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APEC SEMINAR WORKSHOP ON MAINSTREAMING CLIMATE CHANGE ADAPTATION AND MITIGATION INITIATIVE IN AGRICULTURE (AMIA)

Makati City, Philippines
Agricultural Technical Cooperation Working Group
October 2013

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The APEC Seminar Workshop on Mainstreaming Climate Change Adaptation and Mitigation Initiative in Agriculture (AMIA) is a follow up of the APEC Symposium on Climate Change conducted by the Philippines in February 2012. The seminar workshop aims to create an appropriate framework for cooperation to operationalize the recommendations of the APEC Climate Change Symposium. The framework for cooperation is the primary output of this workshop. It will focus on building capacities in mainstreaming and institutionalizing climate change adaptation and mitigation specifically on the three policy instruments: research and development, extension and regulation, and the collaborative activities will be discussed and agreed upon by participating APEC economies and partner institutions. Viable and sustainable partnerships and linkages will be explored in the process. Participants include policy makers and implementers, researchers/scientists and practitioners from APEC economies, selected international organizations and potential partner institutions, and the private sector.

Makati City, Philippines
Agricultural Technical Cooperation Working Group
October 2013

TABLE OF CONTENTS

LIST OF ANNEXES

Seminar-Workshop
Mainstreaming Climate Change Adaptation and Mitigation Initiative in Agriculture (AMIA)

Focus: Viable and Sustainable Partnerships

Holiday Inn and Suites Makati, Philippines
October 22-24, 2013

Day 0 October 21, Monday	
1500 1700	Arrival and check-in: Holiday Inn and Suites Makati (HISM) Start of Registration Tinalak Room (Secretariat Room) Meeting with Session Chairs and Paper Presenters Tinalak Room
Day 1 October 22, Tuesday	
0700-0800	Setting up of **APEC Climate Change Market** Function Room Foyer An area at the lobby of the event's Conference room is being allocated for this purpose. APEC economy representatives, invited NGOs, national and local government representatives and private sector shall display and/or print their list of goods and services available for "sell." The poster/flyer can list technologies, knowledge, expertise, and innovations. An invited participant may want to display samples or brochures of listed good and services at the table provided for the purpose.
0830 – 0900	Registration
Morning Session **Yakan-Abaca-Jusi Rooms** Chair: Dr. V. Bruce J. Tolentino Philippines	
0900 – 1000 1000	**Opening Program** **Opening Remarks** **Dr. Segfredo R. Serrano** Undersecretary, Policy & Planning Department of Agriculture APEC-ATCWG Focal Point, Philippines **Group Photo**
1000-1015	Coffee and Tea Break and Networking

Seminar Workshop Proper **Yakan-Abaca-Jusi Rooms** Chair: Dr. V. Bruce J. Tolentino Philippines	
1015 – 1030	**Seminar Workshop Overview, Objectives, Expected Output and Administrative Arrangements** **Dir. Alicia G. Ilaga** Focal Person, APEC & DA Systems-Wide Climate Change Office (DA-SWCCO) Policy & Planning, Department of Agriculture Project Overseer
Technical Paper Presentations	
1030-1050	Paper 1: **Climate Change Challenge in Agriculture in the Philippines** **Dr. Esteban C. Godilano** International Consultant, GIS/RS
1050-1110	Paper 2: **Adaptation and Mitigation Initiative in Agriculture: The Philippine Framework for Action** **Dr. Segfredo R. Serrano** Undersecretary, Policy & Planning Department of Agriculture APEC-ATCWG Focal Point, Philippines and **Dir. Alicia G. Ilaga** Focal Person, APEC & DA Systems-Wide Climate Change Office Department of Agriculture Project Overseer –SATC 13 12A
1110-1130	Paper 3: **Mainstreaming Climate Change in Research and Development: The Philippine Framework for Action in AMIA** **Dr. Eliseo R. Ponce** International Consultant for Agricultural Research and Development
1130-1150	**Open Forum**

1150-1210	Paper 4: **Mainstreaming Climate Change in R & D: Midstream and Downstream** **Dr. Beatriz P. Del Rosario** International Consultant for Agricultural Research and Development
1210-1230	Paper 5: **Why We Need to Mainstream Climate Change in the Extension System** **Dr. Rowena Baconguis** Associate Professor College of Public Affairs University of the Philippines Los Banos
1230-1250	Paper 6: **Mainstreaming Climate Change in Agricultural Regulations** **Dr. Saturnina Halos** International Consultant for Biotechnology and Biosafety
1250-1310	Open Forum
1310-1430	Lunch Break and Networking Pre-Function Area
Afternoon Session **Yakan-Abaca-Jusi Rooms** Chair: Bill Verzani United States	
1430-1450	Paper 7: **AMIA and the Integrated Eco-systems Management (IEM) Framework** **Dr. Ernesto S. Guiang** Natural Resources Management Consultant
1450-1500	Open Forum
Economy Reports	
Each economy shall prepare and present a report that addresses or focuses on the following issues: 1. Strategic Mainstreaming of Climate Change Adaptation and Mitigation in Agriculture Across Policy Instruments (Research and Development, Extension, Regulations) 2. Viable and Sustainable Partnerships on Climate Change Adaptation and Mitigation	
1500-1520	Economy Report: Mohd Fairuz Bin Md Suptian Malaysia
1520-1540	Economy Report: Mr. Mario Cobos/Mr. Sergio Gomez Rosales Mexico

1540-1600	Open Forum
1600-1615	Coffee and Tea Break and Networking
1615-1635	Economy Report: Dr. Mei-Ping Cheng Chinese Taipei
1635-1655	Economy Report: Mr. Paul Melville New Zealand
1655-1715	Open Forum
1830 – 2030	**Welcome Dinner** **Yakan-Abaca-Jusi Rooms** Host: Philippine Department of Agriculture
October 23, Wednesday	**Morning Session** **Yakan-Abaca-Jusi Rooms** Chair: Mr. Paul Melville New Zealand
0900-0920	Paper 6 **Nitrogen Use Efficient (NUE), Salt Water Tolerant (SWT) and Water Use Efficient (WUE) Crop/Rice Varieties and Potential Public-Private Partnerships** **Dr. Zhongjin Lu** Vice-President for Product Development Arcadia Bio-Sciences
0920-0930	Open forum
0930-0950	Economy Report: Dr. Akkinapally Ramakrishna Papua New Guinea
0950-1010	Economy Report: Dr. Li Ninghui and Dr. Guo Jingli China
1010-1040	Open Forum
1040-1055	**Coffee/Tea Break and Networking**
1055-1115	Economy Report: Pablo Cortés Tirado Chile
1115-1135	Economy Report: Dr. Maswar Bahar Djaka Indonesia
1135-1155	Economy Report: Dr. Arak Chantuma Thailand
1155-1215	Economy Report: Ms. Le Hoang Anh Viet Nam
1215-1245	Open Forum
1245-1400	Lunch Break and Networking Flavors Restaurant

Parallel Workshop Sessions
Ramie, Rattan-Raffia, Sinamay Rooms

Parallel workshop sessions will be held in the afternoon of October 23, and participants shall be distributed according to the following workshop groups:

Workshop Group 1: Research and Development
Workshop Group 2: Information, Communication, and Extension
Workshop Group 3: Regulations

Each workshop group shall focus on the following areas/issues within the function/policy instrument assigned. The critical question is: How should each of the issues indicated below be effectively addressed among APEC economies:

1. Strategic mainstreaming
    - Knowledge, atttidues, and skills (KAS)
    - Organizational culture
    - Policy
2. Operational mainstreaming
    a. Program planning
    b. Program/projects development
    c. Monitoring & evaluation
    d. Impact evaluation
3. Sustainable partnership arrangements

Each workshop group shall identify APEC-wide means/strategies through which member economies can learn from each other on the various issues within each function to achieve effective mainstreaming of adaptation and mitigation in agriculture. These can be in the form of people to people exchange (government personnel, experts/scientists, youth, women, students, farmers, NGOs, private sector) through bilateral and multilateral programs, information and communication, and forums.

1400-1700	**Workshop Group 1: Research and Development** **Workshop Group 2: Extension** **Workshop Group 3: Regulations**
Plenary Session **Yakan-Abaca-Jusi Rooms** Chair: Dr. Mei-Ping Cheng Chinese Taipei	
1700-1800	Workshop Output Presentation Open Forum
1800-1900	Market Interaction: APEC economies are requested to proceed to the Climate Change Market. The aim is to provide an opportunity for the sellers and the buyers to transact business. An economy representative is requested to be present at its display area to respond to potential buyers. Report of market transaction shall be made by filling up the form provided for the purpose. Completed forms shall be submitted to the Secretariat for consolidation.

1900	**Meeting of Group to prepare a Draft Resolution for the Framework of Cooperation across three policy instruments among APEC Economies** Free time for other delegates
October 24, Thursday	
0700 0715 0900 1230	**Field Trip to Climate Change Adaptation and Mitigation Agricultural Projects** • Assembly: Hotel Lobby • Departure for Field Trip by Chartered Bus • ETA, IRRI, Los Banos, Laguna • Lunch
1400	• Return to Manila
1530-1545	Coffee and Tea Break and Networking
Closing Session **Yakan-Abaca-Jusi Rooms** Chair: Mr. Mohd Safarul Izmi Bin Saidin Malaysia	
1545-1615	Report of Market Transactions
1615-1645	Next Steps: **Presentation of Proposed Framework of Cooperation among APEC economies** **Dir. Alicia G. Ilaga** Focal Person, APEC & DA-SWCCO) Policy & Planning, Department of Agriculture Project Overseer- ATC 04 2011A
1645-1715	Synthesis **Dr. Eliseo R. Ponce** International Consultant for Agricultural Research and Development
1715	Closing Remarks **Mr. Naderev M. Saño** Commissioner Climate Change Commission **Dr. Segfredo R. Serrano** Undersecretary, Policy & Planning Department of Agriculture APEC-ATCWG Focal Point, Philippines
End of Seminar Workshop	

APEC Seminar Workshop on Mainstreaming Climate Change Adaptation
and Mitigation Initiative in Agriculture
October 22-24, 2013
Makati City, Philippines

SEMINAR WORKSHOP REPORT

Day 1: October 22, 2013

Opening Program: 9:00 am to 10:00 am

The program started at 9:20 AM, with Dr. Eliseo R. Ponce temporarily acting as moderator. Dr. V. Bruce J. Tolentino took over after Dr. Serrano's speech.

Mr. Segfredo R. Serrano, PhD, Undersecretary, Philippine Department of Agriculture and APEC Agriculture Technical Cooperation Working Group Focal Point for the Philippines, delivered the opening remarks and presented an overview of the three-day seminar-workshop. He then introduced and welcomed the participants.

Mr. Serrano emphasized that climate change is a challenge facing the economy and that there is no turning back once a mistake is made. With depleting resources, the most important resource left that should be nurtured is people's knowledge. The workshop is a venue to identify possible areas of collaboration for the APEC economies' mutual benefit. Therefore, the economies should work in a harmonious way to address further damages of climate change in the planet. Research and development, regulatory systems, and extension are the three most important policy instruments to look into in exploring mutually beneficial cooperation.

The Opening Remarks of Mr. Serrano is attached as Annex B1.

Seminar Workshop Proper

Morning Session: 10:00 am to 1:00 pm

Moderator: **Mr. V. Bruce J. Tolentino, PhD**
Deputy Director General
International Rice Research Institute
The Philippines

Seminar Workshop Overview, Objectives, Expected Output and Administrative Arrangements

Ms. Alicia G. Ilaga
Focal Person, APEC and DA Systems-Wide Climate Change Office
The Philippines

Ms. Ilaga gave an overview of the seminar-workshop. She provided a brief walk-through of the program, and laid down the house rules and presentation guidelines.

She explained that the APEC Adaptation and Mitigation Initiative in Agriculture (AMIA) seminar workshop is a venue for the economies to learn from each other's experiences in addressing climate change in agriculture. The main objective of the activity is to agree on an APEC-wide framework of cooperation. The goal is to create viable and sustainable partnership arrangements among APEC economies and partner institutions to support institutionalization and implementation of AMIA. The aim is to make climate change mitigation in agriculture an economy-wide practice that shall produce solid results at least at the economy level. The Philippines's central strategy is mainstreaming AMIA across policy instruments and agencies in

the whole agriculture bureaucracy, focusing on (1) research and development, (2) information, communication, and extension, and (3) agricultural regulations.

The full text of Ms. Ilaga's presentation is attached as Annex B2.

PAPER 1: Climate Change Challenge in Agriculture in the Philippines

Mr. Esteban C. Godilano, PhD
International Consultant, Geo-spatial Information System/Remote Sensing
The Philippines

The presentation focused on the climate change scenario in the Philippines. The agriculture and fisheries sector is among the most vulnerable areas to climate change effects such as landslides, drought, and flooding. As a strategy, the Department of Agriculture issued a memorandum on "Mainstreaming Climate Change in the DA Programs, Plans, and Budget with four strategic objectives and seven systems-wide programs to make all DA programs climate change-compliant. A socially and environmentally sustainable growth that takes resource limits and climate change into account is recommended. Policy reforms in R&D, regulations, and extension are being planned so that the corresponding services provided are climate change-compliant.

The full presentation of Mr. Godilano is attached as Annex C1.

Open Forum

Mr. Philip Shull, USA:	What is the current position of the Philippine government in using biotechnology as a method in preventing the negative effects of climate change?
Mr. Esteban Godilano, The Philippines:	Most of the yellow corn farmers are already planting BT corn despite opposition from certain groups. Despite this opposition, the Philippine government continues to engage on biotechnology research, specifically on genetically modified organisms, as this is seen as key to address among others climate change challenges.
Mr. Philip Shull, USA:	Can you provide us with a figure of BT corn planting in the Philippines that do not plough the lands to reduce carbon emissions?
Mr. Esteban Godilano, The Philippines:	Data have been collected and recorded in the Department of Agriculture. Kindly access the data from the website of the Bureau of Plant Industry.

PAPER 2: Adaptation and Mitigation Initiative in Agriculture: The Philippine Framework for Action

Ms. Alicia Ilaga
Focal Person, APEC and DA Systems-Wide Climate Change Office
The Philippines

AMIA is a national initiative and a communication strategy to provide focus on two core issues of climate change mitigation and adaptation. The main objective is to provide an efficient and resilient agriculture support services to enable the country's agricultural sector to effectively address climate change. It is a multi-sector partnership among key stakeholders in the country. The government supports AMIA through three major laws, Republic Acts 8435, 9729, and 10121, and Executive Order 43 by President Benigno Aquino III. All government programs should be anchored on these laws. AMIA has four strategic objectives and two mainstreaming strategies. Mainstreaming means incorporating climate change in decision-making processes from priority-setting to monitoring and evaluation. AMIA will adopt the Traffic Light System for assessing institutional compliance to mainstreaming of climate change: red for low level institutional knowledge and awareness on climate change, yellow for moderate level, and green for high level. The DA plans to develop a corresponding reward system for each level. Seven systems-wide mainstreaming programs were approved by the Secretary of Agriculture to generate the following outputs and outcomes: policy studies, increased policy implementation efficiency and accountability, and "all weather" and client-responsive support services.

The full presentation of Ms. Ilaga is attached as Annex C2.

Open Forum

Mr. Buenaventura Dargantes, The Philippines: What is the status of implementation of the Traffic Light System in the Department of Agriculture? How can this system be adopted by other APEC economies?

Ms. Alicia Ilaga, The Philippines: The Traffic Light System is still at the planning stage at the Department of Agriculture. Perhaps the delegates from Vietnam may share their experiences as they might have already adopted the system in their country.

Ms. Le Hoang Anh, Viet Nam: Not much has been done yet as the climate change adaptation and mitigation program in Vietnam has just started.

Mr. Segfredo Serrano, The Philippines:	Every strategy is a work in progress. The main task is to have the same level of understanding and impacts in the whole bureaucracy of the government from the highest officials down to the rank and file employees. Secondly, the government will start with the resources that it possesses. For example, infrastructure projects on road pavement should have provision on damage management. Experts with the best minds are needed to come up with efficient plans on public infrastructure so that political leaders will have a very strong technical basis for decision making worth of public spending. Lastly, if everything will be in place, expensive programs will no longer be necessary.
Mr. Philip Shull, USA:	Do the economies have an education program on climate change for children? In the USA, schools are encouraged to incorporate climate change in their teaching modules. Teaching the bureaucracy is one strategy but teaching the children is another efficient step.
Mr. Akkinapally Ramakrishna, Papua New Guinea:	Schools in PNG have climate change education program that produced teaching educational modules for use in schools.

PAPER 3: Mainstreaming Climate Change in Research and Development: The Philippine Framework for Action in AMIA

Mr. Eliseo R. Ponce, PhD
International Consultant for Agricultural Research and Development
The Philippines

The presentation highlighted the challenges that climate change poses in agricultural R&D. The phenomenon could radically alter the ecosystems and imperil efforts to reduce poverty and hunger. Agriculture producers have to increase production while helping to mitigate carbon emissions. Mainstreaming climate change in R&D means integrating climate change ideas, attitudes, and activities in the national R&D system at two tactical levels: strategic and operational levels. It also means assessing compliance and providing rewards and recognition to agencies and partners. The Philippine R&D system is dichotomized into (1) basic and strategic and (2) midstream and downstream. A robust, climate-resilient R&D can be achieved by “climate proofing” human and physical infrastructure while, at the same time, addressing critical efficiency issues at all levels of implementation.

The full presentation of Mr. Ponce is attached as Annex C3.

PAPER 4: Climate Change Challenge in Agriculture and Opportunities for Midstream and Downstream Research in the Philippines

Ms. Beatriz P. Del Rosario, PhD
International Consultant for Agricultural Research and Development
The Philippines

The presentation discussed the role of technology in addressing climate change in agriculture, challenges and opportunities for mitigation and adaptation, efficiency issues and mainstreaming, and the way to move forward amidst the challenges. Mainstreaming issues identified are human resource development, organizational issues, methodological issues on research prioritization, and funding issues for research planning and priority setting. Among the steps that could be undertaken are sensitization, fast-tracking of AEZ map generation, allocation of resources for capacity development, research priority setting, and strategic planning. The R&D system must provide a platform for more multi-disciplinary interaction.

The full presentation of Ms. del Rosario is attached as Annex C4.

Open Forum

Mr. Buenaventura Dargantes, The Philippines:	How are the issues on (1) conflicting prioritization at the national and regional levels and (2) fast-tracking agro-ecological zone (AEZ) mapping being addressed? What are the existing mechanisms to plan according to AEZ? Climate issues should be considered at the regional level (Asia) and appropriate resources should be allocated to support AEZ mapping and planning.
Mr. Bruce Tolentino, The Philippines:	Dr. Serrano's earlier point that these strategies are already being incorporated in the plans of the Department of Agriculture should be reiterated.
Mr. Philip Shull, USA:	The governments recognize the impacts of climate change. What is the Philippines' policy recommendation other than sensitization? Sensitization is important but the vast majority of the people already realized the presence of climate change and that evidences can attest to this. The concern is on policy recommendations with impact of GHG reductions that may work for the Philippines and for all governments.
Ms. Beatriz del Rosario, The Philippines:	It will require important climate change studies to come up with good policy recommendations especially in the area of agriculture regulations.

Mr. Ernesto Guiang, The Philippines:	Part of the mainstreaming is already included in the Philippine Development Plan.

PAPER 5: Why We Need to Mainstream Climate Change in the Extension System

Ms. Rowena Baconguis, PhD
Associate Professor, College of Public Affairs, University of the Philippines Los Baños, The Philippines

The presenter tackled the challenges that face the extension system in the Philippines with regard to climate change in agriculture. Part of the reasons is the geographic location and composition of the country. Small farmers are the most climate change vulnerable in the agriculture sector because of their lack of access to knowledge and technology. Thus, they must be able to access science-based information for increased productivity. Extending agricultural information to farmers will help them achieve climate-resilient farms and households. The extension gaps must be addressed by research-based participation and collaboration among key agencies. Operationalizing the extension strategies consist of revisiting and considering: (1) human resource assessment and development; (2) organizational systems and procedures; and (3) systems coordination among national RDE institutions with local government units and community.

The full presentation of Ms. Baconguis is attached as Annex C5.

Open Forum

Mr. Buenaventura Dargantes, The Philippines:	Does ATI's climate change mitigation and adaptation plan include strategies for watershed protection and improvement in the area of extension, especially in the local level?
Ms. Rowena Baconguis, The Philippines:	ATI, to a certain extent, has addressed this issue and this requires legislative action. The intention is to cascade the methodology of watershed protection and improvement as part of agriculture development at all levels, that is, from the municipality to the national level.
Ms. Agnes Rola, The Philippines:	A UPLB and RFU 5 project funded by USAID is being implemented in the Bicol Region. Climate-smart field schools as a strategy to improve the extension of climate change information are being established. The DA developed the curriculum that is location-specific for schools. Local government units are directly involved. Part of the project is the establishment of rain gauges for agricultural extension workers (AEW) to come up with database on rainfall.

The goal of the project is to have a decision tool for use of AEWs on seasonal forecast and advisory services.

PAPER 6: Mainstreaming Climate Change in Agricultural Regulations

Ms. Saturnina Halos, PhD
International Consultant for Biotechnology and Biosafety
The Philippines

The presentation dealt with regulations in agricultural development with due considerations in mainstreaming climate change initiatives in agriculture. Mainstreaming climate change in agricultural regulations is very important, as the latter aid the implementation of climate change measures in a massive scale. The first step is to designate a point person (officer) to oversee the country's climate change program. The move is to formulate possible climate change initiatives with clearly defined goals for agriculture. These initiatives must be science-based and harmonized with the National Climate Change Action Plan of the country.

The full presentation of Ms. Halos is attached as Annex C6.

Open Forum

Mr. Paul Melville, New Zealand:	What are the factors that prevent farmers from adopting technologies being promoted to them? Could it be lack of capital and/or expertise or being against traditional practices?
Ms. Saturnina Halos, The Philippines:	It is mostly due to lack of information. An example would be on teaching farmers technologies that are not in accordance with their current practices. This poses a challenge to the extension system to work hard on technology promotion and equipping the farmers with knowledge they need.
Ms. Violeta Villegas, The Philippines:	The presentations and discussions revolve around the strategies that could be done and some of these are already in place. The question is how to do it. There are existing policies that need to be operationalized.
Ms. Saturnina Halos, The Philippines:	The existing policy interventions have yet to be scrutinized to determine which ones to strengthen or discontinue.
Mr. Philip Shull, USA:	The recommendations for policy regulation should be sent to other countries for consideration.

Mr. Segfredo Serrano, The Philippines:	The Philippines' priority is on adaptation to climate change. He said the carbon footprint of the country is next to none compared to some parties in UNFCC but is very willing to share in mitigation. The most pressing concern that should be immediately addressed is to prevent losses of lives, infrastructure, and livelihoods. He cited the billions of pesos spent on public infrastructure yet once a disaster strikes, they are no longer functional. The priority is to adapt to current climate change challenges.

Day 1: October 22, 2013

Afternoon Session: 2:30 pm to 5:15 pm

Moderator: **Mr. Bill Verzani**
Agriculture Attache
United States Department of Agriculture

PAPER 7. Mainstreaming Cc-Adaptation and Mitigation Initiatives in Agriculture with Integrated Ecosystems Management

Mr. Ernesto Guiang, PhD
Natural Resources Management Consultant
The Philippines

The Integrated Ecosystems Management (IEM) is an emerging approach that has been incorporated in the Philippine Development Plan (PDP) for 2011-2016. It is a holistic and integrated approach in the governance, planning and management of investments for the ecosystem towards conservation, socio-cultural preservation and economic development. It aims to minimize the "unintended impacts" of different sectoral programs in watershed-dominated landscapes such as in the Philippines, where at least 70% of the country's total area is within river basins and watersheds of 441 river systems.

IEM is an approach to "climate proof" agricultural production especially for irrigated production systems, municipal fisheries and mariculture/aquaculture. It intends to contribute to improving the resiliency of ecosystems, communities and livelihoods from the top of the ridge down to the coastal, lakes or river beds. This approach requires governance-based collaborative management and implementation thereby capturing the synergies from the complementation of national, sectoral, sub-sectoral, and local programs in highly diverse watershed-dominated landscapes.

Mr. Guiang's presentation is attached as Annex C7.

Open Forum

Mr. Bill Verzani, USA: I have noticed that in the past few years, there is a big uptake in the budget of the Philippine Department of Agriculture for expanding agricultural production. What is the level of funding for watershed management provided by the Department of Agriculture? Is it included in the department's budget?

Mr. Ernesto Guiang, The Philippines: The budget is in the DENR. Basically, there has been an increase in budget support for watershed management due to the national greening program of DENR. The major challenge though is the issue of where the money is spent to get the best impact per investment. There should be an assessment to determine which river basins/watersheds should be prioritized in order to provide a better support for agriculture and downstream economies. The advantage is that DENR is finally looking at its national policies and reviewing how to prioritize and align the budget in support of the priority ecosystem of the Philippines. That policy, once signed will force the RFUs to spend their budget in consideration of the programs, projects and activities with the most impact.

Mr. Arak Chantuma, Thailand: Thailand has a lot of watershed data, information and inventory but there are no standards for investigation, and it seems that nobody uses the data on adaptation and mitigation information that are available.

Mr. Ernesto Guiang, The Philippines: The bigger concern is how to use the data to align investment in priority watersheds. This requires both a technically-driven and scientific approach as well as a political decision. It has to be a combination of science and politics of data use. Ownership of information is by those who have the resources or funds and the decision makers who have the responsibility or power to allocate resources.

Ms. Le Hoang Anh, Vietnam: The Conference of the Party (COP) is drawing near, there is a need for

agriculture-based countries to come up with an agreement and understanding in favor of our common cause and have a common position at the end of this APEC seminar-workshop, which APEC economies could elevate during the upcoming COP.

IEM is a very important approach in adaptation. There is a need to see the whole integrated system; however, there are certain coordination challenges as regards the roles of the sub-national and regional members. Can these be further discussed?

Mr. Ernesto Guiang, The Philippines:

In this kind of system, the local government units are those who can really make the difference. Future investments should be properly assessed to avoid losses and there is a need for a governance body driven by the provinces and chairman of the People's Council. IEM should both be driven by science and the decision-makers. Science-based analysis will be nothing if there is no concerted and harmonious effort of all the stakeholders.

The biggest challenge is to protect our natural resources and ensure that our ecosystem will still be intact for the next generations. There is a need for regulation in these highly hazardous areas and local governments play important roles as they have the responsibility over the issuance of permits for buildings and resettlements.

Malaysia's Economy Report

Mr. Mohd Fairuz Md Suptian
Senior Research Officer
Malaysian Agricultural Research & Development Institute

Mr. Mohd Safarul Izmi Bin Saidin
Senior Assistant Director (Mechanical)
Malaysian Agricultural Research & Development Institute

The initiatives in addressing climate change started with the establishment of the National Steering Committee on Climate Change (NSCCC) in 1994. NSCCC is an agency tasked to formulate and implement climate change related policies. National Communications were submitted to UNFCCC in 2000 and in 2011 while the National Policy on Climate Change was approved in 2009, which provides a framework to

mobilize and guide different stakeholders towards a holistic response in addressing the challenges brought by the changing climate.

Malaysia has a commitment on reducing its greenhouse gas emissions that can be achieved through three sustainable management practices, namely: irrigated rice water management, nitrogenous fertilizer management and manure management. Adaptation strategies, on the other hand, highlighted cultural and management practices on crops, water resource, and livestock. Specific R&D strategies on mitigation and adaptation are necessary in addressing the adverse effects of climate change on agriculture. However, gaps identified that hinder effective response were: (1) the lack of data for climate projections; (2) limited data on the impact of climate change on agricultural activities; and (3) the limited funding for research activities.

Malaysia's economy report is attached as Annex C8.

Open Forum

Mr. Paul Melville, New Zealand:	There is an observed significant yield reduction of oil palm associated with increase in temperature and decrease in rainfall based from the presentation. Where was this yield forecast derived from and what are possible adaptation strategies that can be done?
Mr. Mohd Fairuz Suptian, Malaysia:	The data/projections were derived from a Malaysian Palm Oil agency, which conducts research and projections on palm oil under varying range of Malaysian conditions (i.e. different soil type, planting density, year after planting). At the moment, given the relatively low GHG emitted by the agriculture sector, which is just 3% of the total GHG emissions, Malaysia currently gives higher priority to the energy sector and does not have specific adaptation strategies employed for palm oil yet.
Mr. Bill Verzani, USA:	Is integration of cattle in oil palm plantation a newly introduced approach or is it a common practice already?
Mr. Mohd Fairuz Suptian, Malaysia:	The integration of cattle in the oil palm plantation is not a new approach since cattle is used as part of the cultural management of controlling weeds in the plantation.

Mexico's Economy Report

Mr. Sergio Gómez Rosales, PhD
National Institute of Research in Agriculture, Forestry and Livestock

Mr. Mario Antonio Cobos Peralta, PhD
College of Agricultural Post Graduated Studies, COLPOS

In response to the effects and impact of climate change, Mexico developed the National Policy on Climate Change, National Strategy on Climate Change and National Program on Climate Change to address urgent and pressing country concerns. The National Policy on Climate Change involves multifunctional and inter-ministerial members and has the following key focus: planning, funding, instruments, evaluation, institutional arrangements and inspection and surveillance. The strategic pillars of the National Strategy on Climate Change are in support of the country's vision until 2050.

The Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) and the INIFAP provide research, development and extension support for the country. INIFAP conducts research, develops various innovations and transfers technologies that address climate change variability, socio-environmental vulnerability, GHG emission and other uncertain climatic conditions.

Mexico's economy report is attached as Annex C9.

Open Forum

Mr. Paul Melville, New Zealand: What is Mexico's research focus on methane emissions?

Mr. Sergio Rosales, Mexico: The INIFAP is working on a program that evaluates different feed ingredients relative to methane emission. There is a need to develop feed formulations with lower methane potential.

Chinese Taipei's Economy Report

Ms. Mei-Ping Cheng, PhD
Associate Researcher and Division Chief
Livestock Research Institute
Council of Agriculture Economics and Development

Chinese Taipei targets at least 30% reduction of the total GHG emission by 2020. To fulfil this target, the Nationally Appropriate Mitigation Actions (NAMAS) have been developed. For agriculture, the identified NAMAS are as follows: energy saving models, rational fertilization, high efficiency feeding production model, improving barn structure, forestation on plains and in hilly regions, enhancing concepts of energy conservation and carbon reduction and extended promotion.
The Gold Corridor Program was emphasized as a mitigation demo for an energy efficient agriculture and is expected to save 28 million liters of ground water per

year. The 'Adaptation Strategy to Climate Change in Taiwan' was published for the purpose of economic planning and development. An inter-collegial task force with eight member sectors was established to monitor and coordinate the progress of the Adaptation Policy Framework and Action Plans. One of the most important action plans in the agriculture sector is adjusting farming system through reactivating of fallow farmlands.

Chinese Taipei's economy report is attached as Annex C10.

Open Forum

Mr. Pablo Cortes, Chile:	What are the incentives given to farmers to generate green production technologies? What institution(s) is/are responsible for communicating technologies to the farmers and how are the framework, plans and technologies communicated to them i.e., the farmers?
Ms. Mei-Ping Cheng, Chinese Taipei:	There are no extension institutions in Taiwan. The government provides subsidies to farmers to encourage and convince them to use and adopt new technologies and approaches.

New Zealand's Economy Report

Mr. Paul Melville
Senior Policy Analyst
International Environment Policy

The New Zealand Government has taken a holistic and collaborative policy approach to agriculture and climate change. It involves partnerships with the global organization, the government and the private sector. The Global Research Alliance on Greenhouse Gases was initiated to find ways to grow more food without increasing GHG emissions. The Agricultural Greenhouse Gas Research Center was wholly funded by the government and there are national policies on mitigation, adaptation and training and education.

The Adverse Event Policy is designed to create appropriate support to farmers in the occurrence of adverse events, which includes floods, storms, droughts, volcano eruptions and earthquakes. This policy promotes a shared understanding of the roles of national and local governments and the primary sector in preparing for and recovering from such adverse events. The 'Impacts of Climate Change on Land-based Sectors and Adaptation Options' is a report that holds a range of adaptation activities, which can be part of day-to-day business as well as those that build on the innovative drive of New Zealand's land-based sectors. It also looked at impacts from a financial point of view and assessed methods that farmers could look into to mitigate financial loss.

New Zealand's economy report is attached as Annex C11.

Open Forum

Mr. Pablo Cortes, Chile:	Is the adverse event policy active and accessible to all farmers?
Mr. Paul Melville, New Zealand:	The policy is available to all farmers but the events are designated depending on the degree of impact and the likelihood of occurrence of the event. Hence, there are variations on the support provided and it is also dependent whether the event is designated as a small-scale, medium or large scale event.
Ms. Alicia Ilaga, The Philippines	Where do you get the resources for restoration and other adverse climate support? Do you engage insurance companies for this? How much are you investing for your adverse event policy?
Mr. Paul Melville, New Zealand:	Under the Adverse Event Policy, the government only provides 50% of the financial support and the rest are shouldered by the farmers themselves. I am not sure if insurance companies are involved in this policy.
Mr. Esteban Godilano, The Philippines	We appreciate New Zealand's adaptation strategies and greenhouse gas emissions reductions in sheep but I wonder why there are no such strategies in cattle. Cornell University developed a hormone for cow, which can make a dam produce large volume of milk equivalent to those produced by four dams. It can also significantly reduce nutrient load. Does New Zealand use hormones to induce large milk production in cattle?
Mr. Paul Melville, New Zealand:	There are also some strategies employed to mitigate emissions from cattle. New Zealand has a vast pasture sufficient for dairy cattle production and the farmers do not have to use hormones to induce larger milk production. As such, the milk produced and exported by New Zealand is hormone free.

APEC Seminar Workshop on Mainstreaming Climate Change Adaptation
and Mitigation Initiative in Agriculture
October 22-24, 2013
Makati City, Philippines

Day 2: October 23, 2013

Morning Session: 9:00 am to 12:45 pm

Chair: **Mr. Paul Melville**
Senior Policy Analyst
International Environment Policy
New Zealand

PAPER 7: Nitrogen Use Efficient (NUE), Salt Water Tolerant (SWT) and Water Use Efficient (WUE) Crop/Rice Varieties and Potential Public-Private Partnerships

Mr. Zhongjin Lu, PhD
Vice President for Product Development
Arcadia Biosciences
USA

Arcadia Biosciences develops plants that improve the environment and human health with focus on economically attractive solutions. The 11-year old company develops traits that increase nutrition and food security, plant productivity, efficient use of natural resources, low carbon agriculture, and sustainability using genetically modified (GM) and non-GM technologies. Part of the approach is to leverage very large public and private sector research investments, and partner with leading seed companies globally for the development and commercialization of agronomic traits in target crops. The company currently has available environment technologies such as nitrogen use efficiency (NUE), water use efficiency (WUE), herbicide tolerant wheat, salt tolerance (ST), heat tolerance and NUE/WUE/ST stack, and health technologies such as gamma linolenic acid safflower oil and enhanced nutrition wheat.

Under the NUE Program, Arcadia Biosciences develops crops that will dramatically improve nitrogen use efficiency, reduce nitrogen fertilizer input to agriculture, improve the environment through decreasing GHG emissions from agriculture and nitrogen runoff into ground and surface water, and increase farmer profits and sustainability. For instance, NUE canola has been evaluated to be effective in reducing GHG emissions by 54.3% and NUE rice has exhibited increased grain yield per unit of nitrogen. On the other hand, the WUE technology, which increases plant productivity and food production under drought and reduces environmental footprints, is demonstrated in rice, wheat, cotton, peanut and tobacco. In addition, the salt-tolerance technology, which increases plant productivity and food production under saline conditions, is demonstrated in rice, tomato, wheat and cotton while multiple efficiency and stress tolerance traits have been stacked and field-tested in rice.

The presentation of Mr. Lu is attached as Annex D1.

Open Forum

Mr. Paul Melville, New Zealand:	How can the Arcadia Biosciences technologies ensure leverage of a country in carbon trading considering the fluctuations in the carbon dioxide market and economies' commitment to the

	Kyoto Protocol?
Mr. Zhongjin Lu, Arcadia Biosciences:	More profit is gained from carbon trading when the carbon credits from the nitrogen use efficient crop reaches USD27.
Ms. Alicia Ilaga, The Philippines:	Ms. Ilaga expressed appreciation on the technologies of Arcadia Biosciences that can dramatically reduce the use of nitrogen fertilizer. What kinds of collaboration is the company open to in order to access its technologies?
Mr. Zhongjin Lu, Arcadia Biosciences:	Arcadia Biosciences has a diverse approach to collaborations based on territories and target crops.
Mr. Eulito Bautista, Food and Agriculture Organization:	International Rice Research Institute is developing in-bred varieties addressing a combination of traits to tolerate environmental stresses. Is Arcadia Biosciences moving towards the same direction as well?
Mr. Zhongjin Lu, Arcadia Biosciences:	The company is currently developing crop varieties with stack traits of nitrogen use efficiency, and tolerance to drought and salinity through molecular techniques. The technology is tested for effectiveness under contained conditions and has been recorded to ably produce increased yield compared to conventional controls.
Mr. Bueneventura Dargantes, The Philippines:	What is holding the implementation of the technologies considering that these accrue benefits to the company, government and the farming sector?
Mr. Zhongjin Lu, Arcadia Biosciences:	Wide-spread public acceptance of genetically modified crops is still a long way to go. There are also government regulations that make commercialization difficult. On the other hand, nothing can also be done in research without

regulations.

Mr. Esteban Godilano, The Philippines: Gene stacking is only one approach in climate change mitigation and adaption strategy. The other much easier approach is to shift crops from C3 to C4.

Mr. Zhongjin Lu, Arcadia Biosciences: There are certainly several approaches aside from genetic engineering to improve crop plants. Fertilizer companies are also working on developing nitrogen use efficient fertilizers. Other institutions are also looking at developing future cropping system.

Ms. Beatriz del Rosario, The Philippines: What mechanism makes the stack trait technology efficient?

Mr. Zhongjin Lu, Arcadia Biosciences: The stack trait technology uses a gene that is involved in nitrogen assimilation and amino acid metabolism in plants, and a promoter that is responsive to stress.

Ms. Saturnina Halos, The Philippines: There are available technologies in the Philippines that intend to reduce the use of nitrogen fertilizers such as microbial inoculants. Would these available technologies interact positively with the Arcadia Biosciences' technologies?

Mr. Zhongjin Lu, Arcadia Biosciences: A combination of approaches such as improvement of crops, increasing the efficiency of nitrogen use, and adjustments in cropping systems will work better.

Mr. Eulito Bautista, Food and Agriculture Organization: Is Arcadia Biosciences considering the introduction of submergence tolerance genes in the currently developed technologies?

Mr. Zhongjin Lu, Arcadia Biosciences: Arcadia Biosciences currently focuses on global-wise issues and so submergence tolerance is not yet in the pipeline. Nevertheless, the company is open for

	collaboration to develop such technology.
General Comments from the Session Chair:	The subsequent part of the session is the continuation of reports on respective mainstreaming of climate change initiatives in agriculture from economies of Papua New Guinea, the People's Republic of China, Chile, Indonesia, Thailand, and Viet Nam.

CONTINUATION OF ECONOMY REPORTS

Papua New Guinea's Economy Report

Mr. Akkinapally Ramakrishna, PhD
Research and Development Coordinator
Highlands Regional Centre
National Agricultural Research Institute

In mainstreaming climate change, the National Executive Council (NEC) of Papua New Guinea (PNG) established the National Climate Change Committee (NCCC) with the responsibility of approving all climate change-related policies. Climate change has been integrated in the PNG National Agriculture Development Plan 2007-2016, Development Strategic Plans (2010-2030 and 2011-2015) and Vision 2050. The PNG government has also established the Office of the Climate Change and Development as well as the Strategic Program for Climate Resilience. The key mainstreaming activities in PNG agriculture include: (1) integration of climate change at the sectoral policy formulation and planning stages; (2) implementation of climate change integrated strategies, processes and plans; (3) assessment of impacts of climate change as well as identification of vulnerable regions and production systems; (4) development and utilization of climate-resilient and compatible agricultural technologies; and (5) monitoring and evaluation of climate change compatible technologies.

At the National Agricultural Research Institute (NARI), a five-part R&D strategy is being pursued for adaptation and mitigation purposes. These are early warning system, crops and genotype diversification, biotechnology targeting pests and diseases, dissemination and adaptation of drought-coping strategies, and sustainable water supply.

The economy report from PNG is attached as Annex D2.

People's Republic of China's Economy Report

Mr. Li Ninghui, PhD
Professor
Institute of Agricultural Economics and Development
Chinese Academy of Agricultural Sciences

Mr. Guo Jingli, PhD
Associate Professor
Institute of Agricultural Economics and Development
Chinese Academy of Agricultural Sciences

The economy report from China presented both negative and positive effects of climate change on agriculture. As climate change will affect all sectors of the economy, PROC recognized that policies and measures on climate change should be mainstreamed for comprehensive achievements. Some of the measures being undertaken are the Grain for Green Project that promotes conversion of cropland into forest or grassland. The project provides grain, living allowance, seeding and forestation subsidies, and protection of forest ownership in farmer's converted land. The project's success in attaining its target is coupled with improvements in farmers' livelihood and income as well as the rural economy. The Chinese government also implements compensation and incentive policies including new technology development subsidy, compensation fund for forest ecological benefits promotion, and acceleration of transforming animal husbandry production mode to reduce methane and nitrous oxide emissions. Moreover, there exists a scientific planning of agricultural production system that includes improvement of farmland water conservation system, agricultural infrastructure and weather modification, updating of agro-climatic zoning, and re-planning the structure of agricultural production and the layout of agricultural products. Building the capacities of agricultural production to adapt to climate change includes strengthening of monitoring, prediction and prevention, early warning system of agro-meteorological disaster, and impact evaluation of extreme climate events on agricultural production.

The report from China is attached as Annex D3.

Open Forum

Mr. Arak Chantuma, Thailand:	What is the difference in impacts between rising sea levels and being located in the Pacific Ring of Fire?
Mr. Akkinapally Ramakrishna, Papua New Guinea:	The Ring of Fire is associated with occurrence of earthquakes and coastal areas are more prone to tsunamis and flood. Rising sea levels has caused submergence of small islands thereby reducing available area for cultivation. It also contaminates water in small islands with saline water.

Mr. Paul Melville, New Zealand:	Did PROC find it easier for farmers in the north east of China to adapt to climate change than in other parts of the country?
Mr. Li Ninghui, People's Republic of China:	As development in agricultural technologies progresses, the capability to adapt to extreme climatic conditions and changing climatic patterns is also improving. The agricultural production in China, especially in the north east, has increased because of the gradual change in the planting system or production structure.
Ms. Alicia Ilaga, The Philippines:	Please elaborate further on the compensation fund for farmers.
Mr. Arak Chantuma, Thailand:	Does the compensation fund also cover agro-forestry projects?
Mr. Li Ninghui, People's Republic of China:	There are a lot of compensation and subsidies provided by the government to farmers to encourage farmers to use new technologies in agricultural production, to protect ecology and forests, and to change livestock husbandry management systems. There is also compensation fund involved in agro-forestry projects which is estimated to be more than 30 million Yuan annually.
Ms. Rowena Baconguis, The Philippines:	How are the incentives and compensation packages acceptable to farmers? Which of those is the most interesting to them? Are the policies providing these benefits also acceptable in other parts of the country?
Mr. Li Ninghui, People's Republic of China:	Subsidies for each farmer vary. Farm land subsidy is fifty Yuan or more. There are also good seed subsidy and low price procurement support for rice, wheat and corn. The amount of subsidies increases every year.

Mr. Esteban Godilano, The Philippines:	While increases in yield are remarkable as a positive impact of the increasing amount of carbon dioxide in the atmosphere, science tells us that a combination of increasing nitrate temperature, as one of the negative impacts of climate change, and increasing amount of carbon dioxide in the atmosphere can have adverse effect on grain quality and yield. With that combination, there will be 17% decrease in corn yield, 12% decrease in wheat yield, and 10% decrease in rice yield. Mr. Godilano articulated his two hypotheses, to wit: the northward shift of climate change did not change the nitrate temperature or there may be a technology developed by PROC to adapt to the environmental conditions in order to improve yields.
Mr. Li Ninghui, People's Republic of China:	Agricultural scientists in China have contributed a lot to enable farmers to shift to different farming patterns as well as to improve farming technologies. There are also a lot of international collaborations on agricultural sciences.

Chile's Economy Report

Mr. Pablo Cortés Tirado
Professional Support
Office of Agricultural Policies, Trade and Information
Ministry of Agriculture

Ms. Catalina González Zagal
Professional Support
Office of Agricultural Policies, Trade and Information
Ministry of Agriculture

The National Action Plan of Climate Change 2008-2012 of Chile provides measures towards mitigation, adaptation and capacity building. On the one hand, some of the mitigation actions include formulation of (1) a national strategy for forests and climate change, which aims to regularize land tenure of landowners and forest management for carbon accumulation; (2) a national clean production policy, which operates through agreements on voluntary actions aimed at production efficiency; (3) MAPS Chile, which is a two-year initiative to project GHG emissions in Chile to 2050 and to

identify various mitigation actions consistent with national development strategies and commitments to the UNFCCC. On the other hand, Chile's adaptation actions are anchored at the formulation of the Forestry and Agricultural Sector Adjustment Plan for 2011-2013 that is focused on water resource management, climate risk management, and R&D on pests, diseases and crop breeding. Adaptation Fund initiative is also implemented led by a committee composed of the Ministry of Environment, Ministry of Public Works and Ministry of Agriculture. In addition, there are projects aimed to build capacities for the design and implementation of strategies for low-carbon development and national mitigation actions in the public and private sectors.

The economy report from Chile is attached as Annex D4.

Indonesia's Economy Report

Mr. Maswar Bahar Djaka, PhD
Researcher
Indonesian Agency for Agriculture Research and Development

Mr. Mamat Haris Suwanda, PhD
Senior Researcher
Indonesian Agency for Agriculture Research and Development

In realizing Indonesia's commitment to reduce substantial amount of GHG emission by 2020, the government issued the National Action Plan for GHG Emissions Reduction in 2011. Mitigation is conducted in the context of sustainable management and the measures include land optimization, application of cultivated technology, use of organic fertilizers and bio-pesticides, rice planting with low emission, use of leaf color chart for reduced nitrogen fertilization, use of ameliorants of peat soil, methane capture in oil palm processing, technological feed for animal husbandry, and implementation of policies or regulations on the use of peatland.

On the other hand, the National Action Plan for Adaptation to Climate Change highlights adaptation as the main priority for agricultural sustainability and food security. For the agriculture sector, the Indonesian government has undertaken adaptation actions such as (1) web-based integrated and dynamics planting calendar; (2) sustainable food reserve garden with pilot households in every province to optimize use of home garden; (3) food smart village that is a combination of various measures such as land and water resources optimization, food diversification, integrated crop-livestock system, among others; (4) utilization of rice varieties that are adaptive to environmental stresses; and (5) sustainable peatlands management.

In synergizing adaptation and mitigation initiatives, several strategies have been developed, i.e. land evaluation system that takes into consideration environmental aspects, provision of subsidies to jump-start farmer participation in land rehabilitation, multi-channel information dissemination, and continued support for research on emission factors and improved management systems.

The economy report from Indonesia is attached as Annex D5.

Thailand's Economy Report

Mr. Arak Chantuma, PhD
Senior Agricultural Research Specialist
Rubber Research Institute

Ms. Narumon Ladawan na Ayudhaya
Agricultural Engineer
Professional level

The National Strategic Plan on Climate Change (GHG Mitigation) 2008-2012 of Thailand targets to reduce GHG emissions in energy sector, waste utilization, agricultural activities and industries. The plan targets to increase GHG sink and forest area from 30% to 40% by 2020. Focusing on rubber planting, the Thai government has embarked on several strategies to make rubber plantation adaptable to climate change. Such measures include assessment of vulnerability of traditional and new planting areas, clone application and cultural practice to climate change. Public sector research on the utilization of rubber generated estimates that Thailand rubber is able to fix CO2 amounting to 80 million tons per year. Moreover, application of rubber modified asphalt on pavement surface is regarded as a mitigation technology since it is eco-efficient and at the same time provides safe and durable roads.

Thailand's economy report is attached as Annex D6.

Viet Nam's Economy Report

Ms. Le Hoang Anh
Senior Official
Climate Change Office
Department of Technology, Science and Environment
Ministry of Agriculture and Rural Development

Mr. Le Thanh Van
Official
International Cooperation Department
Ministry of Agriculture and Rural Development

The government directive on strategic mainstreaming of climate change in the agriculture sector is to integrate it in the process of development, approval and implementation of all sector's strategies, plans and programs in accordance with national strategies and target programs. Consistent with this directive, mitigation and adaptation measures have been mainstreamed in the management of crop production, livestock, fisheries, forestry, water resources, and rural development and craft village. The key contents of mainstreaming climate change in crop production include (1) applied procedure of good agriculture practice (GAP); (2) adjusted cropping pattern, and seasonal structure and crop varieties; (3) stimulated adoption of "large scale farming" production model; and (4) processed agriculture by-products and wastes. In livestock management, the key contents of climate change mainstreaming are: (1) adjustment of livestock structure; (2) application of GAP in livestock activities; (3) development and implementation of biogas program in

localities; and (4) production of organic fertilizer from agriculture residues. Mainstreaming climate change in fisheries management includes: (1) construction of storm surge shelters and anchorages; (2) implementation GAP in aquaculture; (3) adjustment of aquaculture rearing and harvesting pattern; and (4) development of fishery production organization models and services in territorial waters. In water resources management, climate change mitigation and adaptation measures are integrated in the master plans of water resources, community awareness and community-based natural disaster management, and program on upgrading of sea dyke systems. In the area of rural development and craft village, Vietnam has reviewed and developed planning of systems for agriculture and rural infrastructure; improved model for waste collection, management and treatment; and promoted energy saving measures in domestic activities.

The presentation also included several opportunities, challenges and recommendations on moving forward.

The economy report of Viet Nam is attached as Annex D7.

Open Forum

Mr. Esteban Godilano, The Philippines:	Does Viet Nam have initiatives to address the big problem concerning the Mekong Water Delta?
Ms. Le Hoang Anh, Viet Nam:	Since the river ends in the territory of Viet Nam, the condition of the river is recognized as a serious problem. The need to adapt to climate change in the context that several countries share the same river is recognized. Vietnam has current undertakings involving public-private and community partnerships under the Mekong River Action Plan to develop and implement mitigation and adaptation to climate change measures such as relocation of people and improving livelihoods.
Mr. Akkinapally Ramakrishna, Papua New Guinea:	World Bank has been funding projects for 6-7 years that are into collective initiatives among several countries such as Thailand, Viet Nam, Cambodia, and Laos for the Mekong river.
Mr. Bueneventura Dargantes, The Philippines:	Is PROC in collaboration with the Mekong River Commission with respect to climate change mitigation and adaptation programs as defined in the Mekong River Action Plan since the stretch of the river actually begins in China?
Mr. Li Ninghui, People's Republic of China:	Big group projects involving five countries are in implementation with funding support

	from ADB. Mr. Li recognized that working together in bigger projects is significant in dealing with the Mekong river problem.
Mr. Paul Melville, New Zealand:	What initiatives are currently being worked out by Indonesia with regard to palm oil production in view of the changing climatic conditions? Do you foresee vulnerability issues with respect to climate change in the future?
Mr. Maswar Bahar Djaka, Indonesia:	Indonesia has put in place regulations on sustainable oil palm production to address vulnerabilities.
General Comments from the Session Chair:	Although different economies have respective approaches in mainstreaming climate change mitigation and adaptation measures in agriculture, similarities in the approaches can be observed especially among tropical and temperate countries.

Day 2: October 23, 2013 Afternoon Session

Parallel Workshop Sessions: 2:00 PM to 5:00 PM

Ms. Rowena Baconguis presented the workshop guidelines. The participants were divided into three groups: (1) Regulations, (2) Research and Development, and (3) Information, Education, and Communication. Each group discussed and drafted strategic and operational mainstreaming on climate change in agriculture.

The copy of detailed guidelines is attached as Annex D8.

Plenary Session: 5:00 PM to 6:30 PM

Moderator: **Ms. Mei-Ping Cheng, PhD**
Associate Researcher and Division Chief
Livestock Research Institute
Council of Agriculture Economic and Development
Chinese Taipei

PRESENTATION 1: Regulations Group

Rapporteur: **Mr. Paul Melville**
New Zealand

The group's strategic mainstreaming emphasized the importance of regional capacity building on new genetics and regulations. This may be achieved through organizing a symposium that would allow improvement of genetics and access to new breeding technologies for everybody. Enhancement of forestry, soil conservation, and manure management should also be looked into as additional strategies. It was also

mentioned that most of the APEC economies have started crafting their own operational strategies. Thus, these must be further explored for improvement. The group, however, cited the immediate need for regulations on the control of water. As to partnerships, sustainability would be achieved through constant sharing of experiences on lessons learned. However, policies should be country-specific to address the local needs of APEC economies who should be encouraged to work together to achieve progress on issues related to agriculture in the UNFCCC.
The full presentation of the regulations group is attached as Annex E1.

Open Forum

Mr. Akkinapally Ramakrishna, Papua New Guinea:	The regulations should not only focus on the control of water but also on fertilizer and insecticide use.
Mr. Paul Melville, New Zealand:	The suggestion is noted but the issues on water use is among the most critical. Hence, the group focused on that.
Mr. Efren Saz, The Philippines:	Can the regulations group develop provisions that would allow sharing of best practices? From there, each country can measure how much it can commit to the GHG reduction in the world.
Mr. Paul Melville, New Zealand:	This is noted.
Mr. Buenaventura Dargantes, The Philippines:	Most of the conflicts on water use arise from access and utilization of transboundary water. Does the regulations group mean the same in crafting regulations on control of water?
Mr. Paul Melville, New Zealand:	Regulations have been a constant topic of the seminar's previous days. Each country may have developed its own strategy to negotiate water use for that country's benefit.
Mr. Efren Saz, The Philippines:	An APEC-wide harmonization of regulation policies should be proposed and discussed.
Mr. Eliseo Ponce, The Philippines:	The body should be reminded that the main issues and strategies should be tailored to address mainstreaming climate change in agriculture.
Ms. Saturnina Halos, The Philippines:	Policy harmonization has been a constant suggestion in many APEC events but nothing has been settled yet.

Mr. Paul Melville, New Zealand: The regulations must consider the local environment as there might be uncertainties on which of the strategies adopted in a country may work across economies.

PRESENTATION 2: Research and Development Group

Rapporteur: **Mr. Ramakrishna Akkinapally, PhD**
Papua New Guinea

For strategic mainstreaming, the formation of a Technical Working Group (TWG) was suggested to achieve organizational efficiency. The TWG will serve as the focal team for strategic planning on climate change R&D issues. Capacity building initiatives should also be adopted such as offering short-term degree and non-degree courses and programs for researches, scientists, and policy makers. For operational mainstreaming, the group recommended the establishment of linkages to exchange knowledge and information among scientists and researchers. To facilitate this, a climate change portal should be set up. Selection criteria for climate change research, policy and research interface, identification and operationalization of indicators for impact evaluation, and identification of financial resources must also be done.

The full presentation of the research and development group is attached as Annex E2.

Open Forum

Mr. Esteban Godilano, The Philippines: The strategic approach on GHG emission focused only on livestock. The impact of climate change generally concerns heat stress, thus, the systems between livestock and crops must be looked into. Large scale farms can survive on their own but not the small farmers. Both livestock and crops should be able to adapt to climate change.

Mr. Efren Saz, The Philippines: One of the major factors that hinder the adoption of research output is the cost of using the technology. The government should be convinced that the time has come to allocate resources for adoption of technologies.

Mr. Buenaventura Dargantes, The Philippines: The proposals to conduct inventory of research is important. A lot of researches are not pooled due to lack of agreement on research result sharing.

Mr. Efren Saz, The Philippines: Any discussion of output sharing should not miss the issue of intellectual property rights, to be addressed by the APEC.

Mr. Buenaventura Dargantes, The Philippines:	This will become a part of the TWG they are proposing. The TWG will look into the criteria for selection of research output that will be included in the mass of knowledge. From there, the ones that are verifiable and duplicable may be suggested for adoption.
Mr. Efren Saz, The Philippines:	An APEC-wide harmonization of regulation policies should be proposed and discussed.
Mr. Sergio Gomez Rosales, Mexico:	What about the R&D plan for manure management?
Mr. Buenaventura Dargantes, The Philippines:	It will be part of the inventory. If a country requires very specific cases to address, the research inventory may provide these.
Mr. Lorenzo Caranguian, The Philippines:	What is the difference between "economic food crops" and the "less economic food species"?
Mr. Eliseo Ponce, The Philippines:	The body should use the commonly acceptable terms across economies.

PRESENTATION 3: Information, Education, and Communication Group

Rapporteur: **Ms. Vilma Patindol, PhD**
The Philippines

The group divided strategic mainstreaming by addressing two major issues in agricultural extension – capacity development and organizational issues. As strategies, the group suggested translating scientific-based data into more popular terms to compose an information inventory and educate the policy- and decision-makers. Mandating the creation of the units and allocation of resources to deal with climate change should follow. An important extension strategy is to develop a climate change portal for APEC specific to agriculture. For operational mainstreaming, the emphasis is on achieving efficiency in activities involving program planning, project development, monitoring and evaluation, and impact evaluation.

The full presentation is attached as Annex E3 .

No one raised a query. The core group composed of the groups' leaders, rapporteurs, and moderators convened immediately afterwards to draft the Framework for Cooperation across three policy instruments among APEC economies.

APEC Seminar Workshop on Mainstreaming Climate Change Adaptation
and Mitigation Initiative in Agriculture
October 22-24, 2013
Makati City, Philippines

Day 3: October 24, 2013

FIELD TRIP TO CLIMATE CHANGE ADAPTATION AND MITIGATION AGRICULTURAL PROJECTS: 7:00 am to 3:00 pm

The participants visited the International Rice Research Institute (IRRI), Los Baños, Laguna to look at R&D adaptation and mitigation on rice. Dr. V. Bruce J. Tolentino, Deputy Director General for Communication and Partnership, delivered the welcome message and provided the overview of the IRRI's research agenda followed by three presentations on IRRI's initiatives and actions on addressing the effects and impacts of climate change on rice production.

SUMMARY OF PRESENTATIONS

Rice, Health and Food Security

Mr. V. Bruce J. Tolentino, PhD
Deputy Director-General
Communication and Partnerships
International Rice Research Institute
The Philippines

IRRI's mission is to reduce poverty, hunger, improve health, and ensure environmental sustainability through rice science, and this supports the Food Staples Sufficiency Program of the Philippine Department of Agriculture. IRRI's research focuses on generating technologies and information that help address the reduction in rice productivity brought about by the changing climate and the GHG emissions from rice production. It aims to achieve a climate resilient farming through development of environment stress-tolerant rice varieties, diversification, and smart water management.

Mr. Tolentino's presentation is attached as Annex F1.

Overview of IRRI's activities on Climate Change and Rice

Mr. Reiner Wassman, PhD
Coordinator-Rice Climate Change Consortium and
Senior Scientist-Climate Change Specialist, Crop and Environmental Sciences Division
International Rice Research Institute
The Philippines

Since 2006, IRRI has its comprehensive program on mitigation, adaptation and impact assessment in rice production. The implementation of the program is in close collaboration with national partners with the goal of developing a climate-resilient rice production. Site-specific nutrient management and mobile applications for rice crop management are some of the broad-based package of technologies employed to address risks and impacts posed by the changing climate. Specifically, IRRI's entry point on climate change adaptation is climate variability research and the development of rice systems tolerant to heat waves, salinity, submergence and drought. Its entry point on climate change mitigation is through its Advanced Resource Management and the development of rice systems efficient in terms of water use, fertilizer uptake and precise timing of management procedures.

Mr. Wassman's presentation is attached as Annex F2.

Geo-spatial Analysis in Support of Climate Change Adaptation in Rice Production

Ms. Alice G. Laborte, PhD
GIS Specialist
Social Sciences Division
International Rice Research Institute
The Philippines

The 30-year average temperature differences from 1851-1980 and 1981-2010 show that rice-growing regions are getting warmer. The temperature anomalies lead to various unfavorable effects on rice production such as sterility, reduced grain filling, and poor milling quality, among others. Hence, appropriate management practices based on science-based information are crucial to address the adverse impacts on rice-producing areas. Spatial assessment through GIS of rice areas vulnerable to heat stress is important for planning and targeting appropriate strategies to ensure food security. It would provide high-resolution information on crop status in different areas which can be used for yield forecast.

Ms. Laborte's presentation is attached as Annex F3.

Mitigating Greenhouse Gas Emission in Rice Production through Water Saving Techniques

Mr. Björn Ole Sander, PhD
Post Doctoral Fellow-Climate Change Specialist
Crop and Environmental Sciences Division
International Rice Research Institute
The Philippines

IRRI has studies on rice production's methane emission since 1991. The total GHG emission from rice production is 2kg CO2-eq/kg milled rice and involves the various stages in rice production and post-production. With this, IRRI develops water saving techniques such as alternate wetting and drying (AWD) technology which helps mitigate rice production's greenhouse gas emissions. The Clean Development Mechanism (CDM) methodology for rice production through shifting from continuous flooding to intermittent flooding (single/multiple aeration) was employed and used for regions/countries where double cropping is practiced.

Mr. Sander's presentation is attached as Annex F4.

Closing Session: 3:30 – 4:30 pm

Chair: **Mr. Mohd Safarul Izmi Bin Saidin**
Senior Assistant Director (Mechanical)
Malaysian Agricultural Research and Development Institute
Malaysia

Report on the Market Transactions

Ms. Perla G. Baltazar
Technical Assistant
Systems-Wide Climate Change Office
Philippine Department of Agriculture
Event Organizer
AMIA Seminar-Workshop 2013

APEC economy representatives, invited NGOs, national and local government representatives and private sector displayed respective technologies, innovations, and services available for "sell" in the area set up for the APEC Climate Change Market.

The Market facilitated 5 transactions involving Malaysia, Mexico, the Philippines, Chinese Taipei, Viet Nam, and Arcadia Biosciences.

Mexico and Chinese Taipei agreed to have research collaboration and technology transfer/exchange on clean energy innovations such as solar panels in swine farms and biogas production during anaerobic digestion of swine manure. A research project proposal will be prepared and funding support will be solicited from the economies involved.

Malaysia and Mexico approved of having knowledge/expertise sharing and technology transfer on methane mitigation from ruminant enteric fermentation, and energy renewal in agriculture irrigation consisting of a combination of solar system and wind turbine, i.e. hybrid gate control system. The collaboration aims to increase efficiency of water use and meat and milk production, and shift to the use of green energy. Both economies agreed to seek financial support for the collaboration from international organizations.

Mexico and Viet Nam shared the objective of reducing nitrogen and carbon emission from manure and using biogas as energy source. Toward this end, both economies decided to have knowledge sharing through seminar and workshops and technology transfer on the treatment of animal manure in anaerobic digestion plants for biogas production and conversion of wastes into organic fertilizers with high nitrogen content.

The Philippines, Viet Nam and Arcadia Biosciences reached an agreement to have teleconferences starting mid-November 2013 to review NUE, WUE, and ST technologies, and explore technology transfer and other possible areas for collaboration through grant contract, memorandum of understanding, or technology licensing agreement.

Market transaction agreements are reflected in the accomplished market transaction forms in Annex G1.

Presentation and Approval of the Resolution on the Proposed Framework of Cooperation among APEC Economies

Ms. Alicia G. Ilaga
Focal Person, APEC and
Department of Agriculture Systems-Wide Climate Change Office
Policy & Planning, Department of Agriculture
Project Overseer – ATC 04 2011A

The draft resolution on the proposed framework of cooperation was presented and deliberated on by the APEC economy representatives.

Mr. Sergio Gomez Rosales, Mexico emphasized the need to include in the resolution technology transfer and funding for the cooperation in support of the framework. Some minor corrections were also incorporated in the document.

The motion to approve the resolution as revised and corrected was raised by **Mr. Esteban Godilano, The Philippines** and was seconded.

The approved resolution on the framework of cooperation is attached as Annex G2.

Synthesis

Mr. Eliseo R. Ponce, PhD
International Consultant for Agricultural Research and Development
The Philippines

The three-day activity highlighted AMIA as a venue to learn from respective experiences on addressing climate change in agriculture and devise a framework of cooperation. The climate change scenario in the Philippines is a manifestation of the issues and challenges that the world is facing on climate change. Mainstreaming climate change in three policy instruments is an approach toward climate change mitigation and adaptation in agriculture.

The workshop identified key measures to mainstream climate change mitigation and adaptation into regulations, R&D, and information, education and communication (IEC) components. In regulations, regional capacity building on new genetics and regulations, and country-specific policies are identified to be vital. Formation of a technical working group is suggested for the R&D component to achieve organizational efficiency. As for the IEC component, strategic mainstreaming should address two major issues in agricultural extension, to wit: capacity development and organizational issues. It was also suggested that scientific-based data should be translated into more popular terms to compose an information inventory and educate the policy- and decision-makers.

The approved resolution identifies mainstreaming as the central strategy to the APEC AMIA. A framework or platform for cooperation in mainstreaming AMIA will be formulated which may cover access to knowledge, expertise and technologies, and people-to-people exchanges.

The activity has also set up the APEC Climate Change Market that showcased the economies' technologies, knowledge, expertise and innovations, and facilitated transactions among economies.

Closing Remarks

Mr. Naderev Saño
Commissioner
Climate Change Commision
The Philippines

Mr. Naderev Saño acknowledged the leadership of the Philippine Department of Agriculture for the success of the seminar-workshop. He highlighted his realization that the challenges which confront the fast-changing world make efforts to make climate-resilient and climate-friendly economy a real choice. The mantra of transformation, development, and the quest to solve climate change should be "be the change you want to see in this world", which underscores the principle of justice and fairness.

He recognized that the most inspiring in the moment of planetary emergency is the powerful outpouring of brilliant ideas and pioneering efforts from the synergy of government, civil society organizations, academe, and private sector. He emphasized that this must generate the political will to move forward with boldness.

He stressed that the current situation make adaptation no longer a choice, but a necessity. Hence, the new era demands global solidarity from the developing world in order to fight climate change and ensure that pursuit of sustainable human development remains at the core of the global community's efforts. He expressed his hopes that efforts under the APEC AMIA are part of the right steps towards building trust and global solidarity and that these partnerships around the region are fully contextualized by the emergency climate pathway and the imperative to fulfill and foster people's rights to a better life.

The AMIA seminar-workshop has provided all economies with the opportunity to learn from each other's experiences on how respective economies are addressing climate change in agriculture. Through a framework of cooperation in the context of the APEC AMIA, viable and sustainable partnership arrangements can be created among APEC economies and partner institutions to support institutionalization and implementation of AMIA. It should be stressed in the work under AMIA that mitigation and adaptation can never be separable and integration of these into agriculture requires country driven-ness.

Final Remarks

Ms. Alicia G. Ilaga, The Philippines expressed her gratitude and appreciation to all economy representatives, organizing team, secretariat and technical documentation team who helped facilitate the seminar-workshop. She expressed her hope that all transaction agreements through the APEC Climate Change Market will push through. She is also hopeful that PROC will volunteer to host the APEC AMIA next year.

All economies were informed that the proceedings will be circulated for validation next week and later on uploaded on the APEC website.

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