



Sustainable Water  
Integrated Management (SWIM) -  
Support Mechanism



Project funded by  
the European Union

*Water is too precious to waste*

**Cost Assessment of Water Resources Degradation (CAWRD)  
Case Study Workshop  
Economics and Environmental Principles**

**Fadi Doumani**

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# Economic and Environmental Principles

The economic theory relies on scarcity.

When limited resources cannot meet all of society's wants and needs, resources have 'scarcity value'.

A country's resources include among others natural resources, capital, labor, technology and information, etc.

# Economic and Environmental Principles

Due to the overall limited amount of such resources, individuals and governments need to make choices as to how these scarce resources are best allocated.

A crucial concept regarding the allocation of scarce resources is that of opportunity cost where available resources are allocated towards one use to the detriment of another use

Country: US\$ Billion ??

Region: US\$ Million ??

Municipality: US\$ Hundred ??

Household: US\$ Thousand ??

# Economic and Environmental Principles

Three basic economic questions which all societies must answer:

- 1. What will be produced?
- 2. How will it be produced?
- 3. Who will receive it once it is produced?

# Economic and Environmental Principles

Three answers are presented below.

- Command Economy
- Laissez-Faire Market Economy
- Mixed economies where the markets are usually managed to some extent by government intervention and regulations.

# Economic and Environmental Principles

Characteristics of the competitive market:  
many buyers and sellers who do not affect the market price or output  
buyers and sellers are free to enter and leave the market in response to price changes  
goods and services being offered for sale are identical or homogeneous.  
All the participants in the market have perfect knowledge. That is, consumers know product prices and producers know input prices.

# Economic and Environmental Principles

## Consumer behavior and demand

The demand function is a curve that indicates how much of a good a consumer will buy at various prices. Note the inverse relationship between price and quantity demanded of the Law of Demand.

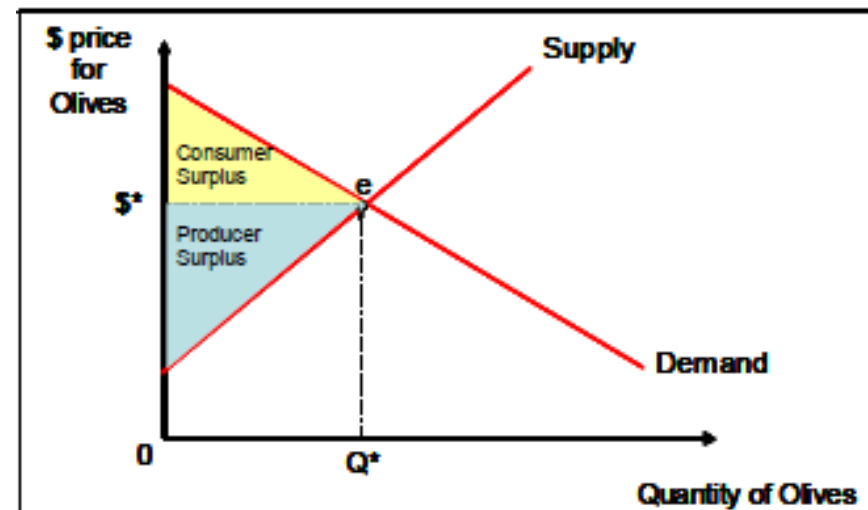
# Economic and Environmental Principles

## Perfect Competition Market

Supply and demand forces interact simultaneously in the market. Together, the forces of supply and demand determine the price of a unique balance (also called "market clearing price") \* \$, and the balance amount corresponding e. \* At this point the balance, and the amount of consumer demand completely equal quantity supplied by producers.

Consumer surplus

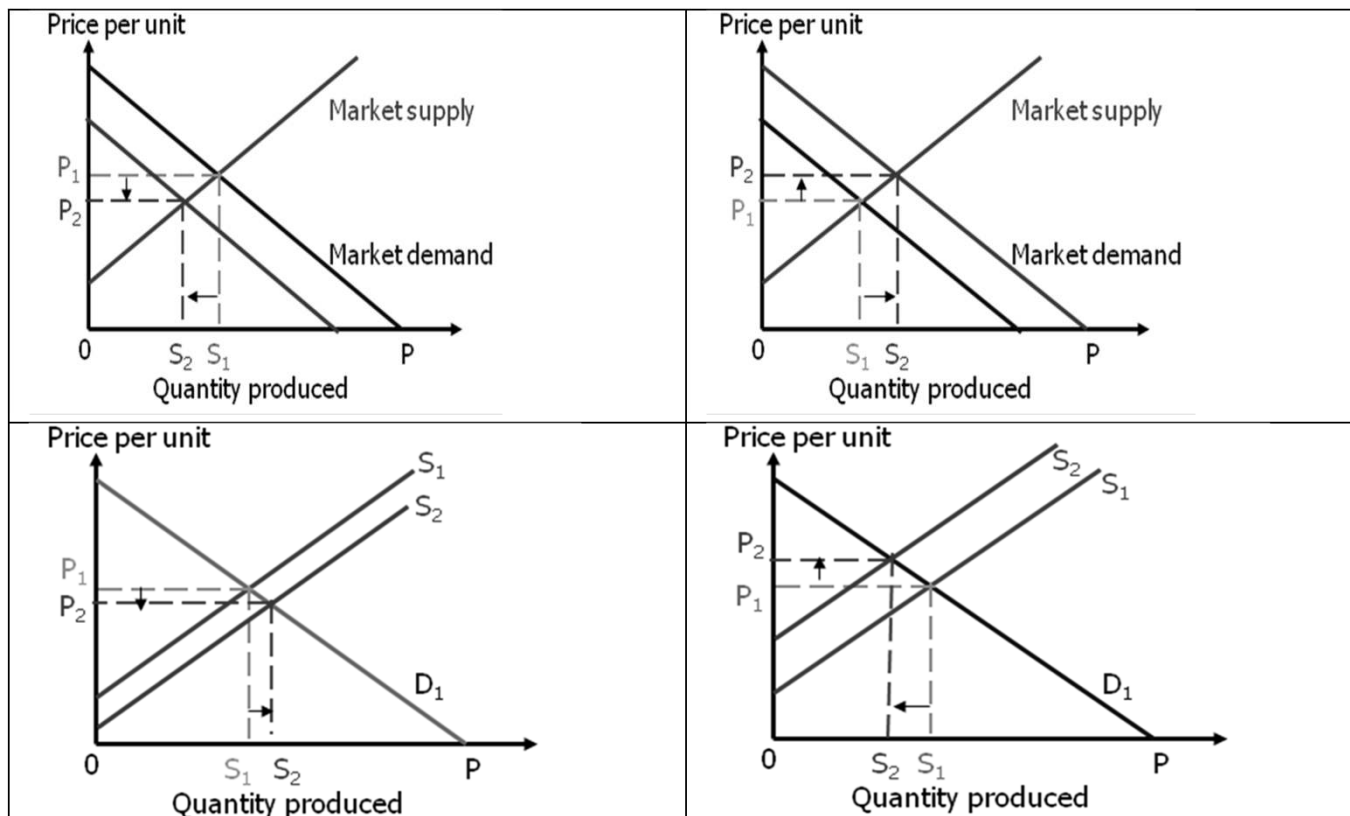
Producer surplus





# Economic and Environmental Principles

A decrease or increase in income (consumer) will make the demand curve move downward and upward respectively. A decrease or increase in input price (producer) will make the supply curve move downward or upward respectively.



# Economic and Environmental Principles

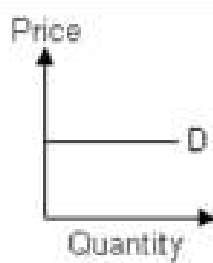


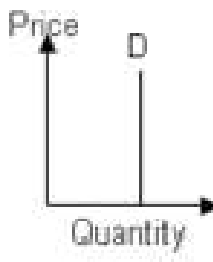
## The concept of elasticity

- The term 'elasticity' refers to the responsiveness of the quantity demanded (or supplied) to changes in other variables (e.g., price and income).

# Economic and Environmental Principles

Forms of elasticities:

e.g.,  
France water consumption after 3% tariff increase: 168 liters in 2004 to 151 liters in 2008 (-10%)

Type	Graph	Description
Perfectly elastic $ \epsilon^D  = \infty$		A small increase in the price of the good causes the quantity demanded to fall to zero. In practice, no good has perfect price elasticity.
Relatively elastic $ \epsilon^D  > 1$		A small change in the price of the good causes a relatively large change in quantity demanded. In general, most luxury goods tend to be relatively price elastic.
Relatively inelastic $ \epsilon^D  < 1$		In this case, a change in the price of the good causes little change in quantity demanded. Necessities such as food and utilities (e.g., water and energy) tend to be relatively price inelastic.
Perfectly inelastic $ \epsilon^D  = 0$		A change in the price of the good does not lead to a change in quantity demanded

# Economic and Environmental Principles

Main many causes for market failures

- **Abuse of Market Power:** Whenever a single buyer or seller in a market is able to exert significant influence over the market there is the potential for a loss in societal well being (Monopoly/Oligopoly).
- **Asymmetric Information :** Asymmetry in information refers to the situation where one side of the market knows more than the other side.

# Economic and Environmental Principles

- **Externalities** are positive or negative impacts arising from an economic activity that affects somebody other than the person engaged in the economic activity and that are not reflected fully in prices. Pollution is often cited as an example of a negative externality. Efforts to ‘internalize’ such externalities into market prices forms a central component of environmental economics

# Economic and Environmental Principles

**Public Goods** are the exact opposite of private goods and they are non-rival and non-excludable.

Good taxonomy defined in terms of: rivalry and excludability

- **Rivalry** decreases the possibility for someone else to consume: a bottle of water follows the principle of rivalry. By comparison, a television show does not obey: if a viewer does not diminish the possibility for another viewer to watch it too.

# Economic and Environmental Principles

- The principle of **excludability** is the possibility to exclude users. It is not always possible. It is possible to prohibit the entrance of a museum to those who do not pay by putting guards at the entrance, but it is not possible to prevent motorists to enjoy the lighting of roads, even if they do not pay anything for this lighting.

# Economic and Environmental Principles

From these two properties we can distinguish four categories of goods and services

**Fakra Natural Bridge**



Good Taxonomy		Excludability	
		Yes	No
Rivalry	Yes	<b>Private Good</b> Food, Clothes, Car, Cable TV etc.	<b>Common Good</b> Water resources, fisheries, oil, etc.
	No	<b>Club good</b> Reserve, Cinema, Private garden, etc.	<b>Public Good</b> Air, Coast, Airwaves such shows on TV, radio, red light, etc.



**Virginia Natural Bridge**



# Economic and Environmental Principles

Most environmental goods fall under the category of pure public goods or open access/common property goods. In such cases lack of well-defined property rights results in market failure. A market failure consequence is inefficient allocation of resources (e.g., excessive pollution, abuse, etc.).

# Economic and Environmental Principles

In an open-access situation, no property rights are assigned to the resource, which results in open access to the resource for all potential users. Water from both underground and surface sources is often an open access resource. Use of the resource is subject to neither exclusion nor regulation. Individuals have complete autonomy in its use.

## Economic and Environmental Principles

The absence or non-enforcement of property rights for resources with open-access characteristics can lead to use of the resource at rates that exceed the social optimum. Described as the "tragedy of the commons", this occurs where individuals have no incentive to conserve the resource because there is no assurance that other users will do likewise.

# Economic and Environmental Principles

The efficiency of resource use under these regimes is based on four determining conditions

- full specification of ownership and entitlement to the resource (universality);
- accrual of all benefits and costs exclusively to the entitled individual (exclusivity);
- exchange of property rights in voluntary transactions (transferability);
- penalties that prevent individuals from encroaching or taking property rights without prior agreement (enforceability).

# Economic and Environmental Principles

## *Property rights regimes and their conditions for efficient resource use*

Conditions	Property rights regime			
	Private property	Common property	State property	Open access
Universality	Yes	Yes (for the group)	No	No
Exclusivity	Yes (except for externalities and provision of public goods)	Yes (for the group)	No (although non-nationals are excluded)	No
Transferability	Yes	Yes (for the group)	No	No
Enforceability	Yes (legal & social sanctions)	Yes (legal & social sanctions)	Yes (legal & social sanctions)	No
Efficiency	Efficient, but inefficiencies arise in presence of externalities and public goods.	Efficient in many cases, but inherent risk of breakdown.	Usually inefficient, owing to government failure.	Very low, no incentive to conserve.

*Source: Pearce, Whittington and Georgiou (1994).*

# Economic and Environmental Principles

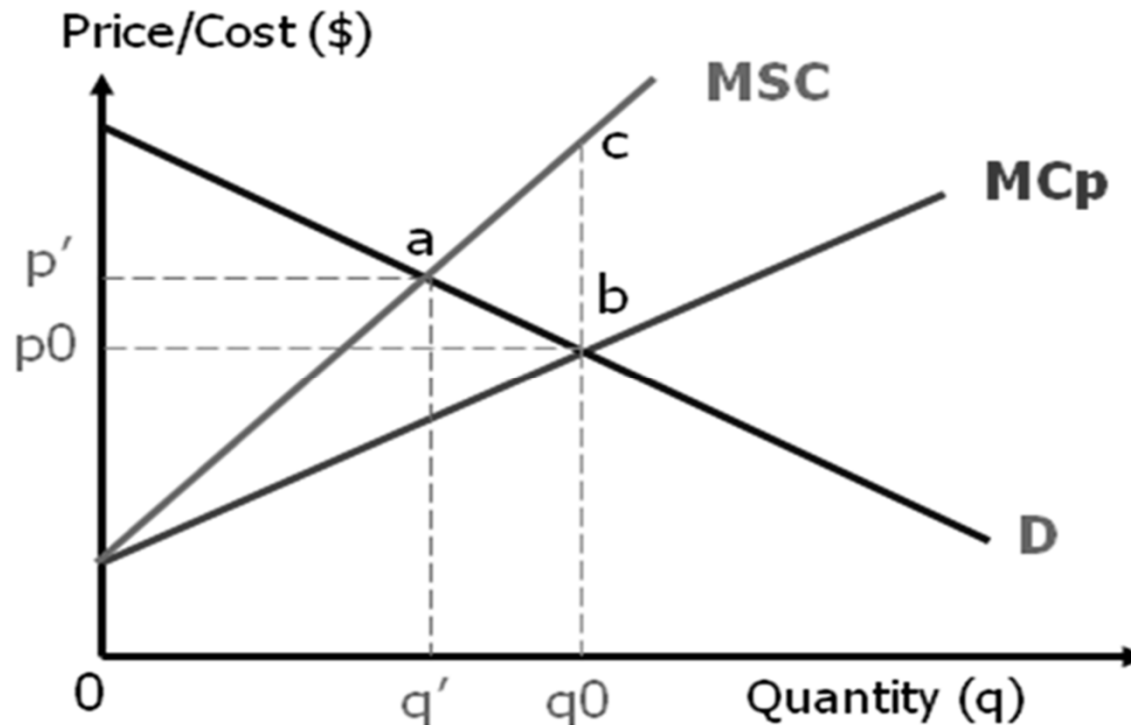
## *Resource allocation in a perfectly competitive market*

Consider a gold mining company that dumps mine tailings into a nearby river without paying for clean up or treating the waste. In this case, production at the mine includes the production of gold as well as pollution. Or to put it differently, the river water is an unpriced input in the gold production process.

# Economic and Environmental Principles

Variables:

D = demand curve for gold;  $MC_p$  = marginal private cost of producing gold (i.e., the firm's supply curve);  $MSC$  = marginal social cost



مع خالص شكري  
وامتناني

Thank you  
for your attention

Merci pour  
votre attention



*For additional information please contact:  
Sustainable Water Integrated Management – Support Mechanism: [info@swim-sm.eu](mailto:info@swim-sm.eu)*