



**Asia-Pacific
Economic Cooperation**

2015 APEC Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock

**Agricultural Technical Cooperation Working Group (ATCWG)
Policy Partnership of Food Security (PPFS)**

September 2015

APEC Multi-Year Project: “Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain” (M SCE 02 2013A)

Prepared by

Dr. Ching-Cheng Chang

Research Fellow

Institute of Economics, Academia Sinica

128 Academia Road, Section 2, Nankang, Taipei 11529, Taiwan

Tel: +886-2-2782-2791 ext. 201

E-mail: emily33662666@gmail.com; emily@econ.sinica.edu.tw

Dr. Tony Shih-Hsun Hsu

Professor

Department of Agricultural Economics, National Taiwan University

No. 1, Sec. 4, Roosevelt Rd., Taipei 10617, Taiwan

Tel: +886-2-3366-2665

E-mail: m577tony@gmail.com

Produced by

Department of Agricultural Economics, National Taiwan University, Chinese Taipei

No. 1, Sec. 4, Roosevelt Road, Taipei 10617, Taiwan

Tel: + 886-2-3366-2666 | FAX: +886-2-2363-7372

Website: apec-flows.ntu.edu.tw

For

Asia-Pacific Economic Cooperation Secretariat

35 Heng Mui Keng Terrace

Singapore 119616

Tel: (65) 68919 600

Fax: (65) 68919 690

Email: info@apcc.org

Website: www.apcc.org

© 2015 APEC Secretariat

APEC#.....

Outcomes Report
“APEC Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock”

Project Number	MYP SCE 02 2013A
Project Title	Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain
Proposing Economy	Chinese Taipei
Seminar Title	APEC Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock
Seminar Location	Iloilo, the Philippines
Seminar Date	September 27, 2015

Project Overseer Information:

Name: Jen-pin Chen, Ph.D.

Title: Director General of Department of International Affairs

Organization: Council of Agriculture, Chinese Taipei

E-mail: jep@mail.coa.gov.tw

Comment:

Please contact Dr. Ching-Cheng Chang at emily@econ.sinica.edu.tw and Ms. Selena Hsu at selena@mail.coa.gov.tw.

I. Introduction

According to UN research, roughly one-third of the edible parts of food produced for human consumption is lost or wasted globally per year, totaling 1.3 billion tons annually. Therefore, it is of vital importance to strengthen partnerships among the public and private sectors of APEC economies in developing policy recommendations and solutions for reducing post-harvest losses and waste, as well as enhancing food quality and safety so as to contribute to food security in the Asia-Pacific region.

Since APEC is composed of developed and developing economies, the food loss issue raises more concerns to developing economies whereas the food waste issue to developed economies. The project aims to address post-harvest losses in all stages of the entire food supply chain in the APEC region by strengthening public-private partnership. This project is designed to be implemented in three phases within five years.

In Phase I (2013), a three-day seminar was held in August 2013 in Chinese Taipei, providing (1) a broad understanding of post-harvest food losses; (2) identifying key issues and challenges; (3) formulating the preliminary methodology on food crops; (4) deliberating on the strategies and action plans of cooperation among APEC economies and facilitating exchanges of best practices from public and private sectors among APEC economies; and (5) promoting exchanges of experience-sharing among APEC economies. In 2014, the “APEC Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fruits and Vegetables” was held on September 15, 2014 in Beijing, People's Republic of China.

In 2015, the “APEC Expert Consultation on Assessment Methodology of Fishery and Livestock Losses” was held on July 16-17, 2015 in Taipei, Chinese Taipei. The main purpose of the consultation was to review the current status and future prospects for reducing losses in the Asia Pacific fisheries and livestock supply chain by sharing current methods and approaches to data collection during loss assessment. Case studies of data gathering were presented and a number of methodologies introduced to attending representatives of APEC economies. The consultation also fostered communication and the beginning of a network among researchers and decision-makers for further collaboration on loss assessment methodologies, capacity building, and toolkit development for policy development for better data gathering and assessment and food loss reduction policies.

The 2015 series of seminars undertaken for this project concluded this September in Iloilo with the Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock. The main purpose of the seminar was to review the current status and future outlook for reducing postharvest losses in the Asia Pacific fishery and livestock supply chain. Case studies from industry were presented by industry representatives and scholars and discussions were held to identify key concerns and possible approaches to promoting postharvest loss prevention technology and policies. The seminar also presented an opportunity for further communication and network creation among smallholders, business groups, researchers and decision-makers for further collaboration. Basic research, current trends, best practices, and business models were presented in Iloilo. A policy recommendation was discussed and formulated over the course of breakout sessions engaging delegates from business, research, and government. Feedback and expertise were combined to create one document as a key output.

II. Summary of Expert Consultation

1. Participants

The 2015 Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock was attended by around 70 participants. The APEC member economies that participated in the Consultation were: Australia, Canada, the People's Republic of China, Chile, Japan, New Zealand, Peru, the Philippines, Singapore, Thailand, Chinese Taipei, the United States, and Vietnam.

2. Opening Remarks (Session 1)

Direct transcription from the opening remarks of Ms. Dong-Chong Hsiou, Deputy Minister for International Affairs, Council of Agriculture, Chinese Taipei:

Chinese Taipei

Ms. Dong-Chong Hsiou, Council of Agriculture, Chinese Taipei

Distinguished Speakers and Representatives, Ladies and Gentlemen:

It is my great pleasure to join you today in opening the APEC Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock. On behalf of Chinese Taipei and her Council of Agriculture, I would like to welcome all of you to this very important gathering. Most of all, please allow me to thank our colleagues, Director Rex Bingabing and his capable team from Department of Agriculture, the Philippines, Dr. Anne Wietheger from the Ministry for Primary Industries, New Zealand for assisting with organizing the Seminar. I am truly delighted that many APEC member economies are participating in this significant event. This indicates that the APEC community is attaching great importance to reducing food losses in the supply chain in general and fishery and livestock in particular. With your active support, Chinese Taipei's APEC multi-year project is implemented in an efficient manner.

With an increasing population, limited resources of water and arable land, and climate change, food security cannot rely on increasing food production alone. There exists the fact that we are producing food and at the same time that is lost and wasted along the supply chain. Therefore, the significance of reducing food losses needs greater emphasis. This is why we are here at this seminar to seek more creative and practical solutions to lower food losses along the entire supply chain of fishery and livestock. Since the private sector plays a critical role in reducing losses along the supply chain, the seminar values the inputs and participation of the private sector, so as to strengthen public-private partnership. Through the active participation and valuable contribution of the private sector, the seminar will generate more creative and innovative ideas and solutions.

In this seminar, we will review the current status and future perspectives of reducing postharvest losses in fishery and livestock supply chain in the Asia Pacific region. It is designed to promote and to identify key strategies for all stakeholders, from public, private, and academic sectors to exchange ideas and application experiences, and to find global partners promoting postharvest technology in fishery and livestock. It also serves to foster communication among smallholders,

business groups, researchers and decision makers for further collaborations in food loss assessment methodologies and toolkit development.

With the collective wisdom and professional expertise of all in attendance here, I am confident that we will achieve the goal of the seminar. Definitely, your participation in the seminar will contribute toward the common goal of enhancing food security in the APEC region.

Lastly, I look forward to a successful meeting and wish all participants a wonderful and rewarding experience here. Thank you!

Direct transcription from the opening remarks of Engr. Rex Bingabing, Executive Director, Department of Agriculture – Philippine Center for Postharvest Development and Mechanization, the Philippines:

The Philippines

Engr. Rex Bingabing, Executive Director, Department of Agriculture – Philippine Center for Postharvest Development and Mechanization, the Philippines

To Ms. Dong-Chong Hsiou, the Deputy Director General of the Department of International Affairs, Council of Agriculture from Chinese Taipei; to Ms. Drusila Esther E. Bayate, the Assistant Director for Technical Services from the Bureau of Fisheries and Aquatic Resources from the Department of Agriculture here in the Philippines; Dr. Feng Dongxin, ACTWG Lead Shepherd; and Mr. Pruthipong Poonthrigobol, the Program Director in the APEC Secretariat; to all the speakers, to all the participants and delegates from the member economies, a pleasant good morning and welcome to Iloilo.

First, we would like to acknowledge Chinese Taipei for spearheading this Multi-Year Project on Reducing Food Loss and this Seminar on Strengthening Public Private Partnership to Reduce Food Loss in the Supply Chain of Fisheries and Livestock. Food loss and waste are growing concerns of all types of economies, which have to be addressed and given importance. Especially with the fact that in some studies, food loss and food waste accounts for about one-third of the total food production.

Because of the growing number of the global population and the significant figure of hunger incidence, there is a need to ensure sufficient supply of affordable, safe and good quality food. And with the additional new challenges in food production such as climate change, decreasing production area and depletion of natural resources, food loss and food waste must be given serious attention.

APEC economies have a big role in addressing these challenges since majority of the total global food production comes from the APEC region. We also recognize that solving the problem is not solely the responsibility of the government institutions but also of the private sector, which includes the producers, processors, service providers and consumers (players of the food supply chain). Cooperation of different economies is also important. Thus, this event is a good venue to exchange ideas and possibly formulate concrete steps to reduce food loss and food waste.

It is a great honor for the Department of Agriculture of the Philippines to host this event here in

Iloilo. My agency, Philippine Center for Post-harvest Development and Mechanization or PhilMech, one of its concerns is reducing food loss and food waste by adopting new technologies in food production.

We look forward to a fruitful discussion in this seminar. And I hope that all the delegates, speakers and guests enjoy their stay here in Iloilo.

Thank you and Good morning!

3. Summary of Presentations (Session 2)

Summary of Keynote Speech:

Dr. Ian Ferguson, Departmental Science Advisor, Ministry for Primary Industries, New Zealand

Dr. Ferguson introduced the topic of food security and the variations in definitions on food loss versus waste that are present across economies and policy institutions. He discussed the need to consolidate definitions and have quantification of the issue and stressed the importance of reducing food loss and waste in the APEC region and globally. Dr. Ferguson expressed his hope for fruitful discussion and opened the presentations with a mind to take action as the next step after information sharing.

Topic 1: Reduce Losses in the Food Supply Chain in Japan

Presenter: Mr. Motoyuki Hazu, Executive Officer, Nichirei Logistics Group, Inc.

- Mr. Motoyuki outlined the role of cold chain infrastructure in the supply chain: stabilizing the food supply, reducing food loss in storage and transit, and stabilizing gaps between supply and demand with storage
- Mr. Motoyuki highlighted key challenges to cold chain infrastructure: food safety concerns and environmental issues whereby food loss could be further reduced but with a significant increase in electricity consumption
- Energy saving technologies are critical to cold chain development as a large part of electricity consumption comes from warehouse cooling
- Damaged goods in transit, particularly of packaging, often means refusal to sell despite contents remaining unharmed – this can logistical issue can be resolved
- Experiences from the development of Japanese cold chain include the implementation of a national food grade, standard, and inspection system; information system on food distribution, and use of processing and transfer centers; these can be recommended to other economies in the process of cold chain development

Topic 2: Red Meat Co-Products: Animal Feed to Human Nutrition in New Zealand Food Chain

Presenter: Prof. James Morton, Head, Dept. of Wine, Food and Molecular Biosciences, Lincoln University, New Zealand

- Prof. Morton began discussion framing “waste” as production that is not sold directly
- Prof. Morton related that “waste” can be redirected as edible co-products such as “MBM” – meat and bone meal
- There is a lack of public understanding of the nutritional value of non-meat product consumption; extra education can be implemented for offal, the government may have a role to play in this public outreach
- Basic research is necessarily funded by government as the risk is intolerably high for private actors
- Prof. Morton discussed the openness of information-sharing that characterizes New Zealand public-private sector interactions as demonstrative of the potential to cultivate close working relationships between government and industry for outreach and information-gathering efforts

Topic 3: Precision Seafood Harvesting: A Public-Private Approach to Innovation

Presenter: Dr. Anne Wietheger, Ministry for Primary Industries, New Zealand

- Dr. Wietheger presented a new regulatory framework developed by New Zealand Plant & Food Research for precise fish harvesting
- Dr. Wietheger explained the research and development process for the precision seafood harvesting: a camera is placed in a trawl net to collect video to analyze damage to fish occurring during harvesting, data and analysis was applied to change regulatory framework to change handling techniques; postharvest analysis was focused on creating regulation to increase survival rates of quality fish
- Increased precision in seafood harvesting is more humane and lower-waste
- Venture was business-led, joint venture between Ministry for Primary Industries business

Topic 4: Philippine Cold Chain Project (PCCP): Innovative Technologies and Best Practices for Public-Private Partnerships

Presenter: Dr. Ching-Cheng Chang, Academia Sinica, Chinese Taipei

- Mr. Gudahl highlighted core challenges in Philippines production – production standards should be targeted for improvement rather than production levels as production levels correspond to demand that is currently low
- A key production concern is the lack of ice use by fisherman, enforcement is thought to be the primary approach for improvement as improvements are behavioral
- Mr. Gudahl related that numerous agencies are assigned but lack a common plan for interagency cooperation; additionally, funding is inefficiently spread across organizations
- Coordination between responsible agencies should be improved to reduce data loss or dispersed, outcomes and analysis should be distributed to producers and other end-users so that they are more knowledgeable of production costs and profit potential
- An key challenge for the Philippines in cold chain development and operation are extremely high electricity costs; more basic improvements such as increasing use of ice by producers in the Philippines may have more immediate impacts

Topic 5: Proper Management for Sustainability of Resources, the Appropriate Measure for Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain in

Fishery and Livestock

Presenter: Mr. Roberto Baylosis, Executive Vice President, Sophil, the Philippines

(Direct text from the address delivered by Mr. Roberto Baylosis is presented below)

The fishery sector particularly in the medium scale commercial fishing spearheaded by the Southern Philippines Deep Sea Fishing Association Inc. (SOPHIL), home ported in Zamboanga City through this representation sincerely expresses our gratitude to have been invited to share our contributions for strengthening Public Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock.

SOPHIL is an association of medium scale commercial fishing engaged in the harvest of Sardine and other small pelagic species operating purse seine fishing vessels within the East Sulu Sea vicinities. Majority of the catches are supplied as raw materials for can processing in the finished product of which are distributed nationwide.

Looking ahead to sustain the fishing operations, the advocacy to conserve and protect the resources by adopting fish ban during heavy spawning period surfaced because of poor harvest when abundance is expected. The presence of fishes with bulging bellies with fish eggs during certain period of the year, prompted SOPHIL to seek the technical assistance of the Bureau of Fisheries and Aquatic Resources (BFAR) to conduct science based research and studies by taking samples at the landing sites.

While some of the fishing operators suspend operations starting every 2nd week of December until about March of the following year annually, although not yet fully aware of any science based research and studies. The science based research and studies somehow seemingly confirmed the presence of fishes with eggs that are about to spawn were abundant. Validated by other groups for similar science based research and studies including the academe resulted for the Philippine Government to act on this advocacy and passed a law that will prohibit the harvest of the Sardine species during spawning period starting year 2011 periodically starting every December 1, up to Mar 1, of the following year as originally proposed by SOPHIL.

The ban has then been practiced officially and as reflected in the periodic catch reports showed 10-15 per cent increase of harvest for the last three years and as of July this year (2015) majority of the fishing operators has declared as the most improved year in terms of harvest compared to the past three years.

Policing among the ranks is seriously considered during the fishing ban. To protect the juvenile from being harvested, the regulation for the fishing net mesh sizes are fully complied with. We take pride to inform this body that after a year of the fish ban in the East Sulu Sea, the Visayan sea operators were also encouraged to seriously practice an existing fish ban for several small pelagic species. After the 2nd year, the Davao Gulf fishing operators, also initiated to adopt the same practice. The Northern Palawan fish ban will soon be adopted as well possibly starting end of the year for the fish ban of round scale species.

With the support of the science based research and studies by the NFRDI and other institutes, these

are significant contributions of the fishery industry to maintain food security, by proper management and for the sustainability of the resources. We believe that this practice has benefited the municipal fishers as well, the fisher folks and the general populace and our neighbors considering that the fishes are highly migratory in nature.

(The address was followed by a 7 min video detailing Sophil's efforts in sardine conservation, proper management, and sustainability)

Topic 6: Reducing Poultry Egg Products Losses in Chinese Taipei

Presenter: Dr. Wen-Shyan Chen, Division Chief, Animal Products Processing Division, Council of Agriculture, Chinese Taipei

- Dr. Chen presented Chinese Taipei poultry production figures as primarily focused on chicken (90%) with remaining production split between duck (7%), geese (2%), and turkey (1%); duck egg production retail process are higher than chicken egg prices
- Dr. Chen discussed a case study for reducing duck egg production losses wherein a traditional gravity-based egg collection system is replaced by a system of collection boxes placed closer to ducks, reducing losses from about 2% of eggs to less than 1%
- Further reduction in losses during processing can be achieved with adequate cooling and storage of product and repurposing of lost product as animal feed or non-food product
- Additional research on diversification of egg products can increase amount of usable food collected from egg production; diversified products can promote value-add in the egg industry; research partnership has yielded new products and loss reduction methods as seen in the case of duck egg production in Chinese Taipei

Topic 7: Reflections and Current Processes: Whole Fish Utilization in the Tilapia Industry in Chinese Taipei

Presenter: Prof. Fu-Sung Chiang, Taiwan Ocean University, Chinese Taipei

- Prof. Chiang discussed the role of aquaculture and fish protein in meeting future nutrition demand; aquaculture and capture fisheries had nearly-equivalent relative contributions to food fish consumption in 2013; fish provide nearly 17% of global animal protein intake
- Prof. Chiang presented the higher conversion efficiency and lower carbon emissions of farmed aquatic animal-sourced food, net exports of fish from developing economies have increased over the past twenty years and improved management is needed to reduce waste while increasing production to meet future demand
- Prof. Chiang highlighted the case of tilapia production as a successful example of aquaculture; tilapia is the cheapest farmed white meat and is highly adaptable
- Concerns with reducing environmental impact should be addressed as tilapia grows in popularity, reaching about 7 billion USD in sales in 2012, expected to reach 10 billion USD in 2014
- Whole fish utilization in Chinese Taipei is applied to numerous aquaculture species, transport, diversification, and zero-waste processing innovations aim to reduce death rate in transit, maintain freshness of product, and meet demand with value-added and diverse food and non-food products
- The Chinese Taipei experience in zero-waste tilapia production can be instructive for other

economies looking to reduce waste while increasing production

Topic 8: Progress Brief on Food Losses and Waste Assessment in Fishery and Livestock in APEC Region

Presenter: Dr. Ching-Cheng Chang, Academia Sinica, Chinese Taipei

- Dr. Chang reviewed the challenge of food security for the Asia-Pacific region which requires substantial reductions in food loss and a mixture of public and private sector approaches to address; reducing food losses require quantification of losses and concrete actions through changing consumption and production behavior
- There is no single solution to the urgent issue of reducing food loss and waste, developing economies in APEC account for most postharvest losses relative to global economies; this is both a financial and environmental cost
- Current progress through the APEC Multi-Year Project on reducing food loss and waste includes the establishment of the Focal Point Network which has launched capacity-building and knowledge-sharing seminars; in 2014 and 2015, feedback was gathered from private enterprise and academics to modify methodologies and begin building a toolkit; annual capacity-building seminars were launched in Taipei, Beijing, and Iloilo
- The next steps are to continue seminars throughout 2016 and 2017 and continue enhancing policy recommendations for the final multi-year output; data collection will continue and the development of a technical team for managing a central database is underway; toolkits will be distributed as analysis of incoming data continues progress

Topic 9: Communication, Consultation, and Cooperation – Sharing Outputs of APEC Food Security Training and Workshop

Presenter: Prof. Feng-Ying Nie, Agricultural Information Institute, Chinese Academy of Agricultural Sciences, People's Republic of China

- Prof. Nie presented the objectives of the Beijing workshop on food security training: to promote communication, share experience, and develop young researchers across the APEC economies
- 10 experts from APEC and international organizations provided training and engaged in discussion with 52 young researchers from 12 APEC and 9 non-APEC economies
- Online discussion was held to share lessons learned and next steps to be targeted; 23 economies provided comments, including Australia, the United States, Chile, Papua New Guinea, the Philippines, Japan, New Zealand, Germany, Italy, Guatemala, Cote D'Ivoire, and the People's Republic of China
- Prof. Nie reviewed the topics of the workshop which included: how to provide benefits to smallholder farmers through the global value chain, how to ensure youth participation in the wider food security dialogue, and how to address the challenge of food security
- Prof. Nie stressed the need to provide information relevant to local conditions and also develop the next generation of researchers as the challenge of food security will remain in the long term, for example, through a pending APEC food security scholars program

4. Breakout Session Presentations and Recommendations (Session 3)

The breakout sessions were held to gather insight into the key issues concerning public-private partnership (PPP) to reduce food losses in the fishery and livestock supply chain. Each topic was accompanied by a brief introduction focusing on the main policy issues and a number of questions to be discussed during your session. There were four discussion groups formed to discuss three topics.

Three or four main points were formulated by each discussion group. How to relate loss assessment to loss reduction and translate to policies could guide the three to four main points for Topics 1 & 2. How do policies and toolkits take in information from recognized opportunities and challenge, and what those policies are can guide the three to four main points for Topic 3. Main points and recommendations from the discussion groups were combined to create a holistic policy picture and recommendation.

The accompanying background guides and discussion questions are included for reference below, followed by the key points presented by each discussion group.

Topic 1: Key Challenges and Opportunities in Food Loss Assessment

A. Background:

To gauge the policy needed to reduce losses and waste in the food supply chain, the APEC region should develop a consistent measurement to identify main causes of food losses, integrate data, and pursue a more cost-effective and sustainable way to achieve food security. At the APEC Expert Consultation on Assessment Methodology of Fishery and Livestock Losses held in Chinese Taipei this July, a number of key challenges were discussed: (1) data reporting and collection, (2) building private trust in initiatives for data gathering, and (3) lack of private sector training and information distribution.

Concerns raised included geographic challenges of country size, unavailable data due to non-incentivized reporting, and the need to increase coordination between agencies. For example, large country size meant overextended human resources. Lack of cooperation meant government agencies could not access data necessary for analysis because there was no knowledge of where or if data had been collected or stored. Private trust in the benefits of data collection also needs to be built so that private industry will more willingly supply data that is often collected but not shared often due to concerns over the threat of competition and potential cost of compliance. Finally: for producers without training or prior practice of collecting data, the need to share information and methods is of primary concern.

B. During discussion, these sub-questions should be considered:

1. What are the challenges in data collection and assessment of food losses for your economy?
 - (1) How much is known about the data being collected? Is data currently being collected and by what source, public or private?
 - (2) Is a primary barrier based on geography? If the size of your geography is prohibitive to data collection, is there a way to decentralize responsibility but centralize reporting?
 - (3) What are the difficulties faced by private or public data collectors?
2. How can trust be built for private sectors to provide data?
 - (1) Is distributing training and information a challenge for your economy? What are the sources of these difficulties?
 - (2) What are the difficulties in coordinating public agencies? What agencies are needed?

3. Are there any other specific challenges faced by your economy in making meaningful assessment of fishery and livestock losses in the supply chain?
4. Can these challenges be translated into opportunities? (For example, can some of the difficulties faced by private producers in tracking data be addressed through cooperation with public data collection initiatives? Private benefit from public initiative can be expressed.)

Topic 2: Key Challenges and Opportunities in Food Loss Reduction

A. Background:

During the presentations this morning, a number of opportunities for reducing food losses and waste were introduced with the potentials to establish or improve public-private partnerships. Cold chain development, co-product utilization, sanitary standards, innovative packaging, waste prevention and value added measures have played vital roles in food supply chains to reduce losses. Easy, “quick wins” such as new regulations which required ships to carry adequate amounts of ice which are determined before leaving port or to install refrigeration were given as examples of opportunity areas which can quickly be implemented.

Nevertheless, the potential for awareness raising, networking, knowledge-sharing, and distribution of scientific innovations and best practices via existing multilateral channels such as APEC should be addressed to reflect the rising demand for sufficient, healthy, and quality food from consumers. Events such as the APEC Expert Consultations were also highlighted as a good opportunity for member economies to take advantage and improve food loss reducing capability.

B. During discussion, these sub-questions should be considered:

1. What are the key challenges in reducing food losses in fishery and livestock supply chains?
 - (1) What public-private partnerships can be viewed as the best practices or successful endeavors in your economy to address these challenges? What recommendations come from these cases?
 - (2) Are there any areas which can be quickly targeted and resolved in your economy?
2. Are there any opportunities in your economy for improving supply chains’ role and performance in food loss reduction?
3. For the opportunities that you have discussed, what might be the most relevant challenges that they can address? (For example, if ice regulations and/or facilities for boats are not yet in place, implementing such a policy can reduce production losses for artisanal fisherman without adequate refrigeration technology on their boats.)
4. How would your economy go about creating policy and toolkits for taking advantage of the opportunities you seek? (For example, is the most efficient method of creating policy and enforcement through a single agency, or multiple agencies?)
5. Consider the mechanisms for building the capability of industry organization to provide training, how does this inform other economies for best practices or approaches to similar opportunities and challenges?

Topic 3: Next Steps: Possible Solution and Policy - Toolkits

A. Background:

At the APEC Expert Consultation on Assessment Methodology of Fishery and Livestock Losses held in Chinese Taipei this July, next steps were discussed and a work plan was put together. The main next steps were: (1) for each economy to begin formulating methods to distribute best practices to farmers and supply chain stakeholders, (2) standardization of definitions and measurement of the terms loss and waste, (3) form a Technical Team for survey preparation, data collection, and policy analysis, and (4) plan for future regional cooperation on the topic of food loss and waste reduction and assessment.

Step (1) is viewed as an independent effort by each economy to improve domestic food loss situation but requires further discussion of the exact methods by which information sharing can be achieved. The standardization of definitions and measurement in step (2) is useful for ease of understanding during international cooperation and knowledge-sharing. Step (3) will be organized by Chinese Taipei with follow-up and feedback from partner economies. Step (4) will also require constant refinement and coordination.

B. Discussion Questions:

1. How has your economy formulated information sharing and capacity-building training for the producers in the fishery and livestock supply chains? Have any initial steps been taken? How were these steps achieved? Would a directory of experts be a useful resource for economies?
2. What sort of loss assessment and policy analysis carried out by the Technical Team would be most helpful to your economy? What type of information are you most interested in?
3. What policy efforts or solution tools has your economy developed? What agencies are responsible? Are there any organizational methods your economy has found especially effective and would like to share?
4. What opportunities and challenges are the largest for your economy? Are there policies or toolkits under development to address them?

Discussion Group Presentations: Key Challenges, Opportunities, and Next Steps

Group 1

General Challenges:

- Lack of data

General Opportunities:

- Creation of survey, development of methodology
- Considering geographic limitations on transport and distribution of food products, for example, the thousands of islands of the Philippines
- Choosing priority products per economy and following their supply chains to assess losses
- Development of new technologies, provision of necessary energy (for example, a key

challenge in the Philippines)

- Harmonizing government agencies, border control, and destruction of confiscated food products
- Trading between economies to avoid waste when there is surplus production
- Increase quality and sanitation and increase private sector participation

Group 2

Topic 1 Challenges:

- Lack of accurate data
- Changing consumption patterns and consumer preferences
- Lack of integrated agency/assessment approaches
- Determining different priorities between different commodities

Topic 1 Opportunities

- APEC knowledge and technology sharing
- New business and job creation
- Private partnerships and investment opportunities

Topic 2 Challenges:

- Lack of investment capital
- High operating costs (ex. cold chains)
- Lack of suitable technology for managing climate change, lack of technology in general
- Inefficient production
- Lack of sufficient value-adding technology and high-value product creation
- Poor appreciation of loss reduction opportunities

Topic 2 Opportunities:

- Foreign direct investment
- Increasing food demand
- Technology is available to some APEC economies and can be shared

Group 3

Topic 1 Challenges:

- Data deficit (non-comprehensive data)
- No common standards, definitions, methodologies
- Lack of analysis using available data
- Diverse species

Topic 1 Opportunities:

- Analyze available data

Topic 2 Challenges:

- Lack of infrastructure, awareness, policies, cultural mindsets

Topic 2 Opportunities:

- Make use of available data
- Capacity-building
- Information exchange and other information campaigns (IEC)

Topic 3 Key Points:

- Best practices are available and should be distributed along with intervention strategies and global training, teach schoolchildren and begin food habits early
- APEC role should be to submit report and recommendations to policymakers
- Better organize fish landing centers and improve infrastructure
- Government should engage in market making and match producers to consumers and provide a market
- Improve mechanization, better policies, and continue support

Group 4**Topic 1 Challenges:**

- Data is available but there are no centralized efforts to collect data
- Private industry views data as trade secrets/proprietary information

Topic 1 Opportunities:

- Raise awareness

Topic 2 Challenges:

- Lack of training
- Climate change
- Differing cultural preferences regarding storage and beyond (ex. using ice or not during harvesting)
- Lack of strategic plan

Topic 2 Opportunities:

- Capacity-building
- Public-private partnerships
- Research and innovation
- Reducing “built-in” waste by changing mindsets for discarding products during production or consumption

Topic 3 Key Points:

- Centralize data collection in one body/agency
- Inform industries of decisions

- Pursue market-driven reduction in food losses
- Encourage investment in technology/innovation
- Encourage cooperation of agencies and across economies

Common Themes from Breakout Discussions:

- Data and methods – concern with availability and standards
- Need for training and awareness
- Increasing infrastructure and investment
- Harmonizing agency, public, and private engagement
- Creating a global perspective, changing cultural mindsets, and increasing international cooperation
- Adjusting policies and efforts for unique geographic needs, standards, demands, while optimizing consumption preferences and patterns
- There is a mismatch in research – developed economies focus on own research but there needs to be an increased focus on where there is higher need for academic exploration
- Public-private partnership requires not only government and industry but need to involve academics and research, the community and the public
- Training young researchers is extremely important to build the next generation of policymakers
- Communicating efforts and needs to the public is critical

III. Policy Statement

The group discussion points were then collected and discussed as an entire seminar group to formulate a policy statement that was jointly written during the conference. The policy statement is one of the key outputs of the conference, integrating academic and research expertise with insight and feedback from delegates from private enterprise of all sizes along with policymaker participants. The result of the overall discussion is the policy statement presented below.

Policy Statement

Agreed statement (to be taken to ATCWG, PPFS, HLPD-FSBE and possible inclusion in the APEC Leaders' statement)

Acknowledging the strong commitment by APEC Leaders to achieve Regional Economic Integration and building capacity to participate in the global value chain;

Recognizing the importance Food Security Ministers place on promoting agriculture and food production through science and technology innovation and economic development;

Understanding the impact that food loss along the supply chain has on food security within the APEC community, and the value of collaboration among the public, private and science sectors; to address this significant problem, the APEC Seminar on “Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock” was held on September 27 2015 in Iloilo and convened as a public private dialogue forum to discuss the challenges facing the fishery and livestock value chains and practical solutions in this region.

The Seminar was designed to identify the importance of developing a systematic approach to reducing food loss through the value chain, increasing capability for producers to target high value products in export and domestic markets, thus providing economic gain.

The participants agreed that building technical and policy capabilities across APEC economies, and providing a stable regulatory framework to encourage investments in innovative solutions would achieve a sustainable reduction of food loss.

The outcomes of this Seminar support our position that the sustainable business model to reduce food losses along the value chain needs strong partners from both the public and private sectors in the APEC region.

To achieve these outcomes, it is critical to examine the multi-dimensional aspects of waste and loss including: genetics, production, food safety, postharvest quality, logistic process, infrastructure improvement, and consumer behavior.

Capability development and best practice business models, along with raising public awareness of the importance of food loss, were identified as equally important factors.

It is recommended that Ministers or Senior Officials:

1. Recognize the effects of food loss in the Asia-Pacific as a major challenge posed to the region and seek common solutions to post-harvest and consumption loss;
2. Support multi-faceted solutions to the multiple sources of food losses, including production methods, food safety, quality control, logistics and processes, infrastructure, consumer behavior, and other sources which shall be investigated;
3. Encourage members of APEC to promote best practices in business and enhance the ability of the body to reduce food losses and;
4. Foster communication and awareness among smallholders, business groups, researchers, decision-makers, and the public for further collaborations in food loss assessment methodologies and toolkit development for working on a wide variety of trade and sustainable development policy issues.

IV. Major Outcomes

- An important outcome of the seminar is that participants were able to meet, share ideas, and further strengthen an expert and professional network for continuing cooperation. Participants gained valuable knowledge relating to best practices, innovative technologies and management, and assessment methodology along with an awareness of key challenges and possible solutions from presented case studies.
- The dissemination of knowledge and awareness of the challenge of food security and the necessity of reducing food loss in the region was achieved through the engagement of multiple members from private industry and enterprises of all sizes
- The foundation for further meetings for sharing progress, data, and newly-developed best practices was strengthened with new networks, awareness, and interest in the project and challenge of food security for APEC and the global food supply chain
- Deliberations during breakout sessions resulted in the first iteration of a policy recommendation, a major goal of this multi-year project; the policy recommendation encompassed viewpoints from academia, public, and private representatives, representing a combination of public-private partnership which has been another major aim of this multi-year project

Closing Remarks

Direct transcription from the opening remarks of Ms. Dong-Chong Hsiou, Deputy Minister for International Affairs, Council of Agriculture, Chinese Taipei:

Chinese Taipei

Ms. Dong-Chong Hsiou, Council of Agriculture, Chinese Taipei

Distinguished Speakers and Representatives, Ladies and Gentlemen:

It is my honor to deliver the closing remarks for the 2015 APEC Seminar on Strengthening Public-

Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock. After an engaging day of insightful presentations and fruitful deliberation, our meeting is coming to a close. I would like to thank all of you for bringing your diverse expertise and solutions to this meeting in Iloilo. I hope you have enjoyed your time here.

Our discussion today has yielded a holistic policy statement and actionable recommendations for reducing fishery and livestock losses. The academics and private industry experts that have gathered here today are a testament to the growing public-private partnership that we have started to solve the problem of food loss and waste in the APEC region. We have shared further case studies and best practices from across our economies and have been updated on the capacity-building efforts of our colleagues in Beijing and assessment progress across APEC. The policy statement we have formulated today should prove invaluable as each of our economies continue to reduce food loss and waste.

Our previous consultations and trainings have created consensus on definitions, key issues, and our assessment methodology. Most recently in Taipei, we have begun forming a technical team to coordinate loss assessment efforts and gather data. And in Beijing, we further trained our experts in food security capacity-building and continued the exchange of best practices and knowledge. We are working to create a database, increase data sharing, and continue to analyze data for our member economies.

Today's meeting has engaged our large group in refining solutions and recommendations. We have also learned much from our partners, both public and private. I am delighted to highlight the excellent attendance at this consultation and believe that the next year of this project to reduce food waste has clear direction. I believe that all of us will leave with many tangible solutions that address the food loss challenges of our home economies.

It was wonderful to see many of you all again and to further strengthen and expand our networks. Continue to send us comments and suggestions on how to further refine today's policy recommendations for our region. I believe our work is in a wonderful place already and look forward to improving it even more. And we will all meet again soon as we continue our series of seminars to exchange knowledge and update our partners on our progress.

In closing, I would like to take this opportunity to thank you all once again for providing your expertise and active engagement throughout today's seminar. My special thanks go to Prof. Hsu and Prof. Chang of National Taiwan University and their capable team and the Chinese Taipei Ministry of Foreign Affairs, and the Chinese Taipei APEC Study Center of the Taiwan Institute of Economic Research for their dedicated effort in putting on this event. I would also like to express my deepest appreciation for the Philippines' work on co-hosting this seminar and for putting together a wonderful APEC event here in Iloilo.

On behalf of Chinese Taipei and the Council of Agriculture, I hope all of you enjoy the rest of your stay in Iloilo and have a good flight home. Thank you very much!

V. Appendix

1. APEC Seminar on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock

List of Speakers (by order of Sessions)

Member Economy	Title	Family Name	First Name	Position	Institute
New Zealand	Dr.	Ferguson	Ian	Chief Scientist	Plant & Food Research
Japan	Mr.	Hazu	Motoyuki	Executive Officer, General Manager	Overseas Business Development Division, Nichirei Logistics Group Inc.
New Zealand	Dr.	Morton	James	Head of Department	Dept. of Wine, Food and Molecular Biosciences, Lincoln University
The Philippines	Mr.	Gudahl	Daniel J.	Senior Program Officer	Winrock International
The Philippines	Mr.	Tan	Leonardo	General Manager	E & L Fishing Enterprises
Chinese Taipei	Mr.	Chen	Wen-Shyan	Researcher and division chief	Animal Products Processing Division, Livestock Research Institute, Council of Agriculture
Chinese Taipei	Prof.	Chiang	Fu-Sung Frank	Professor	Dept. of Applied Economics, National Taiwan Ocean University
People's Republic of China	Dr.	Nie	Feng-Ying	Division Director	Chinese Academy of Agricultural Science

2. List of Participants Organized by Breakout Group

Breakout Group	Economy	Participant	Sector (Fishery/Livestock/Both/Other)	Type (Public/Private)
Group 1				
Moderator	Dr. James Morton			
Rapporteur	TBD			
1	The Philippines	Ms. Consuelo C. Baltazar	Fishery	Public
1	The Philippines	Ms. Elizabeth Armamento	Fishery	Private
1	Chinese Taipei	Dr. Wen-Shyan CHEN	Livestock	Public
1	The Philippines	Mr. Felix O. Tiukinhoy	Livestock	Private
1	Canada	Ms. Natalie DORE	Other	Public
1	The Philippines	Engr. Rex L. Bingabing	Other	Public
1	Japan	Mr. Motoyuki HAZU	Other	Private
1	The Philippines	Ms. Jessica Esmao	Fishery	Public
1	The Philippines	Mr. Helendrino Morales	Fishery	Private
1	The Philippines	Engr. Jane T. Tapel	Livestock	Public
1	The Philippines	Dr. Edgardo C. Dimalanta	Livestock	Private
1	Chinese Taipei	Ms. Dong-chong HSIU	Other	Public
1	The Philippines	Dr. Arnel N. Del Barrio	Other	Public
1	The Philippines	Dr. Loinda R. Baldrias	Other	Private
1	Chinese Taipei	Mr. Jr-wei CHEN	Both	Public
1	The Philippines	Mr. Arsenio Dela Peña	Fishery	Private
1	Chinese Taipei	Mr. Chen-sheng HO	Other	Public

Group 2				
Moderator	Mr. Fu-sung Chiang / Dr. Feng-Ying Nie			
Rapporteur	TBD			
2	Chinese Taipei	Mr. Wei-shiun WU	Fishery	Public
2	The Philippines	Dr. Nerissa D. Salayo	Fishery	Private
2	People's Republic of China	Dr. Feng-Ying Nie	Other	Public
2	The Philippines	Ms. Cherry E. Romero	Fishery	Public
2	The Philippines	Ms. Ching Sanchez	Fishery	Private
2	Thailand	Ms. Parinya Sakorncharoen	Livestock	Public
2	The Philippines	Mr. Gregorio A. San Diego	Livestock	Private
2	Canada	Ms. Vanessa S. Blair	Other	Public
2	The Philippines	Dr. Renita SM. Dela Cruz	Other	Public
2	The Philippines	Mr. Eric Hong	Other	Private
2	The Philippines	Engr. Ariel T. Cayan	Fishery	Public
2	The Philippines	Mr. Leonardo Tan	Fishery	Private
2	The Philippines	Dr. Ma. Elizabeth D. Callanta	Livestock	Public
2	The Philippines	General Luisio Ticman	Livestock	Private
2	Chinese Taipei	Ms. Selena, Pu-yun HSU	Other	Public
2	The Philippines	Dr. Rubina O. Cresencio	Other	Public
2	The Philippines	Mr. Patrick Chua	Other	Private
Group 3				
Moderator	Dr. Daniel J. Gudahl			

Rapporteur	TBD			
3	The Philippines	Ms. Sarah Bales	Fishery	Public
3	The Philippines	Ms. Caridad C. Felisilda	Fishery	Private
3	The Philippines	Mr. Stephen G. Castillo	Livestock	Private
3	Chinese Taipei	Ms. Ching-cheng CHANG	Other	Public
3	The Philippines	Ms. Emelina Lopez	Other	Public
3	Chinese Taipei	Ms. Hui-chun TSAI	Fishery	Public
3	The Philippines	Mr. Roberto BAYLOSIS	Fishery	Private
3	The Philippines	Dr. Venus G. Garcia	Livestock	Public
3	Peru	Ms. Rosa Angélica Sánchez Díaz	Other	Public
3	The Philippines	Dr. Angel Encarnacion	Fishery	Public
3	The Philippines	Mr. Robert Manansala	Fishery	Private
3	The Philippines	Atty. Beata Humilda O. Obsioma	Livestock	Public
3	The Philippines	Mr. Jesus Cham	Livestock	Private
3	Chile	Ms. Maritza Karina Muñoz Sánchez	Other	Public
3	The Philippines	Dr. Amelita R. Salvador	Other	Public
3	The Philippines	Mr. Anthony S. Dizon	Other	Private
Group 4				
Moderator	Dr. Anne Wietheger			
Rapporteur	TBD			
4	The Philippines	Mr. Omar Sabal	Fishery	Public
4	The Philippines	Ms. Diana de los Santos	Fishery	Public

4	The Philippines	Atty. Jacqueline B. Yao	Fishery	Private
4	The Philippines	Dr. Jonathan V. Sabiniano	Livestock	Public
4	The Philippines	Mr. Edwin Chen	Livestock	Private
4	Chinese Taipei	Mr. Fu-sung CHIANG	Other	Public
4	The Philippines	Dr. Ma. Cecilia R. Antolin	Other	Public
4	The Philippines	Dr. Leo A. Obviar	Other	Private
4	The Philippines	Ms. Juliet Opulencia	Fishery	Public
4	The Philippines	Mr. Raymond Tuzon	Fishery	Private
4	Chinese Taipei	Mr. Shih-hsun HSU	Other	Public
4	Vietnam	Mr. Pham Sy Tiep	Other	Public
4	The Philippines	Ms. Drusila Esther Bayate	Fishery	Public
4	The Philippines	Engr. Francia Macalintal	Fishery	Public
4	Peru	Mr. Fernando Javier Martínez Ruiz	Other	Public
4	Singapore	Dr. Sze Sze Tan	Other	Public

3. Selected Photographs

