

# Food Losses and Wastes in the Armenian Agri-food Chains

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# Outline

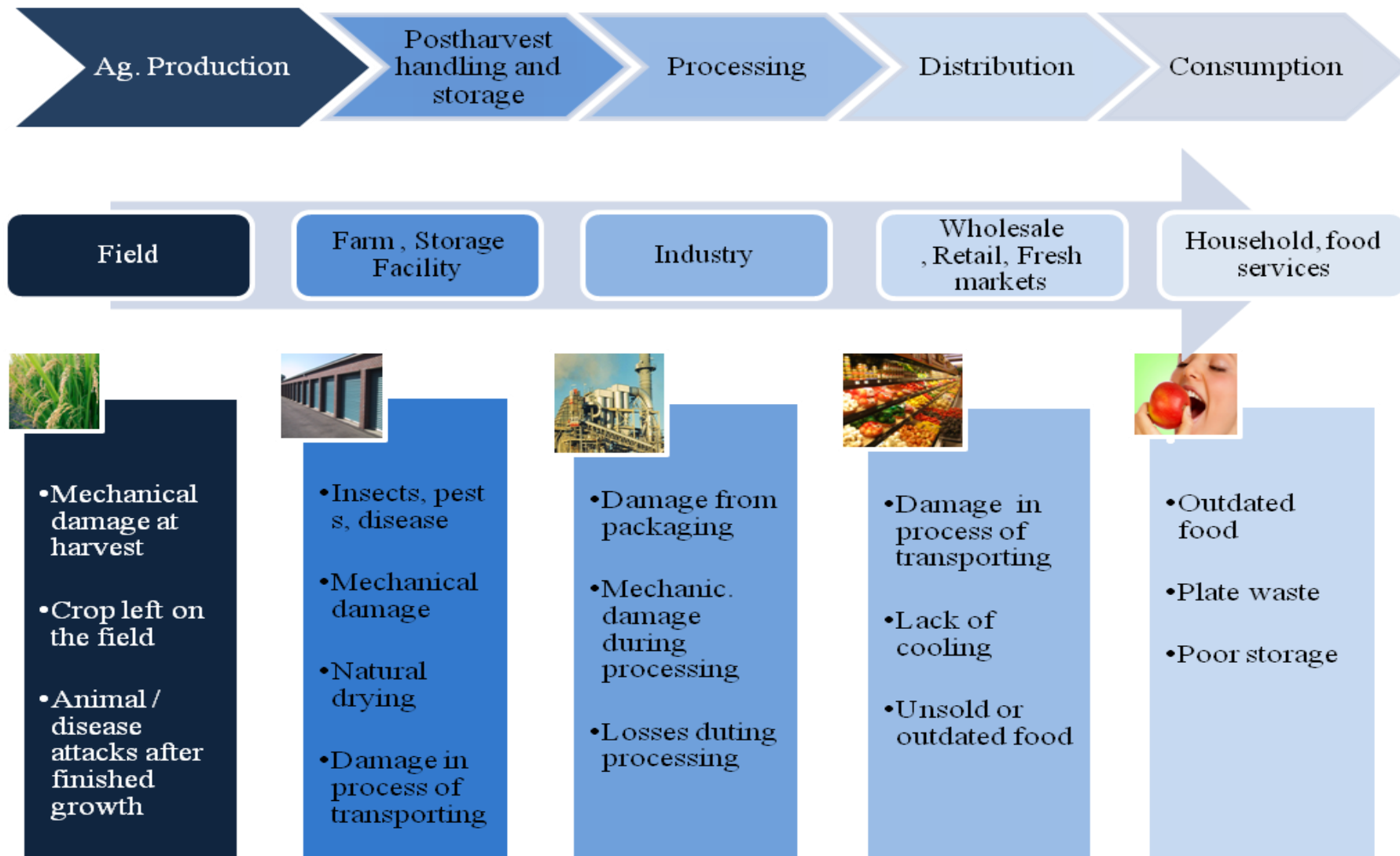
- Food Loss and Waste – Definition and Facts
- Importance of Preventing FWL
- Study Objectives and Relevance to Armenia
- Methodology and data
- Findings and Recommendation

# Food Loss and Waste Defined

- **Food losses** refer to the decrease in edible food mass throughout the *part of the supply chain that* specifically leads to edible food for human consumption. Food losses take place at production, postharvest and processing stages in the food supply chain (Parfitt *et al.*, 2010).
- *Food losses occurring at the end* of the food chain (retail and final consumption) are rather called **“food waste”**, which relates to retailers’ and consumers’ behavior (Parfitt *et al.*, 2010).
- Food waste or loss is measured only for products that are directed to human consumption, excluding feed and parts of products which are not edible.

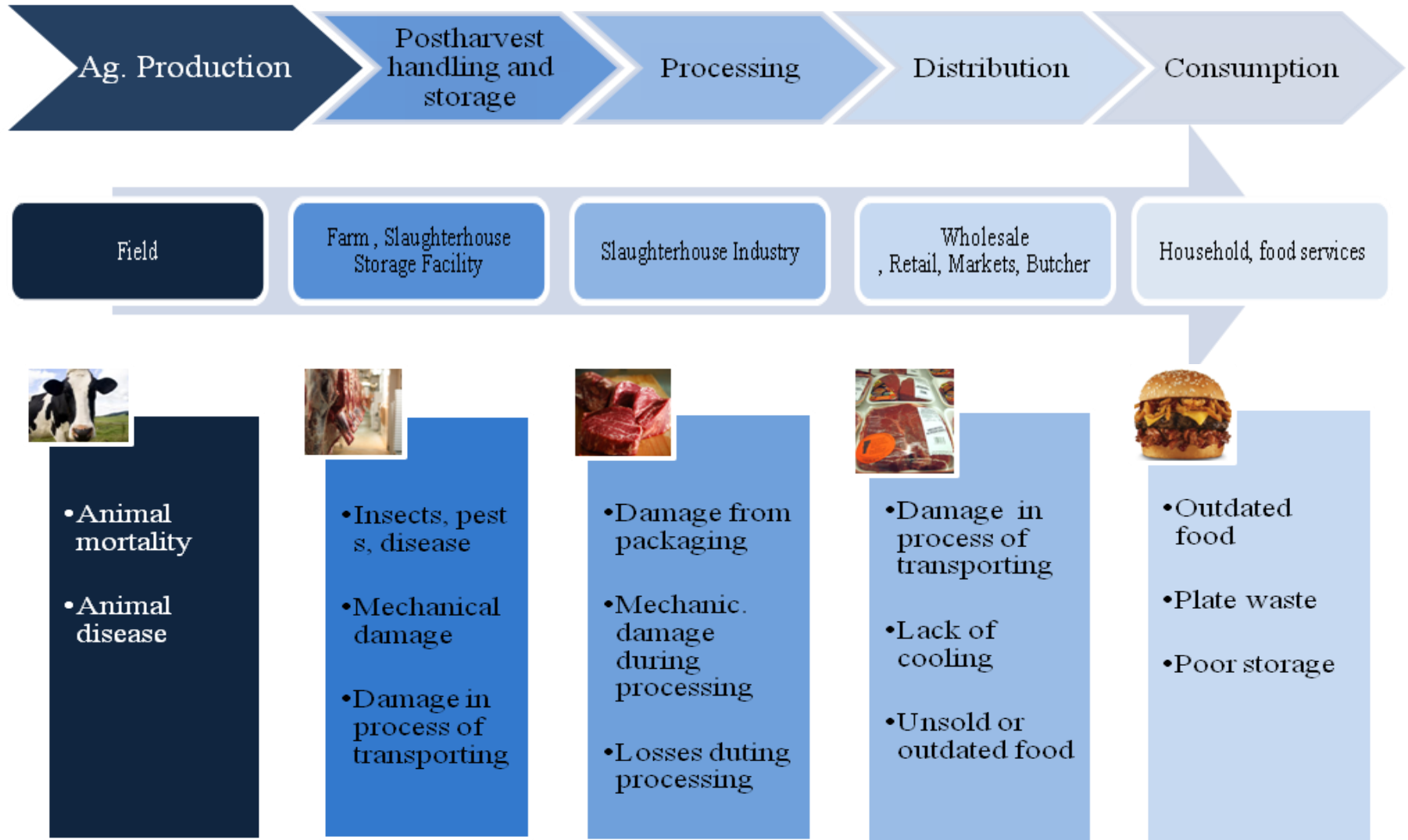
# FWL elements in each stage of the value chain

## Vegetable commodities and products



# FWL elements in each stage of the value chain

## Animal commodities and products



# FLW facts ([www.save-food.org](http://www.save-food.org))

- Roughly 1/3 of the food produced in the world for human consumption every year — approximately 1.3 billion tonnes, gets lost or wasted.
- The amount of food lost or wasted every year is equivalent to more than half of the world's annual cereals crop.
- Every year, consumers in rich countries waste almost as much food (222 million tonnes) as the entire net food production of sub-Saharan Africa (230 million tonnes).

**ALMOST A BILLION PEOPLE**  
are going hungry, while we waste  
**1/3 OF THE FOOD WE PRODUCE.**



Credit for picture <http://ccaafs.cgiar.org/bigfacts/food-waste/>

# Why Preventing FWL is Important?

- High importance in the efforts to **combat hunger, raise income and improve food security** in the world's poorest countries.
- Food losses have an impact on **food quality and safety**, on **economic development** and on the **environment**.
- Food losses represent a waste of resources used in production such as land, water, energy and inputs.
- Improving the efficiency of the food supply chain could help bringing down the cost of food to the consumer and thus increasing access.

Irrespective of the level of economic development and maturity of systems in a country, food losses should be kept to a **minimum!!!**



# Study Objectives

The aim of this research is to find and analyze data on food waste and loss in Armenia as it goes through different stages of the food supply chain, starting from harvesting and ending with consumption.

# Relevance to Armenia

- Agricultural production and processing share in total GDP – 25.3% (2013)
- Plant production – more than 60% of GAO (2013)
- Employment in Agriculture – 37.3% (2012)
- Share of Agricultural Exports in Total Exports – 28.1% (2013).
- Rural Poverty – 32% (2013)

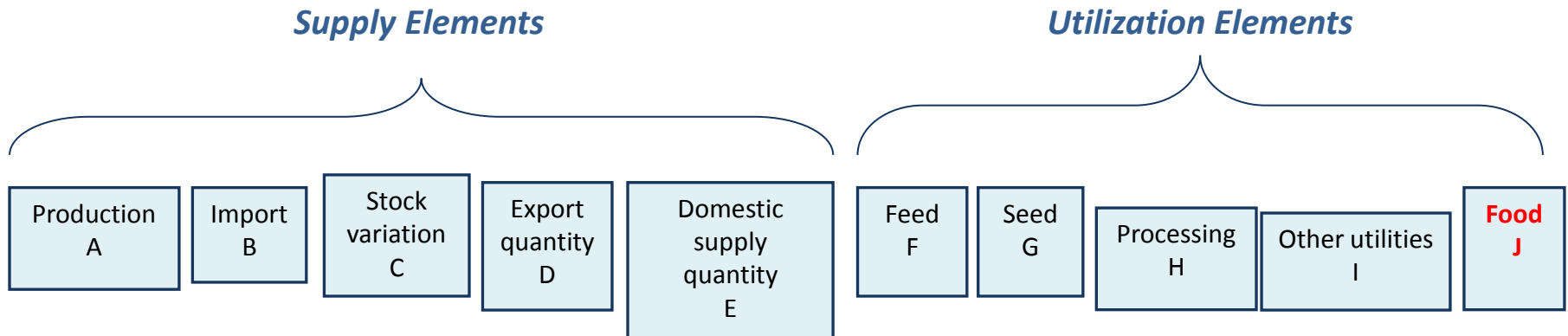
# Methodology -Primary Data collection

- Conducted in-depth interviews with farmers, to find out product waste during **harvesting** and **postharvest handling and storage**,
- Contacted cold storage facilities, wholesalers for obtaining data on FWL during **postharvest handling and storage**,
- Contacted selected dairy processors and canneries to find out FWL during **processing and distribution** (since most of dairy products are returned to processing plants, if spoiled in the retailing stage or brought back to the retailer by consumers),
- Interviewed supermarkets, medium size grocery stores, small shop holders, butcher's outlets and fruits and vegetables resellers on open markets to reveal FWL during **distribution stage**,
- Interviewed 506 customers in Yerevan to get information on FWL during **consumption stage**.

# Secondary Data collection

- **Food Balance Sheets** based on FAO methodology – published by NSS Armenia (ArmStat). **FBS** show the patterns of a country's food supply during a specific period of time. For each food item the domestic supply (E) equals the sum of production (A), imports (B) and stock variations (C).

Food available for human consumption (J) is left after withdrawing utilization sources such as exports (D), feed (F), seed (G), processing (H) and other utilities (I).



- NSS data on agricultural production

# Weight percentages of food losses and waste (in percentage of what enters each step)

	Ag. production	Post-harvest handling and storage	Processing and packaging	Distribution	Consumption at household level
<b>Cereals</b>	15%	5%	6%	7%	5%
<b>Roots &amp; Tubers</b>	19%	6%	0%	3%	1%
<b>F&amp;V</b>	10%	4%	3%	10%	3%
<b>Meat (Beef)</b>	1%	0.1%	1%	1%	1%
<b>Fish and Seafood</b>	20%	0.1%	0.2%	3%	1%
<b>Milk</b>	2%	0.1%	4%	2%	1%
<b>Eggs</b>	23%	1%	0.1%	0.1%	0.1%

Source: Own data (Expert opinion and surveys).

# Applying concept of Potential Production



For the step Agricultural Production, where we do not have Possible Production volumes, we will use the following formula to calculate waste:

$$W = r * P$$

were

W is waste at the current stage

r is the waste rate as a fraction of Production

P is Production

In general for other steps of Supply Chain the formula for waste will be:

$$W = r * PP$$

# Waste Calculation Methodology, cont'd

- The waste is then adjusted for the unavoidable loss or loss assumed by the processes.
- For example, it is reported that during the milling process 3% of wheat/flour is being lost due to processing procedures. Then we need to reduce wheat waste percentage during harvesting step by 3%, since even if it was harvested, it would be lost any way during the milling.
- **Allocation factors** have been applied to determine the part of the produce oriented to human consumption (and not for animal feed).
- **Conversion factors** have been applied to determine the edible mass (e.g. peeling by hand, industrial peeling, etc.).

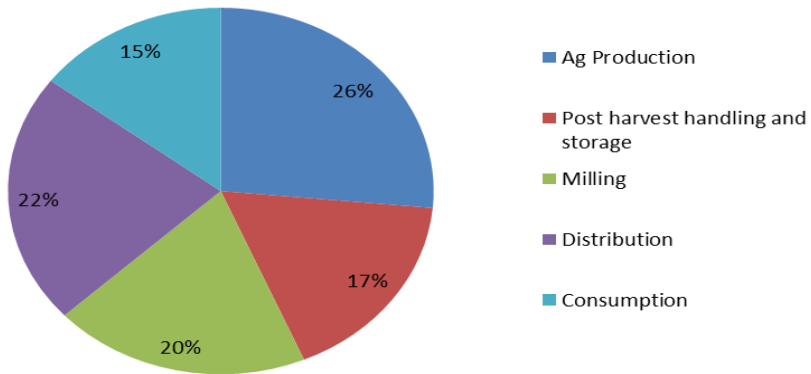
# Results: FLW volumes

Commodity	Total volume of L&W (thous. Tons)	L&W as a % of food available for human consumption
Wheat	129	30%
Potatoes	67	32%
Tomatoes	23	9%
Milk	66	10%

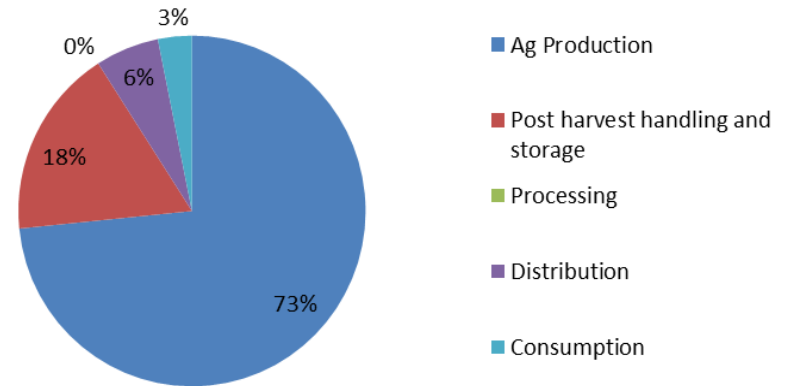


# Results: FLW distribution

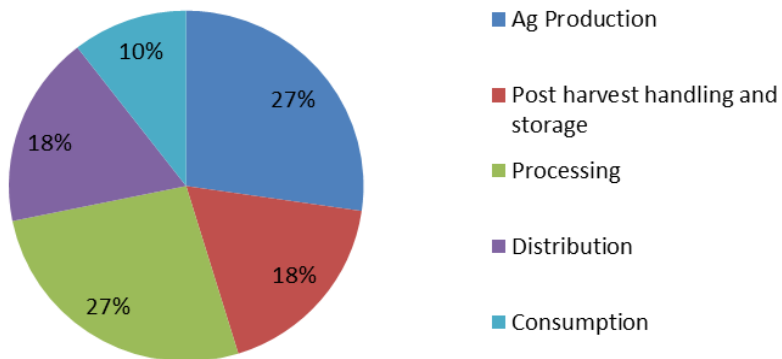
## Wheat



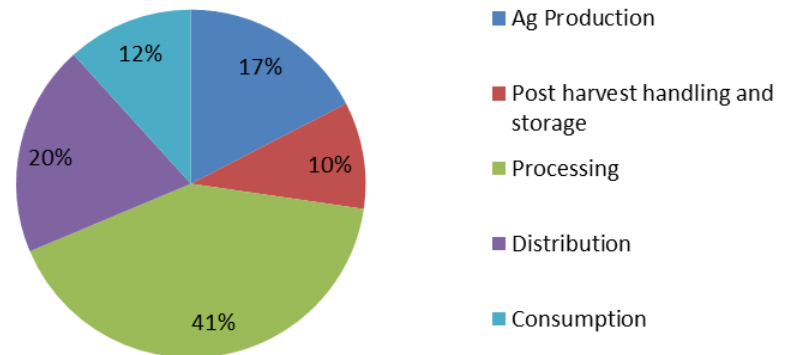
## Potato



## Tomato



## Milk



# Priority actions and policies for reduction of Food Loss and Waste

Stage	Causes of food waste and loss	How to prevent food losses and waste
<b>Agricultural Production stage</b>	Improper harvest timing	Farmer education Strong linkage between extension and farmers
	Improper harvesting procedures and lack of mechanization	Technical support – investing in new machinery Establishing farmer cooperatives (e.g. farm machinery coop model in France)
<b>Post-harvest handling and storage</b>	Poor storage facilities	Increase the number of cold storage rooms and collection points equipped with modern technologies
	Poor storage techniques and know-how	Farmer education in handling and storage skills

# Priority actions and policies for reduction of Food Loss and Waste, cont'd

Stage	Causes of food waste and loss	How to prevent food losses and waste
<b>Processing and packaging</b>	Obsolete processing procedures and poor packaging	Invest in production lines and packaging facilities Apply Resource Efficiency Management Systems (e.g. ProReMAS).
<b>Distribution</b>	Distance from main food markets and lack of ability to sell own produce	Establishment of farmer cooperatives Resource mobilization, reduction of transaction cost, etc.
	Inadequate selling conditions	Development of marketplace Improved farmers' markets
<b>Consumption</b>	Inadequate storing conditions	Improved storage conditions
		Food purchase planning Effective social messages and campaign

# Thank You

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