



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

**Iloilo, The Philippines, Sept 27, 2015**

## **Report on MYP “Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain”**

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**(APEC/ PPFS & ATCWG Multi-Year Project M SCE 02 2013A)**

# Outline

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- ▶ **Progress (2013-September 2015)**

- ▶ Challenges
- ▶ Project Overview
- ▶ Progress in 2015 – Fishery and Livestock Loss Consultation
- ▶ Loss Assessment and Data Collection Progress Check
- ▶ Toolkits: Information System, Knowledge-Sharing, PPP

- ▶ **Future Plan**

- ▶ Loss Assessment, Data Collection, and PPP
- ▶ Information Platform and Policy Survey
- ▶ Seminar: 2015, 2016

# Food Loss Challenges for Asia-Pacific

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## 1. Reducing food losses and waste is an urgent issue

- About **one-third** of edible parts of food produced for human consumption, which is about 1.3 billion tons per year, gets lost or wasted (Gustavasson, et al., 2011)
- **Developing** economies in APEC accounted for most postharvest losses, with higher losses in Southeast Asia than other areas (Hredzak and Le, 2012)
- Food loss represents a **financial cost** to supply chain as well as a loss of our **environment** (land, water, energy, etc.)

## 2. Many tools have been proposed to correct the post-harvest system, but there is likely no single solution.

- ▶ **Developing**
  - ▶ Technologies: Inadequate storage, transportation, etc.
  - ▶ Management: Loss-reducing practices are less common
  - ▶ Infrastructure: Lack of investment in farm and retail levels
- ▶ **Developed**
  - ▶ Strict hygiene and safety rules inhibit recovery of uneaten food
  - ▶ Costly to reduce loss or to safely collect, store, and transport food to food banks.

# Challenges for Asia-Pacific

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## QUESTION

➔ **How to get started?**

## ANS:

Substantial reductions in food loss require a mixture of public and private-sector approaches in

- ▶ **Loss Estimation:** Definition, Quantify the “quality” aspect, under or over-estimate?
- ▶ **Concrete actions:** Technical issue, Sanitary issue, Cost/Benefit Analyses, Rapid Changes in Consumption Patterns

# APEC Multi-Year Project

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## ▶ 3 Purposes

- ▶ Identify **key issues** on reducing food losses and wastes
- ▶ Seek **best practices** in private and public sectors
  - enhance the role of public-private partnership (PPP)
  - reinforce policy coordination among APEC economies
  - establish a milestone for APEC food security
- ▶ Find **practical solutions** and enhance capacity-building
  - establish a **toolkit and dataset** on reducing food losses
  - develop a **consolidated assessment** methodology

# Work Plan (3 Phases)

2013

## Preparation, Research and Identification

- Establish a Focal Point Network (FPN) and launch a capacity building seminar.
- Identify key issues on reducing post-harvest losses and wastes
- Study methodology on loss assessment and toolkit, database

2014~  
2016

## Investigation of Food Losses and Waste

- **Modify methodology, toolkit and dataset** based on feedbacks from FPN and MEs
- **Launch annual capacity building seminars** on reducing post-harvest losses for fruit and vegetables, fishery and livestock products, and consumption wastes sequentially

2017~  
2018

## Action and Inter-linkages

- Launch a high-level meeting to facilitate policy dialogue
- Complete final report including policy recommendation and action plans
- Disseminate project results via APIP online website

# Relevance to PPFS

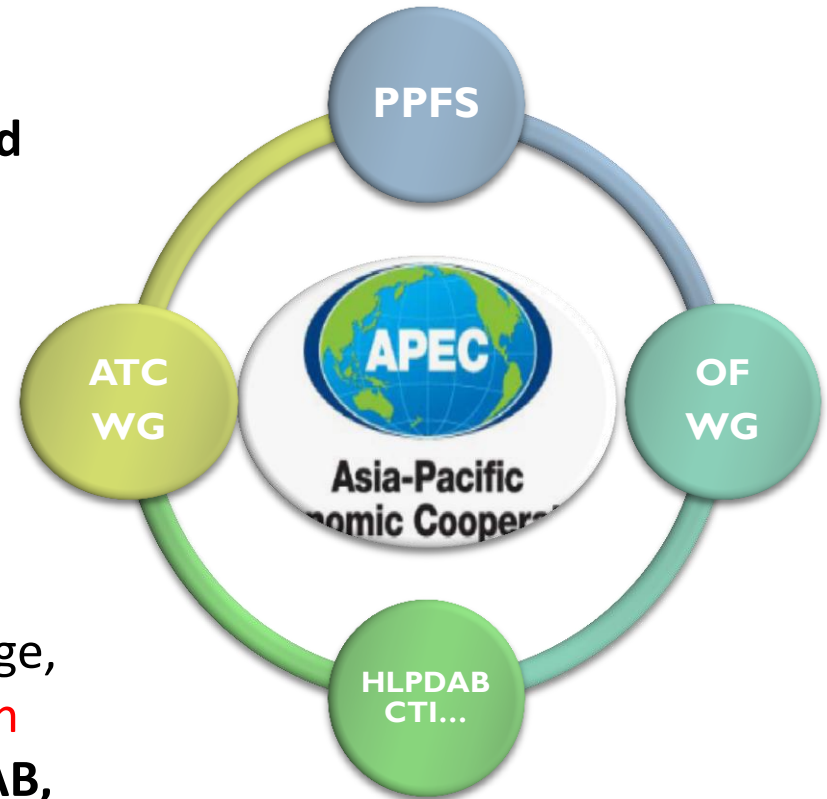
## ▶ Action Plan of PPFS 2014

### ▶ Priority in WG on Enhancing Trade and Market:

- ▶ Post-harvest management tech & standards
- ▶ Supply chain and cool chain
- ▶ **Food loss and waste reduction**
- ▶ Quality and safety assurances

### ▶ Key areas for cooperation

- ▶ Technology exchanges in food storage, supply chain and **food loss reduction**
- ▶ Engage with **ATCWG, OFWG, HLPDAB, CTI.**

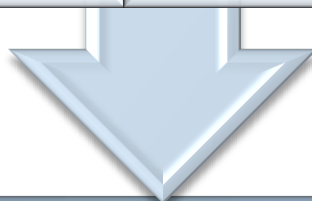


# Capacity Building in 2015

## **APEC 2015 Expert Consultation on Assessment Methodology of Fishery and Livestock Losses Chinese Taipei, July 16-17, 2015**

**Discuss loss assessment  
methodology in fishery and  
livestock supply chain**

**Collect baseline information and  
capacity building**



## **APEC Seminars on Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain of Fishery and Livestock Iloilo, September 27, 2015**

**Identify practical solutions and  
incentives to enhance PPP of  
reducing food losses in fishery and  
livestock**

**Best practices sharing and innovative  
technologies on reducing food losses in  
fishery and livestock supply chain**



# 3rd APEC Seminar on Fishery and Livestock Chinese Taipei, July 16-17, 2015

## Agenda

- ◆ APEC fishery and livestock loss status and methods
- ◆ Best practice of enhancing fishery and livestock PPP
- ◆ Survey development for loss assessment
- ◆ Develop assessment methodology and dataset



## • Achievements

### Key Findings on Food Security

- ◆ Assessment surveys need to be shortened and better-targeted for best data
- ◆ Legal definitions can be improved to reduce waste, consensus on terms reached
- ◆ Government signaling to producers is an effective method to raise awareness of consumer needs and interests which reduce waste

### Public-Private Partnership

- ◆ PPP with buy-in will increase data quality from assessment surveys but private producers need to be informed of benefits to be gained from research
- ◆ Partnerships can be better-developed with third-party oversight that increases buy-in from private industry partners

# Loss Assessment

- ▶ “Measurable quantitative losses along the food supply chain starting with harvest until consumption by end users.”
- ▶ **Mass Flow Model (MFM) of FAO**

Food Loss and Waste along the Value Chain

Production	Handling & Storage	Processing & Packaging	Distribution & Market	Consumption
<b>Definition</b>				
During or immediately after harvesting on the farm	After produce leaves the farm for handling, storage, and transport	During industrial or domestic processing and/or packaging	During distribution to markets, including losses at wholesale and retail markets	Losses in the home or business of the consumer, including restaurants/caterers
<b>Includes</b>				
Fruits bruised during picking or threshing	Edible food eaten by pests	Milk spilled during pasteurization and processing	Edible produce sorted out due to quality	Edible products sorted out due to quality
Crops sorted out postharvest for not meeting quality standards	Edible produce degraded by fungus or disease	Edible fruit or grains sorted out as not suitable for processing	Edible products expired before being purchased	Food purchased but not eaten
Crops left behind in fields due to poor mechanical harvesting or sharp drops in prices	Livestock death during transport to slaughter or not accepted for slaughter	Livestock trimming during slaughtering and industrial processing	Edible products spilled or damaged in market	Food cooked but not eaten
Fish discarded during fishing operations	Fish that are spilled or degraded after landing	Fish spilled or damaged during canning/smoking		

## Agricultural Production Flow

- FAO Food Balance Sheet
- By product
- By economy

## Food Loss % in each stage

- Gustavsson et al., (FAO 2011) Study
- Loss in %
- by stage, product, group, region

## Food Loss Volumes

- By product,
- By economy,
- By stage

- ▶ **Accounting technique and internal consistency checks** are used within the framework of the Supply/Utilization Accounts.
- ▶ Although **FAO Food Balance Sheets** are not perfect in statistical terms, they do provide a consistent and clear picture of overall food situation of individual economy.

# Structure of Assessment Model

## • Model for Cereal & F&V

1. Production and Harvesting Loss <sub>i</sub>	=	$((R \times L_1) / ((1 - L_1)) \times E$
2. Handling and Storage Loss <sub>i</sub>	=	$R \times L_2$
3. Processing and Packaging Loss <sub>i</sub>	=	$(C_i + F_i \times U_i) \times L_3$
4. Distribution and Marketing Loss <sub>i</sub>	=	$F_i \times (1 - U_i) \times L_4 \text{ for fresh}$ $+ \{(C_i + F_i \times U_i) \times (1 - L_3)\} \times L_4 \text{ for processed}$
5. Consumption Loss <sub>i</sub>	=	$F_i \times (1 - U_i) \times (1 - L_4 \text{ for fresh}) \times L_5 \text{ for fresh}$ $+ \{(C_i + F_i \times U_i) \times (1 - L_3)\} \times (1 - L_4 \text{ for processed}) \times L_5 \text{ for processed}$

## Model for Fish & Livestock

### Total Food Loss Equations for APEC Economy *i*

1. Production and Harvesting Loss <sub>i</sub>	=	$((C \times L_1) / ((1 - L_1)) \times E$
2. Handling and Storage Loss <sub>i</sub>	=	$(C + A) \times L_2 \times E$
3. Processing and Packaging Loss <sub>i</sub>	=	$(C + A) \times L_3 \times U_i$
4. Distribution and Marketing Loss <sub>i</sub>	=	$((P \times F)) / (1 - L_5) \times L_4$
5. Consumption Loss <sub>i</sub>	=	$((P \times F)) / (1 - L_5) - (P \times F)$

# Data Collection Progress

- ▶ 2015 Expert Consultation in Chinese Taipei gave a chance to share economy progress on data collection and current challenges

Member Economy	Data Collection Status	Comments
Indonesia	Paused	Large geography requires additional coordination
Korea	Collected/In Progress	New data is being collected
Mexico	Collected	Data should be collected and reportable
New Zealand	Accessible	Concentrated industries mean easy data access
Papua New Guinea	In Progress	
Peru	In Progress	
Philippines	In Progress	Building relationships for improved data collection
Singapore	Accessible	Smaller industry contacts need to be developed
Chinese Taipei	In Progress	Data is being reported and new contacts compiled
Thailand	Paused	Departments need to renew cooperation
United States	Accessible	Contractors need to be notified for data
Vietnam	Paused	Process to start after this consultation

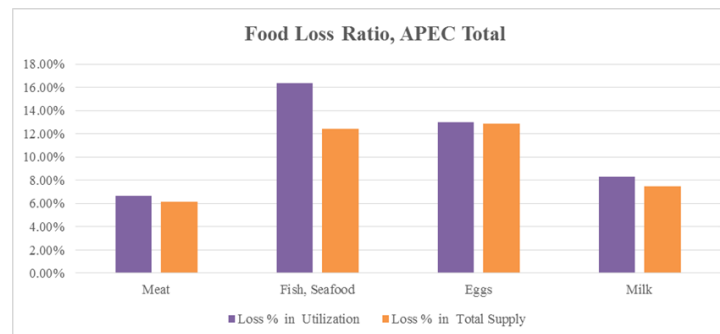
# Assessment and Other Progress through 2015 Chinese Taipei Consultation

## Definitions

### ✓ Interchangeability of FAO terms:

- ✓ “Loss”
- ✓ “Waste”

3-



- ✓ Agreement was reached that the terms simply denote the stage of post-harvest supply/consumption at which the food was lost and further time should not be expended on definitional issues

	Losses (mill MT)	Production (mill MT)	% Loss in Total Production
Meat	11.44	168.58	6.78%
Fish	17.43	109.83	15.87%
Egg	6.10	47.04	12.96%
Dairy	18.97	225.69	8.40%

## Technical Team

### ✓ Formation and organization of technical team:

- ✓ Delegates agreed to a Work Plan where Chinese Taipei will organize a Technical Team with relevant statistical and data collection experience



# Toolkits

- ▶ Dairy
  - ▶ Cool Chain
  - ▶ Refrigerated transport
  - ▶ Rapid and efficient drying
  - ▶ Separation of milk to provide ingredients for high value products such as infant formula and ingredients.



# Public-Private Partnerships

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- ▶ **Public-Private Partnerships greatly improve data quality**
  - ▶ Engagement and building trust in key stakeholders for food production and loss reduction mitigates improper reporting of data
- ▶ **Partnerships produce applicable best practices and case studies**
  - ▶ Select case studies include: kiwi marketing by Zespri, banana pre-harvest improvement in the Philippines, and mango best practices in Chinese Taipei
- ▶ **Partnerships create favorable business environment and develop market-oriented structures for food export and import.**
  - ▶ Establish high value-added food value chains by improving postharvest centers and cold chains with advanced technologies such as dry & cold weather farming, irrigation, ICT, plant factories and quality control system.
- ▶ **Partnerships makes policy, knowledge-sharing, and enforcement/compliance more effective**

# Knowledge-Sharing Activities: Seminars in 2013-2014

## 1st APEC Seminar on Food Grain Taipei, Aug 5-8, 2013

### Agenda

- ◆ Main Challenges of Food losses and Food Security
- ◆ Key Issues of PPP in Reducing Post-Harvest Losses
- ◆ APEC Best Practices
- ◆ Next Steps and Future Action Plans



### Achievements

#### Key Findings on Food Security

- ◆ Only 5% of agricultural R&D investment on post-harvest
- ◆ Promising post-harvest technologies and management options available
- ◆ Recycling for nonedible losses needs government support

#### Public-Private Partnership

- ◆ Public sector + Private sectors + NGOs & Academia
- ◆ Need to accelerate and support PPP initiatives
- ◆ Education of supply-chain actors Stakeholders + Consumers

## 2nd APEC Seminar on Vegetable and Fruits Beijing, Sept 15, 2014

### Agenda

- ◆ Main Issue in vegetable & fruit supply chain in APEC
- ◆ Best practice of enhancing PPP in vegetable & fruits
- ◆ Innovative technology and management
- ◆ Develop assessment methodology and dataset



### Achievements

#### Key Findings on Food Security

- ◆ Measuring food loss is challenging and data intensive
- ◆ Information exchange of best practices & traceable supply-chain management contribute to strategic approach development
- ◆ Loss prevention can be a priority to launch a regional PPP initiative

#### Public-Private Partnership

- ◆ PPP is important in food supply chain management for quality improvement, reducing postharvest decay, and food safety assurance
- ◆ Partnership could be costly and effort/time-consuming, so innovative models is needed to become successful and sustainable



# Knowledge-Sharing Activities:

## APEC 2015 Expert Consultation on Assessment Methodology of Fishery and Livestock Losses, Chinese Taipei, July 16-17, 2015

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# **Future Plan:**

## **Loss Assessment, Data Collection, PPP**

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### ▶ **Loss assessment Improvement**

#### ▶ **Initial purpose of food**

- ▶ Domestic or Foreign Market?
- ▶ Direct consumption or Processing use?

#### ▶ **Marketing channels**

- ▶ Wholesale: Wholesale vs Distribution Center
- ▶ Retail: Traditional vs Supermarket

#### ▶ **Edible or Non-edible Portion Standards**

### ▶ **Best Practices of PPP**

#### ➔ **Establish a food loss reduction program**

- ▶ **Prevention** ➔ Farm level (Pruning, Bagging, Netting, Residue...)
- ▶ **Mitigation** ➔ Retail level (Refrigeration, Information, Safety Standard,...)

#### ➔ **Main issues**

- ▶ What are the hidden costs?
  - ▶ KPI/metrics needed to make informed decisions
  - ▶ Supporting mechanism for policy formation
-

# Information Platform and Policy Survey

## ▶ APIP-PHLOWS

- ▶ Open Data
- ▶ As a Knowledge Bank

## ▶ Key features

- ▶ Loss estimates
- ▶ Toolkits
- ▶ Best practices



QR code



## ▶ Two Phase Survey

1. collect **existing technologies, data, and best practices**
2. identify the **most efficient and cost-effective way** to achieve the policy objective of food security in the region

Questionnaire on Food Loss Assessment and Inventory of Capacity Building Activities in the APEC Region

**Purpose**  
The purpose of the survey includes the following:  
1. Gain insight into the extent and nature of postharvest losses in all stages of the food supply chain in the APEC member economies.  
2. Identify key areas, targets to improve data collection and sharing along the fishery and livestock supply chains in the Asia-Pacific region.  
3. Gain insight on existing programs/projects with regard to assessment methodology and capacity building for postharvest food loss reduction.  
The questionnaire is divided into 3 sections:  
Section 1: Basic Information;  
Section 2: Information on causes, effects and details of food losses;  
Section 3: Existing programs/projects on loss assessment/reduction.

**Note:**  
1. Do avoid duplication with existing studies; we try to focus on collecting primary and regional data, but the questionnaire should be able to apply to other perishable products as well.  
2. To address our purposes, both questionnaire and qualitative approach will be used in our questionnaire.

**Section 1: Basic Information**

**1. Respondent (Interviewee):**

Emergency	
Name of Respondent	
Position & Institution	
Contact Details (address, Tel, email)	
Service Area	

**A. For the following categories, please pick those most descriptive of your experience such that this research may best inform policies that will better address the challenges your enterprise is facing. (Please tick on the boxes)**

**1. General Characteristics: Which of the following best describes your business?**

Harvester	<input type="checkbox"/>
Post-harvest handler	<input type="checkbox"/>
Primary processor	<input type="checkbox"/>
Secondary processor	<input type="checkbox"/>
Wholesaler	<input type="checkbox"/>
Retailer	<input type="checkbox"/>

**B. The following questions seek to better understand your perception of food loss and waste such that this research may be better tailored to industry needs.**

**1. What does the phrase food loss/waste mean to you?**

**2. On a scale of 1-10 do you believe that food loss/waste impacts your business?**

**3. Does waste reduction become important when considering specific markets or segments? Please elaborate.**

**4. Do you believe your business colleagues hold similar opinions on food loss/waste?**

**5. Do you believe that loss reduction is a cost of business forced on you by government regulation?**

**6. Do you believe loss reduction is valuable to business?**

**C. How much does loss/waste reduction in production affect your business decisions when considering the following?**

	No impact	Minimal impact	Significant impact	High impact
Increased quality assurance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Response to customer demand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Efficient use of your business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meeting public standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compliance behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government regulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**2. Baseline Data of Service Area (Base Year: 2012):**

	Fishery (capture)	Fishery (aquaculture)	Milk (milked/butter)	Data Source
<b>1. Operations Scale</b>				
(1) Annual Production (MT/1000)				
(2) Annual Import (MT/1000)				
(3) Annual Export (MT/1000)				
<b>2. Loss by by stage (kg)</b>				
(1) Production				
(2) Handling				
(3) Processing				
(4) Distribution				
(5) Consumption				
(6) Other Parameters				
(1) Process Ratio (kg)				
(2) Fishery Ratio (kg)				
(3) Population in service area (persons)				

	Egg	Meat (beef, mutton, pig)	Milk (quantity)	Data Source
<b>1. Operations Scale</b>				

# Next Steps, 2015-2016 after Iloilo

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## ▶ 2015

- ▶ 3<sup>rd</sup> APEC seminar in **the Philippines**
- ▶ on **Fishery and Meat/Dairy Products**

1

- Form technical team (Chinese Taipei)
- Draft improved loss assessment survey based on consultation

2

- Compile list of targeted respondents and distribute survey
- Collect responses and built database

## ▶ 2016

- ▶ 4<sup>th</sup> APEC seminar in **PERU**
- ▶ on **Retail and Consumption Waste**

3

- Share knowledge and findings from survey analysis with APEC
- Cooperate to create policy recommendations

4

- Distribute policy recommendations and monitoring
- Maintain contact, network, and knowledge-sharing