



Asia-Pacific  
Economic Cooperation

# Existing International Efforts in Data Collection, Impact Assessment, and Reduction of Food Loss and Waste in APEC Region

PRESENTED BY

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# Outline

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- Introduction
- Existing international efforts to **collect data** of food loss and waste
- Existing international efforts to **assess impacts** of food loss and waste
- Existing international efforts to **reduce** food loss and waste
- Policy recommendations

# Outline

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- **Introduction**
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# Introduction

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- Food loss and waste have been defined in many ways, and disagreement remains over proper definition
  - Although the terms “postharvest loss,” “food loss,” “food waste,” and “food loss and waste” are frequently used interchangeably, they do not refer to the same aspects (Lipinski et al., 2013).
  - **Food loss:** Food that gets lost, spilled or spoiled before it reaches its final product or retail stage.
  - **Food waste:** Food that is of good quality and fit for human consumption but that does not get consumed because it is discarded either before or after it is spoiled.
- Due to data quality and availability, efforts to assess the impacts of food loss and waste are limited and could affect decision to reduce food loss and waste.

# Outline

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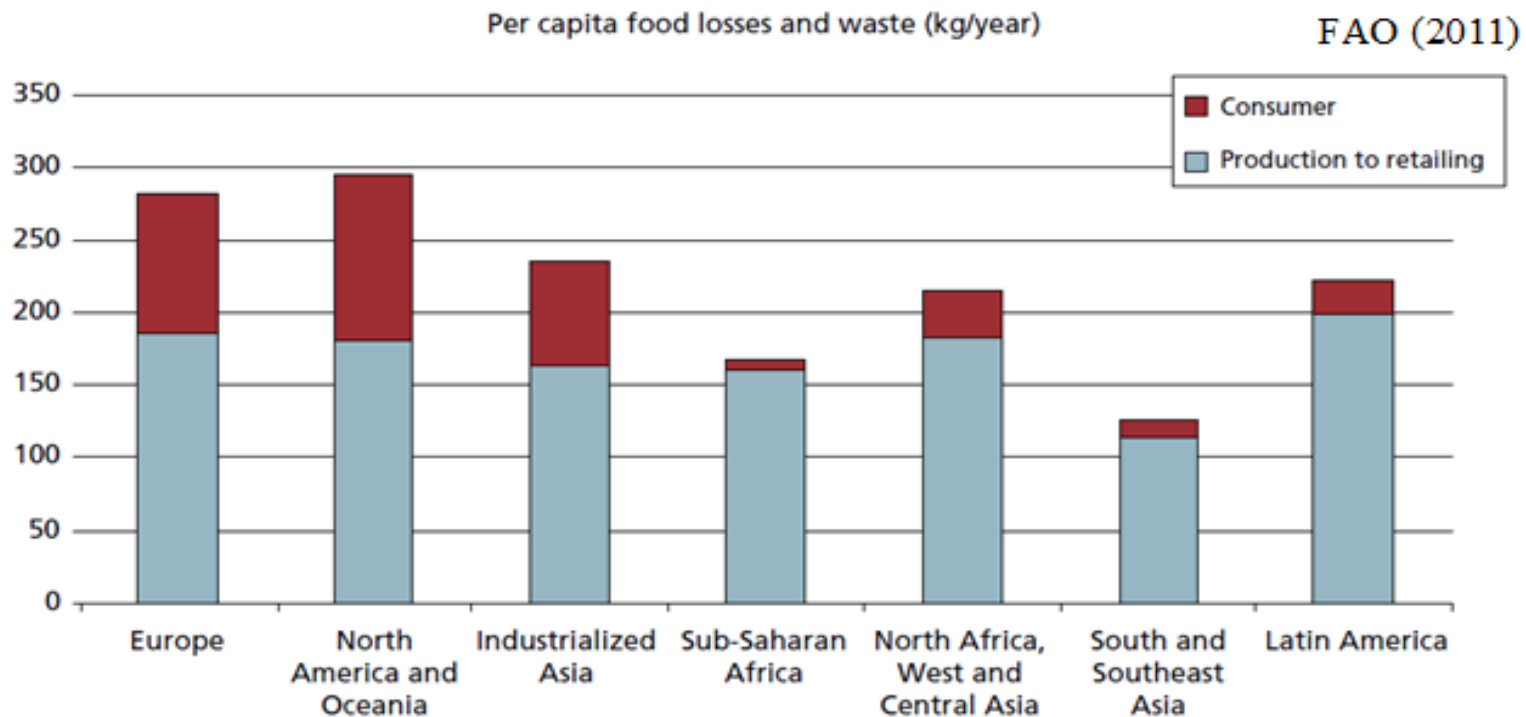
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# Existing international efforts to collect data of food loss and waste

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- At the international level, FAO is the main organization collecting the data

Per capita food losses and waste, at consumption and pre-consumptions stages, in different regions

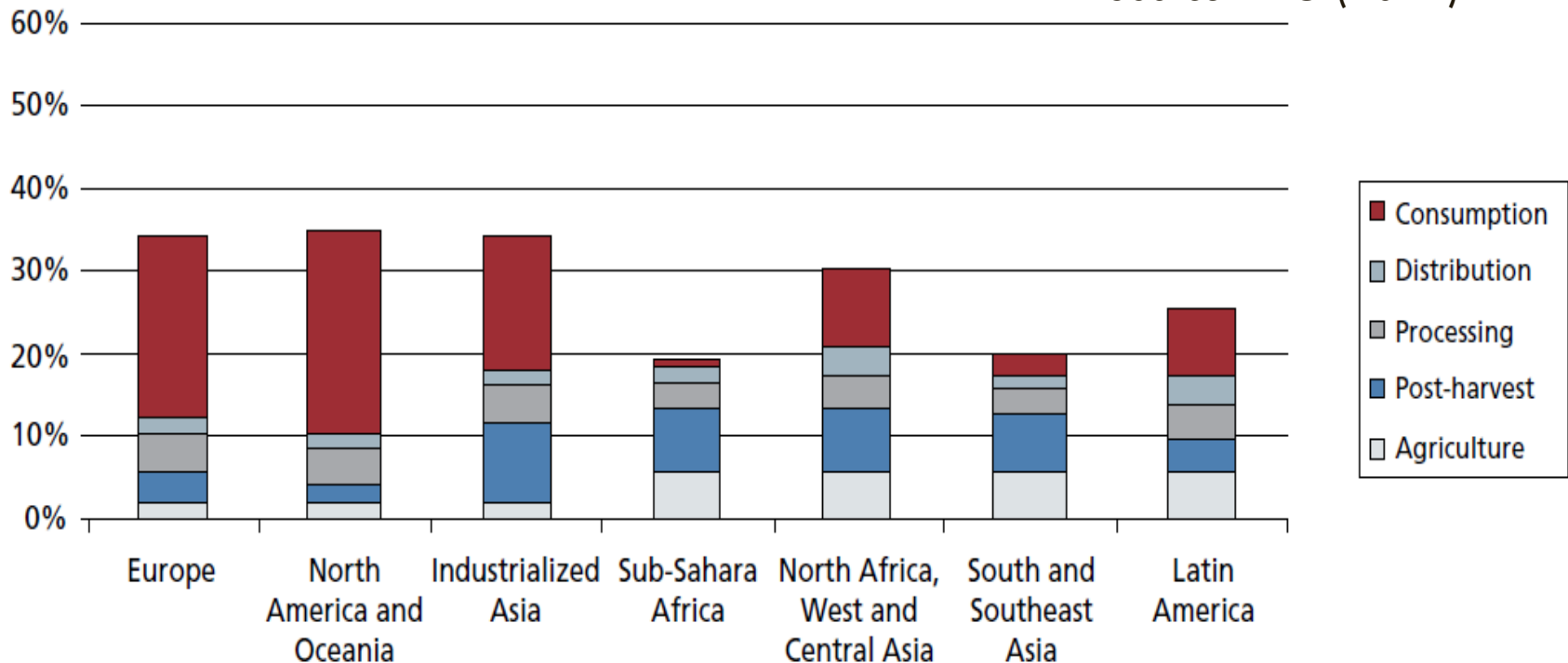


# Existing international efforts to collect data of food loss and waste

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Food losses - Cereals

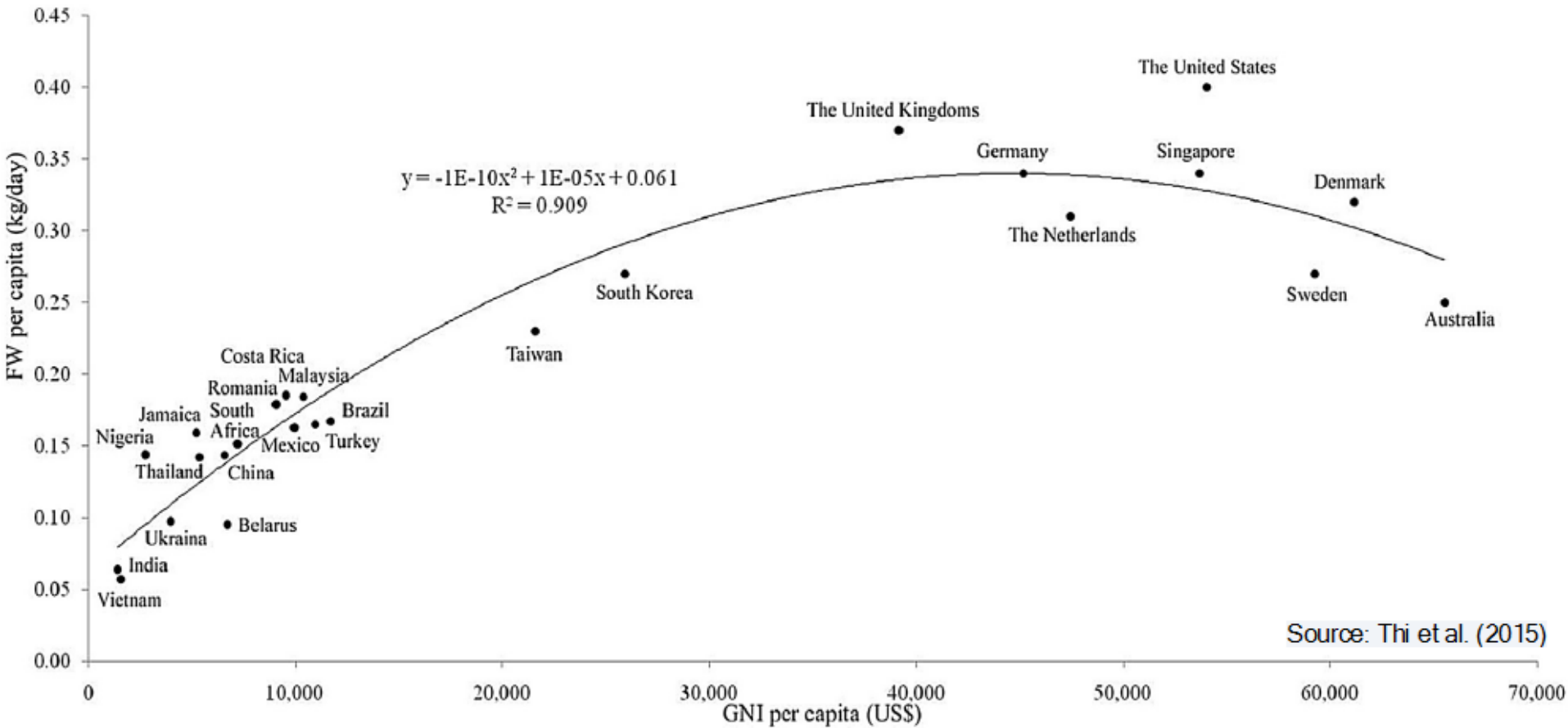
Source: FAO (2011)



- Wheat is the dominant crop supply in medium- and high-income countries.
- In low-income regions rice is the dominant crop, especially in South and Southeast Asia.

# Existing international efforts to collect data of food loss and waste

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Source: Thi et al. (2015)

Relationship between GNI per capita and FW per capita in some countries.

Non-linear relationship between food waste and income.



# Existing international efforts to collect data of food loss and waste

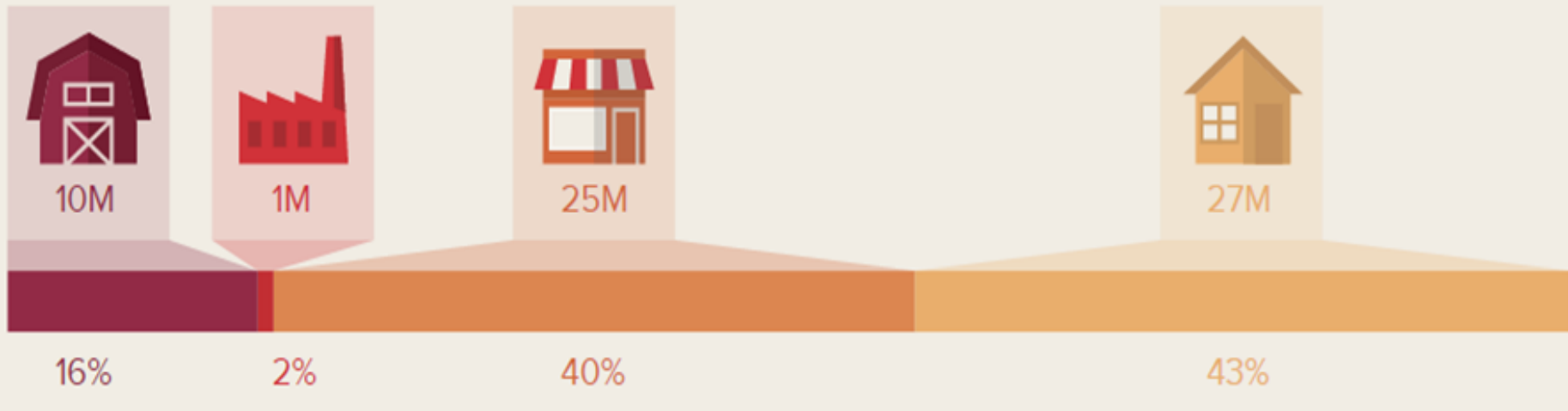
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- **At the national level, several countries have attempted to collect the data.**
  - **The United States:** ReFED, USDA and US EPA are main data providers.
    - The US waste up to 40% of food globally, which equals roughly 400 pounds annually for every American. Meanwhile, 1/7 Americans is food insecure.
    - The US spend over \$218 billion (1.3% of GDP) growing, processing, transporting, and disposing of food that is never eaten.
    - Approximately 31% of the overall food supply available to retailers and consumers is lost or wasted (ReFED, 2016).

# Existing international efforts to collect data of food loss and waste

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FOOD WASTED BY WEIGHT - 63 MILLION TONS



Source: REFED (2016) <http://refed.com/?sort=economic-value-per-ton>

Nearly 85% of food waste occurring downstream at consumer-facing businesses and homes!

# Existing international efforts to collect data of food loss and waste

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## ■ The Southeast Asia (SEA)

- A study concludes that the region wastes approximately 33% of food, but accurate estimates are not available due to a lack of quantitative information (Teng and Trethewie 2012) .
- A significant amount of food waste occurs within the production and post-harvest stages due to the domination of smallholder farmers.
- Asians tend to provide an abundance of food to guests, and at social or festive events .
- It is common to see food waste at buffets, where the all-you-can-eat concept see customers take more food than they can finish.

# Existing international efforts to collect data of food loss and waste

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- **Singapore:** National Environmental Agency is an important source of data.
  - Threw away about 0.68 million tonnes of food waste in 2011 and only 10% was recycled (130kg/person/year).
  - Supermarkets, manufacturers, and outlets do not reveal how much food waste they generate.
  - A survey finds that 6 out of 10 would buy more than what they need when shopping at supermarkets & 70% would throw away food that has been slightly expired by 1-3 days.

Source: <http://www.savefoodcutwaste.com/food-waste/food-wastage-in-singapore/>

# Existing international efforts to collect data of food loss and waste

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- **Thailand:** Pollution Control Department, Ministry of National Resource and Environment is the main data provider.
  - By analyzing the supply chain of vegetable for salad, OAE (2015) finds that the share of agricultural production loss is 15 percent followed by post harvest loss 9 percent, processing and packaging 25 percent, distributing and retailing 10 percent, and consumption 7 percent.
  - Pollution Control Department (2014) reports that a share of food waste is 64 percent of municipal solid waste.

Source: [http://www.pcd.go.th/info\\_serv/waste.html](http://www.pcd.go.th/info_serv/waste.html)

# Existing international efforts to collect data of food loss and waste

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- **Australia:** The Australian Waste Database (<http://awd.csiro.au>) is an important data source.
  - The majority of useful food waste data comes from organizations and groups currently disposing of this resource (Mason et al. 2011).
  - The National Waste Report estimates that food waste makes up approximately 1/3 of Municipal Solid Waste.
  - Tai (2005) asks 1,644 members of households across Australia and finds that \$5.2 billion was spent nationally in 2004 on food that was not consumed.
  - Existing studies, surveys and reports have noted a lack of consistency in data gathering, including differences in units of measurement, sampling and collection methods, as well as approaches to defining representative study areas.

# Existing international efforts to collect data of food loss and waste

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## ■ Malaysia:

- Solid Waste Corporation Management (2016) finds that every year, an average Malaysian household throws away more than one month's salary on food they don't eat, and it is estimated to be enough to feed 11 million people daily.
- Malaysians generated 15,000 tonnes was food waste daily and 20 percent of this food waste was avoidable.
- Watanabe et al. (2013) analyze the household waste in Selangor using the survey and indicate that unused food were found to be the largest items that consumers could reduce.

# Existing international efforts to collect data of food loss and waste

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- According to **SDG Target 12.3**,
  - “By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses”
  - Indicator 12.3.1: Global Food Loss Index (GFLI), measuring the total losses of agricultural commodities from the production to the retail level.
- There is a need for data collection, but we face with several limitations (FAO, 2015)
  - Case studies based on expert opinions focused on few products or stages of the value chain.
  - Lack of international guidelines on how to collect postharvest losses and waste data.



# Existing international efforts to collect data of food loss and waste

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- There is a need for data collection, but we face with several limitations (FAO, 2015) `(continue)
  - Complexity of measurement:
    - Along different stages of the value chain
    - Different statistical units & survey tools
    - Value chain changing with different food products
    - Value chain changing in developing & developed countries
  - Reliable nationally representative data on losses are generally not available (4.4% official data reported yearly in FAOSTAT)

# Existing international efforts to collect data of food loss and waste

Source: FAO (2015)

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Proportion of data on losses collected from state agencies and publications (in %), 1990-2012

Food Group	Sub-Saharan Africa	North Africa, Middle East	Latin America	Industr. countries	East Europe, Central Asia	Asia & Pacific	World
Cereals	0.4	7.8	12.1	37.4	19.7	11.8	13.4
Roots & tubers	0.2	4.3	6.6	25.1	21.3	6.4	6.2
Sugar crops	0.0	6.5	7.8	13.0	0.0	3.9	4.4
Pulses	0.1	0.0	9.1	3.3	2.0	0.0	2.8
Tree nuts	0.0	0.0	14.3	2.5	0.0	0.0	2.3
Oil crops	0.0	0.6	7.9	4.2	4.7	2.1	3.1
Vegetables	0.7	0.0	3.6	3.9	5.9	0.0	2.4
Fruits	0.3	0.1	5.6	3.8	8.0	0.0	3.0
Stimulants, spices	0.0	0.0	8.4	0.0	0.0	0.0	2.0
Milk	0.0	0.0	4.8	15.3	0.0	0.4	2.0
Eggs	0.6	0.0	3.6	17.9	17.0	0.0	4.7
Meat	0.0	0.0	40.6	30.0	19.0	0.0	21.7
<i>Total</i>	<i>0.3</i>	<i>0.9</i>	<i>6.9</i>	<i>7.5</i>	<i>8.1</i>	<i>2.2</i>	<i>4.4</i>

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# Existing international efforts to assess impacts of food loss and waste

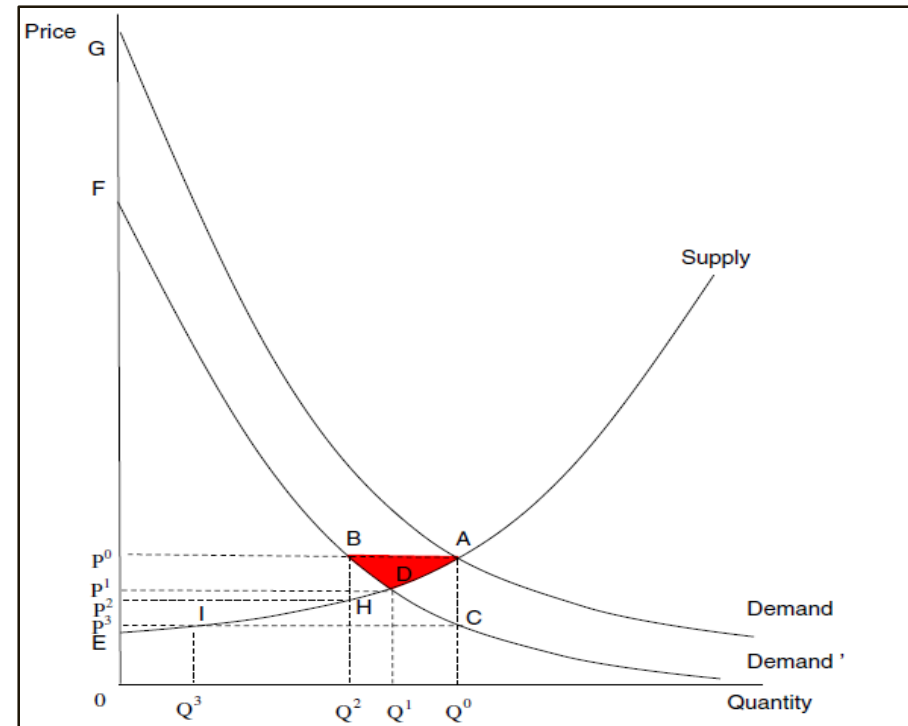
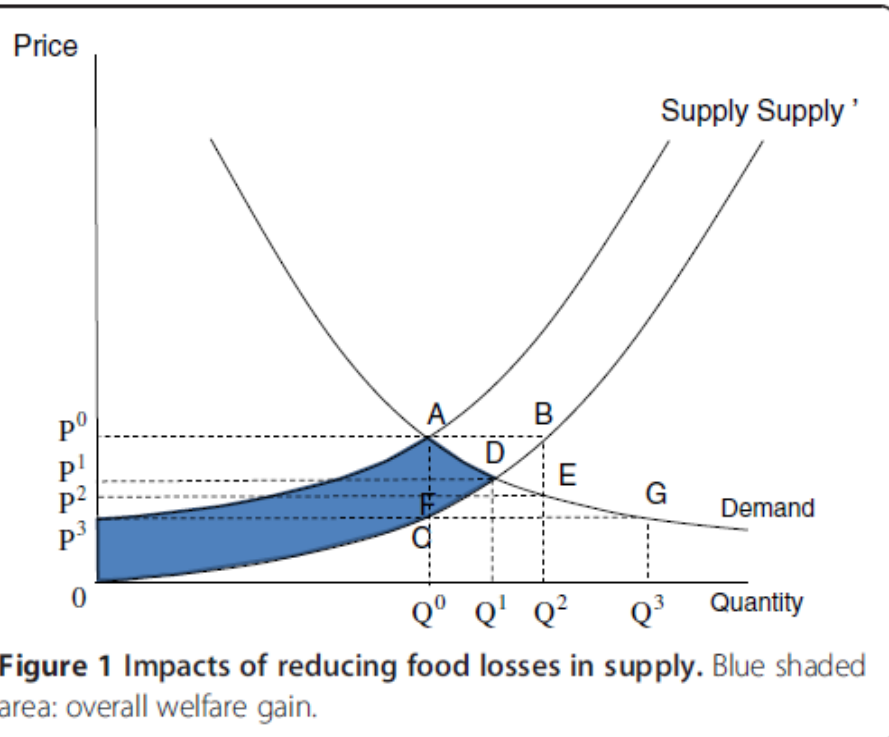
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- Food loss and waste significantly affect economic, environmental and human resources plus a range of actors.
- However, the impacts of reducing food losses and waste have, so far, not been investigated in detail due to the absence of reliable and consistent international data.
- Given the lack of applied studies, literature has been focusing on expressing food loss and waste in terms of the value of the resources (land, water) embodied in the output, or the negative external effects that could have been avoided.
- However, this only says something about the scale of the problem, not the actual impacts, as it ignores interactions between demand and supply, the role of the price mechanism (Rutten, 2013).

# Existing international efforts to assess impacts of food loss and waste

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- Using the demand-supply framework, Rutten (2013) provides insights into the effects that are likely to occur if food losses and waste were to be reduced



# Existing international efforts to assess impacts of food loss and waste

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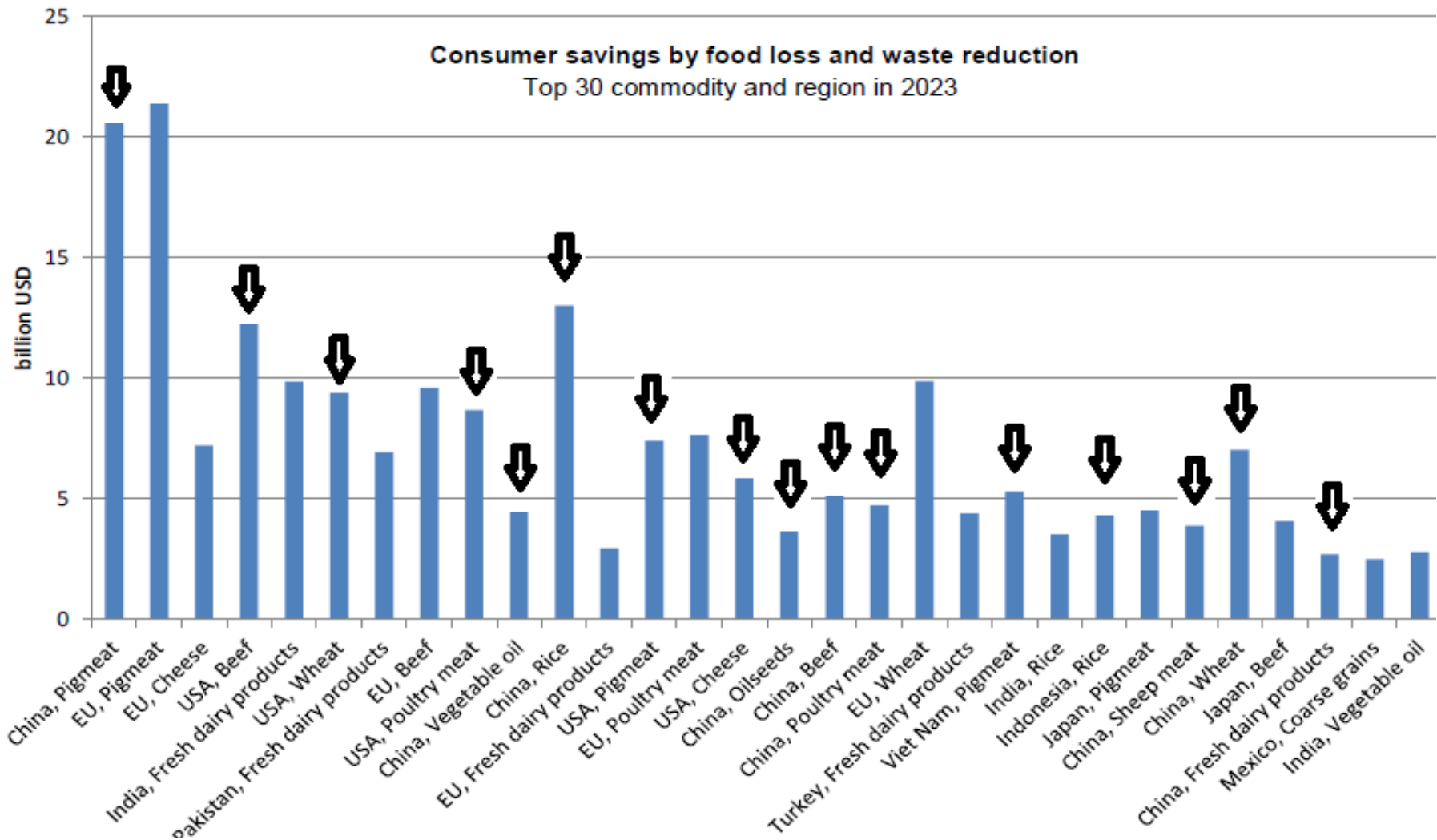
- Okawa (2015) analyzes the market and trade impacts of food loss and waste reduction, based on the latest projections for world and national agricultural markets provided by the Aglink-Cosimo model for the ten-year period 2014-23.

Food loss and waste reduction scenarios using Aglink-Cosimo

Region	Commodity	Stages of food supply chain concerned	Timeframe	Reduction level
All	All	All	2014-2023	20%
North America, Europe including Russia, Turkey, Iran, North Africa	Cereals	Distribution-Consumption	2014-2023	20%
Developed countries	Meat and dairy products	Distribution-Consumption	2014-2023	20%
Developing countries	Cereals and oilseeds	Agriculture production-Processing and packaging	2014-2023	20%

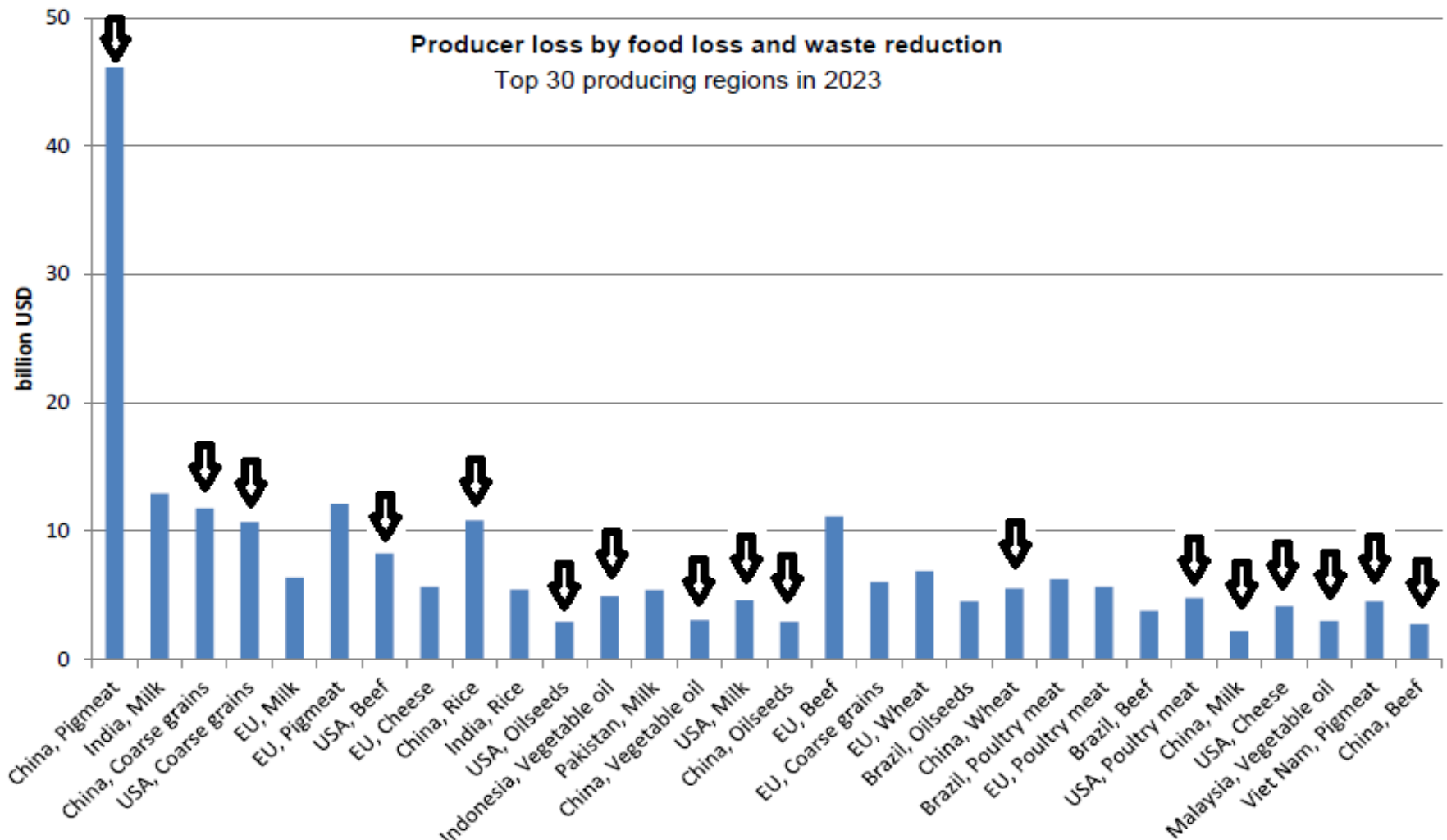
# Existing international efforts to assess impacts of food loss and waste

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Source: Okawa (2015)

# Existing international efforts to assess impacts of food loss and waste



Source: Okawa (2015)



# Existing international efforts to assess impacts of food loss and waste

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- Using an econometric analysis , Rosegrant et al. (2016) find that investment in infrastructure for postharvest loss reduction leads to food prices↓, food availability↑, and food security↑.
- Munesue et al. (2015) find that by reducing the levels of food loss and waste by up to 50% in developed regions,
  - Undernourished people will decrease by 63.3 million in developing regions with 25.8 million in Southeast Asia, 20.5 million in Eastern Asia and 10.6 million in Sub-Saharan Africa.
- The Natural Resources Defence Council estimates that if food losses could be decreased by 15% there would be enough food to feed up to 25 million Americans each year.

# Existing international efforts to assess impacts of food loss and waste

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## □ The United States

- In September 2015, US EPA and USDA announced a national goal to reduce food waste by 50% by the 2030.
- ReFED was formed in early 2015 to create a *Roadmap to Reduce U.S. Food Waste*, the first ever national economic study and action plan driven by a multi-stakeholder group.
- Implementing the *Roadmap* is projected to generate
  - 15,000 new jobs;
  - double recovered food donations to nonprofits (1.8 billion meals/year);
  - reduce up to 1.5% of freshwater use; and
  - avoid nearly 18 million tons of greenhouse gas emissions annually

Source: ReFED (2016)

# Existing international efforts to assess impacts of food loss and waste

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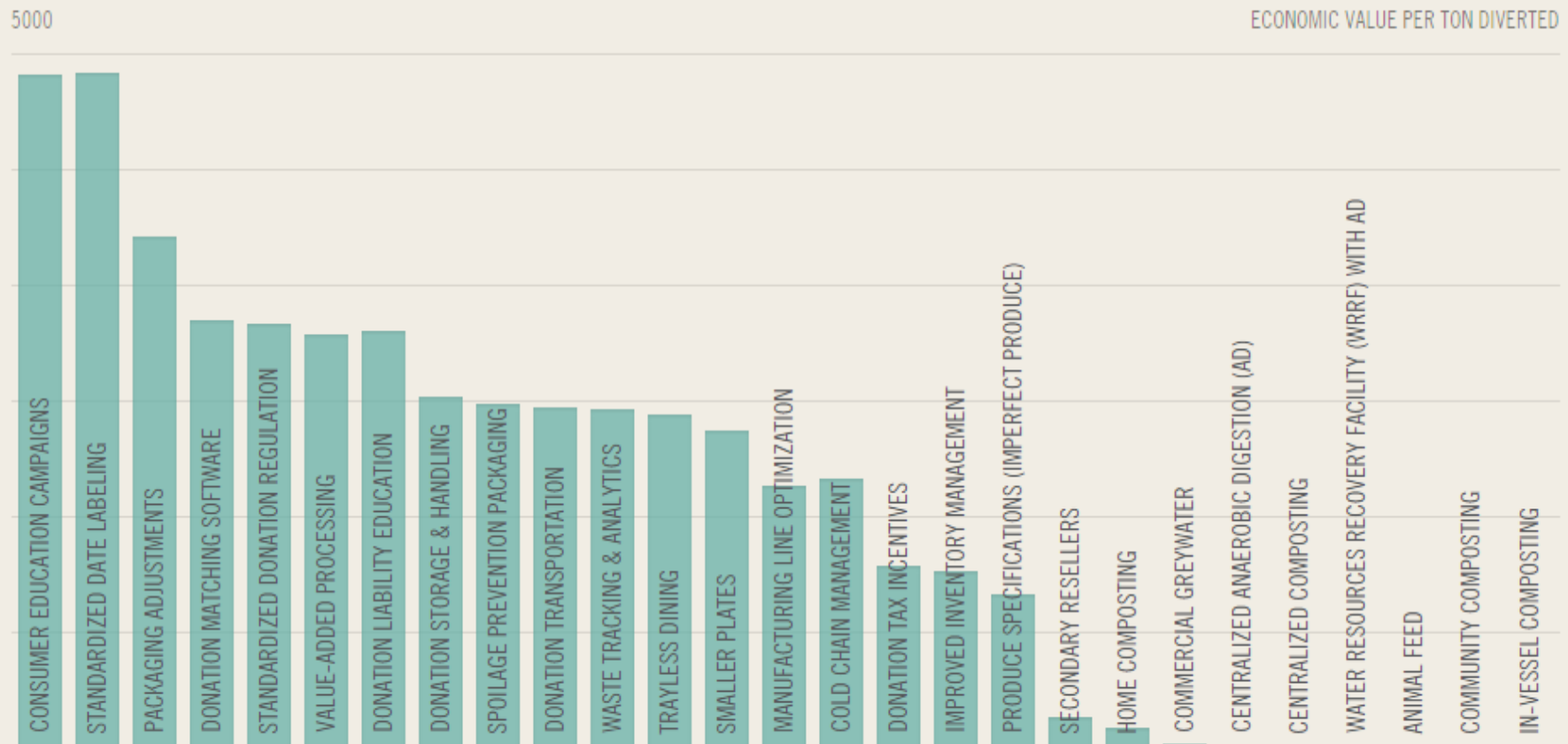
## □ The United States (continue)

- ReFED is projected to provide the biggest benefit to consumers (\$5.6 billion annually)
- Restaurants and foodservice providers could gain over \$1.6 billion annually by adopting Waste Tracking & Analytics, Smaller Plates, and other solutions.
- Economic value per ton diverted in each activity is also assessed.

# Existing international efforts to assess impacts of food loss and waste

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The aggregate financial benefit to society (consumers, businesses, governments, and other stakeholders) minus all investment and costs per ton of food waste diverted. It shows the amount of benefit received per ton of reduction and is calculated as the Economic Value per Ton.



Source: ReFED (2016)

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# Existing international efforts to reduce food loss and waste

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- Reducing food loss and waste need participation from all stakeholders.
- In the past, many of the efforts that have been undertaken to combat are localized and civil society-led, but few initiatives exist at the national and regional level.
- At global level, FAO coordinates the initiatives, activities and projects by partnering with UN agencies, other international organizations, and worldwide stakeholders.
- The Global Initiative on Food Loss and Waste Reduction (also known as *SAVE FOOD*), launched jointly by the FAO and the private sector trade-fair organizer in 2011, is the largest worldwide initiative to fight food loss and waste.

# Existing international efforts to reduce food loss and waste

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## □ Southeast Asia (SEA)

- Effective interventions to prevent and minimize food waste is not widely implemented in the SEA region.
- Relatively few initiatives have been established at the retail level, but some supermarkets have adopted strategies to address food loss and waste.
  - Selling food that has passed its “best before” date at discounted rates.
  - Engage in food redistribution with local associations or participate in awareness campaigns.

# Existing international efforts to reduce food loss and waste

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## □ The United States

### THE ROADMAP'S FOOD WASTE REDUCTION GOALS



Source: ReFED (2016)



# Existing international efforts to reduce food loss and waste

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- MANUFACTURERS should collaborate with retailers on
  - Packaging Adjustments,
  - Spoilage Prevention Packaging, and
  - Standardized Date Labeling.
- RESTAURANTS & FOODSERVICE should
  - Adopt Waste Tracking & Analytics
  - Incorporate Imperfect Produce into menus to reduce costs and
  - shift consumer behavior with Smaller Plates.
- GROCERY RETAILERS should
  - Collaborate with retailers and manufacturers to adopt Standardized Date Labeling to benefit consumers.

# Existing international efforts to reduce food loss and waste

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- Malaysia
  - Setting up the MYSaveFood initiative and informs everyone that everyone wastes.
  - Initiatives by other agencies such as the Lost Food Project introducing a food surplus collection service in partnership with Jasons Food Hall that pools together products and delivers to five charities twice a week (Albakri, 2016).
  - Chin (2015) finds the *formal contractual agreements* between retailers and suppliers, wholesalers and processors have reducing post-harvest loss.

# Existing international efforts to reduce food loss and waste

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## □ Thailand

### ■ Government (Ministry of Agricultural Cooperative)

- Added the Agricultural Development Plan in the 11<sup>th</sup> National Economic and Social Development Plan (2012-2016) to improve supply chain, cool chain, public-private partnership in logistics.
- Launched the strategic framework for food security (2013-2016)
- Operate the Save Food Network project with the FAO in 2015

### ■ Government (Ministry of Education)

- Launched the Save Food Campaign for Schoolchildren with FAO

### ■ Government (Ministry of Natural Resource and Environment)

- Working on the Roadmap for waste management with 3Rs

# Existing international efforts to reduce food loss and waste

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- Thailand (continue)
  - Private sector (Charoen Pokphand Foods (CPF) PCL)
    - Implements the CPF's Product Sustainability project to reduce food loss and waste by considering product life cycle assessment.
    - For example, the company used 12,000 tons of agricultural residues to produce electricity of 54 million KW-hour and can reduce GHG emission up to 38,000 CO<sub>2</sub> ton-equivalent
    - Reuse the cooking oil to produce Biodiesel for the transportation sector.

# Existing international efforts to reduce food loss and waste

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- Thailand (continue)
  - Private sector (Tesco Lotus )
    - Implements the strategies “from farm to table” by direct sourcing farm products from farmers.
      - Example: improving tomato shelf life from 5 to 6 days
    - Donate unsold food to those who need food and promote food waste and loss campaign.
  - Private sector (Royal Project Foundation Bangkok)
    - Improve packing methods to reduce the food damage from transportation.
    - Change the transportation method and packaging
    - Sell no fresh-looking food with discounted price
    - Donate food to child cares and animal zoos.

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# Policy Recommendations

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- Agree on scope of food loss and waste's definition (global level and state level)
- Agree on protocols for measure (all levels), collect data, and promote transparency and corporate social responsibility (all levels)
- Due to data availability in low- and middle-income countries, the methodology used should be applicable across multiple crops and regions.
- Investigate opportunities to improve data collection and reporting on pre- and postconsumer food waste by businesses and food charities
- Deal with companies to make the data of food waste and loss publicly available to researchers or policymakers. Thus, there is a strong need for more transparency.

# Policy Recommendations

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- Increasing consumer awareness on the benefits of supporting local agriculture could change buying preferences.
- Educating consumers on reducing food waste by buying less “attractive” produce.
- Supermarkets could offer reduced prices for less attractive produce, and increase the participation of farmers otherwise could not adhere to quality standards.
- Incentivize the development and use of improved food storage, transport and packaging in traditional supply chains.
- Modify policies, such as higher fees for the disposal of food and tax incentives, to reduce and prevent retail and consumer food waste in urban environment.



# Policy Recommendations

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- It is essential to extend food supply chains beyond the existing endpoint (i.e., consumers).
  - Redistributing edible wasted food to the food insecure.
  - Supporting civil society projects to collect unsold or unconsumed food from retailers, the hospitality industry, communities and households for the purpose of such redistribution.
  - If the unused food is inedible for humans, options to turn the food into energy and agricultural inputs should be explored.

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**THANK YOU**

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