

Economics of Sustainable Management



3. Scarcity of natural resources



Scarcity of natural resources

- Disproportionate environmental burden caused environmental goods **are becoming limited**. Limitedness (boundedness) means that human needs and desires for natural resources exceeds their capabilities. Due to this fact, environmental economics **deals with questions**:
 - **What and for whom to produce - from limited natural resources?**
The production of useful goods which are used (allocated) natural resources? How to share (distribute) natural resources and have made useful goods between different groups in society? How allocates and distributes a factor of production "environment"?

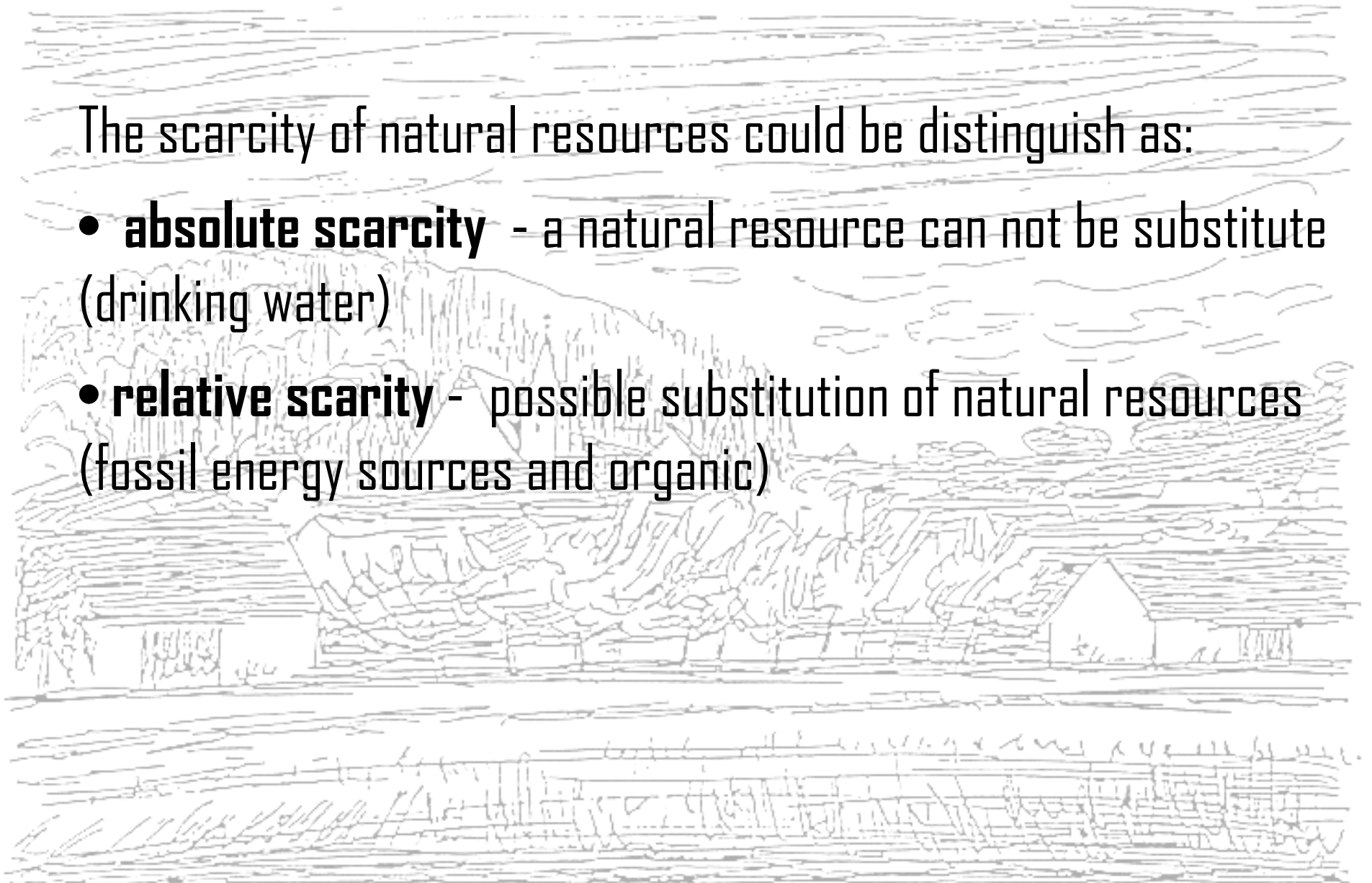
Scarcity of natural resources

- **What criteria to provide - natural resources and useful goods?** How to use the environment? Based on the most efficient use of natural resources, thus economically? Based on the criteria of equality, so fairly? Based on the requirements of future generations, thus permanently?
- **Who should be decision-maker on issues of natural resources and the environment?** They make decisions by consumers and businesses based on their individual preferences, ie decentralized decision-making? He has decided to stand on the basis of social preferences, ie centralized decision-making? Decisions to be mixed and to what extent?

Scarcity of natural resources

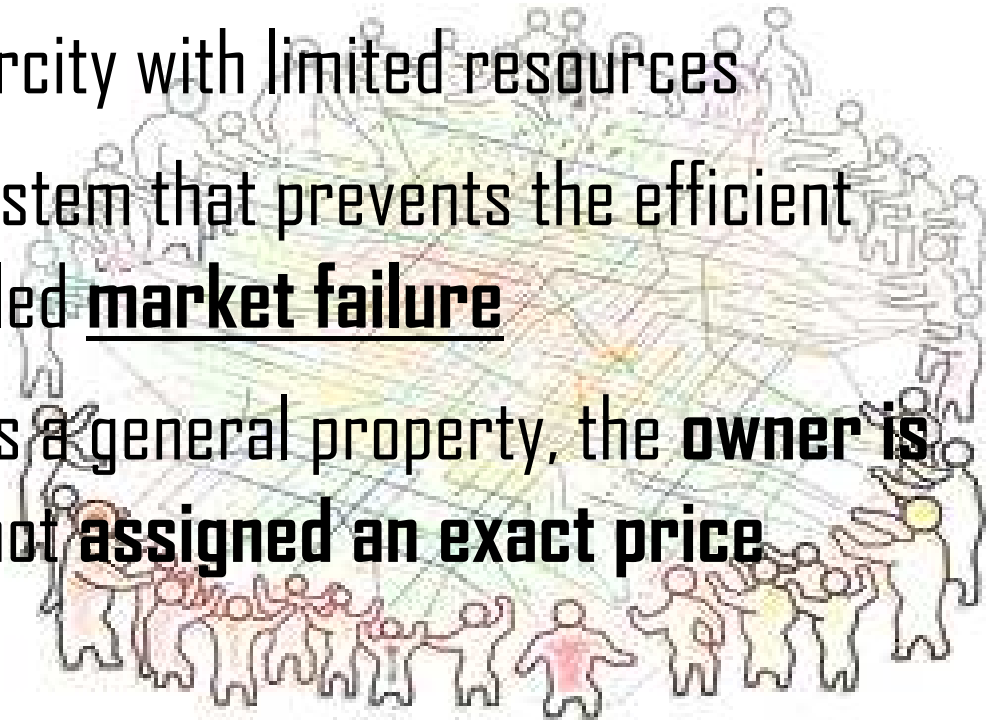
The scarcity of natural resources could be distinguished as:

- **absolute scarcity** - a natural resource can not be substituted (drinking water)
- **relative scarcity** - possible substitution of natural resources (fossil energy sources and organic)



Scarcity of natural resources

- **Price** is an indicator of scarcity with limited resources
- Imperfection in the price system that prevents the efficient allocation of resources is called market failure
- Most environmental goods is a general property, the **owner is not well-defined** and is has not **assigned an exact price**



- Associated problems described by *Garrett Hardin* in his paper

"The Tragedy of the Commons," Garrett Hardin, *Science*, 162(1968):1243-1248

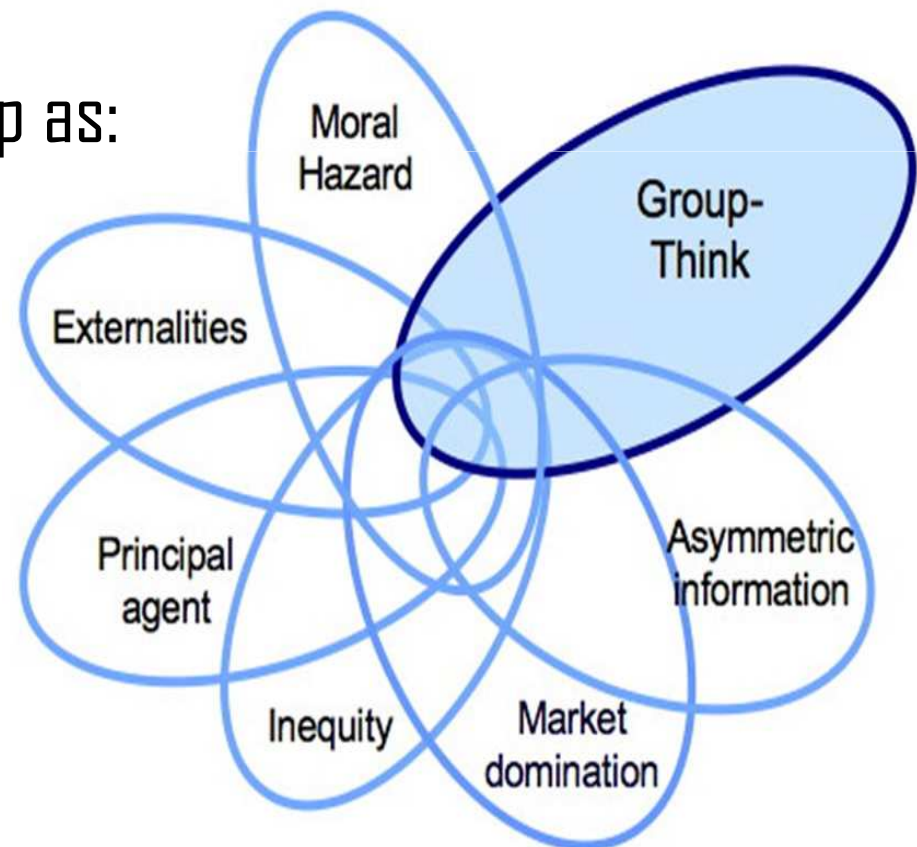
<http://www.youtube.com/watch?v=L8gAMFTAt2M>

Market failure

In the real world there are many obstacles to **perfect competition** respectively. **causes of market failure...**

The most important you can group as:

- **monopoly power**
- **externalities**
- **public good**
- **imperfect information**



Environmental goods and services

Environmental goods and services are goods and services **provided by the environment** (air, water, flora and fauna, landscape relief, etc., etc.) and which gradually became due to the enormous consumption gradually **limited**.

Economic theory classifies goods according to **their nature of consumption** (rivalry) and the **possibility of exclusion from consumption**.

Environmental goods and services

Excludable means the **possibility of excluding individuals** from the consumption of certain good. It causes that the good is the subject of the market and so-called "*free (black) riders*" who would like to use goods for free, may be excluded from its consumption

Rival consumption is the fact that the goods which are **consumed by one individual can not be consumed by another.** Rivalry between individuals on the consumption of goods is due to its scarcity

Excludable

NonExcludable

Rivalrous

**Private
Good**

**Common
Pool
Good**

NonRivalrous

**Club Good
Toll Good**

**Public
Good**

	Excludable	NonExcludable
Rivalrous	Private Good	Common Pool Good
NonRivalrous	Club Good Toll Good	Public Good

Environmental goods and services

Private goods - fully rivalry and excludable - allows to be subject to the market

Public goods - zero rivalry and excludability (it is not possible to exclude anybody from consumption, either technically or ethically, and there is no rivalry in their consumption (eg, national defense, police, motorway network, etc.)

(**Non-profit goods** mean goods that are consumed in terms of inadequate or excessive degree. On the basis of a *political decision* and using the tools of *public policy* is *the optimal amount of consumption*. This is a specific example of public goods. Excludability from consumption is technically possible, but not normatively desirable. Eg. alcohol consumption.

Mixed goods - they are either nonreducible (nonrivalry), but excludable, or nonexcludable but reducible (rival).



Environmental goods and services are in most cases
purely public goods, which means –

nonrivality and nonexcludability

Environmental goods and services

Collective (common pool) goods - it is impossible to exclude anyone from consumption, while consumption in their rivalry exists because property rights are not clearly defined. Intensive *recreation in protected areas* is seamless to the point where there is a conflict of different interests (recreation and nature protection). Their production by market mechanism is not possible.

Club goods forms a *transition between public and by private goods*. These goods can be assigned a degree excludability, because when their usage is common – the number of users increases and the quality decreases. The club goods is then possible to analytically determine the optimal *size of the group, to allow production* of a good with equivalent quality (*Hotel owners are willing to pay for forest enterprises measure that increases the efficiency of avalanche functions. If there is a large number of hoteliers the agreement may not come to force*).

Environmental goods and services

By private goods, their *scarcity is reflected in the price*. The more limited good, the more higher price

Public goods have specific features that *do not allow free operation of the price mechanism*. Therefore, in the "ideal" free market economy, available free of charge

Value paradox lies in the fact that many **vital goods** (eg water) have a low "market" value, while many superfluous **luxury goods** which have low "useful" value, have a high market price. The explanation for this paradox lies in the values that the price does not reflect the total benefit from, but its marginal benefit.

Optimal amount of public good

For optimal amount of public goods we consider the **level of its production**, in which the **market demand curve intersects with the supply**, respectively. marginal cost curve, because the supply curve is a public good as well as for private goods derived from the development of the marginal cost of production.

Optimal amount of public good

- the criterion of efficiency is Pareto optimality - a condition in which there **is not possible reallocate resources so that the increased benefit certain individuals, without reduce benefits by at least one other person.** Such a situation is efficient
- Analysis of the conditions for achieving Pareto optima deals with *Welfare economics and social stability*

Asymmetric information, moral hazard and adverse selection

- when economic entities decide - plays an important role in **the information barrier**
- often occurs the situation when one side of the market **knows more than the other**
 - the information is asymmetric

Asymmetric information arises due to:

1. **secret activities** - in respect of such activities, which can not be accurately and at no additional cost *observable*
2. **confidential information** - a situation where one side of the market has more expertise, knowledges



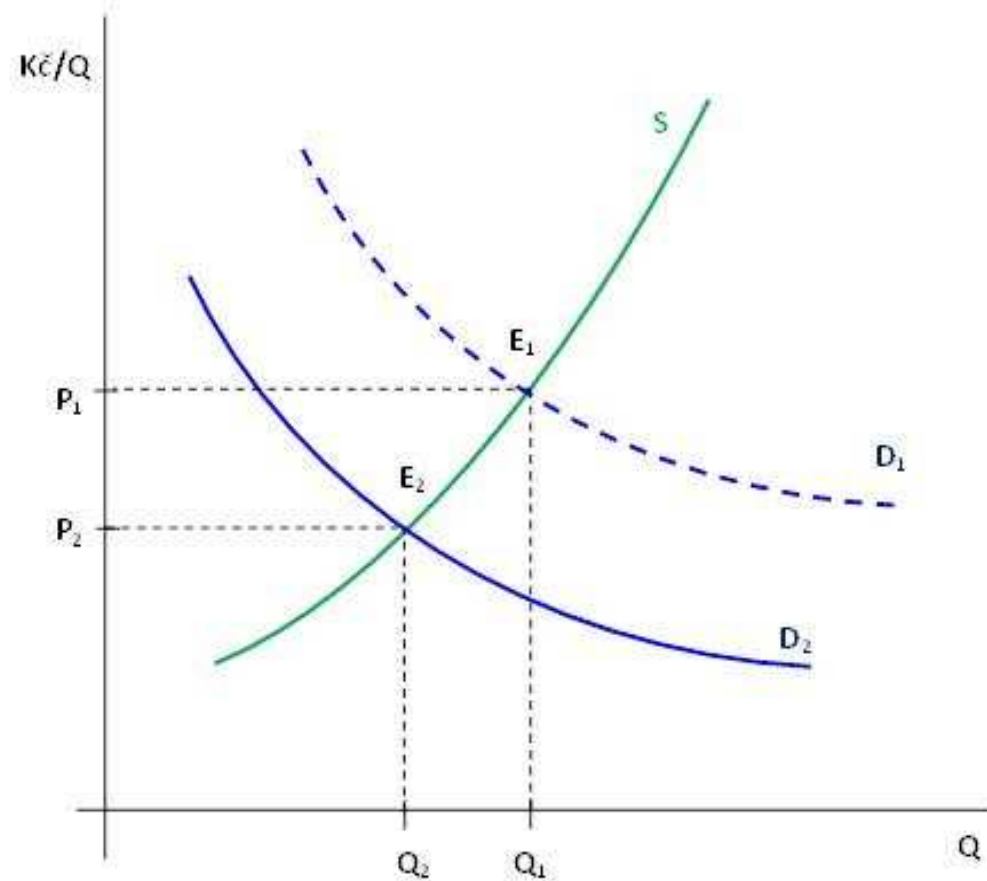
Asymmetry of information leads to two problems, called **moral hazard** and **adverse selection**

Asymmetric information, moral hazard and adverse selection

- **Moral hazard** is defined as the activity of a single economic entity (**informed**) that by **maximizing of their benefits reduced benefit others** (**uninformed**) participants in market transactions
- **Adverse selection** is a process that leads to the fact that "less desirable" market entities (buyer or seller) will participate in shifts rather than others.
- Asymmetric information leads in its consequences **to be squeezed out of the market quality products inferior goods**

Effect of incomplete information

In the case of incomplete information on a particular farm there is **inadequate demand** for the good, which is higher (because of ignorance of the negative characteristics - curve D_1) or lower (ignorance of the positive characteristics) than the demand in perfect competition (D_2)



Prisoner's dilemma

The basic problem of providing (provisioning, creating) public goods can be characterized by the prisoner's dilemma.

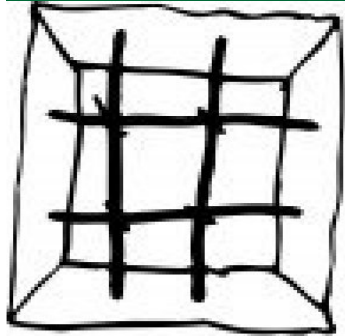


Prisoners dilemma in providing public goods

		All others individuals	
		produce	do not produce
individual A	participate	$10 - 5 = 5$	$0 - 5 = -5$
	do not participate	$10 - 0 = 10$	$0 - 0 = 0$

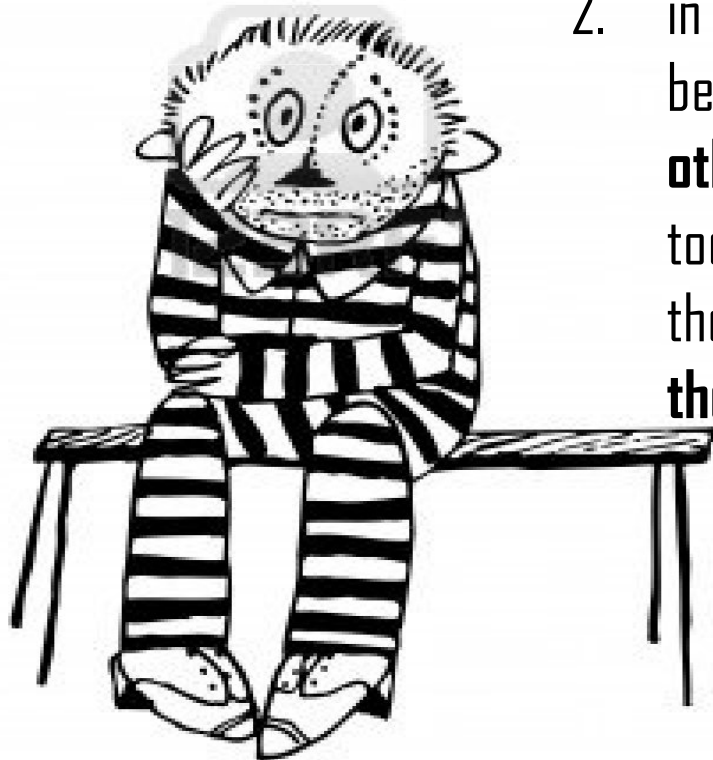
A large number of individuals **have to decide whether to participate in the creation of some environment good**. If the good is available, it follows for the individual benefit 10 monetary units, for the creation of a good must give 5 units. Because it is **a public good you can not force** someone to contribute to reduce pollution of this good. Any individual A does not affect the behavior of others. Implements its contribution to the environment and the good is yet provided, obtained from the net profit 5 units. Does not contribute to the creation of the farm, but farm produce other individuals acquires net benefit to 10 units. If a situation arises that individual A contribute to the good production, but this is not provided, because the others are not involved, created for him only the costs (-5 units)....?

Prisoners dilemma in providing public goods



Each entity has two reasons **not to participate** in providing farm environment:

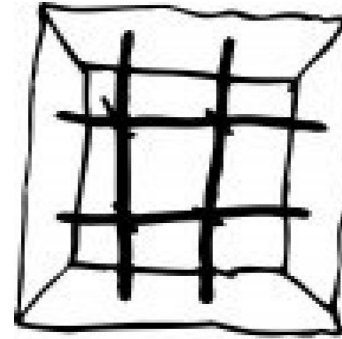
1. has an incentive **to behave as a stowaway** and speculate that the good will create others. In this situation, the net **benefit of each individual's highest**
2. in the case of the individual's own contribution can not be sure if goods will be created. He realizes that **others have an incentive to behave as stowaways** too. Since it **is advantageous not to participate** in the creation of good and he has **no certainty about the behavior of other individuals**, the individual is a rational strategy that does not implement **any post.**



If it behaves most individuals in this way, no environment good is created.

- Dilemma leads to the fact that it is provided "too little" public good.

- From the **environment is taken too many natural resources** and **passes into it too much waste.**



Inadequate protection of natural resources and environmental pollution are the major two aspects of the same issue:

1. inadequate protection of resources means their **excessive consumption**
2. excessive environmental pollution, a **failure to provide a healthy environment**





externalities

Externalities

Externality is such **economic activity** of the subject, which has positive or negative effects on other economic entities without the establishment of market relations between them. This means that the **costs and revenues are transferred FREE to the others.**

Externalities penetrate when the economic entity **intentionally or unintentionally, partially or not at all apply to other** entities for the **increased costs** they caused by their activity.

In the context of environmental externalities are talking about as **specific economic relationship**, which is caused by the free use of some components of the environment.

Negative and positive

Negative externalities arise in those cases where the operator does not assume all the costs of their activities and of the costs transferred to other entities, without their consent. **This creates a mismatch between private and social costs** (*pollution industrial manufacturers*)

Positive externalities positively affect production and utility functions of others. Business activity has on other market entities external savings without him on the basis of market relations compensate (*a farmer creating, in frame of his agricultural activities, groves - shelter for insects and higher animals*).



..in production

Negative externalities in production: if the production of good brings negative external effect, then the social marginal costs include besides their own (private) marginal cost of production as well the **external costs**

Positive externalities in production: when a company develops advanced technology and the resulting new techniques. **Other entities use them without pay for this benefit.** In this case, the private costs exceed social costs. This means that the firm produced thanks to private marginal cost of the manufacturer, but they also reduce its production costs by other entities (**without paying an advantage**)

.. in consumption

Positive externalities in consumption: if an activity **produces external benefits to other entities**, then the marginal social benefit exceeds the marginal private benefit. Private marginal benefit in this case is the sum of private and external marginal utility marginal utility.

Negative externalities of consumption: it is also the result of an **unintended negative effect**. In this case, the private benefit exceeds the social benefit. Socially optimal output is then smaller than the output in private markets.

Decide whether it is an externality or not. In the event that the externality is, specify the type:

examples	Externality	Type
<p>Eva lives in the village, where it is incorporated incinerator whose activities produce dense smoke. Eva has curtains in the windows. In the summer when it's warm, often venting. The curtains are yellow from the smoke, so it must be washed frequently.</p>		
<p>Eva lives in Prague at the settlement, which is near a very busy road. Cars are running well late in the evening, so it is hard for her to sleep in the evening. Therefore it can not even open the window in the evening and have to buy earplugs.</p>		
<p>In his garden was always Eva shadow and therefore had to go to the nearest swimming pool sunbathing on which her journey took half an hour. But one day the neighbors cut down cherry, which caused most of the shadow on Eva's garden.</p>		
<p>As a result of air pollution occurred in the vicinity of the plant to the extinction of rare species of stinging insects. Eva stinging insects since childhood fears.</p>		
<p>Eva works in the pharmaceutical industry, and participates in the development and production of drugs. One day invent company producing car tires on a new type of tire</p>		

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Internalization ?

So what to do?



Topics

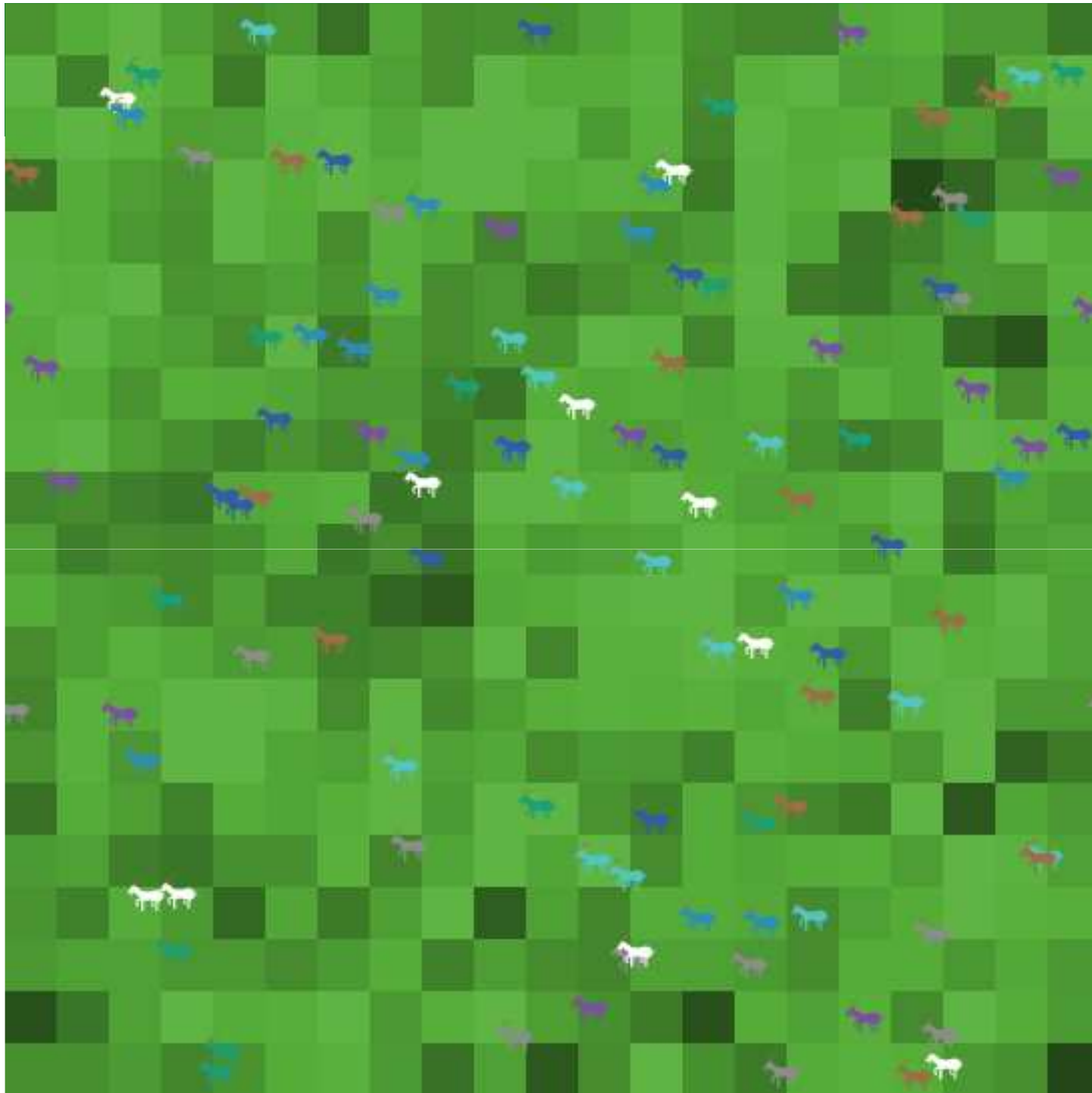
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Thank you.