INTERNATIONAL AGRIFOOD MARKETS AND POLICY

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1. Agri-food markets

1.1 Demand and supply of agri-food products

1.2 Market models in agri-food sectors

1.3 Instability and uncertainty in agriculture

1.1 - Demand and supply of agri-food products
1.2 - Market models in agri-food sectors
1.3 – Instability and uncertainty in agriculture

Specific discussion Topics are:

- ✓ Characteristics of agri-food demand
- ✓ Characteristics of agri-food supply
- ✓ The theoretical market models in agri-food sectors

Characteristics of agri-food demand

The traditional microeconomic theory does not investigate consumer motivation and consumer behavior.

These are an exogenous elements of demand function, also in the case of agri-food demand

The traditional type of goods are:

➢ Normal goods

➢ Necessary goods

➢ Luxury goods

➢ Inferior and superior goods

The Engel's law is used to individuate the type of goods

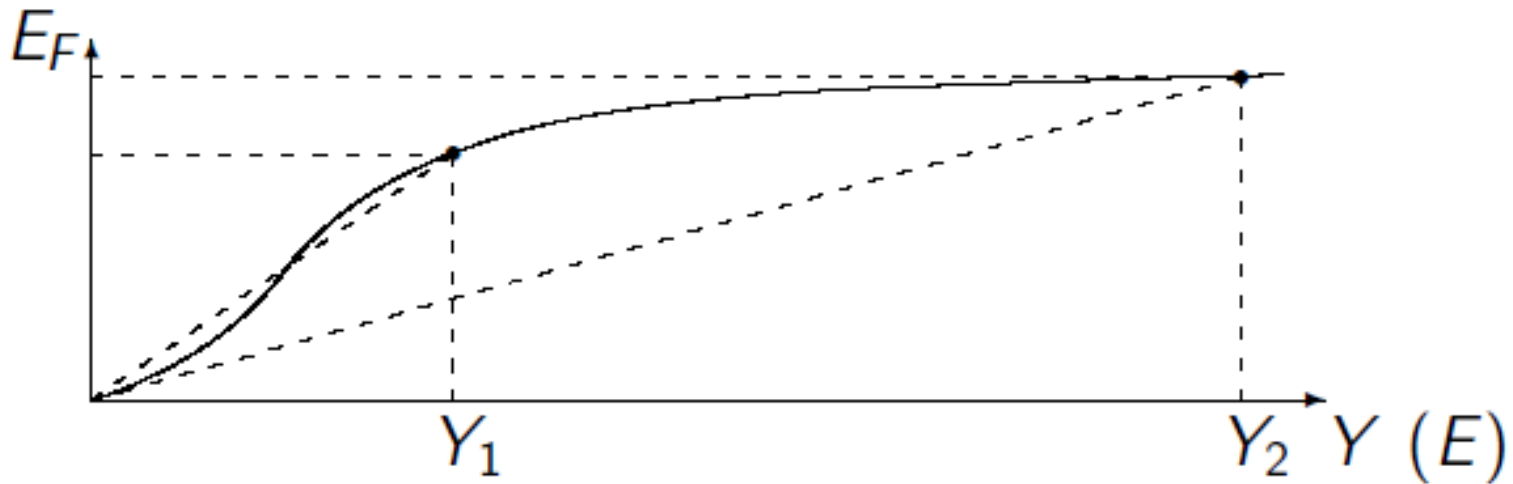# Characteristics of agri-food demand

- The agri-food products are classified as normal goods and, in many cases, as necessary goods.

- Inelastic income elasticity of demand for staple foods: as per capita income rises, declining proportion of household expenditure is devoted to food.

- By Engel's law, as per-capita income rises, the proportion of income spent on food declines relative to other products.

Characteristics of agri-food demand

- An increase in income (or total expenditure) leads to a less than proportionate increase in food expenditure.

- The income elasticity of food demand is less than 1

Characteristics of agri-food demand

Engel's law

Y= income
E= total expenditure
E_F= expenditure in food products

Characteristics of agri-food demand

Agri-food products = commodities

In economics, a commodity is an economic good or service that has full or substantial fungibility: that is, the market treats instances of the good as equivalent or nearly so with no regard to who produced them.

The price of a commodity good is typically determined as a function of its market as a whole: well-established physical commodities have actively traded spot and derivative markets.

Most commodities are raw materials, basic resources, or agricultural products, such as iron ore, sugar, or rice.

Characteristics of agri-food demand

Agri-food products = normal (necessary) goods

Agri-food products = commodities

Commodities   ➡️   perfect competition markets

perfect competition markets is microeconomic model to analyse the agri-food markets

Characteristics of agri-food demand

In the recent decade the study about food includes a multidisciplinary approach.

These studies are inter-disciplinary social science that blends elements from psychology, sociology, social anthropology, ethnography, marketing and economics.

The aims of this researches is to set up a model to understand the factor that influence the purchasing and consumption of food and predict the consumer behavior.

The results can be useful for marketing of firms, agri-food policy, nutritional guidelines, health policy,...

Characteristics of agri-food demand

In this way it is also possible to individuate different type of agri-food product and understand the differentiation or not differentiation process of agri-food products on the markets.

Different approach to analyze the consumer behavior and the demand:

Among these:

➢ Maslow approach

➢ Consumer behaviour studies

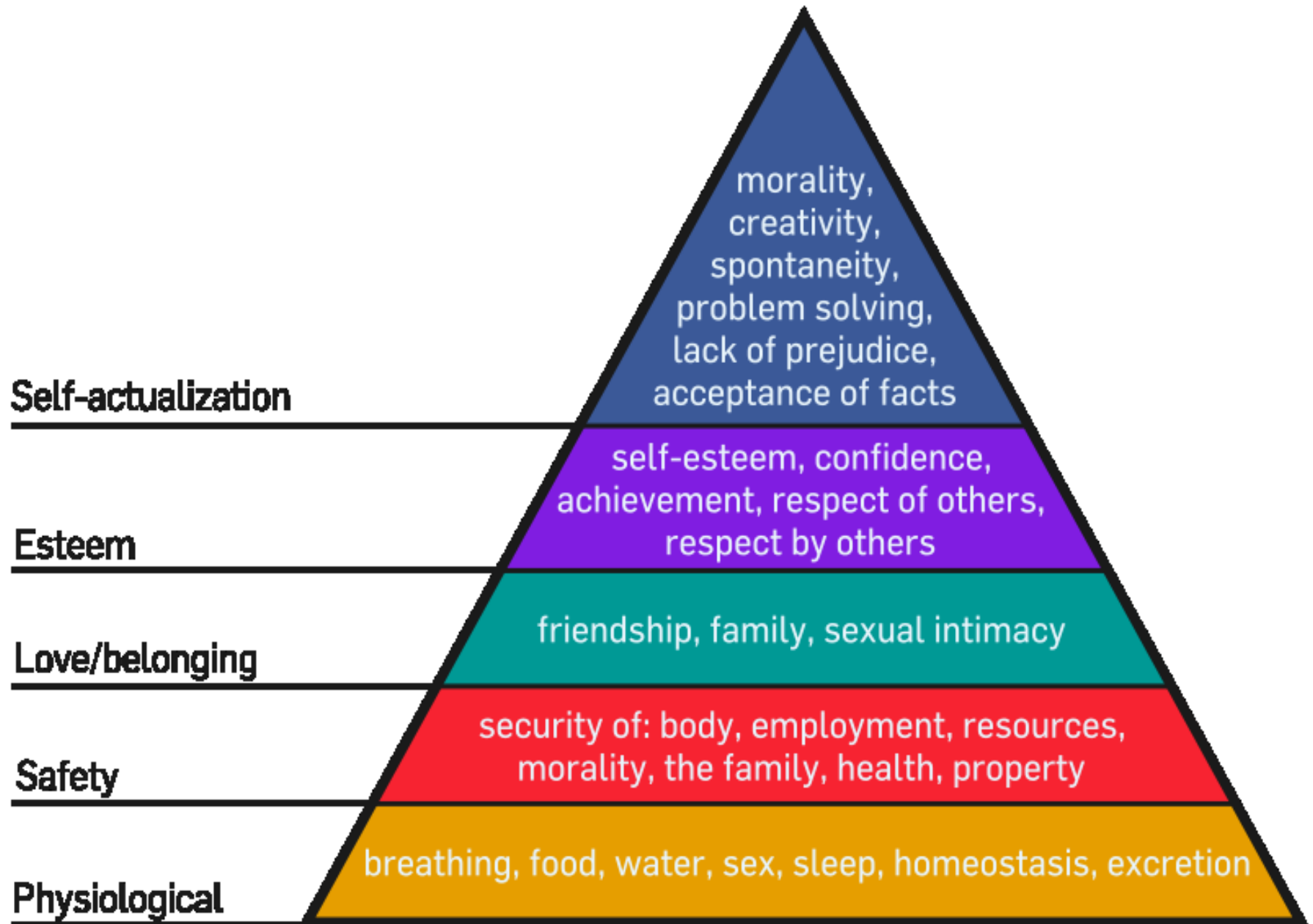➢ New theory of consumer demand (Lanchaster approach)

➢ Others …..

Characteristics of agri-food demand

Maslow approach:

The most widely known academic model of needs was proposed by psychologist, Abraham Maslow, in 1943.

His theory proposed that people have a hierarchy of psychological needs, which range from basic physiological or lower order needs such as food, water and safety (e.g. shelter) through to the higher order needs such as self-actualization.

Characteristics of agri-food demand

Self-actualization — morality, creativity, spontaneity, problem solving, lack of prejudice, acceptance of facts

Esteem — self-esteem, confidence, achievement, respect of others, respect by others

Love/belonging — friendship, family, sexual intimacy

Safety — security of: body, employment, resources, morality, the family, health, property

Physiological — breathing, food, water, sex, sleep, homeostasis, excretion

Characteristics of agri-food demand

Maslow approach:

People tend to spend most of their resources (time, energy and finances) attempting to satisfy these basic before the higher order needs of belonging, esteem and self-actualization become meaningful.

Maslow's approach is a generalised model for understanding human motivations in a wide variety of contexts, but must be adapted for specific contexts.

One difficulty with a psychological theory of needs is that conceptions of "need" may vary radically among different cultures or among different parts of the same society.

Characteristics of agri-food demand

Consumer behavior study:

The study of consumer behavior is concerned with all aspects of purchasing behavior - from pre-purchase activities through to post-purchase consumption, evaluation and disposal activities.

It is also concerned with all persons involved, either directly or indirectly, in purchasing decisions and consumption activities including brand-influencers and opinion leaders.

Characteristics of agri-food demand

Example of consumer behavior approach
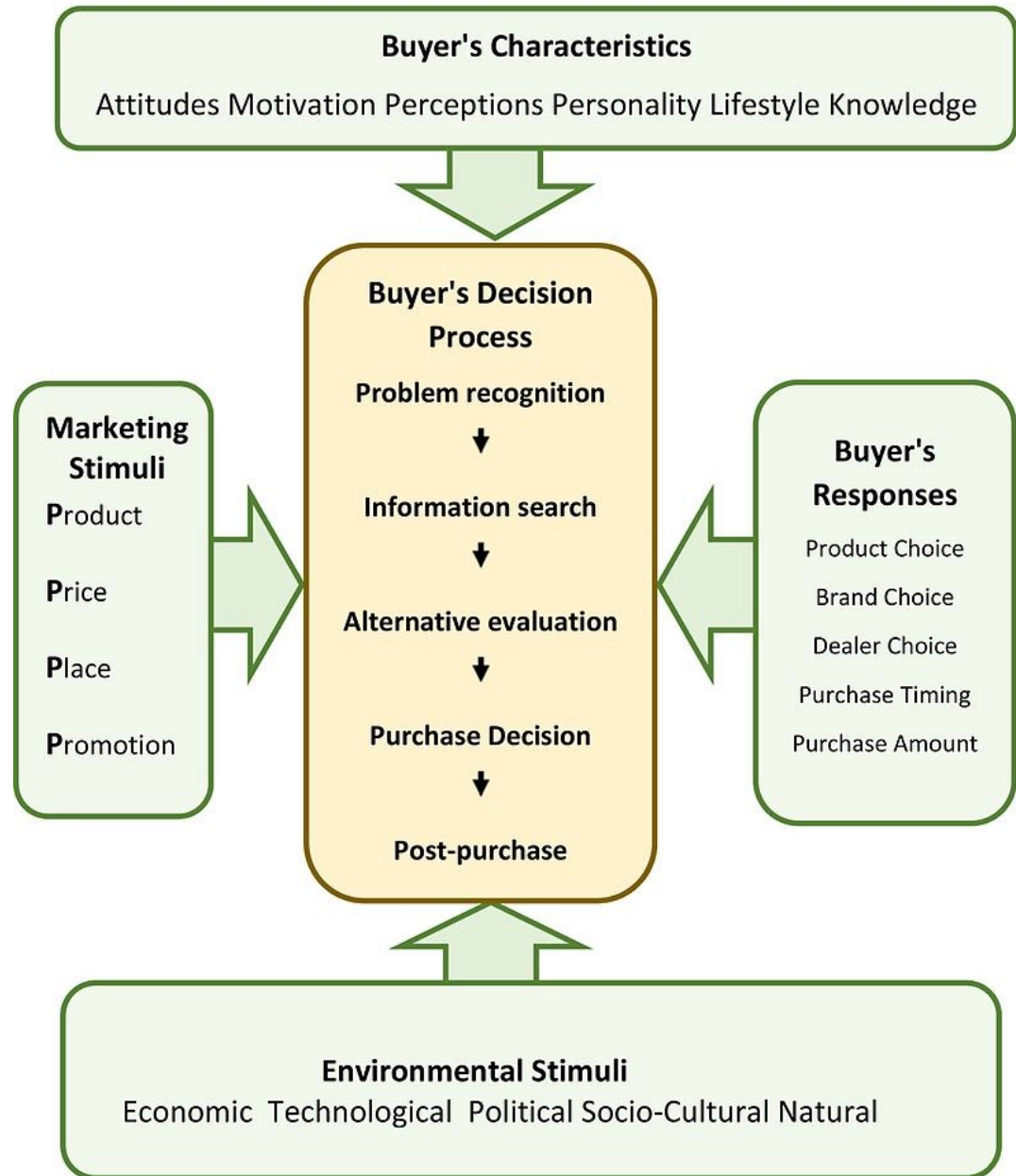
Characteristics of agri-food demand

Consumer behavior study:

Research has shown that consumer behavior is difficult to predict, even for experts in the field.

However, new research methods such as ethnography and consumer neuroscience are shedding new light on how consumers make decisions.

Characteristics of agri-food demand

New theory of consumer demand (Lancaster approach):

In a 1966 paper, Kevin Lancaster developed what he called a "new theory of consumer demand", in which the then standard microeconomic demand theory was modified by stipulating that what consumers are seeking to acquire is not goods themselves (e.g. cars or train journeys) but the characteristics they contain (e.g. transport from A to B, display of fashion sense).

Characteristics of agri-food demand

**New theory of consumer demand
(Lancaster approach):**

This approach allows us to predict how preferences will change when we change the options or baskets presented to consumers by studying how these vary according to the change in the characteristics that make them up.

With conventional theory, the introduction of a new option meant that we could not reliably predict how this would slot into the consumer's preference map.

Characteristics of agri-food demand

New theory of consumer demand
(Lancaster approach):

However, by relying on a study of the characteristics rather than the goods or service involved, we can predict how changes will affect a consumer's behavior without needing to start once again empirically.

This allows us to calculate 'shadow prices' for different attributes without having a price for the good itself by associating utility to the characteristics that make up the good rather than the good itself.

Characteristics of agri-food demand

**New theory of consumer demand
(Lancaster approach):**

With these 'shadow prices', we can solve utility maximization problems for baskets or options for which we do not have empirical evidence, as Lancaster demand also lends itself to building utility functions (based on the amount of each type of characteristic rather than the amount of each type of good in a particular basket).

Characteristic demand theory also helps justify the existence of brands.

Characteristics of agri-food demand

**New theory of consumer demand
(Lancaster approach):**

Luxury brands are able to get a higher price for their products by differentiating themselves from competitors who sell similar products.

This approach is also used to analyze the demand of agri-food products and the characteristics of them.

For examples: the influence of brand, organic products certification, Fair Trade labels and so on

Characteristics of agri-food demand

These new approaches point out that the demand of food is complex and differentiated.

The agri-food markets in many cases is a differentiated markets where there are not only normal (necessary) goods, but also luxury goods.

Market models in agri-food sectors

agri-food products

normal (necessary) goods

luxury goods

Agri-food products

commodities
(no differentiated products)

"specialties"
(differentiated products)

Commodities ⟹ perfect competition model

"specialties" ⟹ imperfect competition model
(monopolistic competition)

Market models in agri-food sectors

The perfect competition model is adopted to analyze the market function and the farmer's behavior in the case of agri-food commodities (no differentiated products)

The imperfect competition model (monopolistic competition) is adopted to analyze the market function and the farmer's behavior in the case of agri-food "specialties" (differentiated products).

Market models in agri-food sectors

Market function and the farmer's behavior in the case of agri-food commodities mainly concern the instability and uncertainty in agriculture.

This problem involves some related issues such as:

- Food security

- Supply instability

- Farm income instability

- Market price fluctuation

Market models in agri-food sectors
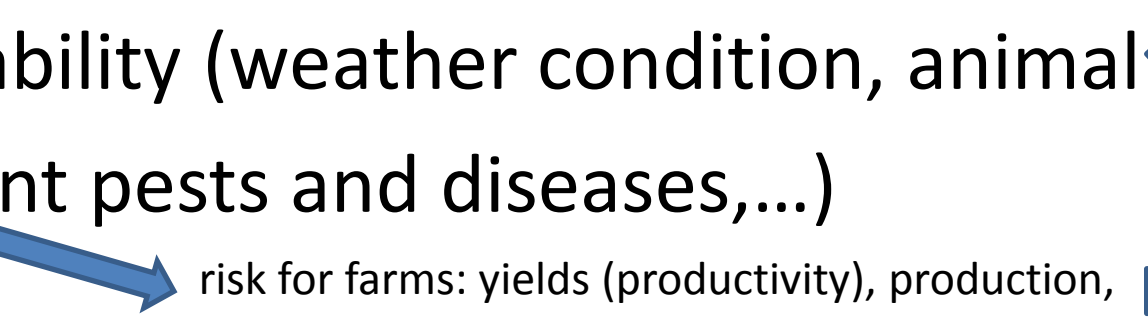
Market function and the farmer's behavior in the case of agri-food specialties mainly concern the quality of agri-food products and their certification.

This problem involves some related issues such as:

- Food safety

- Quality definition

- Asymmetric information and market failure

- Quality certification

Instability and uncertainty in agriculture

Main agri-food characteristics and problems

➢ Food = necessary goods (food security)

➢ Supply instability (weather condition, animal disease, plant pests and diseases,…)

risk for farms: yields (productivity), production, revenues, income and profit

➢ Price fluctuation

➢ Agriculture = marginal sector in economic growth

➢ Asymmetric information about food characteristics (food safety and food quality)

Instability and uncertainty in agriculture

- ✓ Many agricultural commodities exhibit inelastic consumer demand
- ✓ Individual farmers lack market power
  - ➢ In contrast to some input suppliers
- ✓ Interest sensitivity
  - ➢ Capital intensive operations
  - ➢ Production credit
  - ➢ Capital purchases
- ✓ International trade important market
  - ➢ Tends to be more volatile
- ✓ Asset fixity and excess capacity

Instability and uncertainty in agriculture

✓ Farms and ranchers in the aggregate exhibit conditions of perfect competition
  - ➢ Large number of producers
  - ➢ Producing a homogenous product (i.e., corn, soybeans, wheat, etc)
  - ➢ No one farmer has sufficient market power to influence the market equilibrium price
    - ✓ If a single producer suffers a disastrous year in terms of yield, he alone will suffer as market price is not impacted

Instability and uncertainty in agriculture

Effects of Inelastic Demand on Farm Revenue
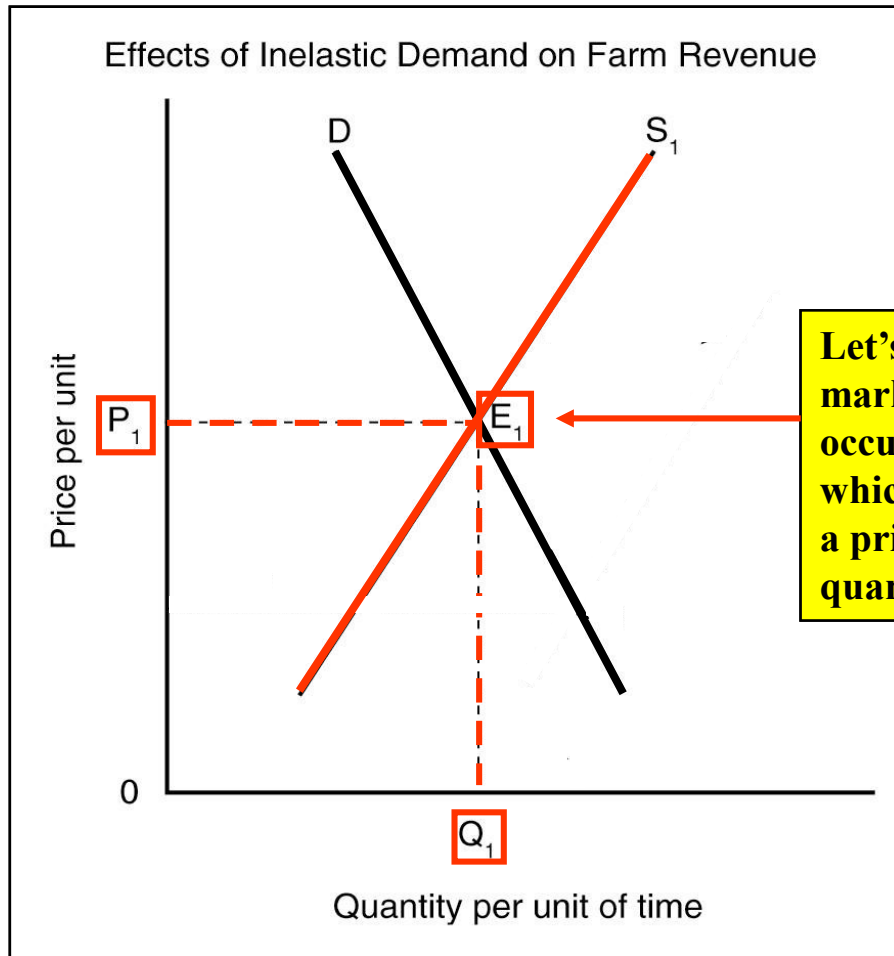
Let's assume that the market equilibrium occurs at point E_1, which corresponds to a price of P_1 and a quantity of Q_1.

Instability and uncertainty in agriculture
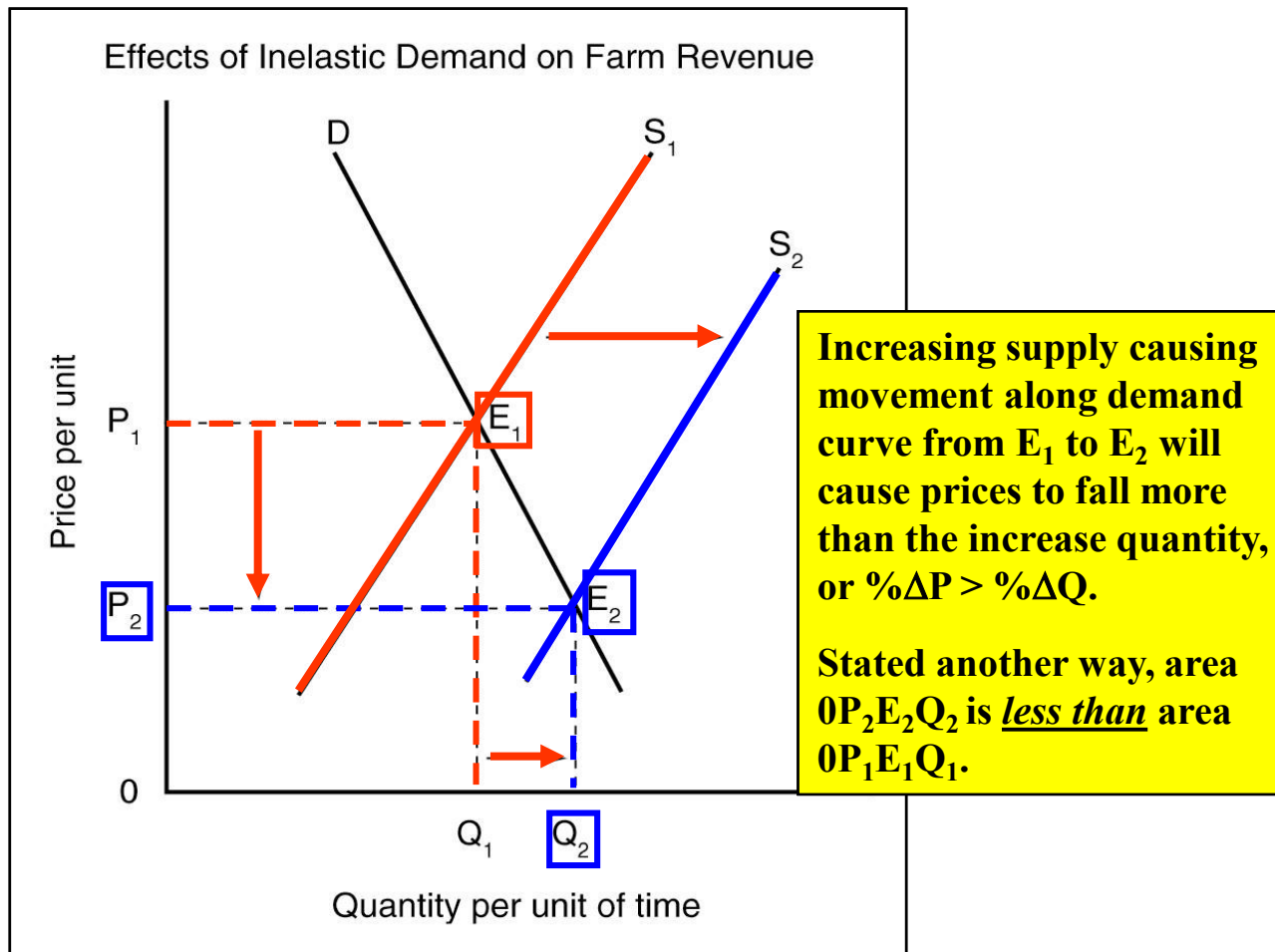
Effects of Inelastic Demand on Farm Revenue

Increasing supply causing movement along demand curve from E_1 to E_2 will cause prices to fall more than the increase quantity, or $\%\Delta P > \%\Delta Q$.

Stated another way, area $0P_2E_2Q_2$ is *less than* area $0P_1E_1Q_1$.

Instability and uncertainty in agriculture

Own Price Elasticity of Demand

Own price elasticity of demand

$$\eta_{ii} = \frac{\text{Percentage change in quantity demanded (Q)}}{\text{Percentage change in its own price (P)}}$$

Point Elasticity Approach:

Own price elasticity of demand $= \left(\dfrac{\Delta Q}{Q_a}\right) \Big/ \left(\dfrac{\Delta P}{P_a}\right) = \dfrac{\Delta Q}{\Delta P}\dfrac{P_a}{Q_a}$

% Δ in Q

% Δ in P

$\Delta Q = (Q_a - Q_b)$

$\Delta P = (P_a - P_b)$

Single point on curve

P_a

P_b

$\$$

Q

Q_a Q_b

✓ **The subscript**
- ***a*** stands for *after price change*
- ***b*** stands for *before price change*
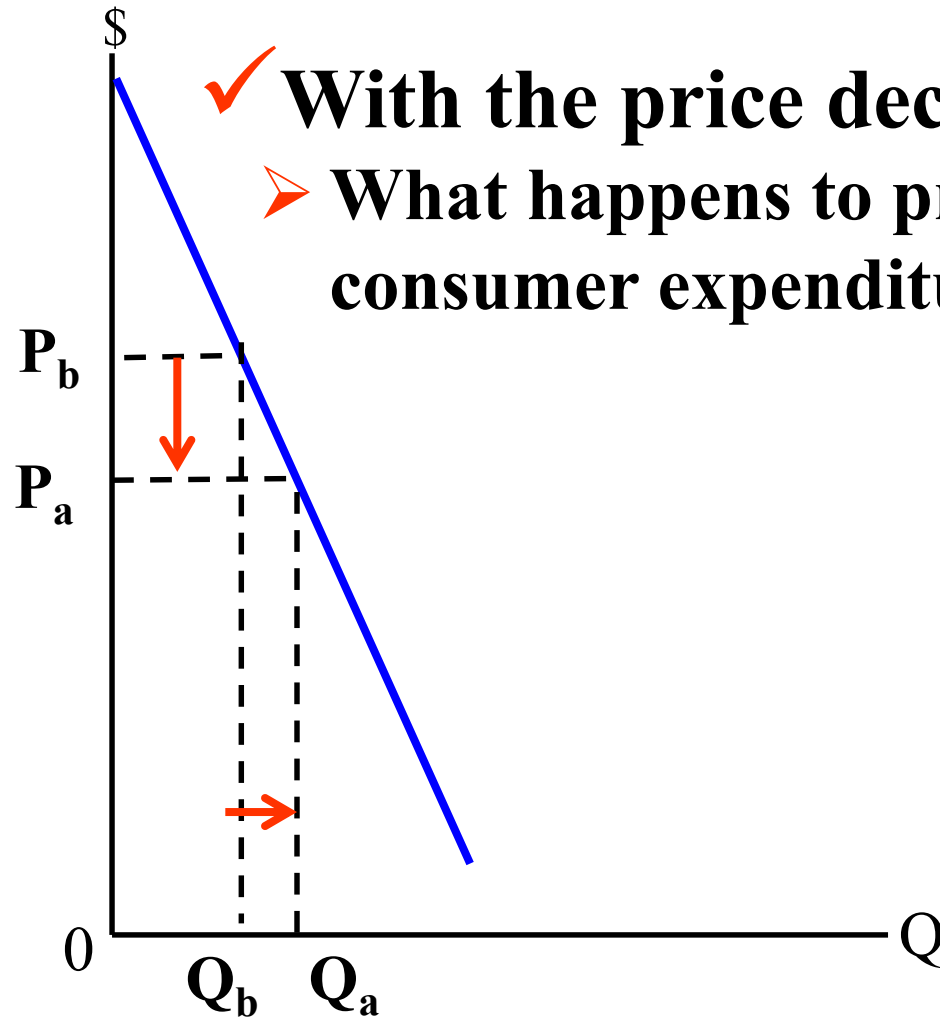
Instability and uncertainty in agriculture
Own Price Elasticity of Demand

Own price elasticity of demand

$$\eta_{ii} = \frac{\text{Percentage change in quantity}}{\text{Percentage change in own price}}$$

Specific range on curve

Arc Elasticity Approach:

Own price elasticity of demand $= \dfrac{\Delta Q}{\overline{Q}} \Big/ \dfrac{\Delta P}{\overline{P}} = \dfrac{\Delta Q}{\Delta P}\dfrac{\overline{P}}{\overline{Q}}$

where:

Avg Price $\longrightarrow$ $\overline{P} = (P_a + P_b) \div 2$

$\overline{Q} = (Q_a + Q_b) \div 2$

Avg Quantity

$\Delta Q = (Q_a - Q_b)$
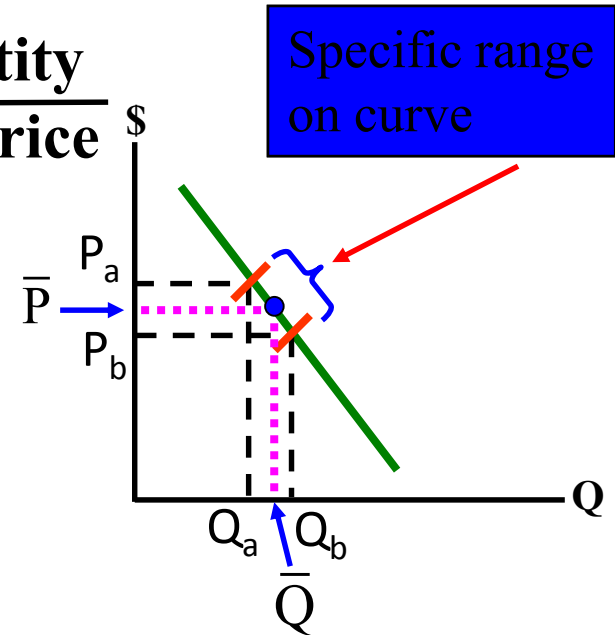
$\Delta P = (P_a - P_b)$

✓ **The subscript**
- ***a* stands for *after price change***
- ***b* stands for *before price change***

Instability and uncertainty in agriculture

Interpreting the Own Price Elasticity of Demand

If Elasticity Measure is:	Demand is said to be:	%Δ in Quantity is:
Less than −1.0	Elastic	Greater than %Δ in Price
Equal to −1.0	Unitary Elastic	Same as %Δ in Price
Greater than −1.0	Inelastic	Less than %Δ in Price

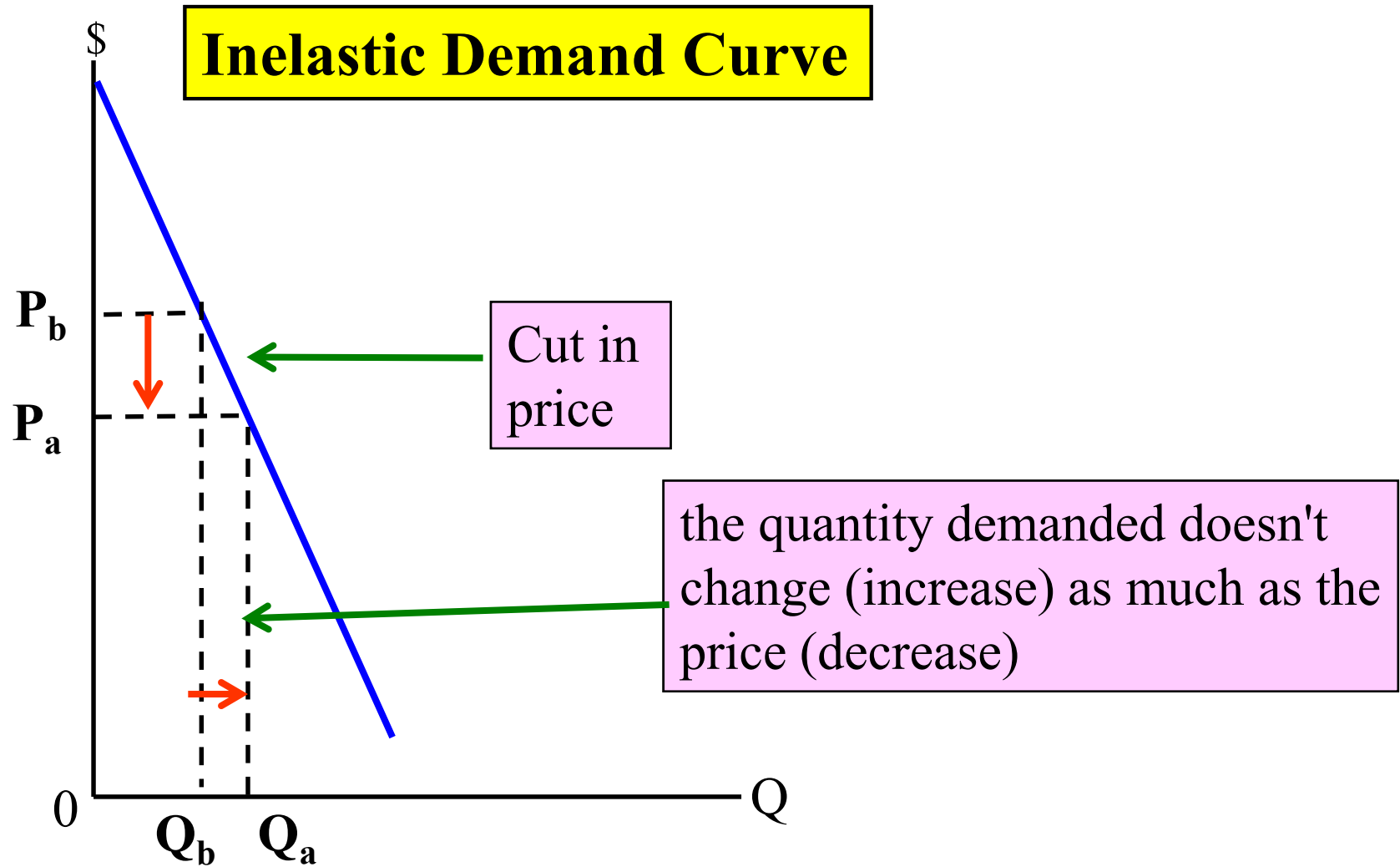Note: The %Δ in Q is in terms of the absolute value of the change

Instability and uncertainty in agriculture

Inelastic Demand Curve

✓ **With the price decrease from P_b to P_a**
   ➤ **What happens to producer revenue (or consumer expenditures)?**

Instability and uncertainty in agriculture
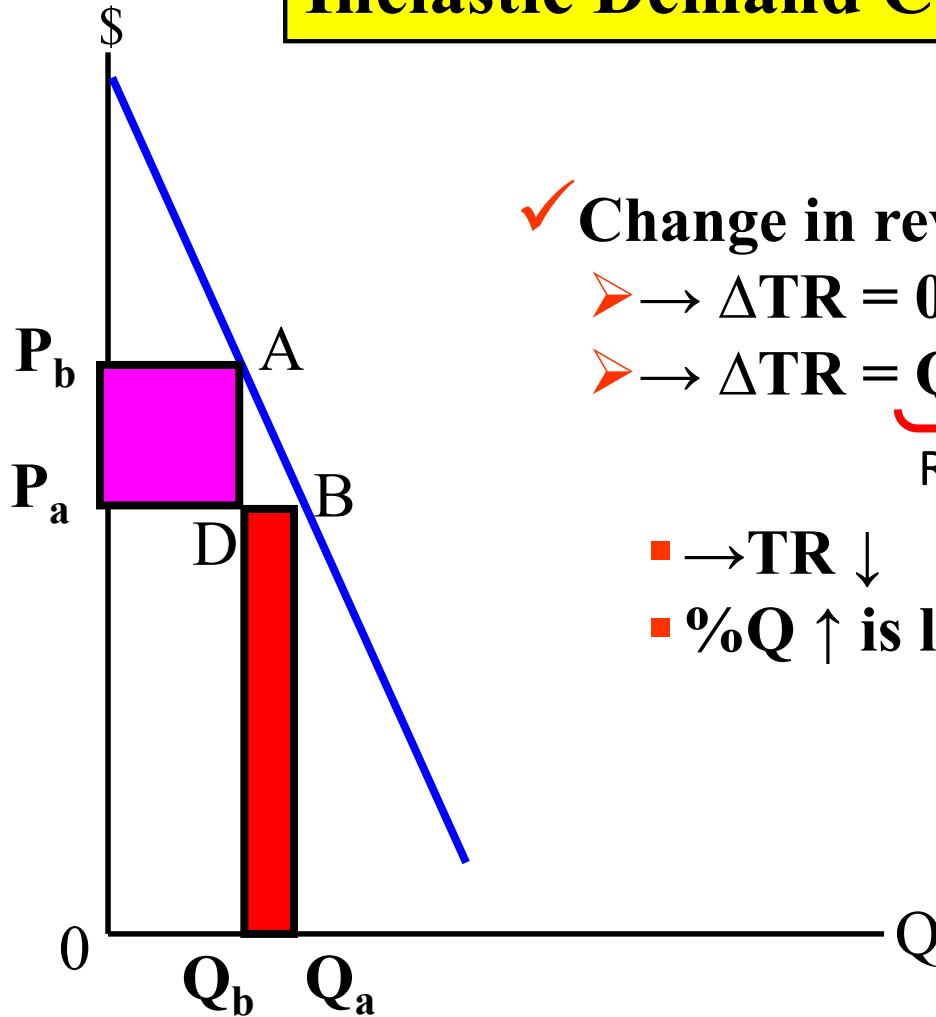
Instability and uncertainty in agriculture

Inelastic Demand Curve
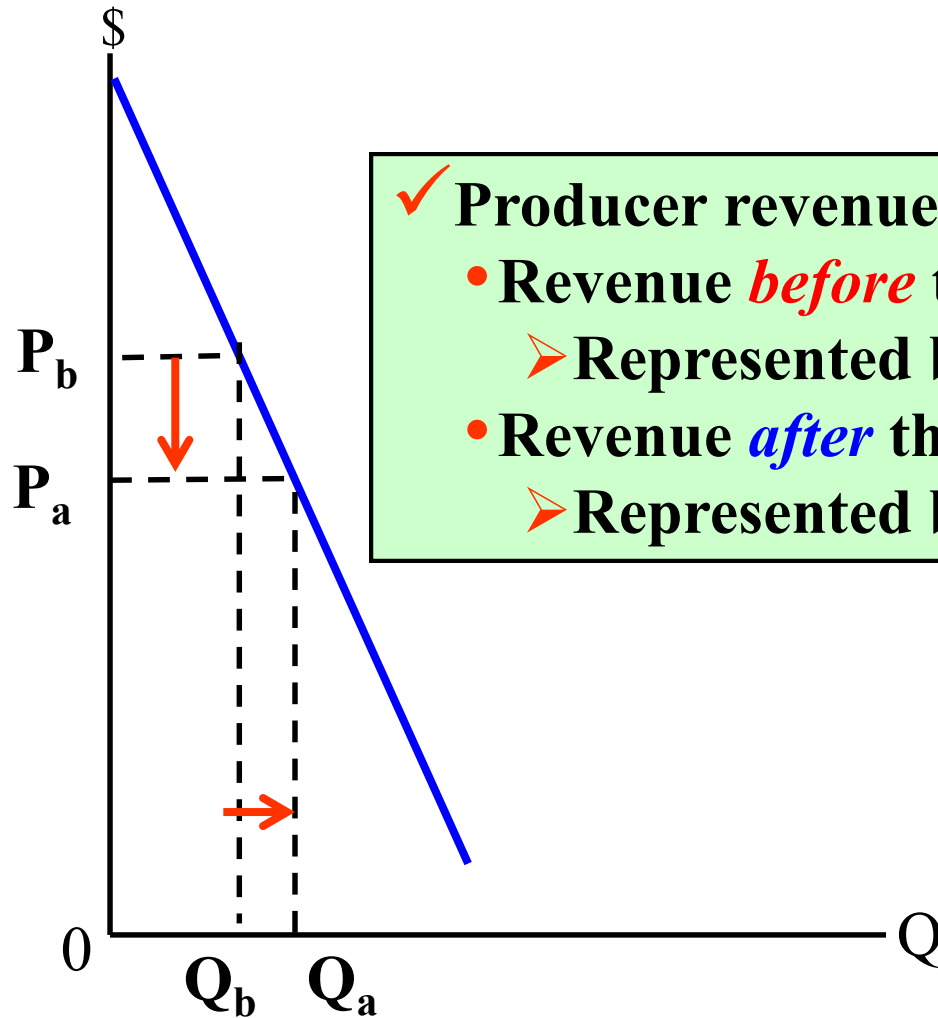
✓ **Producer revenue (TR) = price x quantity**
- **Revenue *before* the change (TR$_b$) is P$_b$ x Q$_b$**
  - ➤ **Represented by the area 0P$_b$AQ$_b$**
- **Revenue *after* the change is (TR$_a$) is P$_a$ x Q$_a$**
  - ➤ **Represented by the area 0P$_a$BQ$_a$**

Instability and uncertainty in agriculture

Inelastic Demand Curve

✓ **Change in revenue (ΔTR) is TR$_a$ – TR$_b$**

➢ $\rightarrow \Delta$**TR = 0P$_a$BQ$_a$ – 0P$_b$AQ$_b$**

➢ $\rightarrow \Delta$**TR = Q$_b$DBQ$_a$ – P$_a$P$_b$AD**

Red Box   Purple Box

▪ $\rightarrow$**TR ↓**

▪ **%Q ↑ is less than %P ↓**

Instability and uncertainty in agriculture

Inelastic Demand Curve
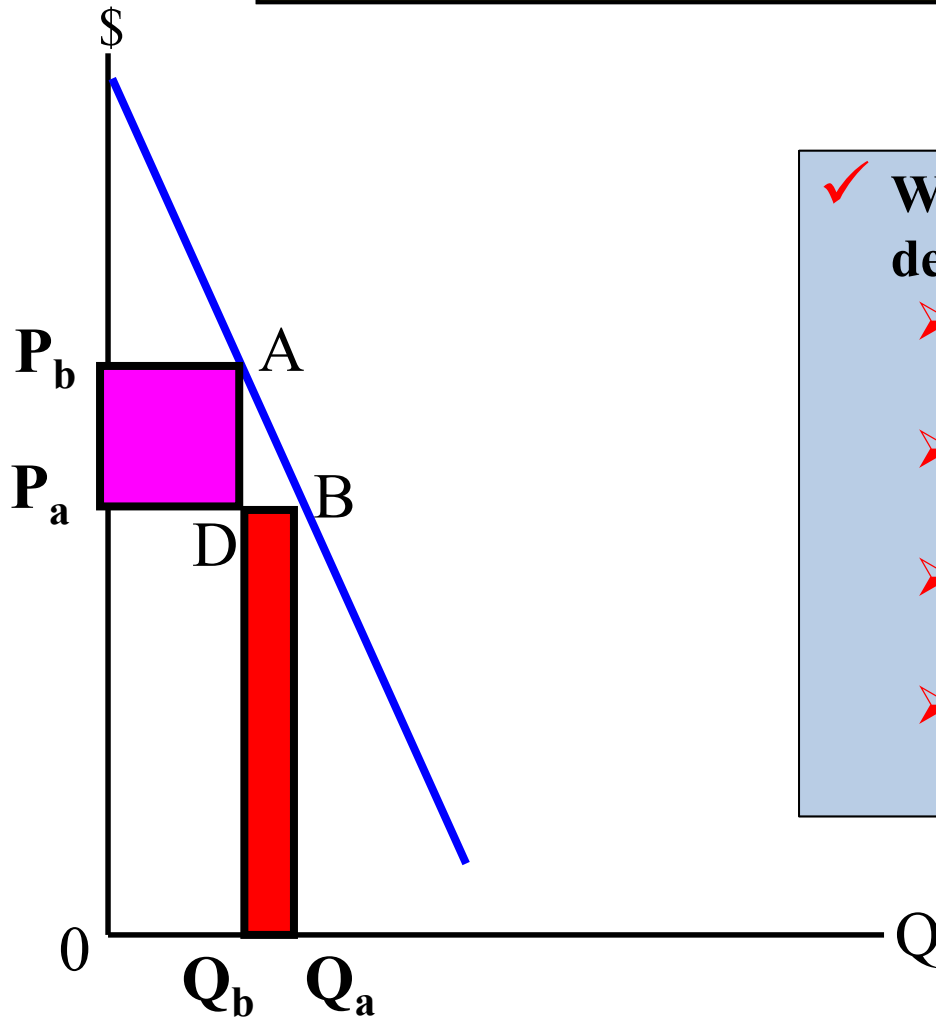
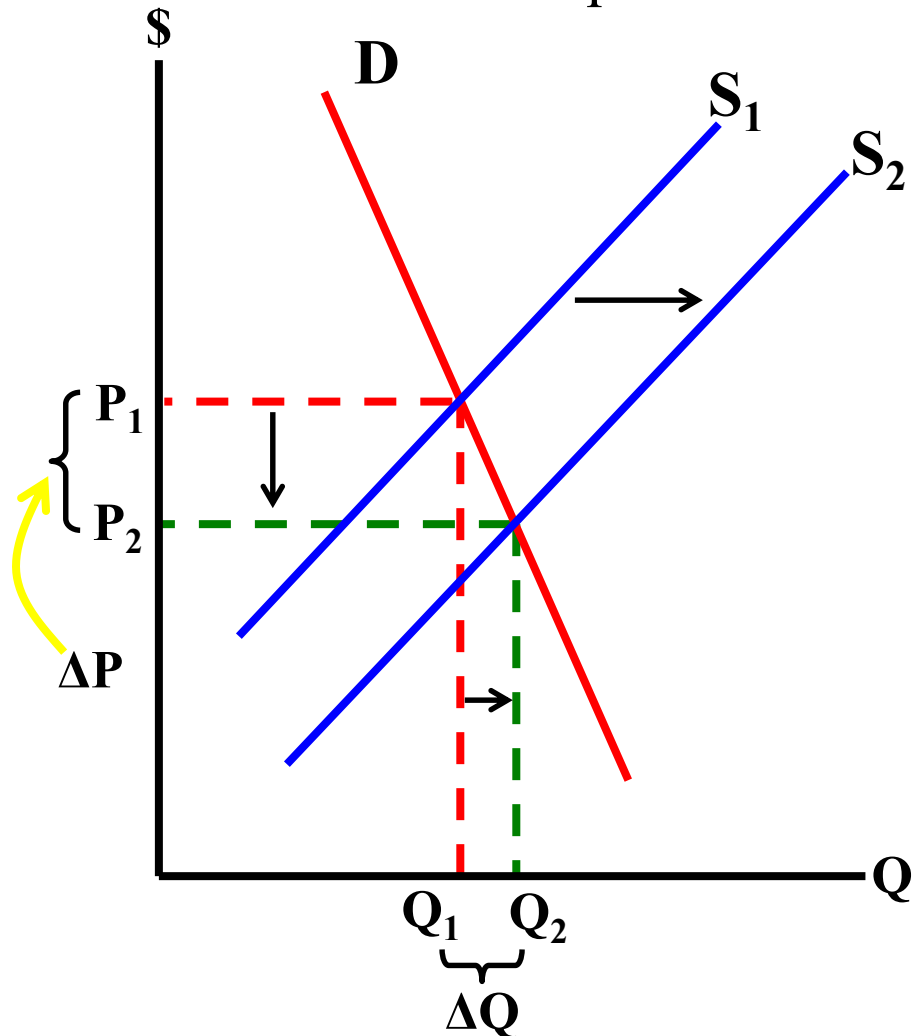- ✓ **When you have inelastic demand**
  - ➤ **↑ in price → ↑ total revenue (expenditures)**
  - ➤ **↓ in price → ↓ total revenue (expenditures)**
  - ➤ **↓ in quantity → ↑ total revenue (expenditures)**
  - ➤ **↑ in quantity → ↓ total revenue (expenditures**

# Instability and uncertainty in agriculture
The Farm Problem

Market Equilibrium

- ✔ Assume we have an inelastic demand for a particular crop
- ✔ Also assume that due to great weather conditions there is an increase in supply due to record yields
  - ➤ → A shift out of supply curve at every price
- ✔ Results in price falling *relatively* more than the market clearing quantity

Instability and uncertainty in agriculture
The Farm Problem
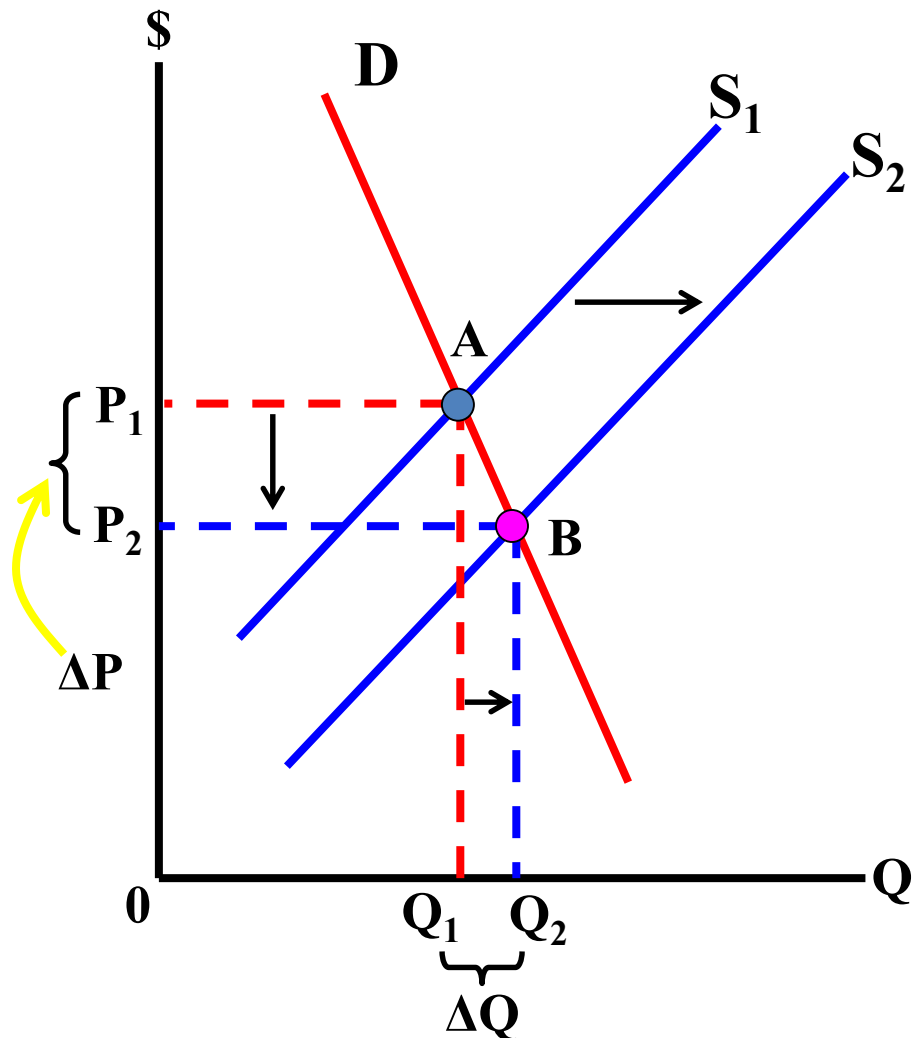
✔ What happens to total farm revenue when you have an *inelastic demand* and an *increase in supply*?

➢ Total revenue under original equilibrium was area $0P_1AQ_1$

➢ Total revenue under the new equilibrium is $0P_2BQ_2$

✔ We know that total revenue to this sector has ↓, (i.e., $0P_2BQ_2 < 0P_1AQ_1$)

➢ How do we know this?

Instability and uncertainty in agriculture

The Farm Problem
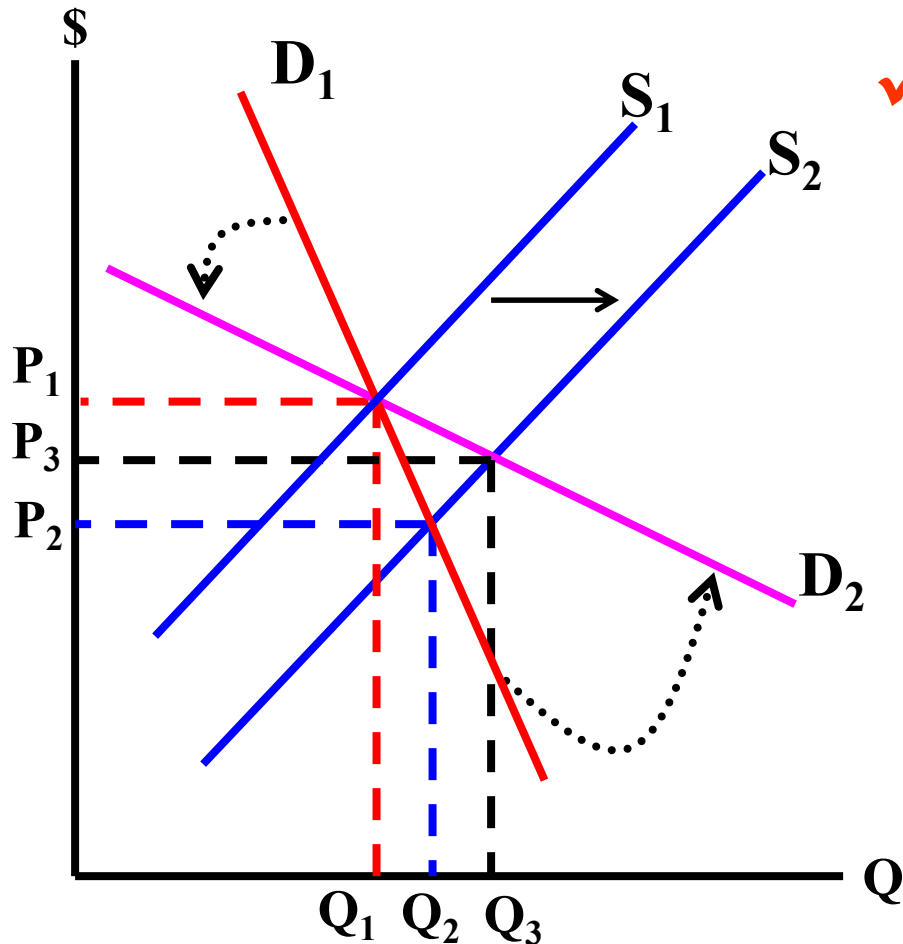
✓ In contrast, with a relatively *elastic* demand curve, D_2
  ➢ Shift in supply will result in price P_3 instead of P_2
  ➢ Shift in supply will result in quantity Q_3 rather than Q_2
  ➢ Compared to inelastic demand, a larger impact on quantity and less of an impact on price
  ➢ What happens to total revenue?