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Sustainable Agri-Food Production and Supply Chain Management

SUSTAINABILITY & FOOD SUPPLY CHAIN

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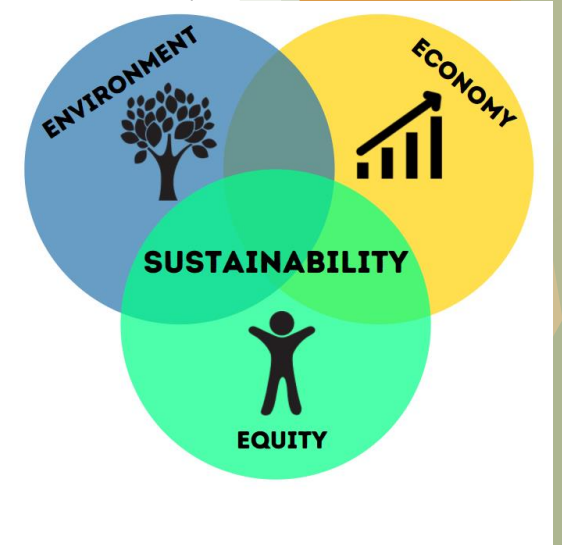
Topic: *ERASMUS-JMO-2021-MODULE*

WHAT IS SUSTAINABILITY?

- ❖ Sustainability is meeting the needs of the present generation without compromising the ability of future generations to meet their own needs (un, 1987).
- ❖ Sustainability consists of fulfilling the needs of current generations without compromising the needs of future generations, while ensuring a balance between economic growth, environmental care and social well-being (un, 1987).

What Are the 3 Principles of Sustainability?

- ▶ **What Is Economic Sustainability?**
- ▶ Economic sustainability refers to a company's ability to continue its operations over a long-term horizon. In order to be economically sustainable, a company must be able to ensure that it will have adequate resources, workers, and consumers for its products into the distant future.
- ▶ **What Is Environmental Sustainability?**
- ▶ Environmental sustainability is the responsibility to conserve natural resources and protect global ecosystems to support health and wellbeing, now and in the future.
- ▶ **What Is Social Sustainability?**
- ▶ Social sustainability is a proactive way of managing and identifying business impacts on employees, workers in the value chain, customers, and local communities.



(Mollenkamp, 2022)

(UCLA, 2022)

Sustainable Supply Chain Management

- ❖ Supply chain management encompasses all activities associated with the flow and transformation of goods from the raw materials stage through the end user, as well as the associated information flows.
- ❖ Sustainable supply chain management requires that sustainability criteria be met while maintaining competitiveness through meeting customer needs.

(Fernando, 2022)

Issues Affecting Sustainability

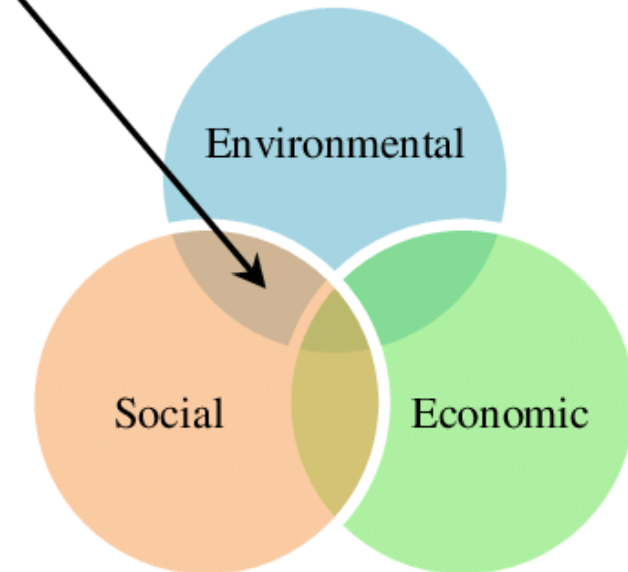
- ❖ Product design
- ❖ Product returns
- ❖ Length of product life cycle
- ❖ Extension of product life cycle
- ❖ End of life disposal
- ❖ Packaging
- ❖ Source reduction
- ❖ Recycling
- ❖ Material substitution
- ❖ Waste disposal
- ❖ Refurbishing
- ❖ Repair
- ❖ Remanufacturing

Sustainability in Supply Chain Management

Use of the triple bottom line

- ▶ **Social;**
 - ❖ Manage risks to organizational reputation
 - ❖ Create competitive advantage
- ▶ **Environmental;**
 - ❖ Regulatory issues
 - ❖ Risk of harm from usage, disposal, packaging, shipping
- ▶ **Economic;**
 - ❖ Sustainability can be cost efficient
 - ❖ Sustainability can enhance shareholder value

Sustainability



(UCLA, 2022)

Why is sustainable supply chain management important?

A sustainable supply chain also **helps improve productivity while saving money at the same time**. By using sustainable techniques and resources, you increase the efficiency of buildings, vehicles and machinery at a significant cost savings.

(Prologis, 2022)

Sustainability & Food Supply Chain

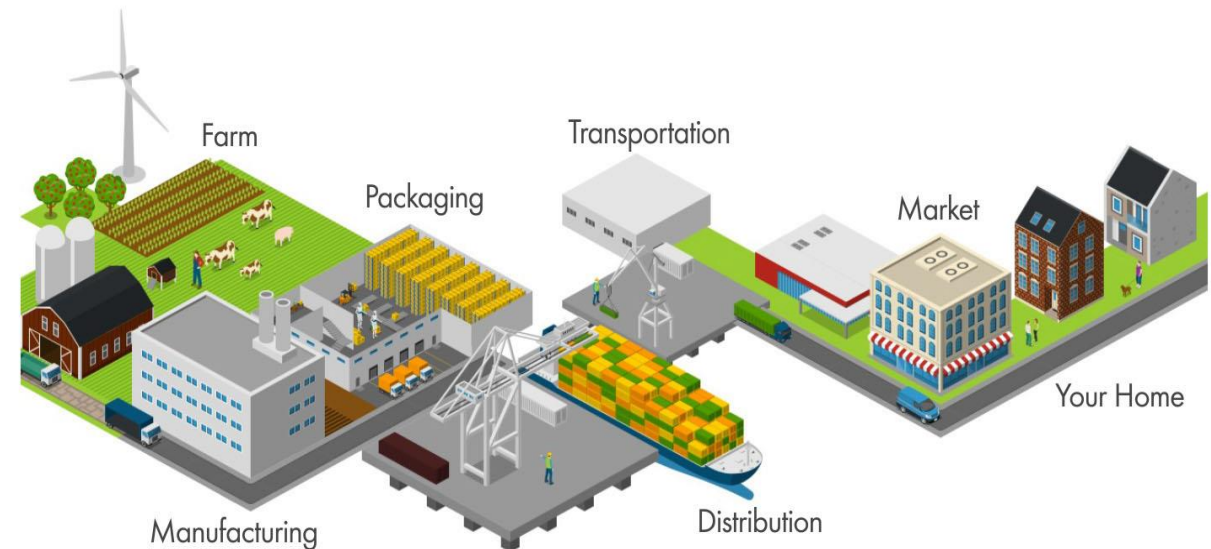
- ❖ As the growing population generates the need for increased food production, the food industry needs an expanded supply of quality raw materials.
- ❖ But from the supply side, there is a concern about how the industry can respond to the growing demand in terms of quality and yield gains, which are being affected by factors such as climate change, water shortages, land usage and diminished returns for agricultural producers.



Sustainability & Food Supply Chain

- ❖ Food supply chains are complex as they include different level actors, from those who produce and aggregate; to those that add value to the product (processing); and those who sell into the next level (wholesale and retail).
- ❖ Consumers are increasingly concerned about where their food comes from and pay great attention to whether it is produced responsibly, from farm to fork (Sustainable Food Lab, 2009), from a social justice perspective and also regarding food safety standards.

The Food Supply Chain



Sustainable Food Supply Chain

- ❖ The objective of supply chain sustainability, as defined by UN Global Compact is to “create, protect and grow long-term environmental, social and economic value for all stakeholders involved in bringing products and services to market. Through supply chain sustainability, companies protect the long term viability of their business and secure a social license to operate”.
- ❖ **Sustainable food value chains (SFVC)** are defined by FAO, as “the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products that are sold to final consumers and disposed of after use, in a manner that is profitable throughout, has broad-based benefits for society, and does not permanently deplete natural resources”.

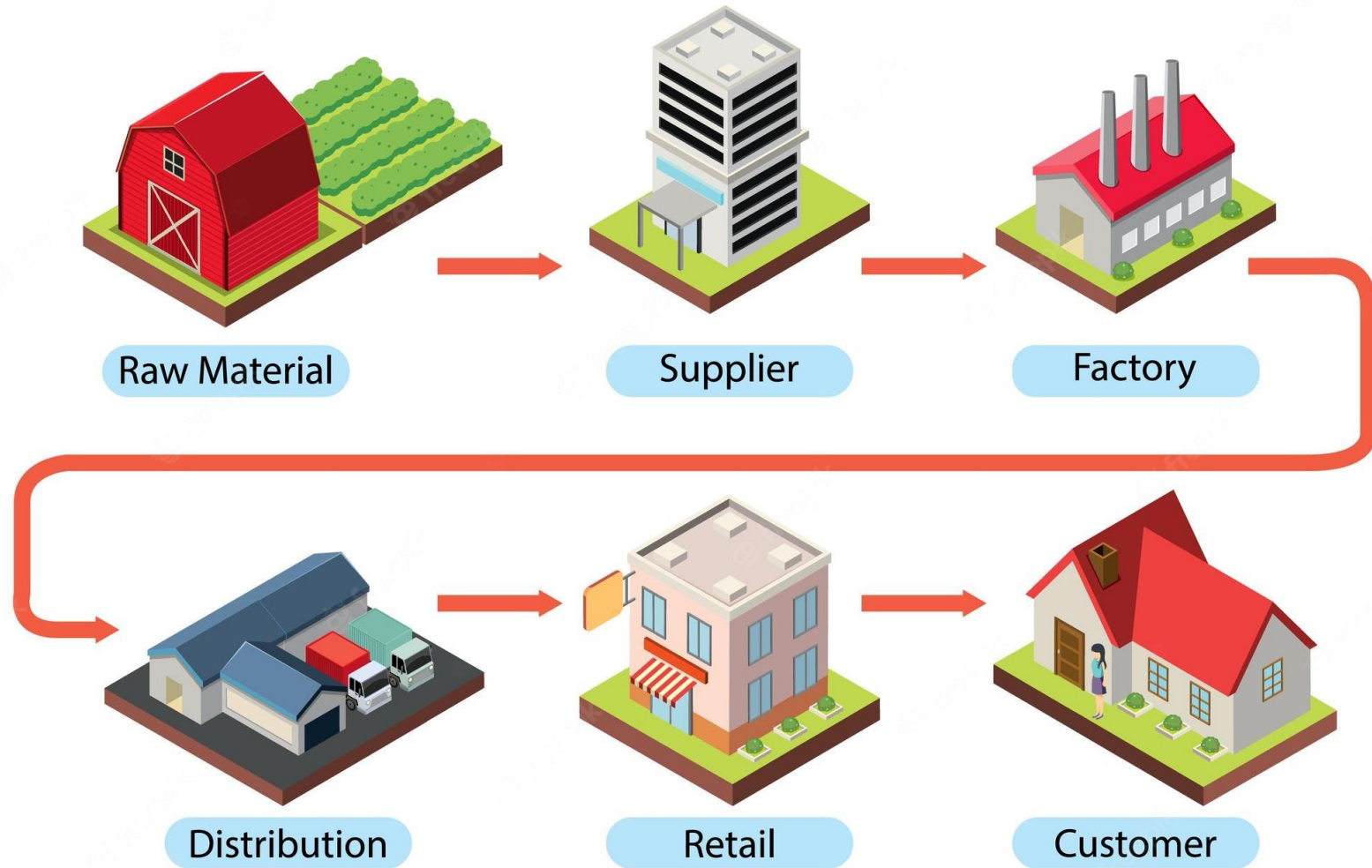
FOOD SUPPLY CHAIN

WHAT IS SUPPLY CHAIN?

- ❖ «A supply chain is a network of facilities that procure raw materials, transform them into intermediate goods and then final products, and deliver the products to customer through distribution system.»
- ❖ «A supply chain is a system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer. Supply chain activities involve the transformation of natural resources, raw materials, and components into a finished product that is delivered to the end customer.»

(Investopedia, 2022)

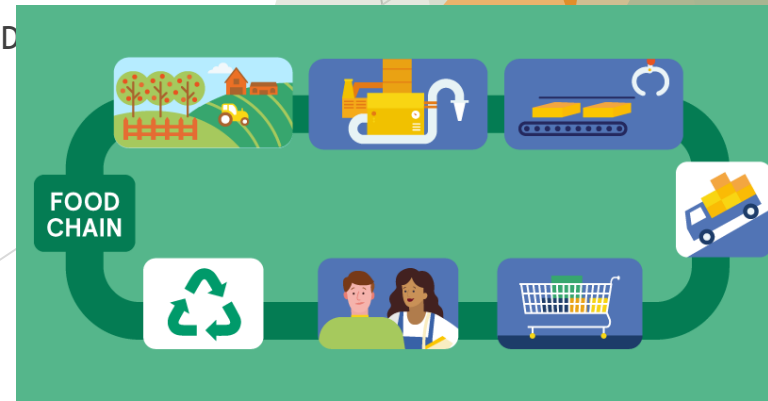
Stages of supply chain



FOOD SUPPLY CHAIN

- ❖ While developing economies increase consumer awareness, an increase is observed in the demand for better quality, safe and healthy foods.
- ❖ While the level of risk that the customer can tolerate while purchasing food is gradually decreasing, the safety of food goods has become an issue that needs to be carefully managed for businesses and especially food supply chains.
- ❖ The public awareness of the deterioration of food and the emergence of diseases pose a danger to both public health and the image of the company.

(OECD



FOOD SUPPLY CHAIN

- ❖ The food supply chain comprises all the stages that food products go through, from production to consumption. Nowadays, food is transported over longer distances, across continents.
- ❖ A food supply chain is the process that all food products go through, from production all the way through to consumption. The food supply chain is, thus, a hugely important step in how you safely consume and understand the food you eat.



<https://toogoodtogo.com/en-us/movement/education/the-food-supply-chain>

STAGES OF FOOD SUPPLY CHAIN

▶ **Production** - This is where the food supply begins at a production level, and where the food is sourced. Whether it is grown or developed, the food will follow local and international guidelines to ensure quality and food safety.

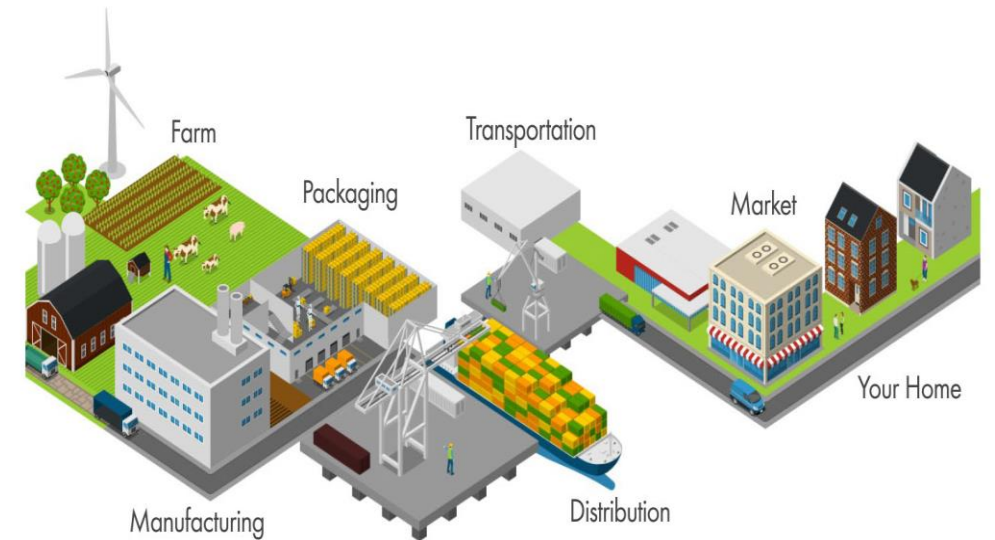
▶ **Handling and Storage** - This refers to the preparation and last minute steps that food undergoes once the product has been harvested. This step will occur before food is sent to be processed.

▶ **Processing and Packaging** - This is where the food, whether it be from plants or animals, is converted into an edible form. Here it is especially important that the food meets all food safety requirements before it is packaged for sale and distribution.

▶ **Distribution** - This is where, once the food is edible, it is transported and distributed to the necessary retail or supplier.

▶ **Retailing** - This is the process used to deliver the products from suppliers to consumers, and involves everything from obtaining the food to selling it on.

▶ **Consumption** - This takes place once the customer purchases a food from a retailer.



Simplified examples of a food supply chain

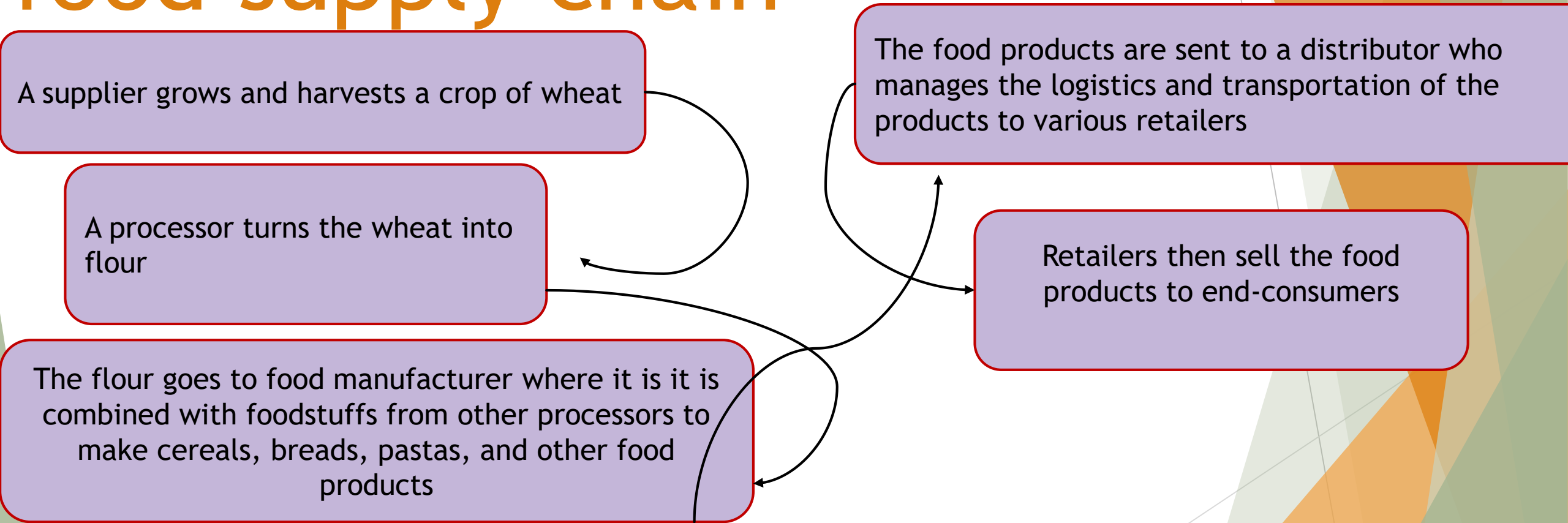
A supplier grows and harvests a crop of wheat

A processor turns the wheat into flour

The flour goes to food manufacturer where it is combined with foodstuffs from other processors to make cereals, breads, pastas, and other food products

The food products are sent to a distributor who manages the logistics and transportation of the products to various retailers

Retailers then sell the food products to end-consumers



Increased Demand for Traceability

Lack of Honesty in Processes

Challenges in food supply chains

Lack of Communications Within the Food Supply Chain

The Potential of Food Fraud

FOOD LOSS AND WASTE IN FOOD SUPPLY CHAIN

Food loss and Waste



- Food loss and waste (FLW) became a great public concern. FLW is defined as a decrease in the quantity or quality of edible food that is intended for human consumption (FAO, 2013a).
- Food lost at the post-harvest stage is generally referred to as ‘food losses’ and ‘spoilage’, while at the later stages of the food supply chain it is termed ‘food waste’ and generally applies to food lost due to behavioural issues (e.g. consumer behaviour) (Grolleaud, 2002).

Food loss and Waste

Statistical information

- The Food and Agricultural Organization (FAO) reported that *approximately one-third of all produced foods* (1.3 billion tons of edible food) for human consumption is lost or wasted every year across the entire supply chain (FAO, 2013a).
- 1.3 billion tons = enough to feed 2 billion people around the world (FAO, 2013a).
- 8 percent of the carbon emission occurring in the world is caused by food loss or waste (Sawaya, 2017).

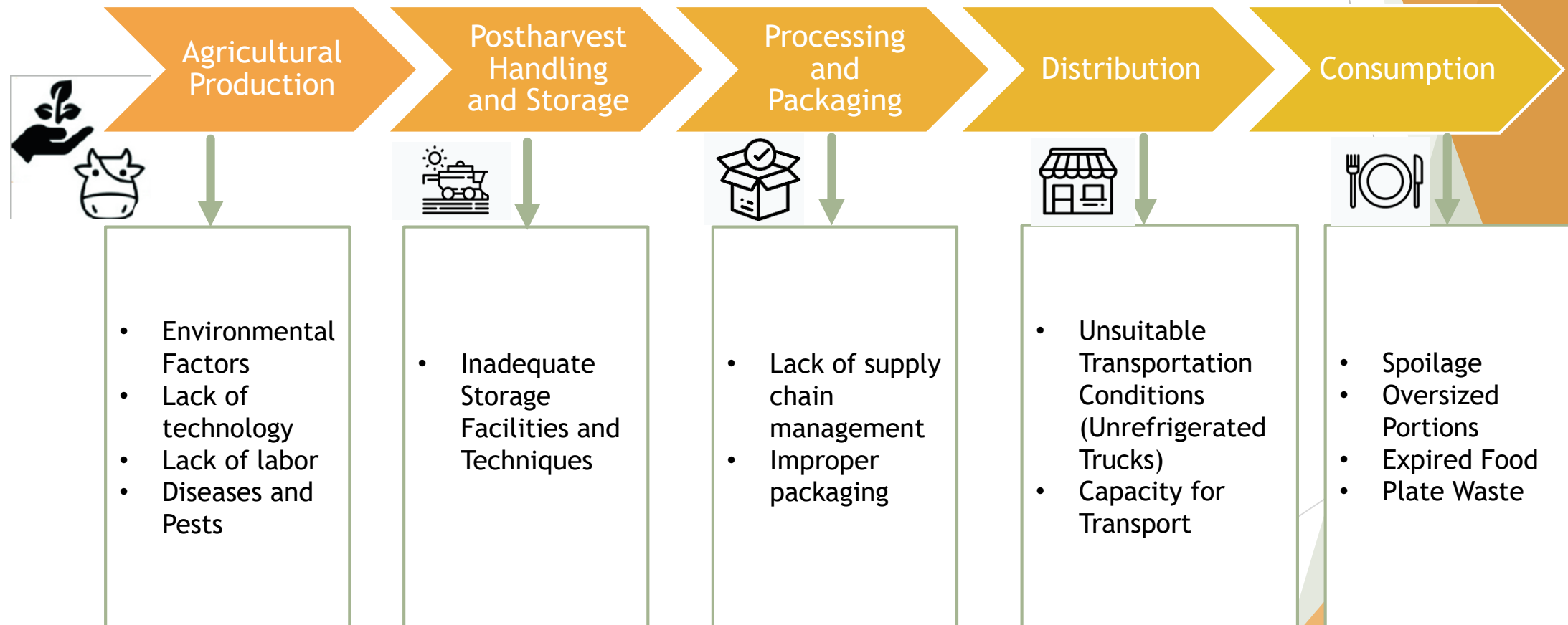


Food loss and Waste

- Food loss and waste in supply chain is a growing problem due to its environmental, social and economic impacts.
- Food loss and waste occurs at different stages in the food supply chain (Salihoglu et al., 2018).
- The most significant food loss and waste from farm to fork occurs in early and middle stages of the food supply chain (close to the farm) in **developing countries**, whereas mainly at later stages at the retail and consumption (close to the fork) in **developed countries** (Parfitt et al., 2010).



Some Reasons of Food loss and Waste in food supply chain



Food loss and waste in TURKEY

STATISTICAL INFORMATION

Statistics About Food Sector In Turkey

- Turkey, thanks to its fertile soil, adequate climate, and abundant rainfall, is one of the few self-sufficient countries in the world in terms of food (Tatlıdil et al., 2013; TUIK, 2019).
- Turkey is an agricultural country.
- In addition, animal husbandry is the most important source of income in mountainous eastern regions.

MACRO INDICATORS	DATA
Population	83 million 154 thousand 997
Food and Agriculture Export (Billion \$)	\$16.21
Food and Agriculture Import (Billion \$)	\$11.51

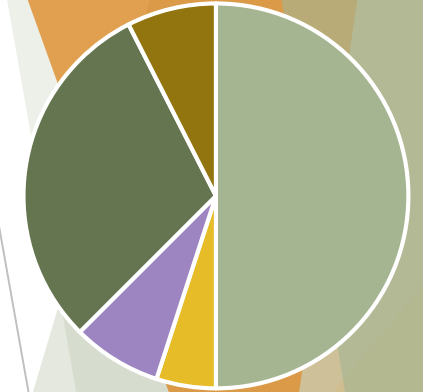
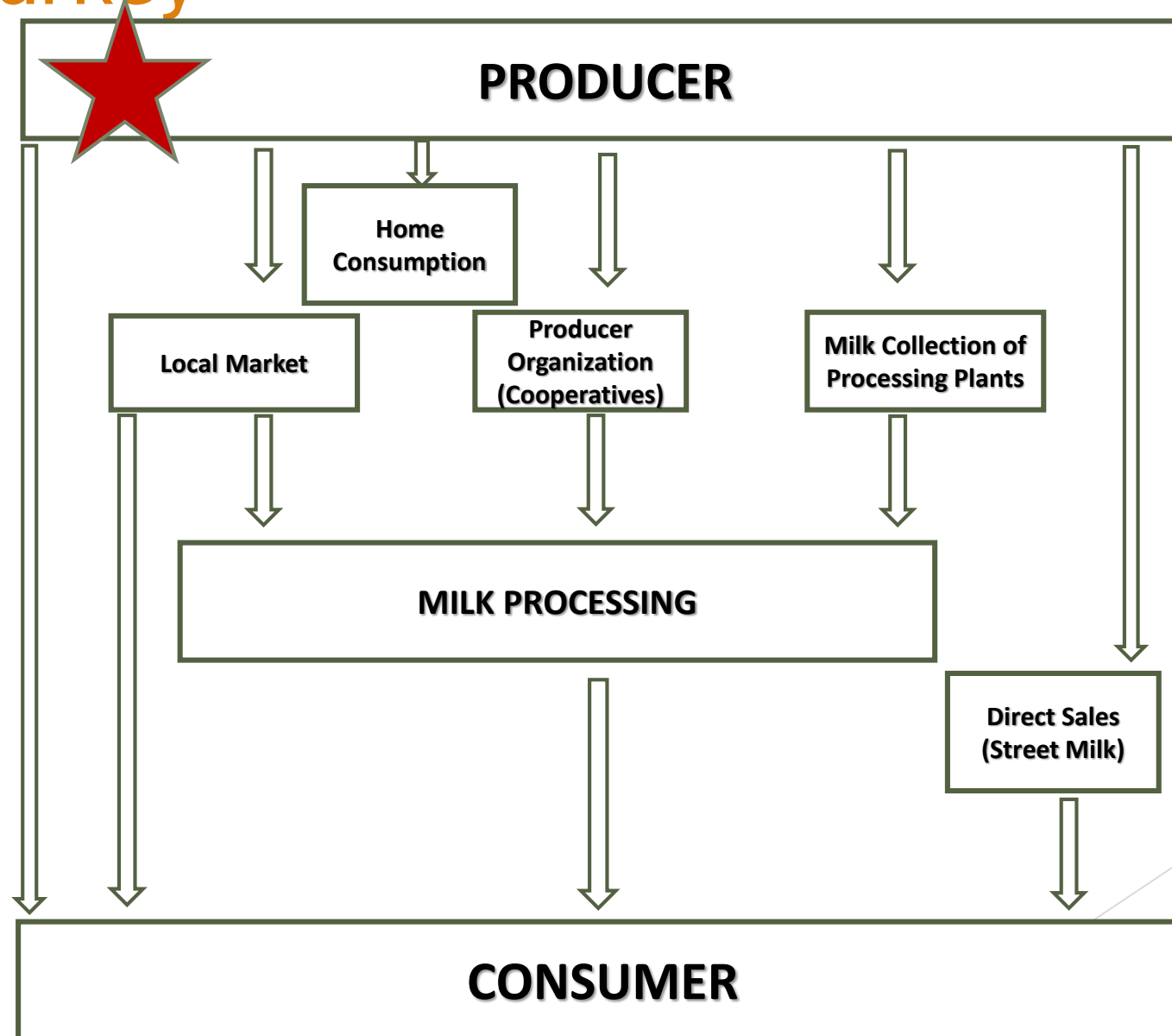
Food loss and Waste in Turkey

Statistical information

- In Turkey, there has been an increase in the types and amounts of loss & waste due to *the increase in welfare level, rapid growth in the field of economy, urbanization and population growth* (Salihoglu et al., 2018).
- Turkey's total annual food waste is **214 billion TL** (TUIK, 2017).

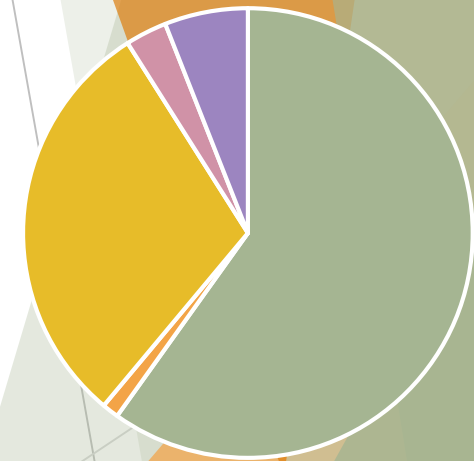
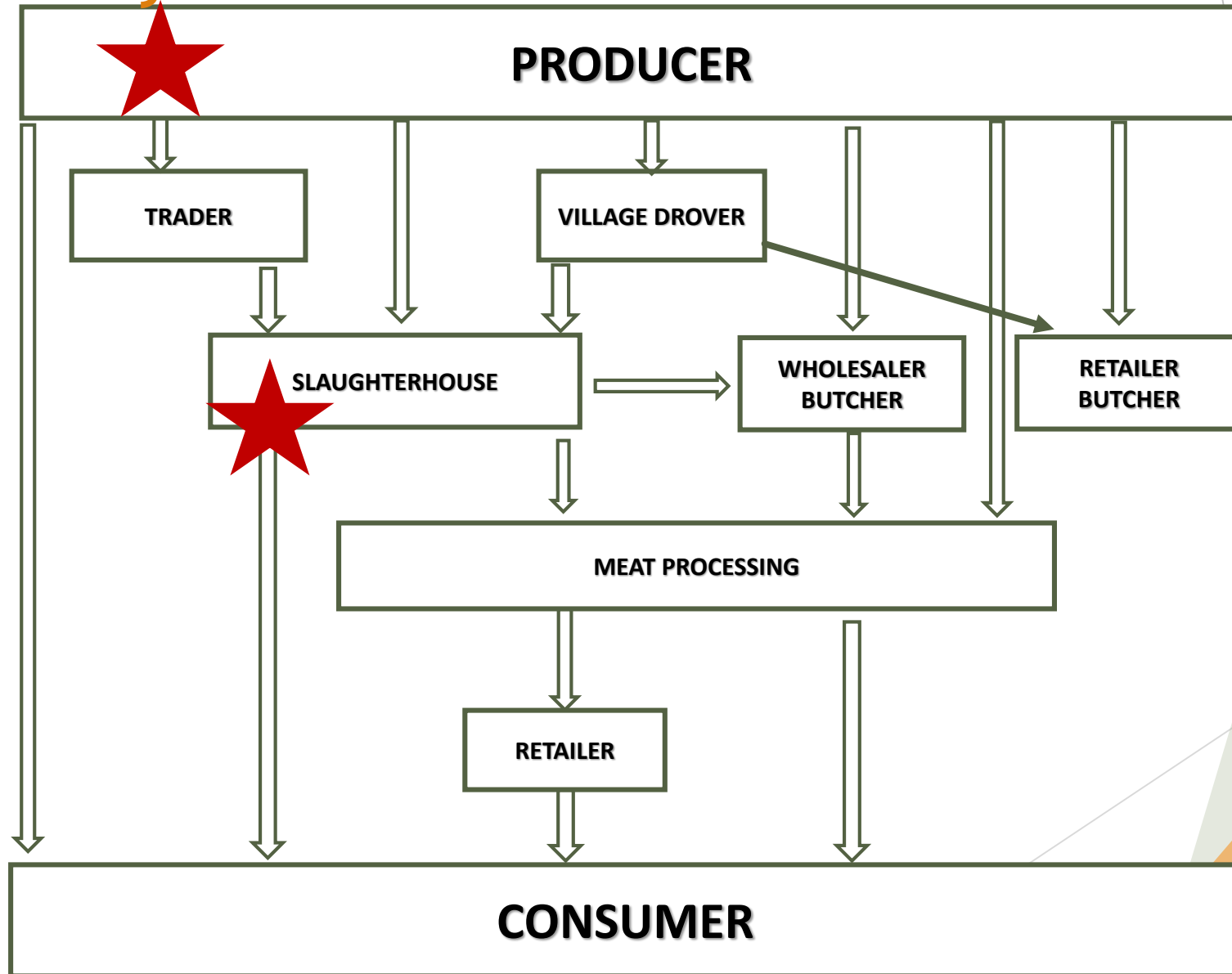


Milk Food Supply Chain and Critical Loss Points In Turkey



- Agricultural Production
- Postharvest Handling and Storage
- Processing and Packaging
- Distribution
- Consumption at Household Level

Meat Food Supply Chain and Critical Loss Points In Turkey



- Agricultural Production
- Postharvest Handling and Storage
- Processing and Packaging
- Distribution
- Consumption at Household Level

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THANK YOU