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SAVE FOOD



INTRODUCTION

Global Food Losses and Food Waste

1.3 billion ton
(1 300 000 000 000 kg)



1 / 3



History of FLW action

1950 – 1970. Focus of agricultural development on primary production.

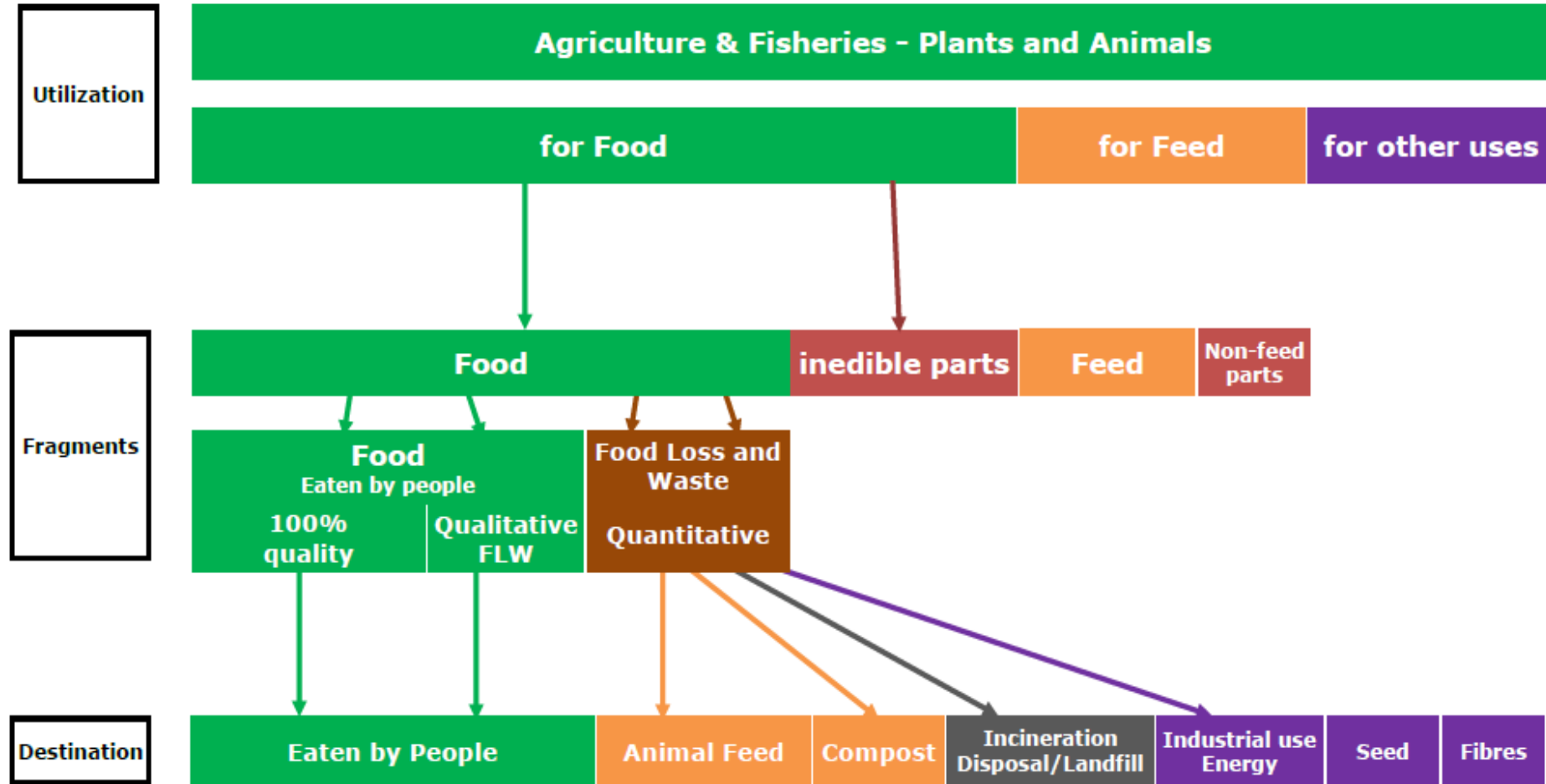
1970 – 1990. Development of ‘food technology’ as a science, implemented as ‘postharvest technology’. ‘Action Programme for the Prevention of Food Losses (PFL)’.

1990 – 2010. Accelerated development and introduction of the ‘Quality Management’ concept and ‘Logical Framework’. Application of the ‘Value Chain’ approach. ‘Special Programme on Food Security (SPFS)’.

2010 – . Climate change on top of the political agenda, relation with energy-/ natural resource efficiency and FLW is made. The 2011 study ‘Global Food Loss and Food Waste’ and the Düsseldorf Save Food Conference introduced Food Waste to FAO vice-versa.



DEFINITIONAL FRAMEWORK OF FLW



DEFINITIONAL FRAMEWORK OF FLW

Quantitative FLW can also be referred to as **physical FLW**. It is food which is not eaten by people.

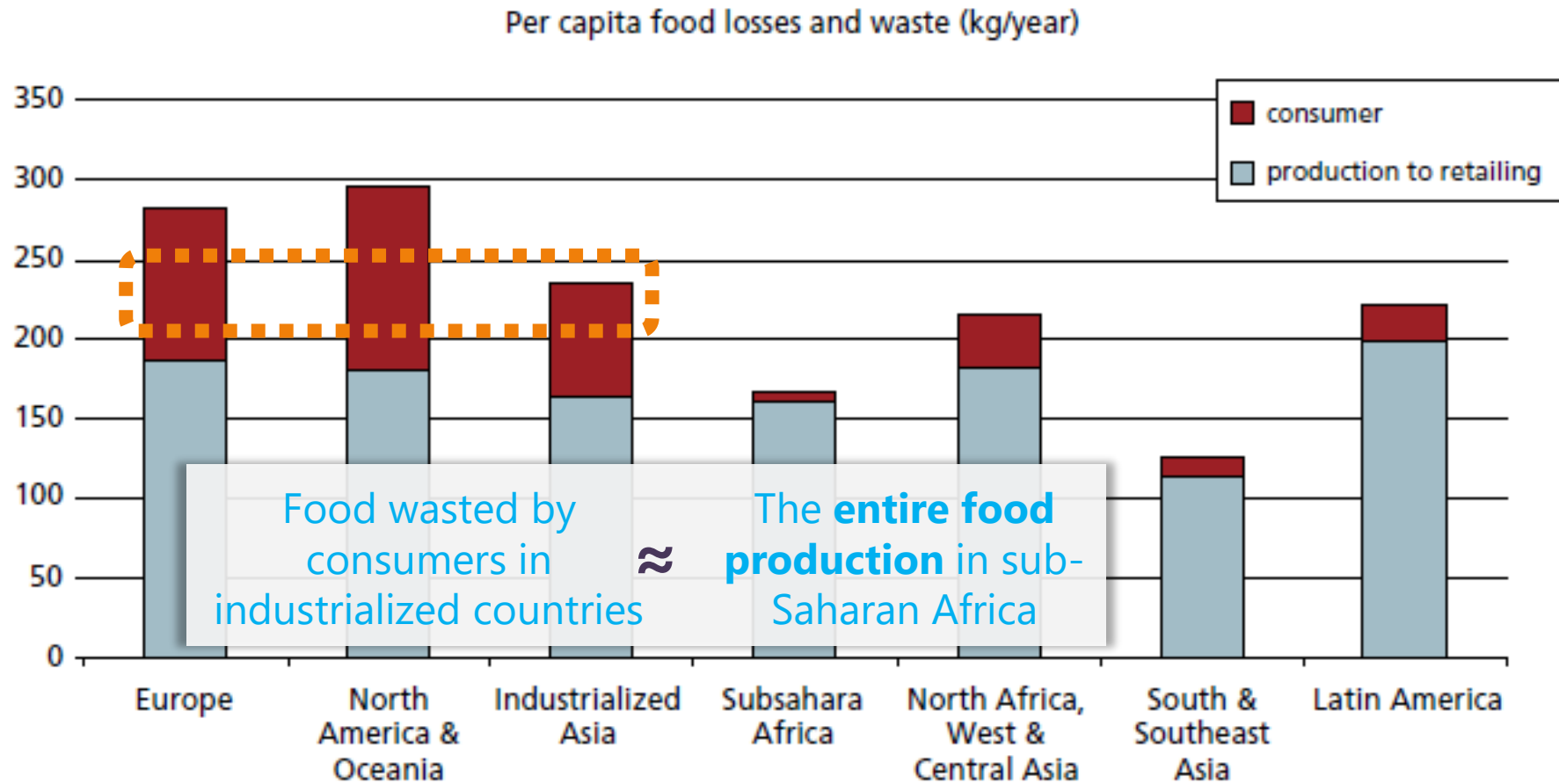
Qualitative FLW: All the produce is eaten by people, but has incurred reduction of nutritional value, economic value, and/or food safety.

Food Loss is mainly caused by the malfunctioning of the food production and supply system or its institutional and legal framework..

Food Waste is the removal from the FSC of food which is fit for human consumption, by choice, or which has spoiled or expired, mainly caused by economic or social behaviour, poor stock management or neglect.



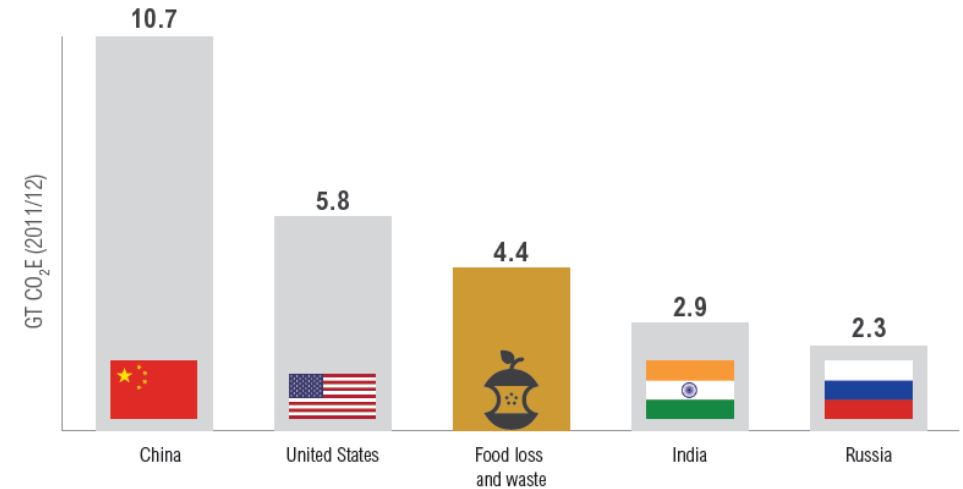
Figure 2. Per capita food losses and waste, at consumption and pre-consumptions stages, in different regions





FLW & THE CONNECTION TO CLIMATE CHANGE

- **FLW: a major contributor to climate change**
~ 8% of global GHG emissions
- **GHG emissions of FLW are generated at each stage of the food system (such as land preparation, livestock, fertilizers, energy inputs along the value chain and waste disposal)**
- **FLW = misuse of natural resources (water, land, inputs, etc)**
- **FLW = indirect impacts on ecosystem degradation, deforestation, biodiversity loss**
- **Changing climate: Increase in droughts, other natural disasters, pests and diseases → more impacts on food losses at pre- and post-harvest level**



PUBLICATIONS



**SAVE FOOD FOR
A BETTER CLIMATE**
CONVERTING THE FOOD LOSS AND WASTE
CHALLENGE INTO CLIMATE ACTION



Why is FLW important?

Food Security Impact of FLW

Who are affected?

- Poor smallholder food producer – especially women, direct food access
- Poor food insecure consumer – higher prices
 - ✓ Increased supply and cost reductions of production be translated into price reductions

Impact on nutrition, food quality and safety

- Qualitative food losses - reduced nutritional value
- Unsafe products

Economic impact and income-distribution in the value chain

- Market circumstances
- Where in the supply chain are losses reduced
- Improvement in the efficiency of supply chains benefits both producers and consumers



Why is FLW important?

To increase food availability, food loss and waste reduction is in principle far more efficient than increasing food production.

By 2050 need for 60% more food available:

When halving FLW, only 28% increase of production required.





Food and Agriculture Organization
of the United Nations



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”



Global Initiative
on Food Loss and Waste Reduction



The FBS is a time-referenced food accounting framework whereby supply equals utilisation (in quantities):

$$\textit{Supply} = \textit{Production} + \textit{Imports} - \Delta\textit{Stock}$$

$$\textit{Utilization} = \textit{Food} + \textit{Feed} + \textit{Seed} + \textit{Industrial Use} + \textit{Residual Other Use} + \textit{Exports}$$

$$\textit{Food Loss} = \textit{Supply} - \textit{Utilization}$$

- **Loss** does not refer exclusively to the **Food** component





Food Loss Index (FLI)

The FLI is calculated on a quantity basis by country, on an annual frequency.

**Laspeyres
quantity index**

$$FLI_{ijt} = \frac{\sum_i p_{i0} * q_{ijt}}{\sum_i p_{i0} * q_{ij0}}$$

where: p_{i0} = 2004-2006 average international price (\$) for the commodity i
 q_{ijt} = loss quantity (tons) for the commodity i in the country j at time t
 q_{ij0} = loss quantity (tons) for the commodity i in the base period (2005)



Save Food: vision and strategy

FLW reduction not a goal in itself:

Essential part of the creation of *efficient value chains*, which are the core of *sustainable food systems* which provide *food and nutrition security*, *economic growth* and *climate change mitigation*.

Integrated multi-disciplinary programme –

technology, economics, sociology, ecology, nutrition.

FLW problem extremely complicated – Research must be thorough, practical and innovative.



Save Food: vision and strategy

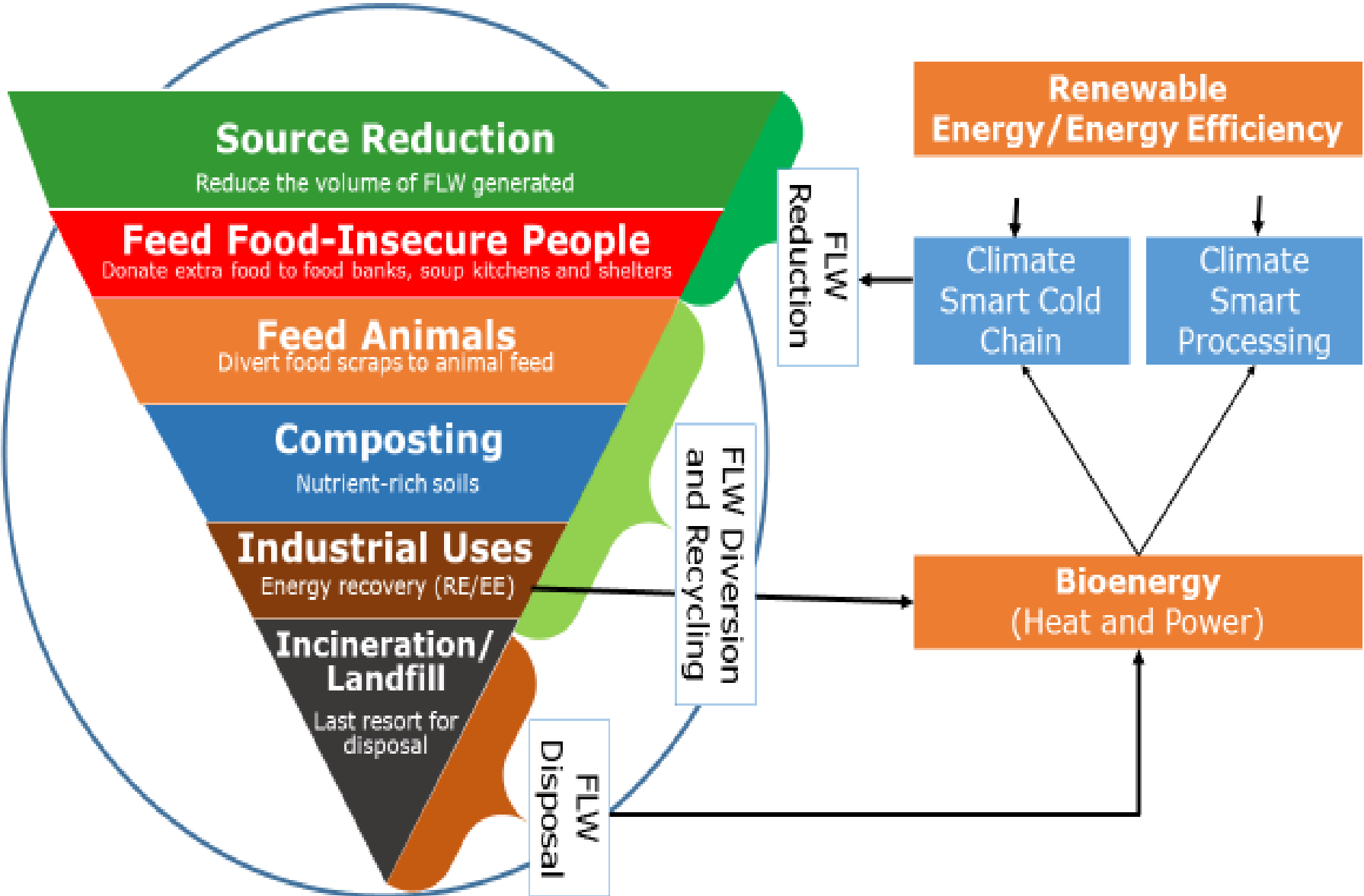
FLW problem extremely vast – Implementation world-wide by partners.

Only the Private Sector can reduce food losses at a significant scale.

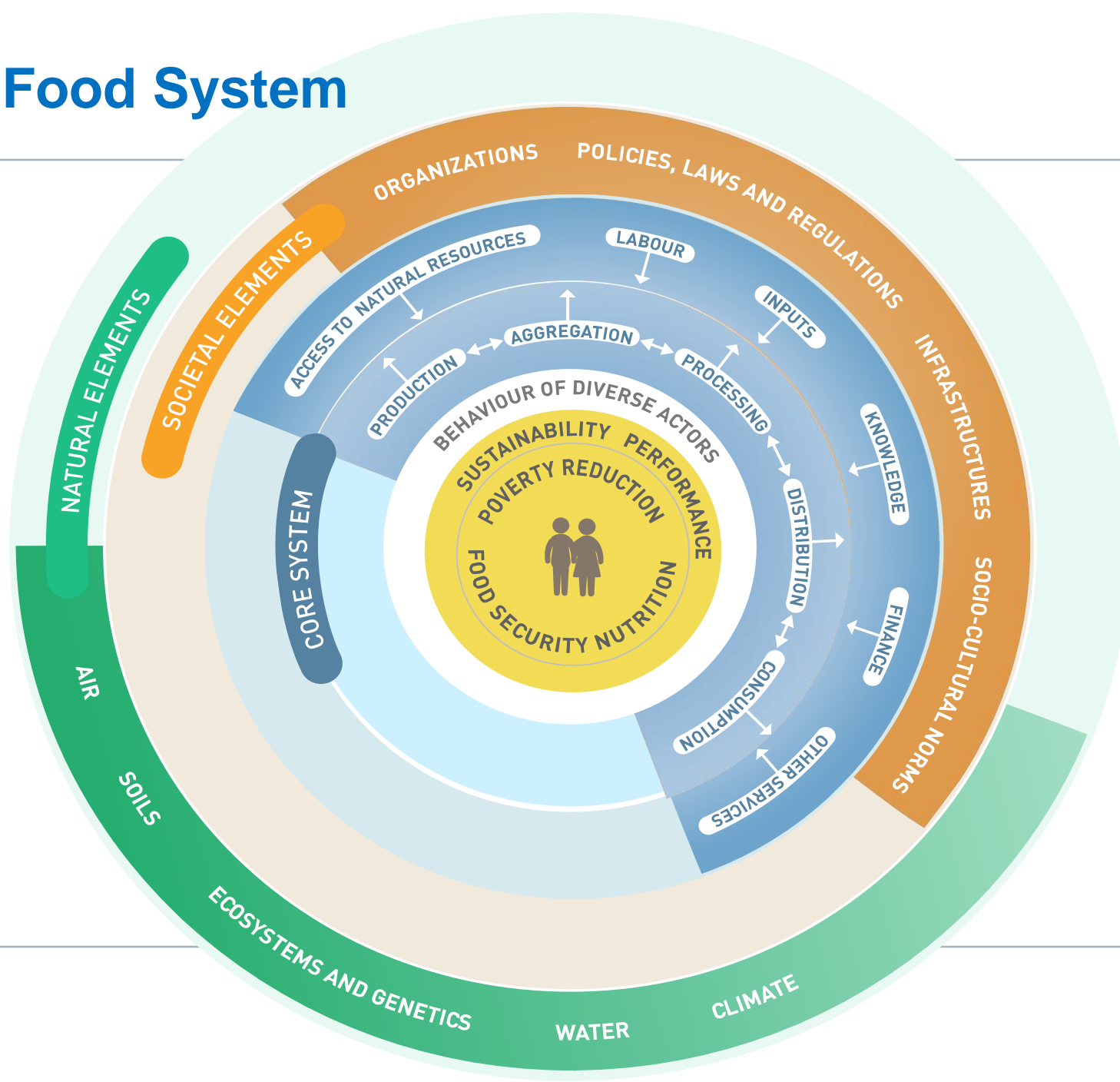
The Public Sector does research and provides guidance. It creates the enabling environment for the Private Sector to **invest** and act.

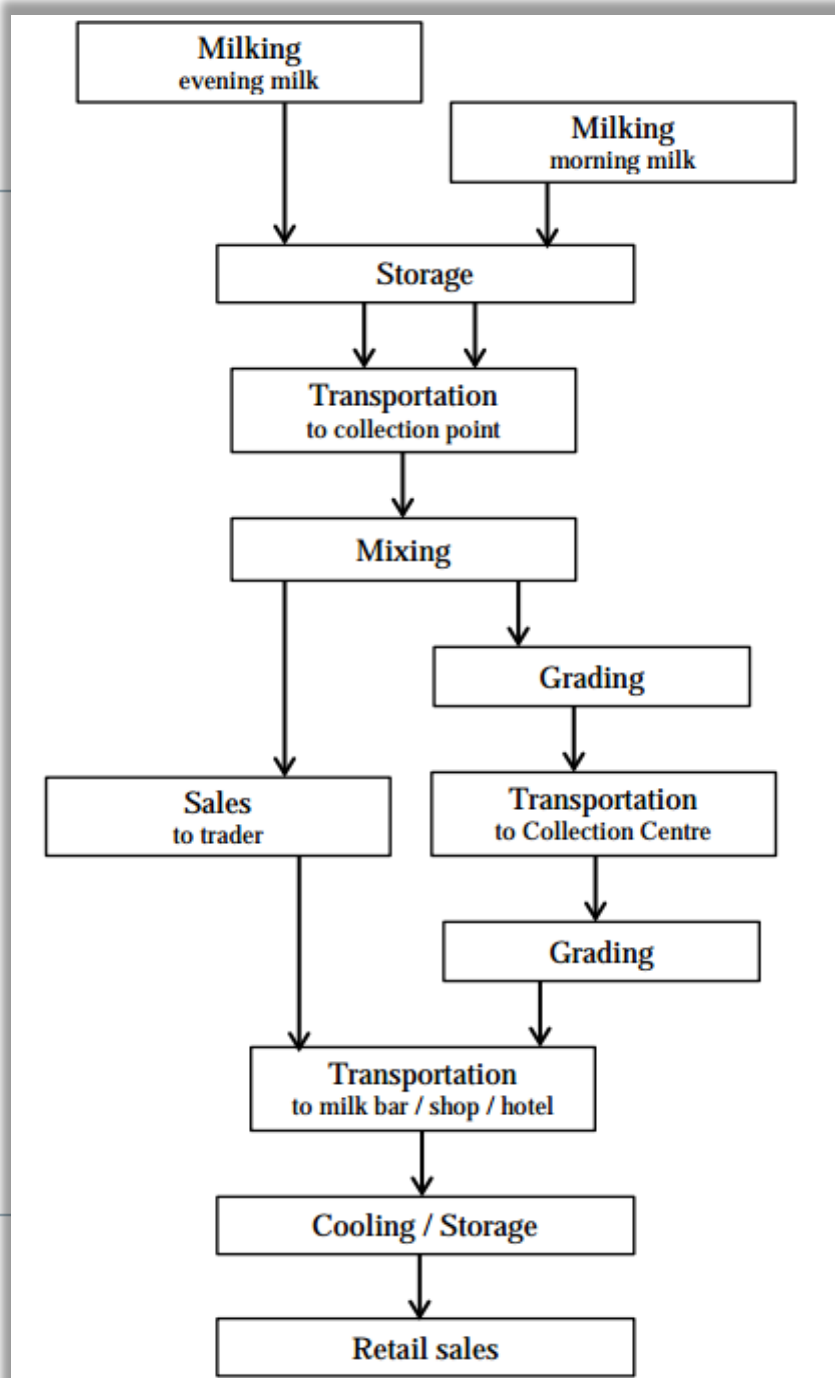


Food-use-not-waste hierarchy



Sustainable Food System





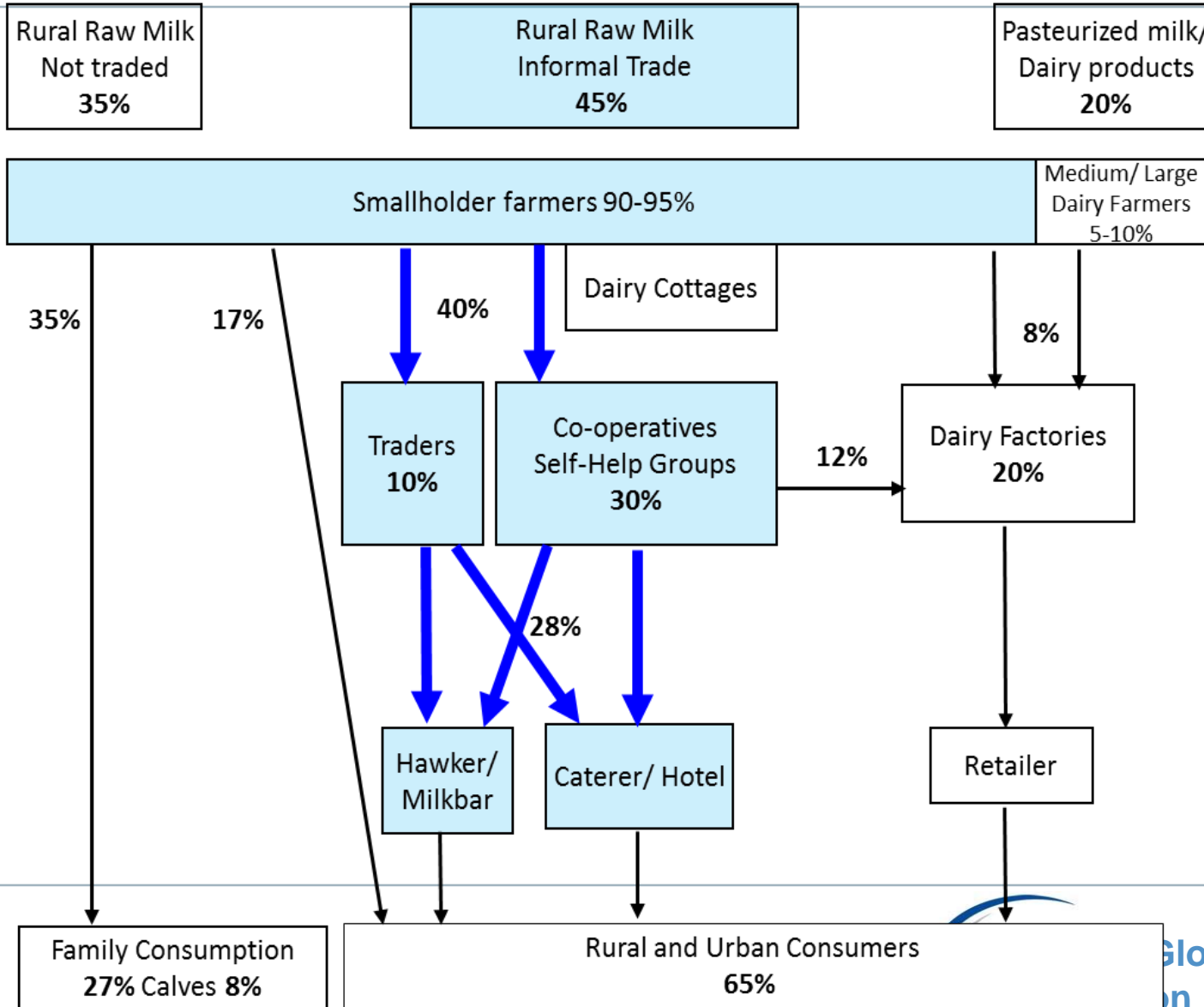
Value Chains

Re-emphasize the integrated Value Chain approach.

cause and effect relations;

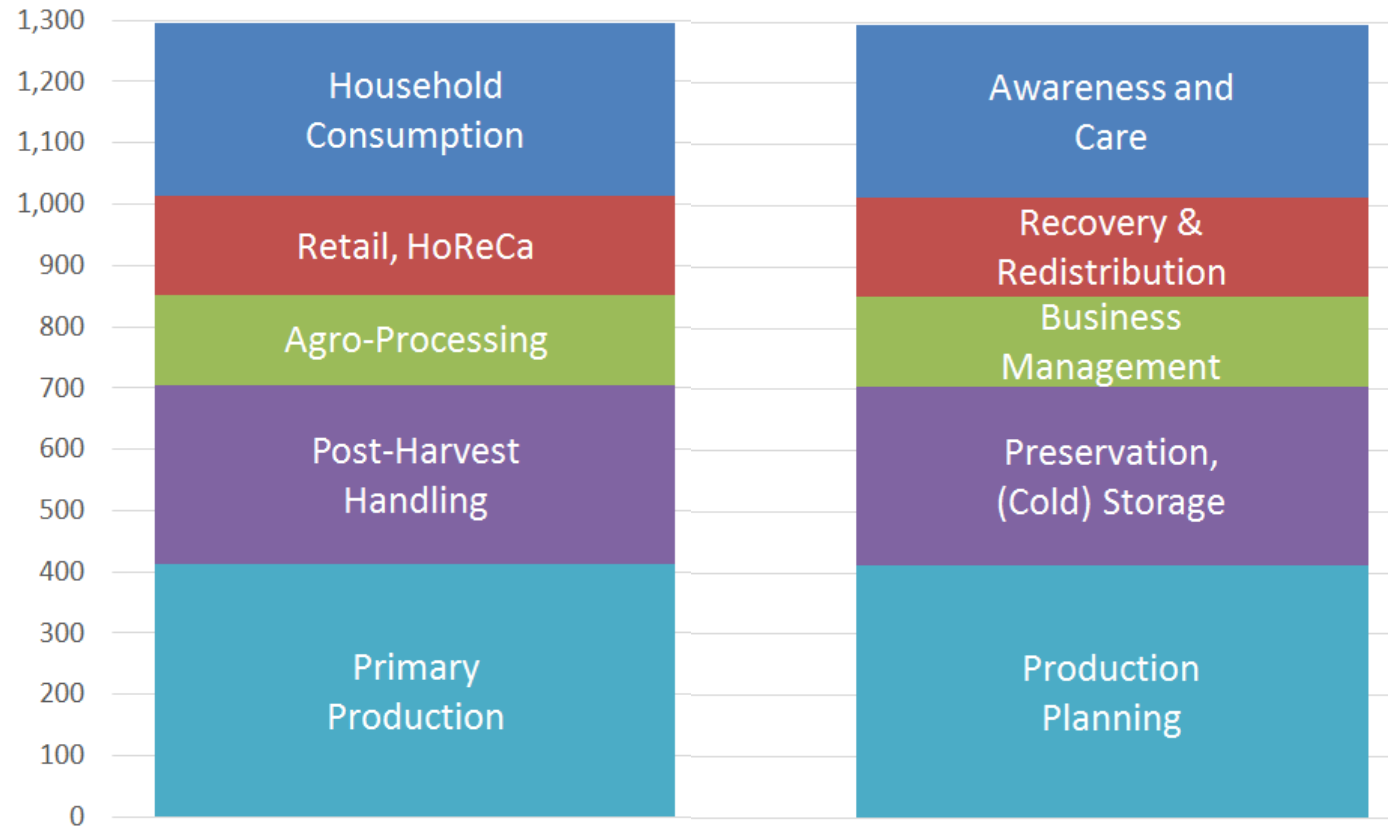
socio-economic impacts (e.g. income distributions).





Supply
chain
actors

Global Food Loss and Waste (million tons)
in the Food Supply Chains





CONSIDERATIONS ON SOLUTIONS

- Not be more **expensive** than food loss itself.
- Not place a higher burden on the **environment** and GHG emissions.
- Make more food available to the **people that need it most**.
- Be **socially and culturally** acceptable.





DEFINITION OF FOOD RECOVERY AND REDISTRIBUTION (R&R)

- **Recovery** is to receive, with or without payment, food (processed, semi-processed or raw) which would otherwise be discarded from the agricultural, livestock, forestry and fisheries supply chains of the food system.
- **Redistribution** is to store and/or process and then distribute the received food pursuant to appropriate safety, quality and other relevant regulatory frameworks directly or through intermediaries, and with or without payment, to those having access to it for direct food intake.





Improving collaboration and cooperation among FSC actors - UK

The Gleaning Network campaign, through Feedback (UK), coordinates volunteers, producers and food redistribution charities to feed people in need. It does so by establishing relationships between farmers and beneficiaries as well as partnerships with national and local charities and social enterprises.

More info:

<http://feedbackglobal.org/campaigns/gleaning-network>





Policy incentives for food donation - Mauritius

The food-sharing project Manzer Partazer provides food donors with a liability disclaimer that protects them from any risk of legal implication due to food safety issues - that are under the responsibility of the redistributor after the donation up to the consumer level. This measure encourages hotels, restaurants and caterers, supermarkets and bakeries to donate food and cut down waste disposal costs.



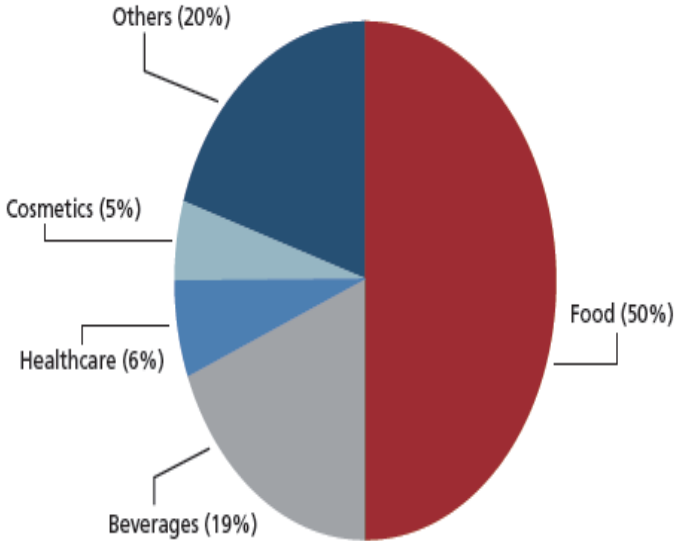
TECHNOLOGIES FOR FL REDUCTION: ENHANCING THE MITIGATION POTENTIAL

- Connection between FL & lack of access to energy
- **Reducing losses could increase dependence on fossil fuels in food systems**
- Addressing losses → opportunity to scale up transfer and deployment of clean technologies
- Improve **Renewable Energy/ Energy Efficiency** in FSC
- Processing and cold storage
- → double the emission reduction potential by promoting climate-friendly technologies to avoid losses

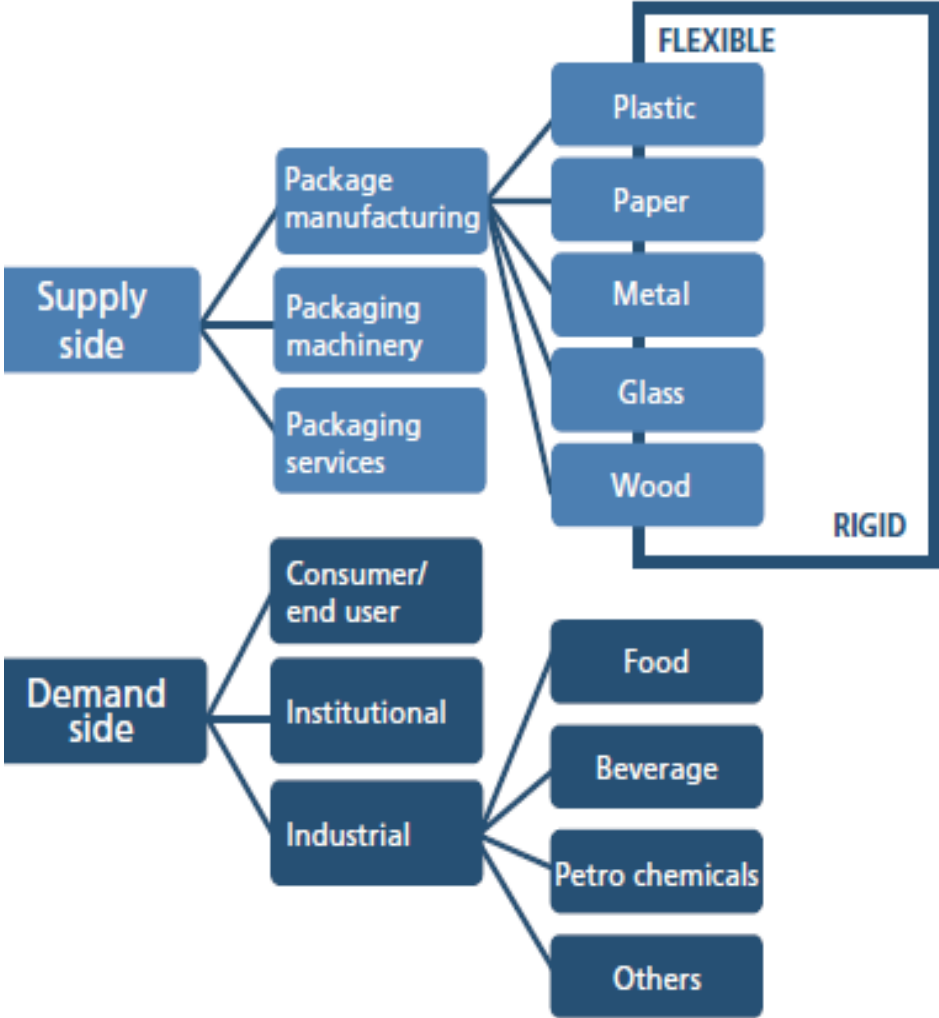


The global packaging industry

Figure 2. The global consumer packaging industry, by end use, 2009

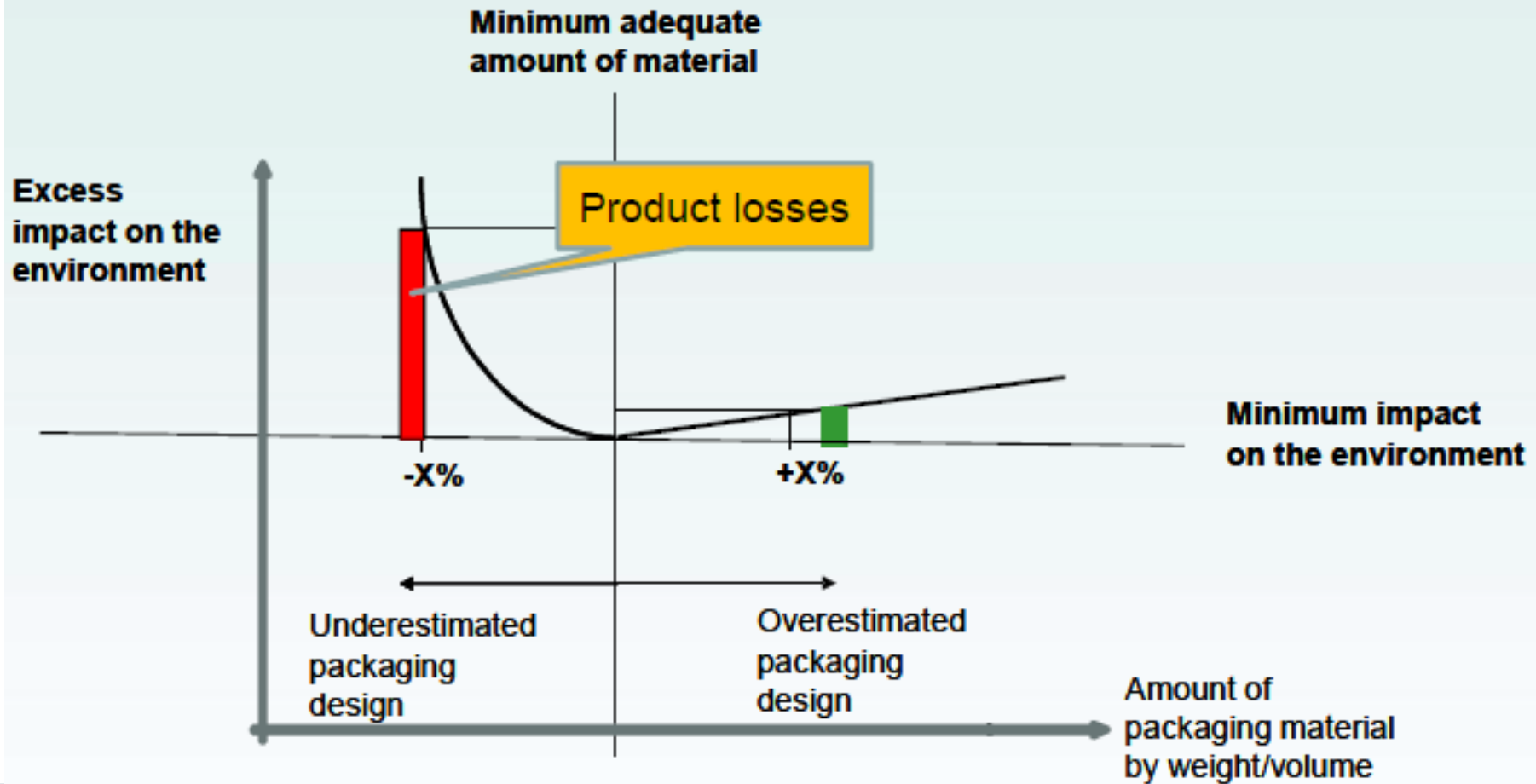


Source: PIRA International, 2009

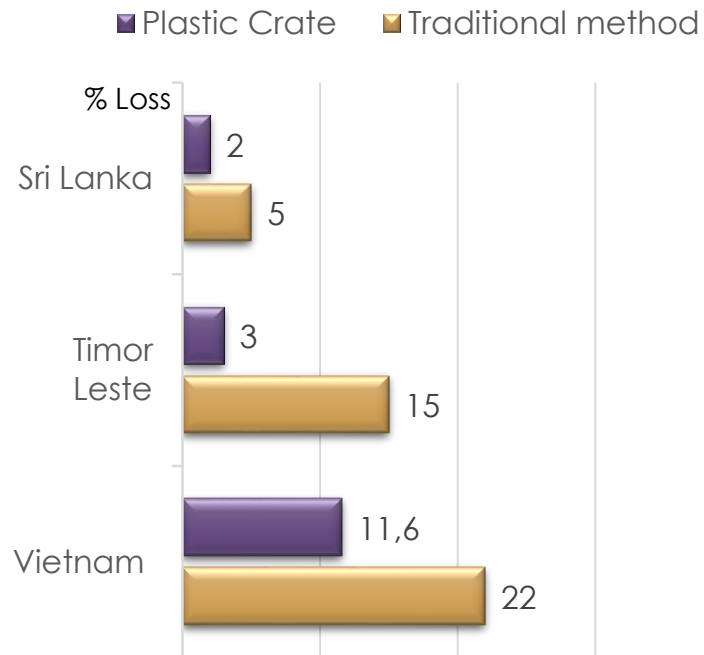




Product design: optimal packaging



Bulk Packaging – A Solution to Transport Losses in Bananas

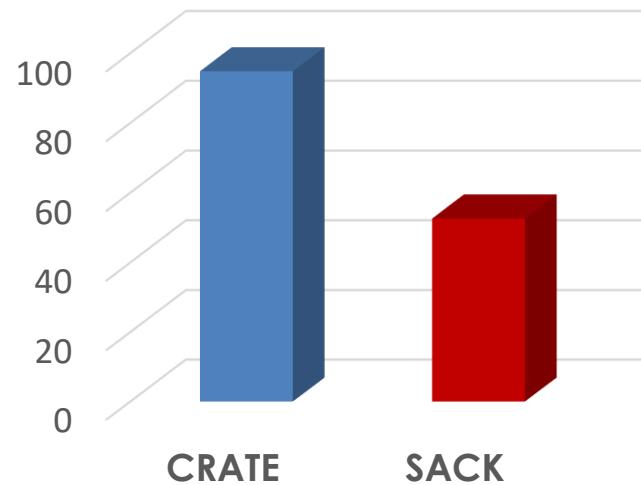


Vs

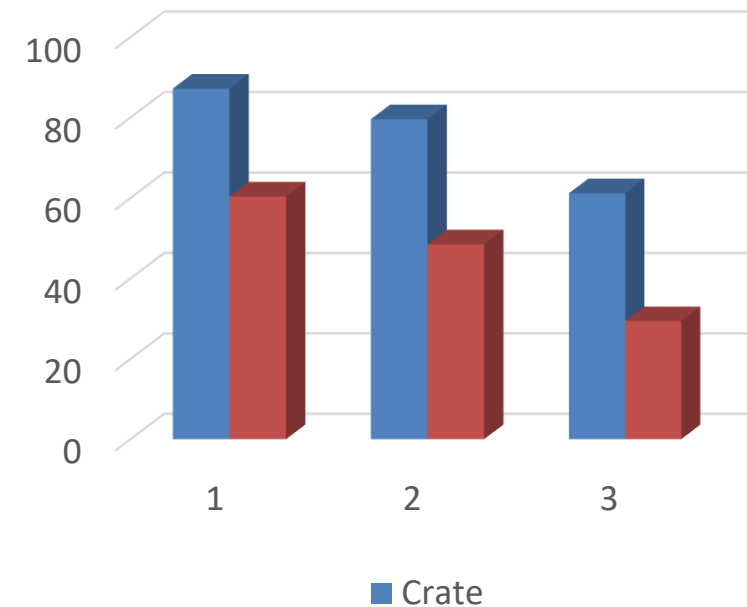




Recovery of sound tomato fruit (%) at the wholesale level



Proportion of fruits fetching a higher marketable price in retail over time (days)



FLW in Eastern Europe and Central Asia

- **Agricultural reforms in the transition period after the Soviet Union break-up**
 - smallholder farmers incomes, food security, diversifying agriculture, support to small and medium enterprises.
- **Foreign investments, access to export markets → food quality standards, innovations in the processing sector, infrastructure and enabling environment.**
- **Challenges:** Fragmentation of land holdings, Setting up cooperatives, Role of the state, Prevailing home food processing.
- **Programmes:** development of agricultural value chains integrating smallholder farmers and SMEs.
- **Agro-industry and agribusiness competitiveness is growing**



FLW in Eastern Europe and Central Asia

- **Still limited information available on the extent and nature of food loss and waste in the region.**
- More research and data collection are needed to understand trends in the food sectors and the extent of FLW at national levels.
- In development projects, FLW is merely indirectly addressed in the context of value chain and subsector support; it is not consistent in the Region.
- Training and technology support for:
 - Harvesting practices;
 - Smallholder access to infrastructure and markets – and better integration into value chains;
 - Cold chains and storage;
 - Logistics centres.
- **Research to food waste at horeca and consumer level is required.**



FLW in Russian Federation

- Data of RosStat* confirms relevance of the FLW problem in Russia
- Difficulties with assessing losses at the consumption level
- Working group on reduction of losses in grain sector
- Pilot development, performance and approbation of FAO methodology on FLW assessment
- Food-sharing initiatives and Food Bank “RUS”

**RosStat – Federal State Statistics Service*



ПОДДЕРЖИ МЕСТНОГО ФЕРМЕРА!

ЛАВКАЛАВКА

ЛАВКА.МОСКВА

Farmers' cooperative uniting small and midrange farms across Russia.
Deliver fresh, natural, seasonal food produced in Russia.

Restaurant and processed food products from food at risk to get wasted





Фонд
продовольствия

РУСЬ

Russia's Virtual Foodbank

Distributes food to socially insecure people in all regions of the Russian Federation. Distributes 5 million kg of food yearly. Largest Russian food manufacturers are involved and transfer their goods to Foodbank Rus from factories and warehouses all over Russia under donation agreements on a continuous basis.

Cooperates with the Russian Orthodox Church, charity organizations and governmental authorities.



BACKGROUND ON THE ECONOMICS OF FOOD LOSS AND WASTE

(FAO 2013)

by
Segrè A., Falasconi L., Politano A., Vittuari M.
Università di Bologna, Italy

Food loss is mainly caused by inefficiencies in the use and allocation of resources along the food supply chain, like poor infrastructure and logistics, lack of technology, insufficient skills, and knowledge and management capacity of supply chain actors, as well as poor access to markets. In addition, natural disasters, weather and climatic conditions, negative economic trends might play a role too.

Food waste relates mainly to the behaviour of retailers and consumers and it is a major problem at the global level, since throwing away food is often cheaper than using or re-using, and in many situations - mainly, but not only, in industrialized nations - consumers can afford to waste food.



BACKGROUND ON THE ECONOMICS OF FOOD LOSS AND WASTE (FAO 2013)

Micro-economic conditions for food waste.

- Farm production planning and profit maximization.
- Consumer theory: globalization, diversity of demand and supply, excessive choice, high purchase power \leftrightarrow low purchase planning capacity.
- Food safety risks and information.
- Consumer demand influenced by cultural, psychological and social factors \leftrightarrow economic rationality.
- Correlation with age and income.



BACKGROUND ON THE ECONOMICS OF FOOD LOSS AND WASTE (FAO 2013)

Macro-economic conditions for food waste.

- Policies and infrastructure to facilitate access to markets, and to grow the food processing sector.
- Food loss reduction upstream the value chain nullified by food waste increase downstream.
- Urbanization and lengthening of value chains.
- Large-scale trade and retail.
- Global food quality and safety standards.



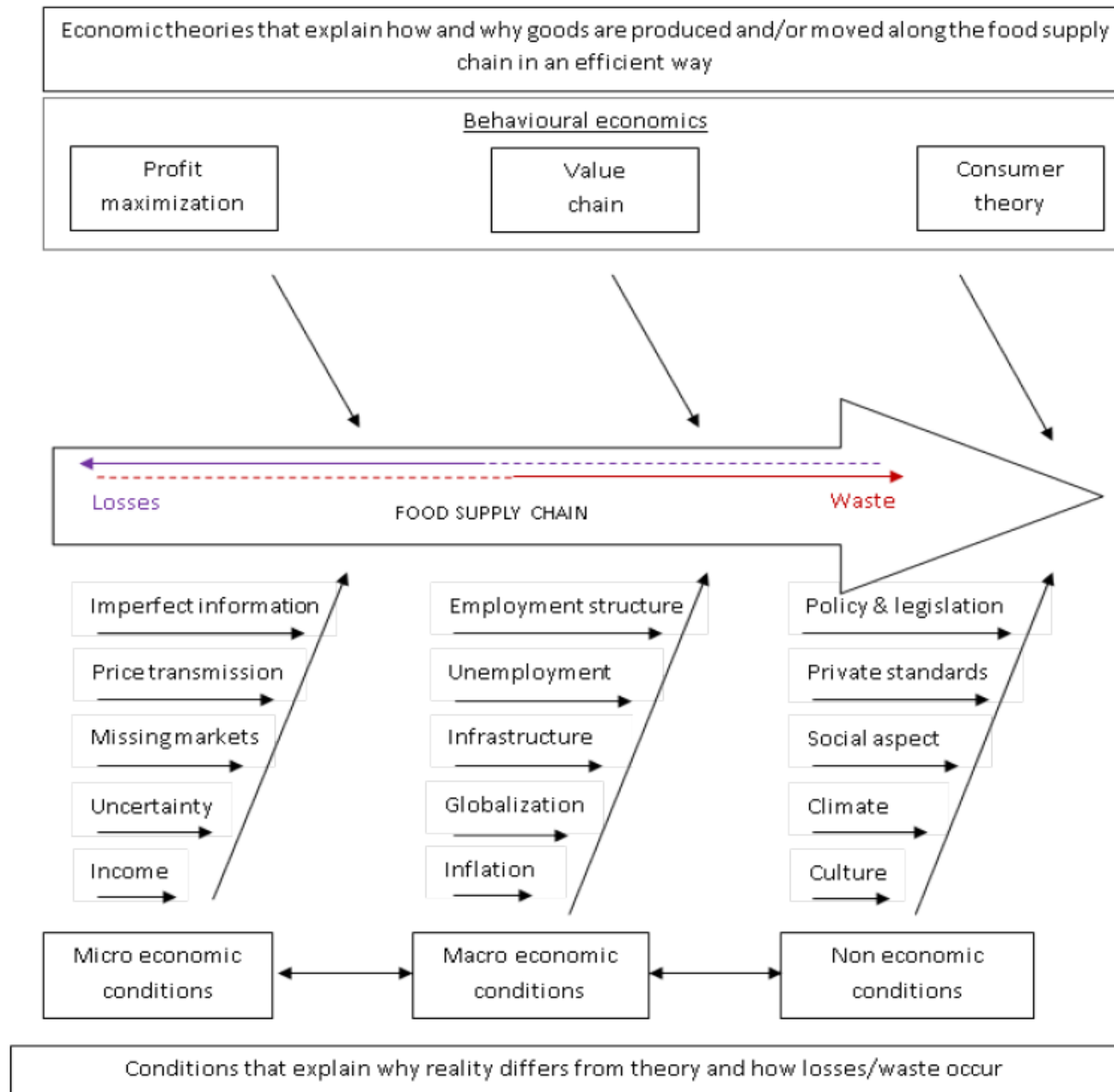
BACKGROUND ON THE ECONOMICS OF FOOD LOSS AND WASTE (FAO 2013)

Non-economic conditions for food waste.

- Consumer demand influenced by cultural, psychological and social factors.
- Traditional and religious events.
- Food declines on the scale of social and ethical values.
- Household size and children.
- Policy and legislation.



Figure. 2. Basic conditions that explain the formation of food losses and waste



BACKGROUND ON THE ECONOMICS OF FOOD LOSS AND WASTE

(FAO 2013)

MAIN SOLUTIONS:

- Vertical integration and information in the value chains.
- Corporate social responsibility combined with innovation.
- Incentives, taxation and legislation.
- Consumer awareness and education.



Consumer Behaviour

DO GOOD: SAVE FOOD! Education materials on food loss and waste reduction

INTERNATIONAL
**FOOD
WASTE
COALITION**

 <p>Food and Agriculture Organization of the United Nations</p> <p>5/7 years</p> <p>AWARENESS RAISING ON FOOD LOSS AND WASTE IN THE EDUCATION SECTOR</p> <p>EDUCATION MATERIAL PACKAGE ON FOOD WASTE REDUCTION IN PRIMARY AND SECONDARY SCHOOLS</p> <p>DO GOOD: SAVE FOOD! Teaching Guide for Age Group 1 (five to seven years old)</p>	 <p>Food and Agriculture Organization of the United Nations</p> <p>8/9 years</p> <p>AWARENESS RAISING ON FOOD LOSS AND WASTE IN THE EDUCATION SECTOR</p> <p>EDUCATION MATERIAL PACKAGE ON FOOD WASTE REDUCTION IN PRIMARY AND SECONDARY SCHOOLS</p> <p>DO GOOD: SAVE FOOD! Teaching Guide for Age Group 2 (eight to nine years old)</p>	 <p>Food and Agriculture Organization of the United Nations</p> <p>10/13 years</p> <p>AWARENESS RAISING ON FOOD LOSS AND WASTE IN THE EDUCATION SECTOR</p> <p>EDUCATION MATERIAL PACKAGE ON FOOD WASTE REDUCTION IN PRIMARY AND SECONDARY SCHOOLS</p> <p>DO GOOD: SAVE FOOD! Teaching Guide for Age Group 3 (ten to thirteen years old)</p>	 <p>Food and Agriculture Organization of the United Nations</p> <p>14 years up</p> <p>AWARENESS RAISING ON FOOD LOSS AND WASTE IN THE EDUCATION SECTOR</p> <p>EDUCATION MATERIAL PACKAGE ON FOOD WASTE REDUCTION IN PRIMARY AND SECONDARY SCHOOLS</p> <p>DO GOOD: SAVE FOOD! Teaching Guide for Age Group 4 (fourteen years up)</p>
 <p>DO GOOD SAVE FOOD!</p> <p>FEED YOURSELF, DON'T FEED THE BIN :</p> <p>9 EASY TIPS</p> <p>TO REDUCE FOOD WASTE.</p>	 <p>DO GOOD SAVE FOOD!</p> <p>FEED YOURSELF, DON'T FEED THE BIN :</p> <p>9 EASY TIPS</p> <p>TO REDUCE FOOD WASTE.</p>	 <p>DO GOOD SAVE FOOD!</p> <p>FEED YOURSELF, DON'T FEED THE BIN :</p> <p>9 EASY TIPS</p> <p>TO REDUCE FOOD WASTE.</p>	 <p>DO GOOD SAVE FOOD!</p> <p>FEED YOURSELF, DON'T FEED THE BIN :</p> <p>9 EASY TIPS</p> <p>TO REDUCE FOOD WASTE.</p>
<p>1 DO GOOD: SAVE FOOD!</p> <ul style="list-style-type: none"> WORKSHEETS GAMES WRITING EXERCISES <p>2 FEED YOURSELF, DON'T FEED THE BIN: NINE EASY TIPS TO REDUCE FOOD WASTE</p> <ul style="list-style-type: none"> WORKSHEETS DISCUSSIONS GAMES WRITING EXERCISES PROJECTS 	<p>1 DO GOOD: SAVE FOOD!</p> <ul style="list-style-type: none"> WORKSHEETS GAMES WRITING EXERCISES <p>2 FEED YOURSELF, DON'T FEED THE BIN: NINE EASY TIPS TO REDUCE FOOD WASTE</p> <ul style="list-style-type: none"> WORKSHEETS DISCUSSIONS GAMES WRITING EXERCISES PROJECTS 	<p>1 DO GOOD: SAVE FOOD!</p> <ul style="list-style-type: none"> WORKSHEETS <p>2 FEED YOURSELF, DON'T FEED THE BIN: NINE EASY TIPS TO REDUCE FOOD WASTE</p> <ul style="list-style-type: none"> WORKSHEETS DISCUSSIONS 	<p>1 DO GOOD: SAVE FOOD!</p> <ul style="list-style-type: none"> WORKSHEETS GAMES WRITING EXERCISES <p>2 FEED YOURSELF, DON'T FEED THE BIN: NINE EASY TIPS TO REDUCE FOOD WASTE</p> <ul style="list-style-type: none"> WORKSHEETS DISCUSSIONS GAMES WRITING EXERCISES PROJECTS





Save.Use.Produce (SaveUP)

Building resilient urban and peri-urban nutrient cycles

- 1. Recovering municipal food waste to be used as safe feed for rearing insects e.g. Black Soldier Fly ;**
- 2. Harvesting insect larvae from the rearing system and processing into animal feed for peri-urban poultry and aquaculture;**
- 3. Using leftover residues after harvesting insect larvae, poultry litter and aquaculture waste, directly or after composting, as a fertilizer for urban and peri-urban agriculture and/or using these resources for biogas production and or fertilizer.**





Environmental opportunities of insect rearing for food and feed.

- High feed-conversion efficiency (animal's capacity to convert feed mass into increased body mass).
- Can be reared on organic side streams, reducing environmental contamination, while adding value to waste.
- Emit relatively few GHGs and relatively little ammonia.
- Require significantly less water than cattle rearing on grass lands.

Black Soldier Fly

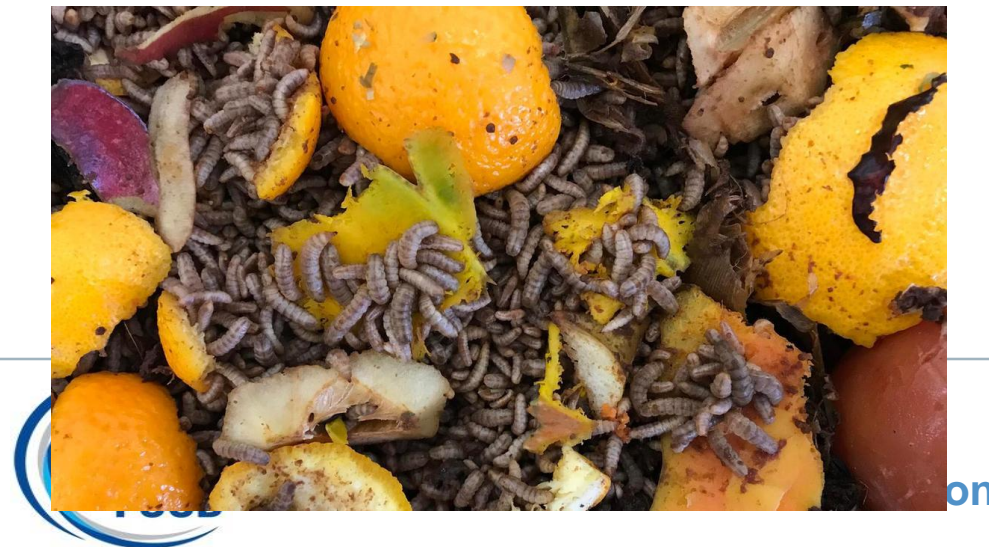
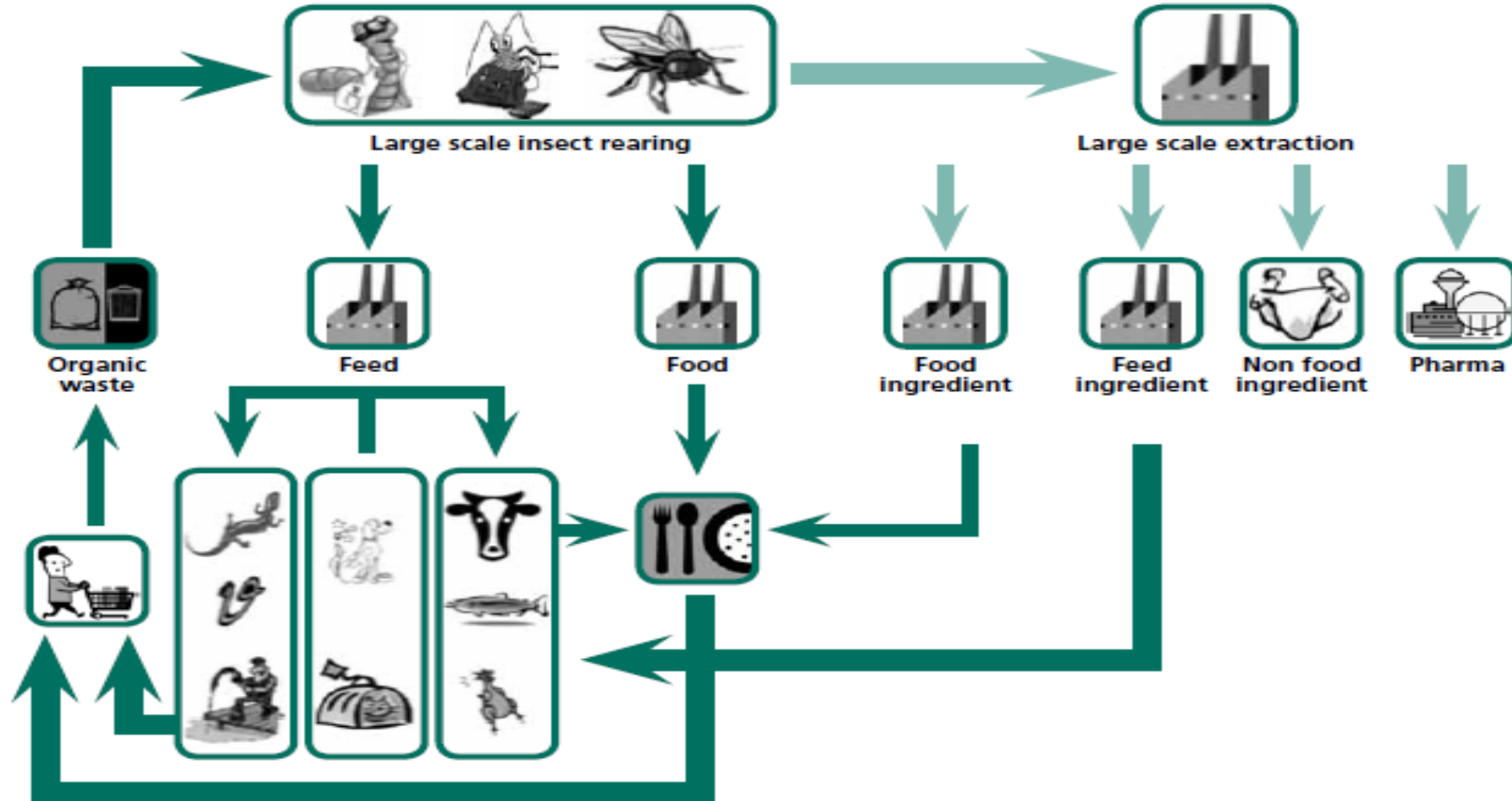


FIGURE 9.3
Insects as the missing link: ecology designs a circular economy



Source: M. Peters, personal communication, 2012.



Food waste as an Energy Source

Adequately processed food scraps can generate:

- renewable energy
- soil fertilizer
- feed for animals.

Composting food waste produces a natural fertilizer.

Through anaerobic digestion, food waste can be used to produce methane, a valuable energy source.

If 50% of the food waste generated each year in the USA was anaerobically digested, enough electricity could be generated to power over 2.5 million homes for a year.





Only 3% to 5% of Pakistan's total milk production is processed and sold through formal channels.

4 biogas plants in dairies having 100 cows
2 plants of 50m³ and 2 plants of 100m³

Produces 32kWh to 64kWh of electricity
enough to run chillers with capacities of 500l
and 1,000l for 8 hours.

The payback period for the farmers was
around 3 years (*USD 1000 subsidy was
provided*).



KENYA

300,000 tonnes of the mango harvest is lost ...



...because the fruits are not picked in time, or don't meet export quality standards.

The Mango Project Kenya supports enterprises in dried and preserved mango products



Production of crude palm oil (CPO – unrefined)

Threshing (removal of fruit from the bunches)

Sterilizing or cooking the palm fruits

‘Digesting’ (crushing) the palm fruits

Pressing - extracting the palm oil

Clarifying and drying the palm oil



Production of crude palm oil (CPO – unrefined)



	Quantity (ton)
Fresh Fruit Bunches	100
Empty Fruit Bunches – fuel for the boiler	40
Palm fruits	60
Palm Oil	27
Oil Cake – raw material for stock feed or soap making	29
Palm kernel shells and husks – fuel for the steamer	4

