

- APEC 2015 Expert Consultation on
- Assessment Methodology of Fishery and Livestock Losses
- Taipei, July 16-17, 2014

# Information Sheet: Major Issues on Food Loss Assessment and Improvement

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

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# Outline

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## About the Multi-Year Project

- Relevance
- Progress
- Capacity Building : 2013, 2014
- Capacity Building : 2015~

## About the Information Sheet

- Definition and Scope
- Assessment Methodology
- Data and Verification

# About the project

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- **Proposed** by Chinese Taipei in **2013 ATCWG/PPFS**
- **Co-sponsored** by
  - **13** APEC economies
  - ABAC, International Rice Research Institute (IRRI), International Livestock Research Institute (ILRI); and WorldFish.
- **Objectives**
  - Identify **key issues** on reducing food losses and wastes
  - Seek **best practices** in private and public sectors
  - Find **practical solutions** and enhance capacity-building

# About the project- Work Plan (3 Phases)

## Preparation, Research and Identification

2013

- Launch capacity building seminars in major cereals.
- Identify key issues on reducing post-harvest losses and wastes
- Study methodology on loss assessment and toolkit, database

## Investigation of Food Losses and Waste

2014~

2016

- **Modify methodology, toolkit and dataset** based on feedbacks from MEs
- **Launch annual capacity building seminars** on reducing PHL for grain, fruit and vegetables, fishery and livestock, and consumption wastes

## Action and Inter-linkages

2017~

2018

- 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 APEC

- **2012 APEC Economic Leaders' Declaration**
  - “**reduce post-harvest losses** along the entire food supply chain...”
- **2014 APEC Leaders' Declaration**
  - *Par 46: “We endorse the Beijing Declaration on APEC Food Security issued at the Third APEC Ministerial Meeting on Food Security. We welcome **APEC Action Plan for Reducing Food Loss and Waste**, the APEC Food Security Business Plan (2014-2020), and the **APEC Food Security Roadmap toward 2020 (2014 version)** and the Action Plan to Enhance Connectivity of APEC Food Standards and Safety Assurance.”*
- **APEC Food Security Roadmap Towards 2020**
  - “Enhance food supply efficiency, provide more affordable food for lower income consumers. APEC economies will strive to **reduce food loss and waste by 10% compared with the 2011-2012 levels by 2020** in the Asia-Pacific economies aim to advance beyond the Millennium Development Goals 2015 hunger goals.”

# 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 Seminars 2013-2014

## 1<sup>st</sup> APEC Seminar Taipei, Aug 5-8, 2013

Main challenges in  
**Food losses and Food  
Security**

Best Practices in  
Reducing Post-harvest  
losses on **Food Grains**

Key Issues on  
strengthening **Public-  
Private Partnership  
(PPP)** on reducing  
post-harvest losses

## 2<sup>nd</sup> APEC Seminar Beijing, Sept 15, 2014

Major issues in  
reducing food losses  
in **Fruits and  
Vegetables**

Best practices of  
enhancing PPP in  
**Fruits and Vegetables  
supply chain**

Innovative  
technologies and  
management in **Fruits  
and Vegetables supply  
chain**

# Capacity Building in 2015

## APEC 2015 Expert Consultation on Assessment Methodology of Fishery and Livestock Losses 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

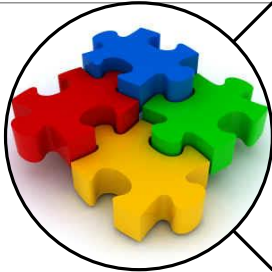
Identify **practical solutions** and **incentives** to **enhance PPP** of reducing food losses in fishery and livestock

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



# APEC 2015 Expert Consultation

## 3 Purposes



**Improve assessment methodology and data collection** on identifying the causes in fishery and livestock



**Design survey questionnaire and identify key targets** to improve data collection and sharing



**Discuss work plan** for the technical team on food loss assessment and capacity building

# Content of Information Sheet

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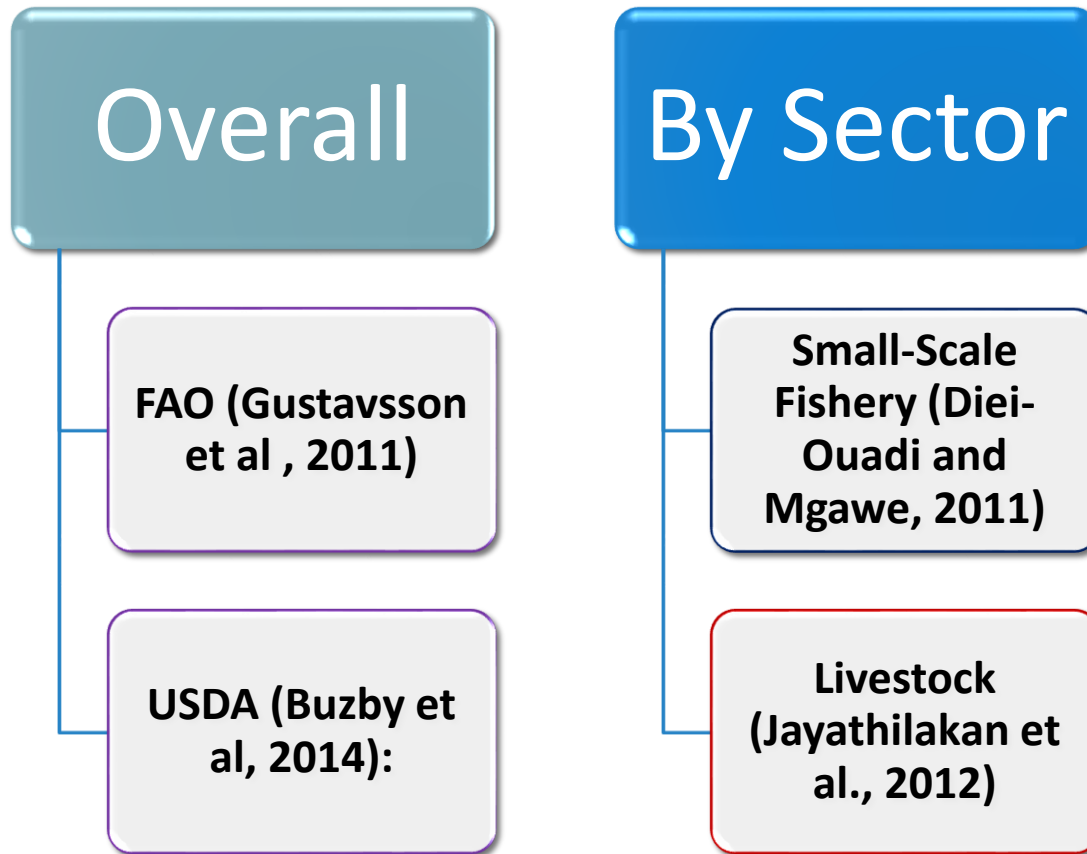
Definition &  
Scope

Assessment  
Methodology

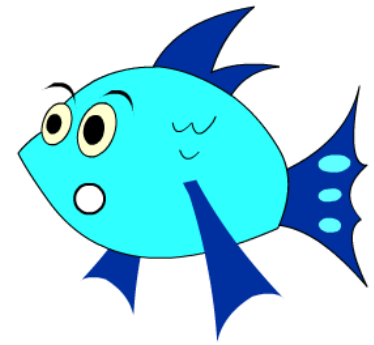
Data &  
Verification

# I. Definition & Scope

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# Definition for Fishery Loss



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## ➤ FAO(Diei-Ouadi and Mgawe, 2011)

✓“Fish that is either discarded or sold at a relatively low price.” owing to

- **biochemical and microbiological spoilage**
- discarding of **bycatch at sea** because fish is too small or not valuable enough to land for sale;
- poor **processing** techniques damaging fish;
- **animal** predation and **insect** infestation;
- inadequate **packaging and storage** practices leading to damage of the end product;
- **market dynamics** affect price and income.

# Definition for Livestock Loss

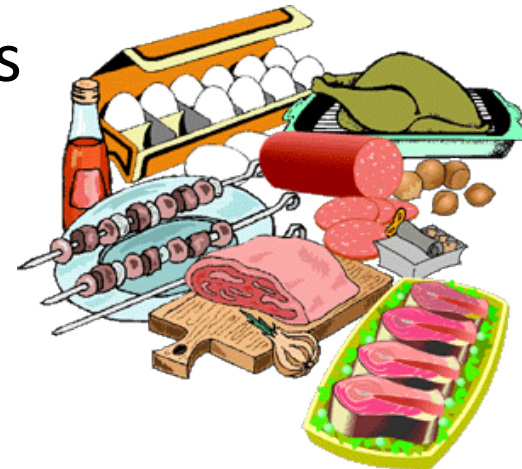
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FAO (Gustavsson et al., 2011):

- ✓ *The majority of the waste in the meat industry is produced during **slaughtering**.*
- ✓ *Such waste includes **bones, tendons, skin, the contents of the gastro-intestinal tract, blood and internal organs**.*

Food Loss Reduction in livestock means

→ **“By-Product Reutilization”**



# By-products as a percentage of market live weight

Item	Pigs		Cattle		Sheep	
	%	kg	%	kg	%	kg
Market live weight		<b>100</b>		<b>600</b>		<b>60</b>
<b>Whole carcass</b>	<b>77.5</b>	<b>77.5</b>	<b>63.0</b>	<b>378.0</b>	<b>62.5</b>	<b>37.5</b>
Blood	3.0	3.0	18.0	4.0	2.4	
Fatty tissue	3.0	3.0	4.0	24.0	3.0	1.8
Hide or skin	6.0	6.0	6.0	36.0	15.0	9.0
Organs	7.0	7.0	16.0	96.0	10.0	6.0
Head	5.9	5.9				
Viscera(chest and abdomen)	10.0	10.0	16.0	96.0	11.0	6.6
Feet	2.0	2.0	2.0	12.0	2.0	1.2
Tail	0.1	0.1	0.1	6.0		
Brain	0.1	0.1	0.1	6.0	2.6	0.156

# II. Assessment Methodology

## Model of FAO (Gustavsson et al , 2011)

### 5 Activity :

- agricultural production;
- handling and storage;
- processing and packaging;
- distribution; and
- consumption.

### 7 Commodity :

- cereals;
- roots and tubers;
- fruit and vegetables;
- oilseeds and pulses;
- meat;
- fish and seafood;
- milk; and
- eggs

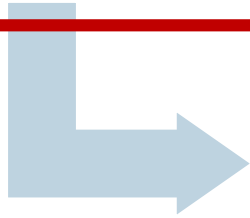
### 8 Regions:

- Europe,
- North America & Oceania,
- Industrial Asia,
- Sub Sahara Africa,
- North Africa,
- West & Central Asia,
- South & Southeast Asia,
- Latin America.

# 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>	=	$F_i \times (1 - U_i) \times (1 - L_{4 \text{ for fresh}}) \times L_{5 \text{ for fresh}}$ $+ \{(C_i + F_i \times U_i) \times (1 - L_3)\} \times (1 - L_{4 \text{ for processed}}) \times L_{5 \text{ for processed}}$



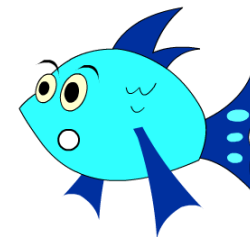
## • Model for Fish & Livestock

### 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>	=	$((P \times F) / (1 - L_5)) - (P \times F)$

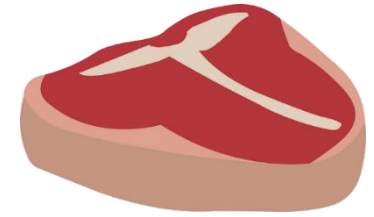


# Loss Ratios - Fishery



APEC Economy		Production Harvesting (L <sub>1</sub> )	Handling Storage (L <sub>2</sub> )	Processing Packaging (L <sub>3</sub> )	Distribution Marketing (L <sub>4</sub> )	Consumption (L <sub>5</sub> )	Process Ratio	Edible Ratio
Australia, New Zealand	USAID	9.4%	0.5%	6.0%	9.0%	11.0%	79%	50%
	FAO	12.0%	0.5%	6.0%	9.0%	33.0%	...	50%
Canada, United States Japan	USAID	12.0%	0.5%	6.0%	9.0%	33.0%	79%	50%
	FAO	12.0%	0.5%	6.0%	9.0%	33.0%	...	50%
Chile, Mexico, Peru	USAID	5.7%	5.0%	9.0%	10.0%	4.0%	46%	50%
	FAO	5.7%	5.0%	9.0%	10.0%	4.0%	...	50%
Indonesia, Malaysia, The Philippines Thailand, Viet Nam	USAID	8.2%	6.0%	9.0%	15.0%	2.0%	46%	50%
	FAO	8.2%	6.0%	9.0%	15.0%	2.0%	...	50%
PR China, Rep Korea, Chinese Taipei	USAID	15.0%	2.0%	6.0%	11.0%	8.0%	79%	50%
	FAO	15.0%	2.0%	6.0%	11.0%	8.0%	...	50%
Russia	USAID	9.4%	0.5%	6.0%	9.0%	11.0%	79%	50%
	FAO	9.4%	0.5%	6.0%	9.0%	11.0%	...	50%

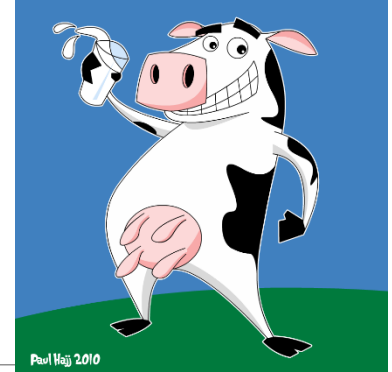
# Loss Ratios - Meat



**Q: why are they much lower than fishery?**

APEC Economy	Production Harvesting (L <sub>1</sub> )	Handling Storage (L <sub>2</sub> )	Processing Packaging (L <sub>3</sub> )	Distribution Marketing (L <sub>4</sub> )	Consumption (L <sub>5</sub> )	Process Ratio	Edible Ratio
Australia, New Zealand,	3.7%	1.0%	5.0%	4.0%	11.0%	50%	50%
Canada, The United States Japan	3.7%	1.0%	5.0%	4.0%	11.0%	50%	50%
Chile, Mexico, Peru	5.6%	1.1%	5.0%	5.0%	6.0%	50%	50%
P R China, Rep Korea, Singapore, Chinese Taipei	3.1%	0.6%	5.0%	6.0%	8.0%	50%	50%
Indonesia, Malaysia, Thailand, The Philippines, Viet Nam	5.6%	0.3%	5.0%	7.0%	4.0%	50%	50%
Russia	3.2%	0.7%	5.0%	4.0%	11.0%	50%	50%

# Loss Ratios-Milk



APEC Economy	Production Harvesting (L <sub>1</sub> )	Handling Storage (L <sub>2</sub> )	Processing Packaging (L <sub>3</sub> )	Distribution Marketing (L <sub>4</sub> )	Consumption (L <sub>5</sub> )	Process Ratio	Edible Ratio
Australia, New Zealand,	3.5%	0.5%	1.2%	0.5%	15.0%	80%	100%
Canada, The United States Japan	3.5%	0.5%	1.2%	0.5%	15.0%	80%	100%
Chile, Mexico, Peru	3.5%	6.0%	2.0%	8.0%	4.0%	50%	100%
P R China, Rep Korea, Singapore, Chinese Taipei	3.5%	1.0%	1.2%	0.5%	5.0%	80%	100%
Indonesia, Malaysia, Thailand, The Philippines, Viet Nam	3.5%	6.0%	2.0%	10.0%	1.0%	50%	100%
Russia	3.5%	0.5%	1.2%	0.5%	7.0%	80%	100%

# Loss Ratios - Eggs



APEC Economy	Production Harvesting (L <sub>1</sub> )	Handling Storage (L <sub>2</sub> )	Processing Packaging (L <sub>3</sub> )	Distribution Marketing (L <sub>4</sub> )	Consumption (L <sub>5</sub> )	Process Ratio	Edible Ratio
Australia, New Zealand,	4.0%	0.0%	0.5%	2.0%	15.0%	80%	100%
Canada, The United States Japan	4.0%	0.0%	0.5%	2.0%	15.0%	80%	100%
Chile, Mexico, Peru	6.0%	0.0%	0.5%	4.0%	4.0%	50%	100%
P R China, Rep Korea, Singapore, Chinese Taipei	6.0%	0.0%	0.5%	4.0%	5.0%	80%	100%
Indonesia, Malaysia, Thailand, The Philippines, Viet Nam	8.0%	0.0%	0.1%	3.0%	2.0%	50%	100%
Russia	4.0%	0.0%	0.5%	2.0%	8.0%	80%	100%

# Information Gaps

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## 1. Where is our Hot Spot?

- Based on existing loss ratios?
- Based on loss estimate results?
- Based on surveys with “qualitative” information from stakeholders?

} “Quantitative”

## 2. What is our Baseline?

- Year 2011 or 2012(Not complete in FAO)?

## 2. Verification needed:

- Loss ratios by “stage”
- Processing Ratios by “product”
- Edible Ratios by “product”
- **Fishery:** Should “by-catch” be counted as fishery loss?
- **Livestock:** What is “Edible By-Products”? → Need check list by product

**Thank You**  
**&**  
**Comment Welcome**

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