

2016 APEC Expert Consultation on Food Loss and Waste at Retail and Consumer Levels
July 18-19, 2016, Taipei

Report of Food Waste in Chinese Taipei

Prof. Tony Shih-Hsun Hsu

National Taiwan University, Chinese Taipei



**Asia-Pacific
Economic Cooperation**



National Taiwan University

2 | Outline

- Retailers and Consumers Levels in Chinese Taipei
- Current Status of Food Waste Research
- Existing Information Gaps & Recommendations
- Major Policies and Measures
- Potential Challenges
- Implications from Food Dollar Series

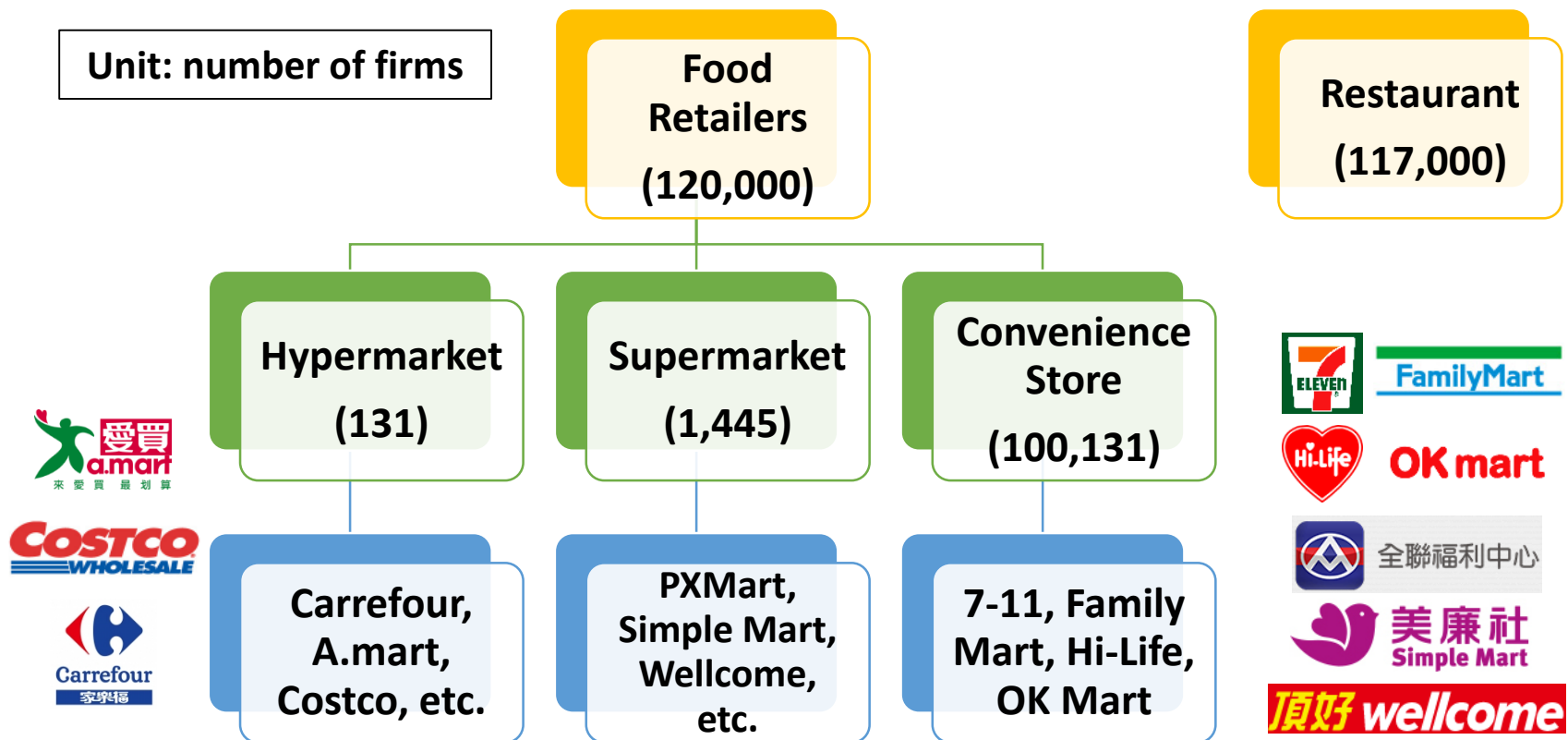
Retail and Consumer Levels in Chinese

3 | Taipei_1

- In Chinese Taipei, there are many retail stakeholders or consumer groups for research and data gathering.
- Retailers have diverse types including hypermarket, supermarket, traditional markets, convenience stores, grocery stores.
- According to COA statistics, there are **300,000 agri-food businesses** in 2014 and the number of food retailers and restaurants account for about 80% (237,000 firms).

4 | Retail and Consumer Levels in Chinese Taipei_2

- There are **120,000 food retailers** in Chinese Taipei.
- **Gross retail sales of food** in 2015: **NT 473.6 billion**.



5 | Current Status of Food Waste Research in Chinese Taipei_1

- Food waste are mainly generated by downstream, i.e. retailers and consumers (Oliver Wyman, 2014; Marthinsen et al., 2012; Jörissen et al., 2015). Chinese Taipei is no exception.
- According to Statistics published by Environmental Protection Administration(EPA), **total leftovers recycled amount** in Chinese Taipei in **2014** was estimated at **72 million tonnes**.
- Since 2003, total food waste in Chinese Taipei amounts to around **96 kg per capita**, and in 2014, it **dropped to 52 kg per capita**.

6 | Current Status of Food Waste Research in Chinese Taipei_2

- However, **total leftovers recycled amount published by EPA is underestimated**, since it is only part of the amount of food waste recycled by environmental agencies, community, campus, and organizations.
- For understanding the overall food waste in the food supply chain, we estimated loss and waste volumes using **Mass Flow model** derived from a framework proposed in Global Food Losses and Food Waste by FAO (2011) to **measure losses and waste volumes** along the food supply chain starting with harvest until consumption by end users.

7 | Mass Flow Model

Agricultural Production Flow

- FAO Food Balance Sheet
- By product
- By economy

Food Loss and Waste% in Each Stage

- FAO (2011) report
- Loss and waste in %
- By 5 stages (production, handling & storage, processing & packing, **distribution, consumption**)
- By product group, region

Food Loss and Waste Volumes

- By product
- By economy
- By stage

8 | Food Loss/Waste in Food Supply Chain

- **Total Food Loss/Waste** in Chinese Taipei is estimated at **3.68 million tonnes per year**, which amounts to **158.41 kg per capita**.
- **Consumption waste**, which is **80.09 kg per capita**, accounts the largest part of losses in the food supply chain of Chinese Taipei.

Unit: kg/per capita

Stage	Chinese Taipei	Overall APEC Economies
Production	28.80	70.94
Handling & Storage	19.44	39.06
Processing & Packing	10.25	42.51
Distribution	19.84	32.65
Consumption	80.09	57.30
Total	158.41	242.46

9 | Food Waste Recovery in Chinese Taipei

- According to [Allen \(2012\)](#) published by Global Anti-Incinerator Alliance, recovery of source-separated food waste in Chinese Taipei is covered by **the Food Waste Recovery and Reuse Plan**.
- In 2009, **319 townships** had **food waste recycling systems**.
- Approximately 75% of the recovered food waste is sold to pig farms for about NT \$400 (US \$13.70) per ton.
- **Most of the rest of the food waste is composted.**



10 | Existing Information Gaps & Recommendations

- Existing Information Gaps for data gathering:
 - The amount of food waste recycled of each cities or counties is the only data published by the government.
 - There is no comprehensive statistics on food waste generated by retailers and restaurants.
- Recommendations for future research:
 - The government should investigate the amount of food waste generated by retailers and restaurants every year to understand the actual situation on food waste.

11 | Major Policies and Measures_1

- Central Government:

- For the food sanitation control, the Congress formulated the *Act on Governing Food Safety and Sanitation (article 15)*, and the Food and Drug Administration, Ministry of Health and Welfare meet the mandate to advocate retailers to make good use of food and reduce food waste.
- ✓ In 2015, establish expiring or promotion area in the supermarket or retail stores and strengthen the cooperation with retailers and social welfare institutions.
- ✓ In May 4th, 2016, the Food and Drug Administration provides the information on food bank for retailers to encourage them to make proper use of food and reduce food waste.

12 | Major Policies and Measures_2

- In last month (June, 2016), the legislators made the public hearing for proposing the draft of the Act of Food Bank.
- It implies food waste in Chinese Taipei has been a front-page issue for our government to do some practices to reduce the food waste.

13 | Major Policies and Measures_3

- Local government:

- **Taipei City Government**: This year, Taipei City held the activity titled "Better market, Happy Taipei (2016)" to encourage consumers to buy local food, eat seasonal food, and reduce food waste.
- **Department of Environmental Protection** provides measures for **reducing** and **reusing** food waste as follows:
 - ✓ Reduce: **Households**: changes for cooking habits; **Restaurants**: changes for eating habits; **Retailers**: make good use of food;
 - ✓ Reuse: plan for **establishing "Food Waste Biomass Plant"** and the estimated electricity generated by food waste is 7.92 million kWh per year.

14 | Major Policies and Measures_4

- Local government:

- **Taichung City Government**: for avoiding too much waste and improving the development of food bank, the city government passed the law on *Taichung Food Bank Autonomous Regulation* on Jan. 18th, 2016.

- ✓ Taichung City is the food bank model city in Chinese Taipei.
 - ✓ Taichung Food Bank was established in 2010.

15 | Opinions and Ideas on Food Waste

- **For Retailers**

- **Taipei Agricultural Products Marketing Company:** fruit and Vegetable waste amounts to 20~30 tons per day in their company. Government may consider whether to **make good use of those waste as an energy use**.
- **I-MEI Foods Company:** General Manager thought it is unreasonable to determine whether food is good or bad through expiry date, and suggested **expiration date** and **best-before date should be labelled** at the same time.

- **For NGO-Homemakers United Foundations**

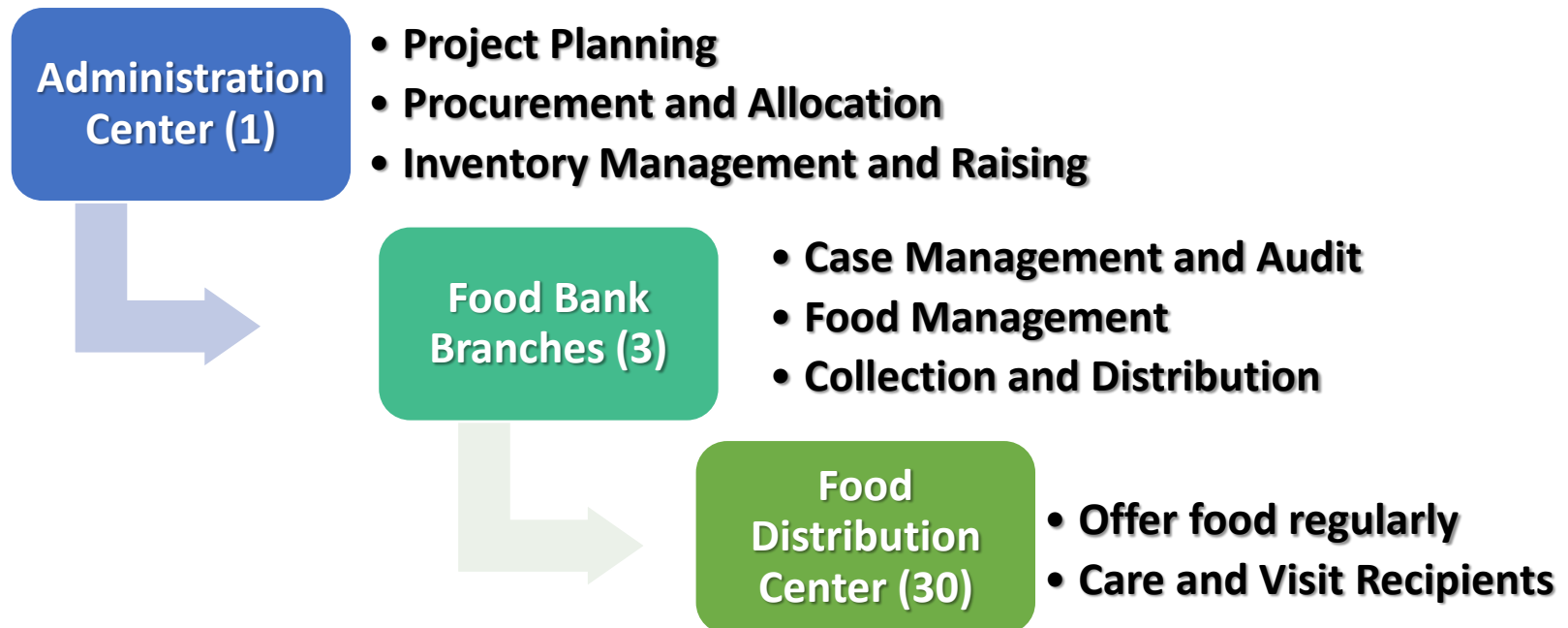
- They think there is **no sufficient** basis for **statistical research** to assess food loss and waste in Chinese Taipei; **regulations** for reducing waste are **imperfect**; **lack of national objectives and policies** on food waste.

16 | Case Study: Taichung Food Bank

- **Taichung Food Bank (TFB)** was established by Red Cross Taichung and the Taichung City Bureau of Social Affairs in **2010**.
- Now, TFB **serves 3,000 households every months** through its **30 food distribution centers** in 2015.
- At their **main center (supermarket-style)** in Taichung, they **serve 300 households per month**. Recipients can choose whatever they want from the selves from condiments to canned items, to frozen items, to shoes, to soaps, to diapers. Most of their items are **donated by businesses**.
- But TFB also purchase some items that are donated to the food bank less often.

17 | Framework of TFB

- TFB establishes a **Administration Center**, three **Food Bank Branches**, and **30 Food Distribution Centers** to implement some practices separately.

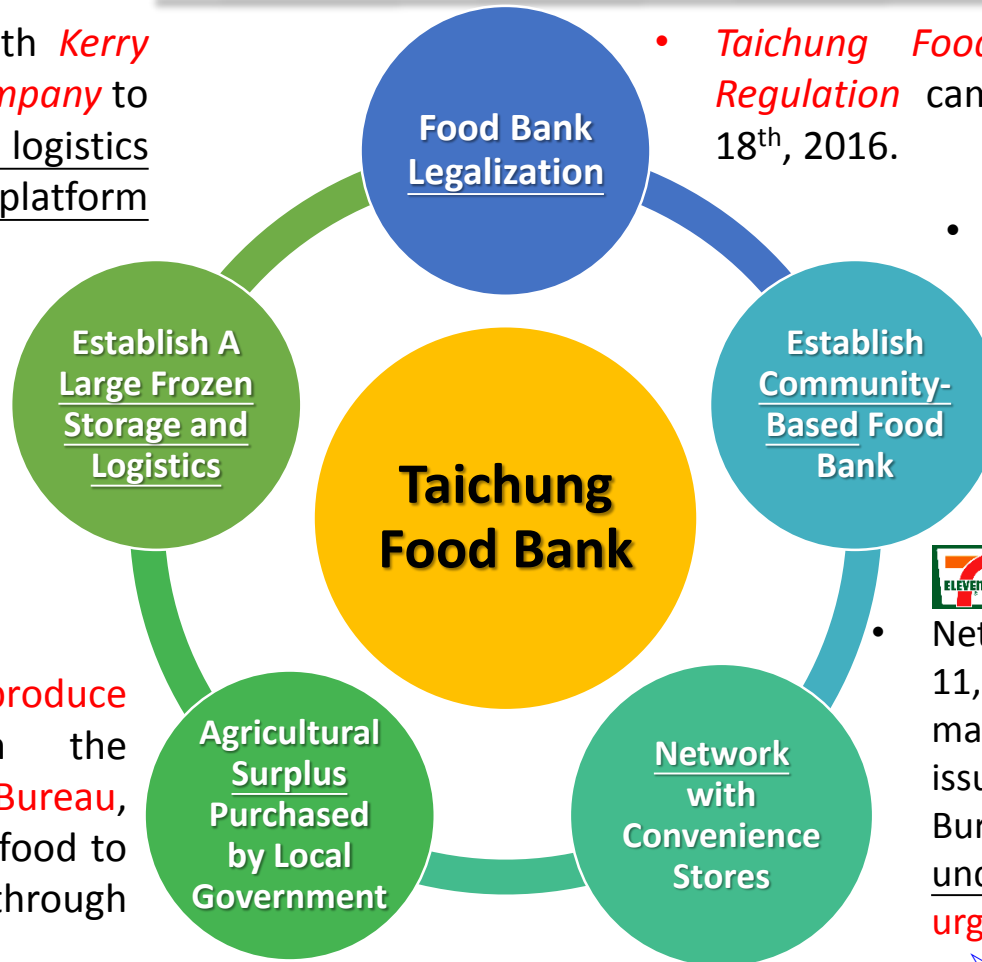


18 | TFB-Five Strategies and Performance

- Collaborate with *Kerry TJ Logistics Company* to create the first logistics and storage platform on 4/21, 2015.



- Purchase the produce surplus with the *Agricultural Bureau*, and distribute food to those in need through TFB.



- Taichung Food Bank Autonomous Regulation* came into force on Jan. 18th, 2016.

- Strategic alliance with private groups to **establish Food Bank Union Stores**.

✓ In 2015, 5 stores have set up.



- Network with 4 retailers (7-11, Family mart, Hi-Life, OK mart) and **meal voucher** issued by the Education Bureau to **provide** children under 18 yrs and adolescents **urgent need for food**.

➤ Expected in July, 2016.

19 | Potential Challenges_1

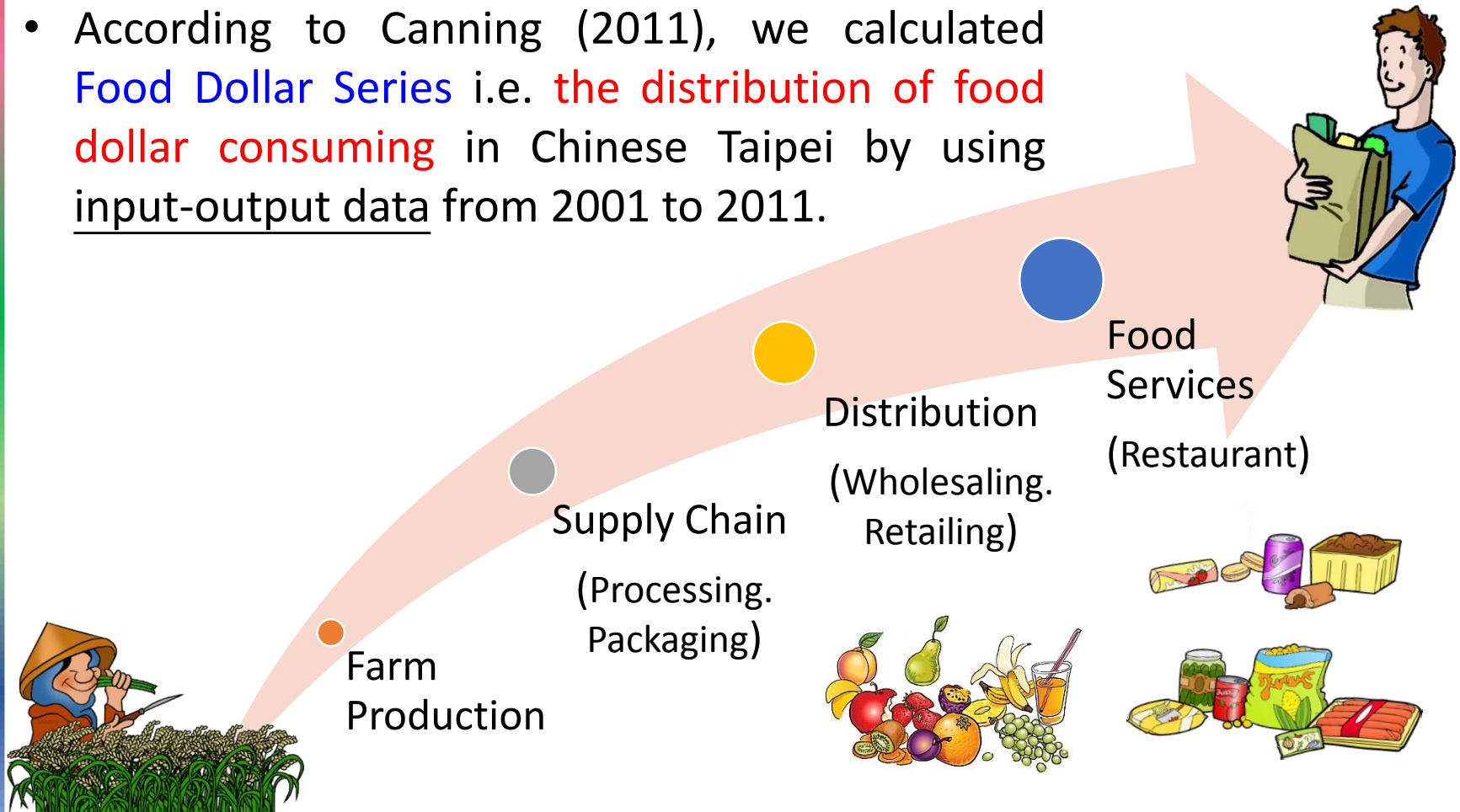
- The central government may follow EU or other developed countries to **formulate the national program** for Chinese Taipei to reduce waste.
- **Food waste** is a **inter-departmental issue** including the Ministry of Health and Welfare, Council of Agriculture, and EPA in Chinese Taipei. It leads to the **meticulous division of responsibilities** easily.
- For businesses, they throw too much overdue food away under food labelling regulations.
 - Overdue food will be thrown away in the retail stores according to the laws.

20 | Potential Challenges_2

- To avoid food waste and make use of food near expiration date, **retailers can distribute those food to food bank or recipients**, but **other problems may need to be resolved**.
 - Why provide expiration food to those people, not the fresh produces?
 - What if food nearing expiration date are harmful for people to eat?
- Households also recycle their waste to **compost use** or **feeding use** in Chinese Taipei.
 - But, where do these recycled items really go? In fact, **some recycled waste were still incinerated as general refuse**.
 - Thus, the government may need to re-examine the recycling process to implement all measures effectively.

21 | Implications from Food Dollar Series_1

- According to Canning (2011), we calculated **Food Dollar Series** i.e. **the distribution of food dollar consuming** in Chinese Taipei by using input-output data from 2001 to 2011.



22 | Implications from Food Dollar Series_2

- In 2011, farm share is 22.7% in Chinese Taipei, which means: the consumers spend NT100 on domestically produced food, **NT22.7 will be earned by farmers in Chinese Taipei.**
- **In comparison with the U.S. and Canada,** we found **regulations on food safety** are also main factors affecting farmers' value or costs.

2011 Marketing bill in Chinese Taipei



23 | Implications from Food Dollar Series_3

- Since the food regulations of the US and Canada are **stricter than** Chinese Taipei, **farm share** in Chinese Taipei(\$23) is **higher than** US(\$14) and Canada(\$17).

2011_Chinese Taipei_Marketing bill



2010_US_Marketing bill

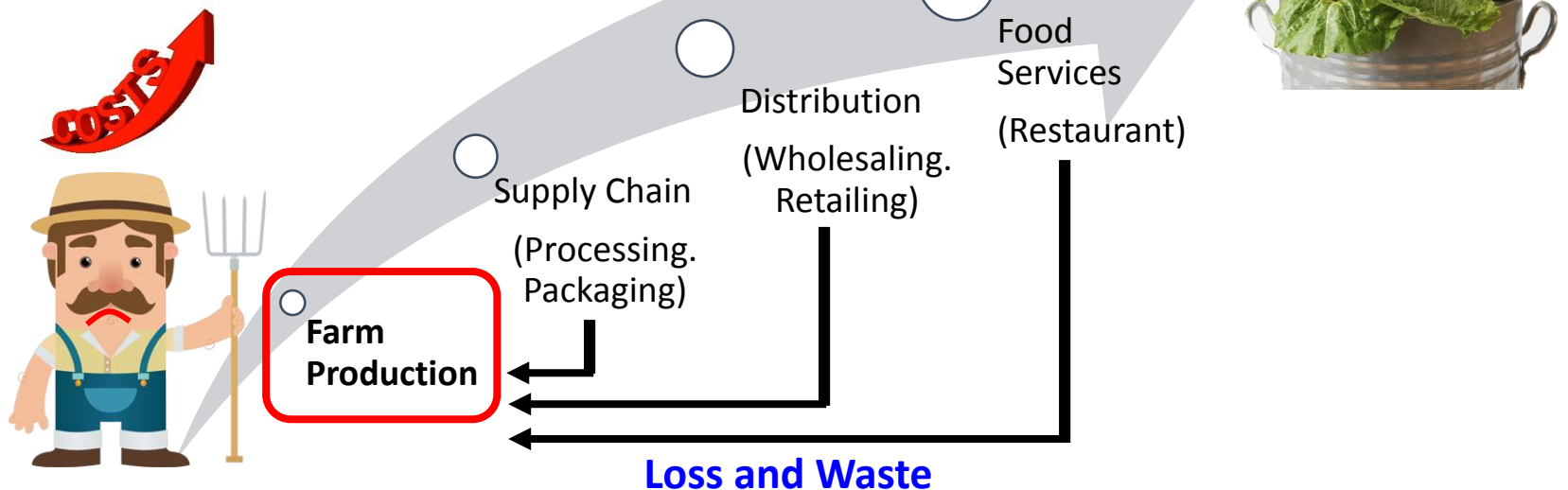


2010_Canada_Marketing bill



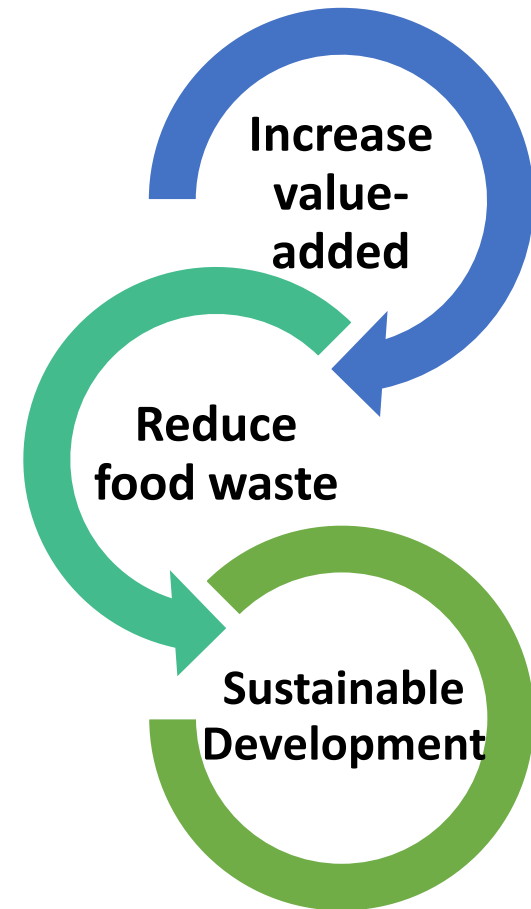
24 | Implications from Food Dollar Series_4

- It implies **loss and waste caused by downstream** will eventually **return to primary producers (farmers)** and thus, it will **increase farmers' additional costs**.
- Education, training and extension.



25 | Sustainable Development

- For the sustainability,
 - Through **value chain**, the most straightforward way for food supply chain industries to increase their profits is to **enhance the value-added**.
 - On the other hand, through supply chain, **reduce food waste** is another way for industries to make profits and increase social welfare too.
- What we can do is to choose more friendly way for sustainable industry and earth to **create more food value rather than food waste**.



Thanks for your listening!



**Asia-Pacific
Economic Cooperation**



National Taiwan University