavior,” which asserts how people are changing the way they make decisions in the public and private spheres. This somehow informs initiatives in the macro, meso, and micro levels. His main point was that in pursuing inclusive development, its change agents or agencies, beyond its beneficiaries, also need platforms where various development partners, from international to local agencies, may share and co-create knowledge.

This would involve proponents of inclusive agricultural and rural development (ARD) letting go of their models and projects that they have developed and allowing them to have a life of their own in a sustainable way. Dr. Wong added that to be sustainable, governments need to be drawn into these inclusive ARD models.
After sharing his assessment of the performance of platforms in IT terms (i.e., utilization patterns, bandwidth) and observations on the current dominant role of overseas Filipino workers’ remittances in the Philippine economy that he considered unsustainable, Mr. Roxas affirmed that the internet is indeed a powerful tool for empowerment. But he was quick to qualify that inclusive ARD requires approaches tailored to communities and solutions developed from the ground up, hence, he was skeptical about scaling them up in one-size-fits-all national programs.

He then elaborated how these inclusive ARD approaches focus on building up funds at the household level, which can then be linked to fund other portfolios in a non-exploitative way linked to the local economy. The local communities can then start working with the local government. Eventually the fund can become sustainable and multi-generational.
Session 3. Agro-industrial Value Chains and Integration of Smallholders

Session Chair: Professor Paul P.S. Teng
Panel of Experts: Mr. Grahame Dixie, Dr. Nerlita M. Manalili, Dr. Bessie M. Burgos, Dr. Larry C.Y. Wong, Dr. Larry N. Digal, and Dr. Rolando T. Dy

Professor Paul P.S. Teng opened the forum by observing how present-day value chains have become longer and more differentiated than before, where creating value in the end-product for the consumer may be incorporated at any part of the supply chain.

He then drew attention to the main challenge of ensuring the inclusiveness of value chains so that farmers can also participate and derive income from producing quality products that the consumers will want to buy.

Insights from Grow Asia’s Multi-stakeholder Partnership Platform

Mr. Grahame Dixie narrated how Grow Asia (GA) as a multi-stakeholder partnership platform catalyzes action on inclusive and sustainable agricultural development in Southeast Asia by building strong supply chains involving smallholder farmers.

The GA platform includes five country partnerships comprising 500 multi-stakeholder partnerships with 55 working groups in 46 value chains. The value chains it works with have to be locally led, capitalize on market opportunity, supported by government, and focused on smallholders to help their farms achieve productivity, profitability, and environmental suitability.

Its working groups collectively decide what are the problems and choke points of the particular value chains. In its start-up phase, the platform has established its learnings and knowledge sharing agenda, including training of practitioners, distilling good practices, and brokering partnerships. Based on what GA has learned, it now focuses on what it has found effective and achieving results at scale.

Mr. Dixie noted how smallholders in ASEAN have to work in the context of increasing and changing demand in urban areas, with consumer food tastes and preferences now leaning toward branded products, and newer, more sophisticated distribution and retail chains. Their challenge is how to become profitable or develop high income-generating enterprises from small units of land by accessing an expanding secure market with secure prices/demand by modernizing or stepping up their operations.

Emphasizing the primacy of grounding GA’s actions on measuring what the situation presents, Mr. Dixie shared that their surveys have shown that participation in the GA platform is motivated by farmers wanting to (1) learn to achieve their highest proficiency possible; (2) meet other farmers and new organizations including
NGOs and potential business partners or collaborators; (3) gain voice in policy dialogue; and (4) demonstrate success.

Their long-term vision of success for GA is to have (1) strong, well-organized country partnerships as platforms for future collaborative action; (2) measured and consistent results; and (3) strong understanding of what success looks like and its ingredients. Mr. Dixie noted how GA country partnerships and working groups have demonstrated competence and have grown in capacity given the wide variation of value chains that the various working groups address, and that the focus of GA’s work is to bridge results and capacity.

Mr. Dixie shared some of the lessons GA has learned in working on individual value chains:

1. The core driver of a value chain is the strong demand for its end-products, not profitability per se.

2. There remains much scope or opportunity for increasing the yields of smallholder farmers, who more often than not (about 60% of them) tend to learn more from fellow farmers than institutionalized extension services.

3. It takes a lot to build trust between smallholder farmers and agribusiness companies/enterprises.

4. Smallholders need access to improved inputs, and increasingly, finance services to provide their working capital.

5. Individual value chains are very much finite in size (e.g., a successful one might touch 20,000 farmers) and one cannot just simply bring them to scale because they require finite volumes of products and can only make finite investment.

Hence, touching the lives of 10 million farmers, as GA aims, requires working with 500 value chains.

6. Based on experience, strong supply chains take time to develop, from four to eight years.

7. Smallholder farmers have the ability to self-organize, and it is best to work with them in clusters.

In Indonesia, a value chain works with 17 different partners operating in a loose corporation organized into productivity partners, finance partners, etc. GA has found a wide variability in the capacities of its partners, which pose a challenge in working with them.

Some approaches that have worked include having shared leadership, organizing discussion groups, or simply being well-organized with setting meeting rooms, taking down minutes, target-setting, and seeing to it that people are delivering on these targets.

8. Some value chains solved the trust problem by embedding better local traders into the supply chains.

9. The best value chains had capacity to weave together multiple partners into holistic solutions.

10. An enduring problem is the high transaction cost and difficulties of working with thousands of smallholder farmers.

To bring its individual value chain projects to scale, GA draws from peer-to-peer learning in its platforms and summarizes 22 different lessons it has gathered into four, namely: (1) plug into government programs (2) plug into donor-funded programs or projects (3) repeat the lessons learned by their own companies, and (4) replicate the business models or parts of business models of other companies.
Mr. Dixie further shared how GA working groups have turned to sectoral cross-cutting programs, such as in implementing the coffee sector roadmap in the Philippines. In the Indonesia, the GA working group facilitated for the oil palm industry, among others, in drawing in a Chinese development bank to assist in providing two million hectares for replanting requirements of smallholder farmers.

Mr. Dixie said that the game changer for CEOs of agribusiness companies is the great potential of digital technology to enable the following: (1) direct payment to individual smallholder farmers as incentive for quality products via e-wallet solutions; (2) traceability of contaminants to ensure food safety; (3) logistics, e.g., an Uber for farmers has been proposed; (4) exploiting digital media for extension, like chat boxes for communicating good agricultural practices (GAP) to large numbers of smallholders; and (5) credit scoring for digital solutions in agricultural finance, to be able to identify smallholder farmers with the propensity to repay loans, which will be piloted with a Japanese bank involving 100 cocoa producers already mapped out in Indonesia.

GA strategy aims to make sure that each of its country partnerships is effective, efficient, self-financing, and its platform is moving forward, working more in the space of regional programs, exchanging perspectives and ideas.

Specific Value Chain Experiences and Successes in Southeast Asia

The five other panel experts shared how specific value chain projects have helped nations focus their interventions and enhance farmers’ positions in Southeast Asia.

Dr. Nerlie M. Manalili said that Vietnam has the advantage in producing fishery products and is gaining an increasingly important position in the world market for fish, brackish water shrimp, tuna, octopus, squid, and mollusks. She noted, however, that seafood has exposed serious gaps in production lines, processing technologies, preserving post-harvest products, and in ensuring quality and food safety. She added that along with the impact of international economic integration, Vietnam’s fisheries sector is under the pressure of increasingly fierce competition from engaging in low value-adding processes.

A value-added approach through constructing and developing the fisheries value chain therefore is becoming a critical requirement in the country, contributing to successfully restructuring the sector toward higher value and sustainable development. From Vietnam’s enhanced participation and competitiveness into the global value chain, they were able to achieve industrialization and the modernization of rural agriculture (Nguyen Thi Bach Tuyet 2016).

Myanmar’s fishery sector, on the other hand, is experiencing a rapid proliferation and development of small-medium enterprises in the off-farm segments of the supply chain linked to fish farming intensification (e.g., pond digging services, hatcheries and nurseries, and feed mills and feed traders) and has identified the foci of specific segments.

The country’s rice industry, on the other hand, is focused on addressing the seed sector and on milling facilities to boost production. It is considering moving into premium rice exportation.

4 Uber Technologies, Inc. develops, markets, and operates a ride-sharing mobile application, which allows consumers to submit a trip request, which is routed to crowd-sourced partner drivers. Its smartphone application connects drivers with people who need a ride. The company’s application enables users to arrange and schedule transportation and/or logistics services with third party providers (https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=144524848, downloaded 3 January 2019).
Dr. Bessie M. Burgos shared on various SEARCA studies geared toward improving value chains, such as one with the Philippine Carabao Center that used a value chain assessment approach to determine policy directions to benefit smallholders. Another project supported by the International Fund for Agricultural Development (IFAD) and executed by the International Food Policy Research Institute (IFPRI) in cooperation with SEARCA is the capacitating policy researchers to undertake rapid value chain analysis (VCA) of prioritized commodities and develop relevant policies toward the integration of smallholders in the regional market.

Dr. Burgos’ presentation zeroed in on how SEARCA’s pilot projects in inclusive and sustainable agricultural development (ISARD) identified entry interventions to revive the calamansi industry in Oriental Mindoro using VCA. The project showed improved livelihood sustainability by mobilizing farmers, addressing major problems like pest infestation (aphids), addressing gaps in the value chain, collecting healthy plants, creating farmer nurseries to further improve the industry, and organizing funding interventions.

Dr. Rolando T. Dy discussed the input-output analysis of the following companies’ value chain models: (1) Piddig Basi Cooperative in Ilocos Norte, (2) Universal Leaf contract growing in Isabela, and (3) Lao Integrated Farms in Bansalan, Davao del Sur.

The Piddig Basi Cooperative (Table 3) is a major poverty-alleviating project involving multisectoral efforts from the LGU, cooperative, and farmers across the value chain. Improved competitiveness and increased income were the measures of its success. On the other hand, Universal Leaf (Table 4) is a multinational company that imports and exports tobacco. Its stakeholders benefitted from the new technologies introduced to its operations. Mr. Ben Lao owns Lao Integrated Farms (Table 5), a business that buys sap to make coco sugar, coco syrup, and turmeric tea mainly for global export. It engages cooperatives and the LGU in its value chain.

Table 3. Rice farm consolidation, Piddig, Ilocos Norte

<table>
<thead>
<tr>
<th>Roles</th>
<th>Farmers</th>
<th>Piddig Basi Coop</th>
<th>Piddig LGU</th>
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</table>
| Input Supply | Zanjera (irrigators association)  
2018: 300 farmers (230 ha)  
2015: 196 farmers (168 ha) | Plant same rice variety (results in higher mill recovery)  
• Full input support to achieve high yield  
• Provides farm tractors | Supplied four-wheel tractor, combined harvester and small rice mill. |
| Production   | Follow agreed protocols     | Technical services                                     |                                                |
| Harvest      |                             | Combine harvesting                                     |                                                |
| Logistics    |                             | Transport wet *palay* (rice) to mill                  |                                                |
| Marketing    |                             | • Buys at P20 per kilo of dry *palay*                 |                                                |
|              |                             | • Sells brown rice                                    |                                                |
Table 4. Universal Leaf Contract Growing, Isabela

<table>
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<tr>
<th>Roles</th>
<th>Farmers</th>
<th>ULPI</th>
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<tbody>
<tr>
<td>Input Supply</td>
<td>• Farmer leaders as seed growers of burley tobacco</td>
<td>• Imports tobacco seeds</td>
</tr>
<tr>
<td></td>
<td>• Recruits and consolidates farmers</td>
<td>• Provides a package of technology and inputs to farmer leaders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(to achieve high yield and quality)</td>
</tr>
<tr>
<td>Growing (includes curing)</td>
<td>• Grow and harvest tobacco (~4,000 farmers)</td>
<td>Provides a package of technology and inputs to farmers</td>
</tr>
<tr>
<td></td>
<td>• Air-cure, strip, classify, bale harvested leaves</td>
<td></td>
</tr>
<tr>
<td>Leaf Buying</td>
<td></td>
<td>• Picks up, grades and buys cured tobacco leaf</td>
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<tr>
<td></td>
<td></td>
<td>• Transports cured tobacco to the processing plant (stemmery)</td>
</tr>
<tr>
<td>Leaf Processing</td>
<td></td>
<td>Blends, conditions, threshes, re-dries, cartons and labels tobacco</td>
</tr>
<tr>
<td>Marketing</td>
<td></td>
<td>• Sells processed tobacco to local cigarette manufacturers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Exports tobacco</td>
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Table 5. Lao Integrated Farms, Bansalan, Davao del Sur

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<tr>
<th>Roles</th>
<th>Coconut Sap Harvesters</th>
<th>LIFI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High poverty area to a progressive community</td>
<td></td>
</tr>
<tr>
<td>Raw material production</td>
<td>• Delivers coconut sap to the plant</td>
<td>Buys sap at competitive prices than toddy (tuba)</td>
</tr>
<tr>
<td></td>
<td>• 134 sap gatherers (mananggete in local language) earn at least P20k a month (above the family poverty line of P10k per month)</td>
<td></td>
</tr>
<tr>
<td>Processing</td>
<td>Coco sugar, coco syrup, turmeric tea (mainly for export)</td>
<td></td>
</tr>
<tr>
<td>Marketing</td>
<td>• Access organic certification – Ecocert France and USDA</td>
<td>• Exports globally</td>
</tr>
</tbody>
</table>
Dr. Larry N. Digal asserted how value chain analysis helps identify priority strategies that promote sustainability, but the key is in its effective implementation. He tackled the value chain structure, particularly plantation versus non-plantation crops, which initially emerged from the discussion. According to Dr. Digal, in other parts of the region, Thailand is the highest contributor to the agricultural economy among ASEAN nations, according to him (Figure 11), with banana as the most competitive commodity. Cavendish banana has a higher production level than corn. He went on to praising Davao’s banana industry for being well-organized. From studying successful linkages of small producers among over 38 case studies, he concluded that the foundation for their success are:

- receptive business sector;
- organized and empowered farmers;
- well-facilitated public sector; and
- effective partnership facilitation.

Lessons and Issues for Policy and Value Chain Programs

Dr. Dy lamented that the land sharing system in Philippine sugarcane farming is exploitative. The farmer will always be poor. The sharing system is: one-third belongs to the land owner, one-third goes to the processing plant, and one-third is allotted to the farmer. The farmer carries cane to the mill, crusher, mixer/stirring, and then produces sugar. There is very little option for them, unless they migrate as overseas foreign workers.

The Philippines needs to focus on a regulatory impact assessment or do away with unnecessary regulatory burdens, added Dr. Manalili. She noted that poor governance is a delimiting factor—if not addressed, development will deviate from the sector.

For Dr. Digal, linkage is weak in the chain for smallholders due to the severe gaps and issues in value chains, financing, and technology. To address these, he recommended building capacities, enhancing network capacities, understanding rules and incentives, strengthening smallholders’ position in the food supply chain, and most importantly, encouraging farmers to act as vehicles of change (otherwise known as inclusive agribusiness).

The government should engage with stakeholders, particularly farmers. In actively listening and knowing what farmers need with respect to what government can provide, welfare can be included in the process. The following must also be sustainable to successfully link farmers to the world stage:

- institutional linkages;
- knowledge management systems and sustainable practices;
- capacity building; and
- diversified farm enterprises.

Dr. Digal added that traders are necessary for consolidation and financing, but strong producer organizations, better infrastructure, and efficient consolidation and logistics system take their place in some chains. He said that facilitating partnerships effectively within the triad incentivizes small-large firm linkages (including linkages to regional and global value chains).

Dr. Manalili said that the Philippines focuses on regulatory impact assessment to do away with unnecessary regulatory burdens. In a recent study of fishery regulations, policy issues with nodes in the value chain, it was noted that the production node is beset with low productivity, high input costs, poor technology transfer, and poor delivery of services. These poor services are due to
the lack of a postharvest process (storage, common services, etc.), not to mention farm-to-market roads. Converting land from agricultural to fisheries use is likewise a delimiting factor in terms of rigid requirements and lengthy approval. For a long time, the marketing and trade sector has been left to fend on its own, given low government support, plus the stringent requirement of establishing fishery-related enterprises, marketing and trade.

To address governance issues in the agribusiness sector, a framework needs to be developed that underscores the elements of good governance, such as effective institutions, mechanisms, and processes. Whatever the program focus is, the necessary conditions and the adopted strategies should embody the presence of these elements. For these elements to thrive, there needs to be sound decision making that takes into account political, economic, and administrative considerations.

From the NEDA-commissioned fishery sector research work, Dr. Manalili’s team found that the Philippines has been focusing on policy regulation lately, and that it doesn’t help that it takes six long years to be given a business permit in some barangays. Not everyone has the knack for entrepreneurship, but one can at least be a part of the value chain.

Dr. Manalili also said that most smallholder producers are still finding their way to being integrated in the sustainable value chains, so inclusive development in this particular aspect is something that needs to be worked on. Some farmers have benefited, while others have seen their incomes fall (differential competitiveness across commodities). Overall, from the value chain analyses, small farmers learned the following:

- Be organized producer organizations and act as vehicles of change.
- Build capacities.
- Enhance networking capability (effective organizations are embedded in dynamic multi-agent networks that link their members to ideas, resources, technologies, incentives, and opportunities).
- Understand the traditional market’s system of rules and incentives (be familiar with contracts, their purpose and how best to use...
them to empower value chain stakeholders in allocating costs and benefits).

- Strengthen one’s position in the food supply chain.

To secure a strong position in the chain, farmers must undertake vertical and horizontal integration, Dr. Manalili said. Vertical integration entails strengthening existing production operations in the current segment and further moving up the chain by assuming more roles and expanding towards other segments. Horizontal integration entails a thorough transition from an observer role to being an active participant (Figure 10).

Towards Regional/Cross-Border Value Chains

Dr. Larry C. Wong said value chain production of tropical fruits is changing because of nanotechnology and biotechnology, and can be set as the main products across the ASEAN region. He analyzed the scenario from macro to micro vantage points. On a macro perspective, there are tons of advantages to improving/developing the coconut industry, for example. It produces a vast array of products i.e., virgin coconut oil, coco water, and coco milk. The top 10 coconut producers in the world are in ASEAN, including the Philippines.

The softdrinks industry in particular is a multibillion-dollar industry, he said. Coco water is penetrating the beverages market because of recent packaging technology (tetra packs). Should the coconut industry be successful, it can penetrate the global market and help eradicate poverty.

Overall, Dr. Wong asserts that the economy of geography needs to be reshaped, perhaps through the involvement of archipelagic countries such as Indonesia and the Philippines. Landlocked countries can benefit from the value chain as well.

Linking smallholders. On a micro level, Dr. Wong said that smallholder farming yields the following opportunities:

- helps small-scale owners;
- integrates the value chain;
- opens one’s mind to new ideas; and
- allows local producers to sell online.

In summary, to sustain gains, each sector—including farmers, the private sector, and government—must play its role to continue the progress that value chains contribute to AD. Particularly, farmers need to strengthen their position in the food supply chain, while those in the private sector need to drive business models that facilitate inclusive development, with the government providing enabling environments for all stakeholders to freely move in.

Open Forum

Dr. Ma. Concepcion C. Lizada asked if anyone has looked into social entrepreneurship and the role it might have played in strengthening supply chains.

Dr. Manalili replied that social entrepreneurship will help and will be sustainable if there is capacity building. But once you wean the program from its sponsor and it had not been followed up with capacity building, the program will die without support.
Session 4. Farm Tourism and Family Farming

Session Chair: Mr. Tomas A. Cabuenos, Jr.
Panel of experts: Dr. Mina T. Gabor, Ms. Gigi Pontejos-Morris, Ms. Tan Thi Shu, and Mr. JonJon B. Sarmiento

Overview

Mr. Tomas A. Cabuenos, Jr. opened the session by stating that tourism in agriculture is one of the rising opportunities in the area of agriculture and development. The many terms used, namely, farm tourism, agri-tourism, eco-tourism, or agro-ecotourism depends on who is promoting it.

Dr. Mina T. Gabor said that in the Philippines, farm tourism sat well with farmers because of their natural affinity to the word “farm,” and it is now the accepted term among practitioners and many organizations in the Philippines, including the Department of Tourism.

Mr. Cabuenos pointed out that farm tourism is defined in the Philippine Farm Tourism Development Act of 2016 as “the practice or business of attracting visitors and tourists to farm areas for production, educational and recreational purposes while encouraging economic activities that provide both the host farmer and the community additional income.”

Outlook on Farm Tourism

From her lengthy and wide experience, practice, and advocacy on farm tourism, Dr. Gabor presented the challenges and opportunities in farm tourism (Table 6).

Overall, farm tourism can increase tourist arrivals, provide new income generating opportunities (supplemental income), as well as new employment opportunities. To further support these opportunities, Dr. Gabor proposed the following innovative approaches: (1) set up farm interpretative centers; (2) link farmers and chefs in real time with digital solutions (like in Haiti) to know who is producing, in what quantities, and in which seasons via mobile applications or apps; and (3) use a metaphysical approach in enriching farm tourism sites’ meaningfulness, e.g., with six senses or a sensory approach, history, and urban legends, among others.
### Challenges and Opportunities in Farm Tourism (Gabor 2018)

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Opportunities</th>
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| **Marketing** | - When marketing to younger groups, social media has potential, although word-of-mouth is still the best marketing tool.  
- Marketing farms and tourist spots using a metaphysical approach (i.e., appealing to psychic value), is also a good strategy.  
- Farm tourism promotes appreciation of minority culture and local lifestyle. |
| **Funding** | Grants are available, but because people do not know about them, we need to reach out to farmers and train them on how they can access funding/financial grants. |
| **Product development** | Opportunities to improve food processing and packaging are wide. |
| **Training** | Educational opportunities for both locals and tourists are available. |
| **Collaboration** | - It is important to partner with LGUs and emphasize the importance of farm tourism together with communities and international travelers.  
- Policies should link agriculture, tourism, and trade.  
- Having a farm stay list and sharing certification/accreditation lists is also suggested.  
- Farm tourism owners are suggested to cluster into cooperatives and share platforms for networking to know who is doing what, how they can learn from each other, how to access grants and foreign funding, etc. |
| **Food supply consistency** | After accommodation, food and beverages generate the highest revenue in the tourism sector. Investing in rural cuisine is important. Top chefs, as change agents, can make local cuisine exciting and flavorful for tourists. Chefs are the engine that can pull the “agricultural train” from small farmers, organic farmers, to small scale processors of sauces and ingredients. A single farmer cannot produce the quantities needed by even just one hotel. |
| **Natural resource management** | Tourism is the best education on ecology and environmental protection. |
| **Climate change** | |
Metaphysical analysis/approach is an exercise that Hitesh Mehta (one of the five ecotourism experts in the world) does at all the sites he works on before he draws even a single line. It is a walkthrough to experience the land with one’s six senses. The sixth is the spiritual sense, and is used before drafting a site analysis and then translating it into a plan.

The sector recognizes that combining tourism with agriculture can disseminate agriculture’s value across the economy and culture of a nation, serve as catalyst for the development of agriculture and fishery communities, and provide additional income for farmers and fisherfolk.

Farm tourism is also one way to make the agriculture profession and industry appealing and exciting to attract people to adopt sustainable, environment-friendly practices. It further provides opportunities for business ventures for farmers and fisherfolk and promotes a healthier lifestyle.

In a nutshell, farm tourism seeks to promote environment-friendly, efficient, and sustainable farm practices; provide alternative recreation facilities and farm tourism activities; and promote health and wellness with high quality farm-produced food, Dr. Gabor said. She shared some guidelines in farm tourism practice, as follows:

- Improve homestay program facilities and services.
  - What are the capacity building programs needed to prepare the host farmer/family/establishment and the community (i.e., interpersonal communication skills, culture, and planning activities for the tourist/s, food, etc.)?

- Balance/integrate cultural, agricultural, and environmental needs.
  - What are some of the strategies/innovative approaches to better integrate culture, practice good agriculture, and manage the environmental impacts of visitors’ activities?

- Foster family farming
  - How do we integrate or harmonize family farming activities vis-a-vis farm tourism to further improve farm families’ livelihood with the general community’s economy?

**Family Farming and Farm Tourism**

Multisectoral and multi-layered family farming and family tourism drive development back to rural areas and give tourists a hospitable experience with locals who share their unique culture and local produce with tourists. Dr. Gabor said that the European Union has asserted farm tourism as an answer to overcoming rural poverty. It marries technology with traditions, as in the case of the Malagos farm in Mindanao, which has produced chocolate recognized with 23 international awards and one gold national award to date (See: https://malagoschocolate.com/2017-cocoa-excellence-programme-france/).
Farm tourism products are usually sustainable and organic in nature, making them more labor-intensive. But farm tourism diversifies the local economy and encourages greater community cohesion.

The UN declared 2014 as the International Year of Family Farming, but Ms. Gigi Pontejos-Morris said that people still have trouble identifying what a family farmer is, and some don’t even identify a family farmer as a real farmer. She shared the humble beginnings and the success of her MoCA Family Farm Learning Center in Padre Garcia, Batangas, Philippines. It first started as a hobby farm that eventually evolved into an operational for-profit farm. When the Philippines enacted its farm tourism law, it paved the way for a farm school support program that Ms. Pontejos-Morris availed of. MoCA now has about 106 graduates of Technical and Vocational Education and Training or agri-TVET since 2017, employing 10 personnel and their families. All earnings are given back to the community and are continuously invested in the farm for rural development and sustainability.

Ms. Tan Thi Shu, the Founder and Director of Sapa O’Chau Project in Vietnam, started out as a simple member (daughter) of a farm family, then tried her hand at becoming a tour guide at 16 years old. The project now has 50 tour guides. The project’s proceeds get plowed back to the community to support children’s education. There are also volunteers teaching children English in the community, with about 70-100 students annually.

Mr. Jonjon B. Sarmiento described his Kuatro Marias farm that operates on 4,000 m². Named after his four daughters, the farm seals its brand as a family farm. Unfortunately, Mr. Sarmiento said that the law does not consider it as a farm tourism enterprise due to its relatively small size. Also, another concern for owners of farms like this is land security. Furthermore, asset requirement is another issue for Filipino farmers. It is a challenge to get the recognition of the role of family farming in the farm tourism value chain. Farm tourism needs a lot of interventions, and farmers are not aware of government support being offered. As advice to farm tourism practitioners and possible policy directions under the Philippines’ farm tourism law, Mr. Sarmiento offered the following notes:

- **Know your market, your product, and your farming system.** If your farm is a “chemical farm,” then you cannot go into farm tourism. On the other hand, if it is an integrated farming system, then you can provide tourists with a diverse range of activities. A monocrop system will be boring for tourists. For instance, if you only produce pineapples, they will only have pineapples to eat from the farm.

- **Balance tourism wants versus environmental needs.** In traditional tourism, tourists look for good hotels, so the challenge/opportunity lies in sustaining ecological services as well.

- **Funding.** Smallholders have difficulty accessing funding or grants compared to big-scale farmers.

- **Indigenous knowledge** is a smallholder farmer’s advantage.

Ms. Pontejos-Morris further shared an alternative perspective to monocrop farming. Turning out multiple by-products from the farm, when used strategically, opens up the opportunity of not needing to open the farm all year round. In this case, you can determine when to open the farm. Farm tourism was initially promoted as only an additional revenue source for farmers, but now it is the main source of profit.
Dr. Gabor said that natural farming is the answer. Startup farms do not need to be organic farms right away, but one can immediately operate farm tourism. By law, it is mandatory that certain government agencies and banks loan funds for farm tourism operators. When its implementing rules and regulations (IRR) are completed, farm operators are advised to make sure that they comply with all of its provisions and understand how to apply for the loan.

Dr. Gabor further noted that even the nature of tour guiding has changed. It is more specialized/diversified now. There are farm guides, culinary guides, and even digital guides (robots/AI, apps). If you are a book author, or a retired showbiz personality, for instance, you can be a guide. Tour guide specialization is now a trend. In training programs, for example, young investment bankers are turning into farm tourism operators.

Mr. Sarmiento said he is glad that smallholder farmers are now playing key roles in farm tourism. The family members’ capacities and roles in farm tourism is changing. He called for institutions to establish facilities for knowledge-sharing, as well as immediate completion of the farm tourism IRR in the spirit of social justice, so that smallholders may fully participate in the farm tourism movement.

**Scope of Growth for Farm Tourism in Southeast Asia**

In terms of regional growth, Dr. Gabor said that farm tourism is already starting to flourish in the Caribbean. The nine-member Caribbean countries have set up a Farm Tourism Linkage Committees that brings together public and private groups to know who is doing what, how they can learn from each other, and how to access grants and foreign funding, among others. Similarly, in Asia, there is a five-country tour package called “Ikot Asia, ikot ASEAN (go around Asia, go around ASEAN).” Dr. Gabor said it all boils down to the local government—if the local government supports farm tourism, things will happen. She said that, “we have just scratched the surface.” The Philippines could become the farm tourism capital of the world with the Ikot Asia, Ikot ASEAN tour.

Mr. Sarmiento strongly suggested that ASEAN should support initiatives for cooperatives, and that an international venue be created to facilitate knowledge-sharing because the Philippines’ neighboring countries (i.e., Vietnam and Thailand) are far ahead in farm tourism. Cabuenos rallied for all ASEAN nations to act together as one body and build partnerships within the region.

**Some Clients’ Farm Tourism Experiences**

Panelists shared hands-on experiences with farm tourism clients/guests. Many tourists come to Vietnam’s Sapa O’Chau Project, for instance, and share the way of life in the community through farm stays. Guests experience the rural way of life and use local farm family products unique to the area.

Similarly, the Kuatro Marias farm is eco-friendly, down-to-earth, focused on natural landscapes, and offers food grown right at the farm—in contrast to the upscale style of tourism with posh hotels and overly-developed landscapes that may not necessarily nurture the environment.

Kuatro Marias once hosted a group of 50 teachers, for instance. Mr. Sarmiento narrated how one lady was not too keen on her experience at first, not liking the dirty/grassy area. She approached him, complaining about knee pains,
so he told her that the grass that she was complaining about could actually relieve her knee pains. She then grew to appreciate the grassy place in the end. According to Mr. Sarmiento, it helps to have plenty of unique stories and culturally relevant products to share with tourists to enrich their experiences and make their farm stays vividly memorable.

**Improving the Image of Agriculture Among the Youth**

The panel observed how several groups now rally for farm tourism and suggested that they need to band together. Pooling their resources and providing a one-stop shop that they could access would help. They also agreed that the success of farm tourism depends on LGU support. If the LGU is ready, everything will follow.

Mr. Cabuenos added that farm tourism is now put on a pedestal, but the moment it starts to showcase millennials going back to the farms, farm tourism could flourish even more. Millennials and the next generation are key to keeping the agricultural sector alive and flourishing.

The panel concluded that given the average age of farmers in the Philippines, said to be at 57 years, it is crucial to engage the youth to sustain the agriculture sector. Farm tourism is a pathway to make agriculture appealing enough to attract the youth to become key actors in the sector. Social media is useful in attracting a younger demographic to agriculture via family farming and farm tourism, among other possible strategies.

**Open Forum**

Dr. Lizada commented that the multi-awarded Malagos chocolate exemplifies a good case to apply the metaphysical approach to marketing, because it has a story behind it that would draw people to visit Puentesfina Farms, which produces Malagos chocolate in Davao City.

On Mr. Sarmiento’s statement that the size of Kuatro Marias farm does not pass the legal requirement to be considered a farm tourism site, Dr. Gabor clarified that the law specifies no size for farm tourism and a large parcel of land is not necessary—what you can show tourists is key.
Dr. Cielito F. Habito observed a common thread in the various panel discussions, pinpointing the primacy of smallholder actors in agriculture. From managing climate uncertainties and water scarcity showing smallholder farmers receiving the brunt of these constraints; to how access to information technology narrows the gap between large and small producers; to drawing in smallholders in national, regional, and global agribusiness and food value chains; and improving livelihoods through farm tourism and family farming—the challenge in the region is how to continue to support smallholder farms and help them flourish.

Dr. Habito also shared his reflection from listening to the discussions, especially on agricultural value chains and on farm tourism and family farming, that the three sectors of the economy—agriculture, industry, and services—can operate simultaneously in an integrated fashion and not necessarily as separate sectors in consecutive stages of economic development.

Key Insights and Opportunities on Managing Climate Uncertainties and Water Scarcity

Co-production of knowledge with smallholder farmers. Dr. Capistrano noted that recognizing the importance of smallholder farmers draws attention to how technologies and information might be better organized, packaged, and communicated to improve their productivity, diminish this sector’s vulnerability, expand their adaptation potential, and mitigate some of their water scarcity issues. It is imperative to rethink what the extension agency really does, and whether there is need to continue how it traditionally communicated with smallholders in the paradigm of technology transfer. She said that the discussion pointed out a need to move more toward co-production of knowledge and sharing of information, mindful of how technology can democratize not only the sources of information but more so the interpretation of information.
Dr. Capistrano added that data and information are not neutral; they are powerful depending on how they are interpreted. In many cases, smallholders have suffered simply because they have been made invisible; or if they have been visible, their roles, meanings, and agencies have been appropriated in ways that actually have turned the tables against them. The key is not just in presenting the data, but in their interpretation or meaning, or in the framing of the possibilities and potential decisions from them.

**Capacity building that empowers.**
Dr. Capistrano said that the forum rightly pointed out that capacities have to be built at different levels, with different stakeholders, not just at the individual but also at the institutional level, which is really the bedrock of sustainability. She then drew attention to the central issue of equity in capacity building—who benefits from how things are framed, and whether smallholder farmers actually benefit. Beyond building capacities by providing information that empowers, she pointed out a need to build capacities among smallholder farmers to articulate and advocate solutions in climate uncertainty and water scarcity in particular, and in agriculture and development in general, on behalf of their sector in ways by which they see the questions as well as their solutions. This calls for capacity building that is affirmative, legitimizes, and does not impose one uniform way of looking at things, preserving the diversity of perspectives—which is also a principle for resilience, or in reducing vulnerability. In much the same way that ecosystems are better off by being diverse, the diversity of opinions and perspectives also provides for built-in resilience that allows for solutions in the future. Capacity building modalities should therefore respect such diversity of views.

**Distilling lessons in governance and institutions.**
Dr. Capistrano acknowledged that there are enough policies and regulations particularly in the Philippines, and that the question is whether and to what extent they are applied; or whether they are applied in ways that are beneficial. On the issue of collaboration in ASEAN, she noted how the language of ecosystems and landscapes facilitates talking across sectors and amongst the different actors; and how the different sectors link together, i.e., how the drivers of agriculture impact forestry, fisheries, etc. In reality, the lessons from subsectors like forestry really have more generic applications beyond this one sector, and the lessons tend to be in governance, institutional reforms, and institutional advocacy.

Dr. Capistrano reiterated the questions and lessons raised on how we manage risks; how we compensate for damage such as in the case of crop insurance; how we need to open up channels for sharing, like in the case of Seeds Without Borders, to facilitate information exchange and lessons learning; and how platforms will have to be provided within and across countries in ASEAN. To her, these points asserted again draw attention to how we frame things not just in the area of capacity building but also in agricultural education and education in general, in how we harness the experience of local actors, to be more in service about a much more integrated way of framing issues on degraded lands and water restoration that provides a lot of potential, but in ways that reflect local knowledge.

Picking up from the discussion in the fourth panel, Dr. Capistrano asserted that security of land tenure for small farmers is important—it provides an incentive for long-term investment in conservation and sustainable resources management, not just in farm tourism. This goes to the heart of the equity issue—inclusive agricultural and rural development really rests on the
Key Insights and Opportunities on IT Applications in Agriculture

Potentials in agriculture and development. Dr. Karen Eloisa Tanzo-Barroga reiterated from session 2 that ICT has indeed reshaped agriculture and development, emphasizing that IT is just a tool by itself and not automatically a solution. IT solutions require the user to know what s/he wants to do with it, what to get from it, how to use it, analyze the costs and benefits, process historical data if available, and be guided by a business model.

Data gathered using IT must also be organized so that users are better informed of their decisions and make the best use of IT. In agriculture, IT can contribute to better production efficiency, help meet the demand for safe and healthy food, and manage finances efficiently. Its applications are currently advancing at a rapid pace in view of its decreasing cost, people’s need to connect and communicate, the reality of labor scarcity, and the generally high level of techno-optimism especially among the youth.

Challenges and opportunities. However, using IT in agriculture and development poses several challenges. These include the digital divide between higher-income and less-developed countries, privacy and information security issues, and the limited availability or high cost of IT infrastructure.

In developed countries in Southeast Asia, IT has created new opportunities for transforming the agriculture sector, and it is now seen as an attractive sector because it is paying very well. But IT-based agricultural transformation is not easy and varies, like in Singapore and Taiwan. In less developed countries in the region where growth is much slower in pace, the increasing interest among the youth, especially with the farm tourism platform where these IT solutions may be showcased, helps advance their application. But expert panelists in session 2 recommended a city approach rather than a country approach as more practical.

To take advantage of the benefits and potentials of IT, everyone in the whole supply chain needs to engage or buy in the technology. In this way, everybody wins, and no one is left behind, including traditional farmers. It is also important to analyze its use at various levels—micro, meso, and macro for a more holistic approach; look at the aggregated data, capitalizing on big data analytics where relevant; to give a better understanding of the gaps and needs to address; identify opportunities that are available; and which interventions to make.

Toward an enabling IT policy for agriculture. The expert panelists in session 2 underscored the importance of having different sectors working together—agriculture and ICT departments or ministries, for example. The use of IT must also show success at financial, engineering, and operational levels. Finally, there must be an enabling environment—e-agriculture policies and a digital ecosystem that reaches out to the rural areas for inclusive development to happen. Such policy could look into sharing of databases and their processing; free internet connectivity or lower cost for rural areas; and policies that prepare us for Agriculture 4.0.5

5 The introduction of Agriculture 4.0 has produced a new term to describe those companies using this new and much more technified model: the Agritech sector. Companies in this sector are adopting new methodologies such as the Precision Agriculture. Basically, according to the European Parliament definition, it is “a farm management model based upon observing, measuring and responding to inter and intra-field variability in crops”. The goals are mainly increasing the productivity of the crops while ensuring a higher environmental sustainability (https://medium.com/iot-security-review/agriculture-4-0-what-is-it-9bb654b7fca5 downloaded 3 January 2019).
To create an enabling environment for IT-enabled agriculture now, it is important to communicate how IT is currently used in interventions for climate change adaptation and mitigation and disaster risk management; and build capacities on transformational leadership in agriculture and development to have more change catalysts who see the promise of IT in this sector.

**Key Insights and Opportunities in Integrating Smallholders in Agro-industrial Value Chains**

Prof. Teng acknowledged the richness of session 5 with its six-member panel using cases to illustrate their points, and a lot of insights drawn from reviewing the breadth and depth of value chain cases they have worked with.

He noted that value chains are definitely contributing to desired agricultural transformation in ASEAN and one can draw a lot of valuable lessons in these experiences. He further acknowledged the importance of smallholder farmers in the supply chain in the context of agriculture and development in this region.

He cited the work of Grow Asia in bringing together almost 50 value chains in a multi-stakeholder platform and identifying their enablers and success factors and addressing their needs. Policy and governance play an important role in enabling these value chains, and his panel put forward some important inputs in this regard.

Prof. Teng reiterated the role that farmers can play as change agents and champions. He then said that at a macro level, it is also important to recognize externalities, as successful value chains now operate beyond national boundaries, outsourcing supplies and services where they are cheaper and faster. He cited developments like the roll-on-roll-off cargo ships and One Belt-One Road initiative of China that enable cross-country and multinational value chains to be successful.

Prof. Teng then drew attention to the importance of doing a proper value chain analysis for identifying priority strategies and directions in value chain development. Noting the role of small and medium scale enterprises, he observed that value chains contribute to the social goals of sustainability, alleviation of poverty, and quality of education. He then reiterated the importance of engaging with government amidst the multiple players in ensuring the success of a value chain.

**Key Insights and Opportunities in Farm Tourism and Family Farming**

In drawing insights on the inclusion of smallholder farmers in agricultural value chains, Prof. Teng cited farm tourism as one form of value addition in agriculture where farmers can participate. The farm can provide a venue for urban dwellers to learn about the food value chain itself, from how farmers produce rice in the paddy, for instance, to appreciating their preparation and nutritive value, and reducing food waste.

Farm tourism featuring natural farming is more popular because organic farming certification is too expensive, Mr. Cabuenos observed. It simply advocates going back to the basics of promoting healthy soil, healthy plants, and developing local culinary cuisine for healthy people. The equation is simple and needs no statistics to convince clients and practitioners alike.

Acknowledging the earlier point asserted on the primacy of smallholder farmers in the discourse of the forum, Mr. Cabuenos called for a need to go back to basics. i.e., asset reform (primarily land/agrarian reform), and concerted effort to keep such asset in the hands of resource-
poor farmers through relevant and appropriate capacity building. Breaking the vicious cycle of poverty is the essence of why the Philippines implemented the Comprehensive Agrarian Reform Program (CARP), he elaborated.

In building farmers’ capacity, he urges for agri-preneurship, or making enterprise out of agriculture. There is a need to change the mindsets farmers so that they do farming as a business, he said. This includes training them on the “numbers” aspect of running a business.

Prof. Teng similarly supported the importance of having a sound business approach out of farmers’ farm tourism initiatives that create value in their farms and produce. While value chains contribute to social goals, they are a business, he said, and when they bring in money, everybody benefits. Mr. Cabuenos qualified that it is easier to bring back excitement in agriculture and show that there is money in farming to the youth, rather than to the current generation elderly farmers, through farm tourism and use of simple-to-use and popular social media, specifically Facebook, to promote it.

From the forum discussions, Mr. Cabuenos also advocated a synergy of the family-size farm and the more commercial farm tourism operation along the principle, “Act local, but go global.” He said in order to thrive, small farm tourism sites must group together and even band with larger farms where possible and feasible.

In the context of how ecotourism and farm tourism involves not just packaging the farm products, i.e., the plants, fiber, and fabric; but also packaging the knowledge and the cultural identity that comes with the lifestyles they showcase, Dr. Capistrano advocated for policy that looks into rights to intellectual property and creative arts. Intellectual property protection for cultural products in the creative industries is an important issue for small farmers and small producers because in many cases, this is what they have that nobody else has, she said.

Directions for Action

Dr. Habito further probed with the forum session chairs what future actions the forum proceedings concretely point out.

Guidance from international agreements and agenda. Dr. Capistrano said that the international agenda for action in managing climate uncertainty and water scarcity is more or less clear with the Paris Climate Agreement, which provides priority action for climate change adaptation and mitigation (CCAM). The SDGs of the UN also provide clear guidance on what governments are expected to deliver on targets and goals. She cited SDG 6 on sustainable water; SDG 15 on life on land, including land restoration, minimizing deforestation, protecting biodiversity; food security, food and nutrition, and climate change adaptation and mitigation goals, among others, which are monitored and governments have to report on every two years.

To deliver on these agenda, Dr. Capistrano underscored the role of policies and regulations at national, district, or provincial levels, as well as collective and social action at the local level. For CCAM, for instance, the government can designate protected areas and carbon sequestration areas.

Pitch for agroforestry. Dr. Capistrano cited how widespread adoption of agroforestry practices plays a role in protecting transboundary environmental resources, which requires concerted, collective action over large territories. Agroforestry, or the climate change-adaptive practice of planting diversified crops and trees in the same space,
straddles agriculture and forestry as areas of concern, a jurisdiction over which can be tricky for policymakers.

Dr. Capistrano added that the ASEAN already has clear guidelines on implementing agroforestry for its 10 member countries. She suggested great potentials for expanding enterprise development in agroforestry, e.g., by scaling up production, timing of harvest, and marketing support technologies that would help enhance the livelihood of smallholder farmers, while simultaneously contributing to CCAM and restoration of degraded lands. She recommended that supporting small- and medium-scale enterprises ought to prioritize those that contribute to sustainable natural resources management, such as agroforestry.

**Engaging children and youth.** Dr. Tanzo-Barroga underscored providing social preparation through the engagement of children and youth in agriculture at an early age. As a creative way of engaging them, she cited PhilRice’s project involving the youth as IT users who pass on relevant farm information and technologies to their smallholder farmer parents. She said the first level of engagement can use simpler technologies, like text messaging. “We get as much as 5,000 texters asking about agricultural information,” she said. The youth are adventurous and curious, hence they are best tapped to share information with their families using IT.

Mr. Cabuenos also vouched for actively engaging the youth in farm tourism ventures and activities, capitalizing on their penchant for travelling. Speaking up from among the participants, Mr. Sarmiento went further to strongly endorse a magna carta for young farmers that his group is pushing. “We need to trust young people, give them the asset (land), the financial support, and invest in them,” he stressed.

Similarly, Mr. Robert Lao (a forum participant) urged for the Commission on Higher Education of the Philippines to incorporate the innovations discussed in the forum in undergraduate curricula.

**Putting in place foundational systems to support regional value chains.** Prof. Teng referred back to his figure on harmonizing agri-development ecosystems in ASEAN (See Figure 5). The key is to make farming an enterprise, he said, and SMEs, and national and regional policymakers and regulatory bodies from the public sector ought to support them with enabling laws, tax incentives, and guidelines for investment, safety, efficacy, and approval.

Technology and knowledge transfer are key to the success of the farm enterprise, and universities as knowledge centers in the public sector, as well as corporate and SME R&D in the private sector, can help customize the technologies that small farmers use.

But then again, the farming enterprise does not exist in a vacuum, and support industries comprising of consultants, public relations firms, marketing firms, and media from the private sector; investment banks; public equity like intellectual property offices; private equity providing venture capital and angel investors; and multinational corporations should be part of its foundational ecosystem.

**Segmenting one’s market.** Mr. Cabuenos said it is important to classify or have focus on one’s product. For instance, if it is farm tourism that features environment-friendly practices and products, farmers

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6 Note from the forum organizing team: Some higher education institutions in the Philippines are already offering programs or major specializations or courses in farm tourism, notably Central Bicol State University of Agriculture (CBSUA) and Pampanga State University (PSU).

7 An angel investor is an individual who invests his or her own money in an entrepreneurial company (https://www.entrepreneur.com/encyclopedia/angel-investor).
should be able to specify their target markets or intended clients, or market segment, mindful that competition abounds.

**Funding support, setting standards, and knowledge sharing.** Mr. Cabuenos further underscored the need for laws, regulations, and standards, and for government agencies to support farm tourism with resources. Ms. Pontejos-Morris affirmed that this is provided by a scheme where the DA-ATI provides funding support for farmers to train fellow farmers, and where her MoCA farm participates as an accredited learning site.

Mr. Cabuenos also emphasized the importance of setting standards (which the accreditation guidelines for farm tourism sites set by the Department of Tourism, Philippines provide for), and that knowledge on this should be shared.

**Quick summary.** Dr. Habito closed the session by identifying at least four challenges with their attendant opportunities in agriculture and development in Southeast Asia that surfaced at the forum:

1. **Climate change,** as already discussed, shedding great light on its many surrounding issues.

2. **Aging farmers** and how best to harness the potentials of millennials to contribute to a sector they seem no longer interested in, with the new hope posed by IT applications in agriculture and farm tourism making farming more attractive and appealing to the youth.

3. **Declining farming area per capita,** due to the rapid conversion of farm lands to non-agricultural uses as presented by Prof. Teng, with the promise of various new technologies in biology/breeding and IT that help mitigate threats of food insecurity.

4. **Regional integration,** better viewed as an opportunity if we capitalize on cross-border value chains in ways described by Dr. Wong, toward more productive and efficient agriculture in Southeast Asia.

Finally, Dr. Habito noted how the forum has yielded a rich set of action points, which doubles as a list of possible topics for future SEARCA forums, acknowledging the center’s key role as knowledge facilitator and hub in agricultural and rural development in the region.

He then commended the organizers’ excellent technical preparation of the forum and expressed confidence that they would synthesize and package its outputs to everyone’s satisfaction and benefit.
On behalf of SEARCA, Dr. Bessie M. Burgos, Program Head for Research and Development, thanked everyone, from the forum technical adviser, session chairs, expert panelists, to the participants, rapporteurs, and the whole SEARCA organizing team “for the energy that they brought to the forum, for their invaluable contributions to the discussion, for their participation in reflecting on and visioning the future of agriculture in the years to come.”

She acknowledged the guidance of Dr. Gil C. Saguiguit, Jr., SEARCA’s immediate past Director, who originally came up with the idea for convening the forum. She also expressed SEARCA’s gratitude to its Senior Fellows, Dr. Habito, Dr. Percy E. Sajise, Prof. Teng, Dr. Gerry M. Collado, Dr. Capistrano, and Dr. Ma. Concepcion C. Lizada, for their words of wisdom and encouragement.

She expressed hope that the enthusiasm and engagement will continue even beyond the forum and that everyone present would “find common grounds of collaboration along the themes identified during the discussions that will help shape the future of agriculture.” She then said that SEARCA would further synthesize the wealth of insights and ideas that came out in the forum and share this with everyone for their own reference and use. Furthermore, she assured everyone that SEARCA will harvest from these insights to inform the center’s 11th five-year plan.
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