

# *Subject of Lecture 9-10*

Ecological principles of  
sustainable  
development



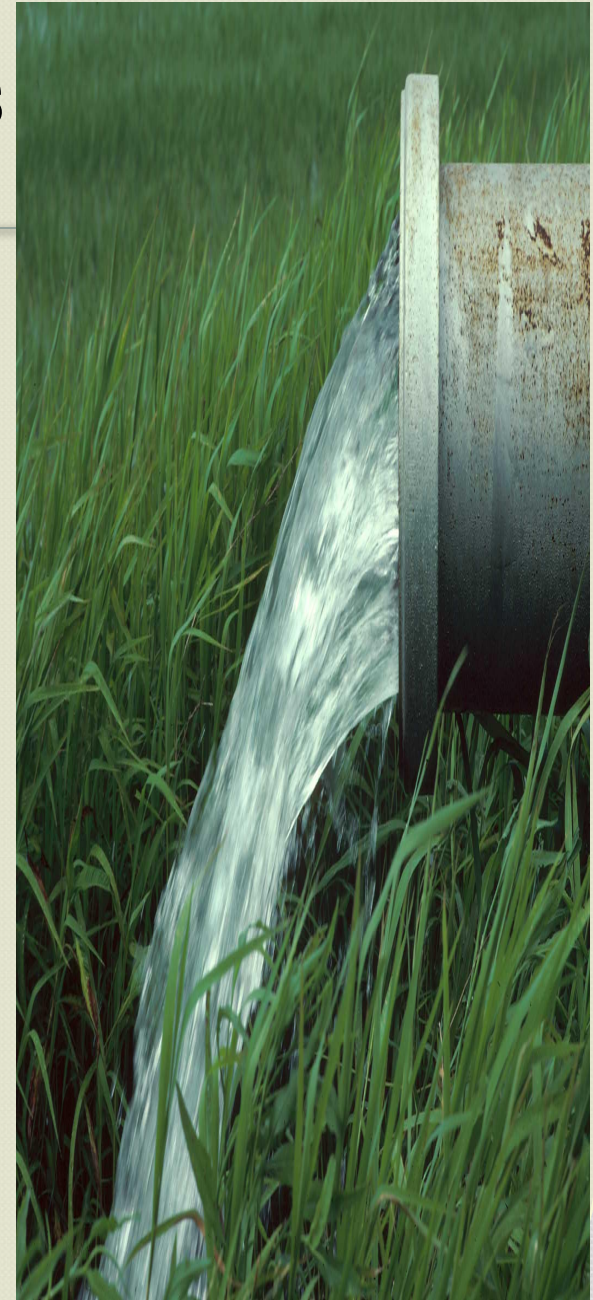
# Plan

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- ◉ Natural Resources
- ◉ Rational Use as One of Aspects of Sustainable Development
- ◉ Characteristics of natural resources and their classification
- ◉ Environmental certification of enterprise



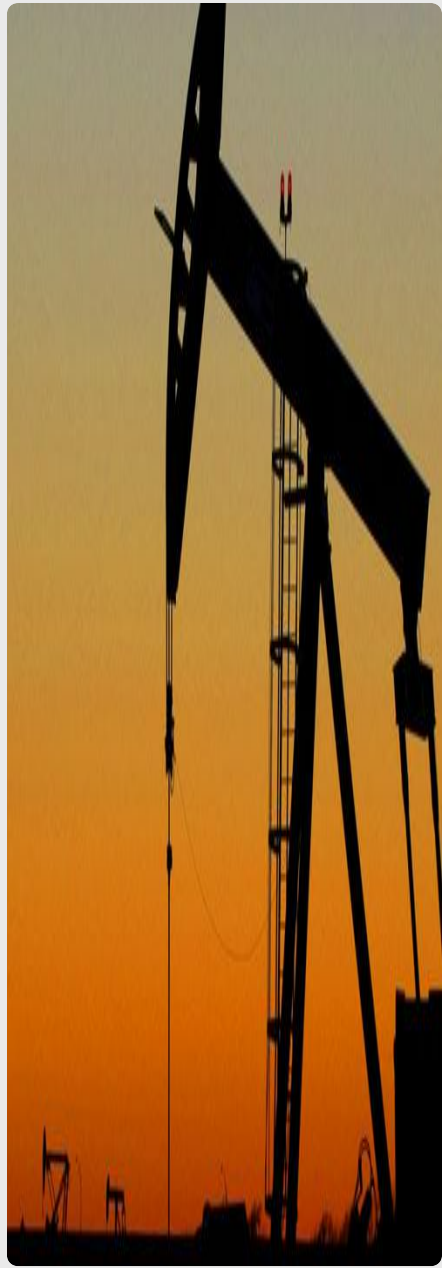
**Natural resources are the basis of life for any human society. Means of people living that are not the result of their labour are qualified as natural resources. They are water, soil, plants, animals, microorganisms, mineral products, cosmic resources (solar energy).**





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- ◎ **There are various classifications of natural resources. For example, with regard to the use the natural resources are divided into industrial, public health, aesthetic, scientific etc.**





The most general classification of natural resources is by their exhaustibility. According to this classification,

All natural resources are divided into:

- *exhaustible*;
- inexhaustible.

The *exhaustible* resources, in their turn, are divided into:

- renewable ;
- *nonrenewable* resources.



# Renewable resources

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- ◎ A living component of the biosphere falls under the category of renewable A living component of the biosphere falls under the category of renewable for example, green plants, soil, fertility of which is formed within a lengthy period and is the most deficit resource. However, the rates of using the renewable A living component of the biosphere falls under the category of renewable for example, green plants, soil, fertility of which is formed within a lengthy period and is the



# Nonrenewable resources

Coal, petroleum, and natural gas are considered nonrenewable because they can not be replenished in a short period of time. These are called fossil fuels.







**Cosmic, climatic and water resources fall under the category of the inexhaustible resources.**



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- ◎ - **The cosmic resource is solar radiation.**
  - ◎ ***Climatic resources* are the atmospheric air, atmospheric precipitation, wind.**
  - ◎ ***Water resources* are water reserves of the Earth. This resource is inexhaustible on a global scale, but on a local scale it may be exhausted (for example, the Aral Sea).**



An aerial photograph of a terraced agricultural field, likely in a mountainous region. The terraces are arranged in a series of concentric, wavy lines, creating a rhythmic pattern of green and brown. A river or stream flows through the lower right portion of the image, its surface reflecting the surrounding landscape. The overall scene is lush and green, suggesting a fertile environment.

From the very first days of his existence the human being began to exploit the nature.

- Up to the 18<sup>th</sup> century the mankind used about 30 chemical elements;
- in the beginning of the 20<sup>th</sup> century over 50 elements were processed in industrial way;
- at present over 100 elements of Mendeleev's table are used by the mankind;
- The needs for mineral products are increasing steadily, and the demand for them is caused, first of all, by a demographic increase.







**Genetic resources fall under the category of biological resources**

**The loss of genetic resource cannot be replenished, because it is impossible to recreate the extinct species with its genetic complex.**



- ◎ **The rational nature management has twofold aim;**

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- ◎ **it is necessary to attain the preservation of nature with all its diversity;**
- ◎ **provide the growth in prosperity of the population.**



**The rational nature management provides for the transition of industry and agriculture to resource saving technologies:**

- 1) a more complete use of extracted mineral products;**
- 2) repeated use of waste of production and consumption;**
- 3) mastering sources of clean energy;**
- 4) strict limitation of emissions within the limits of norms, installation of cleaning filters and structures.**

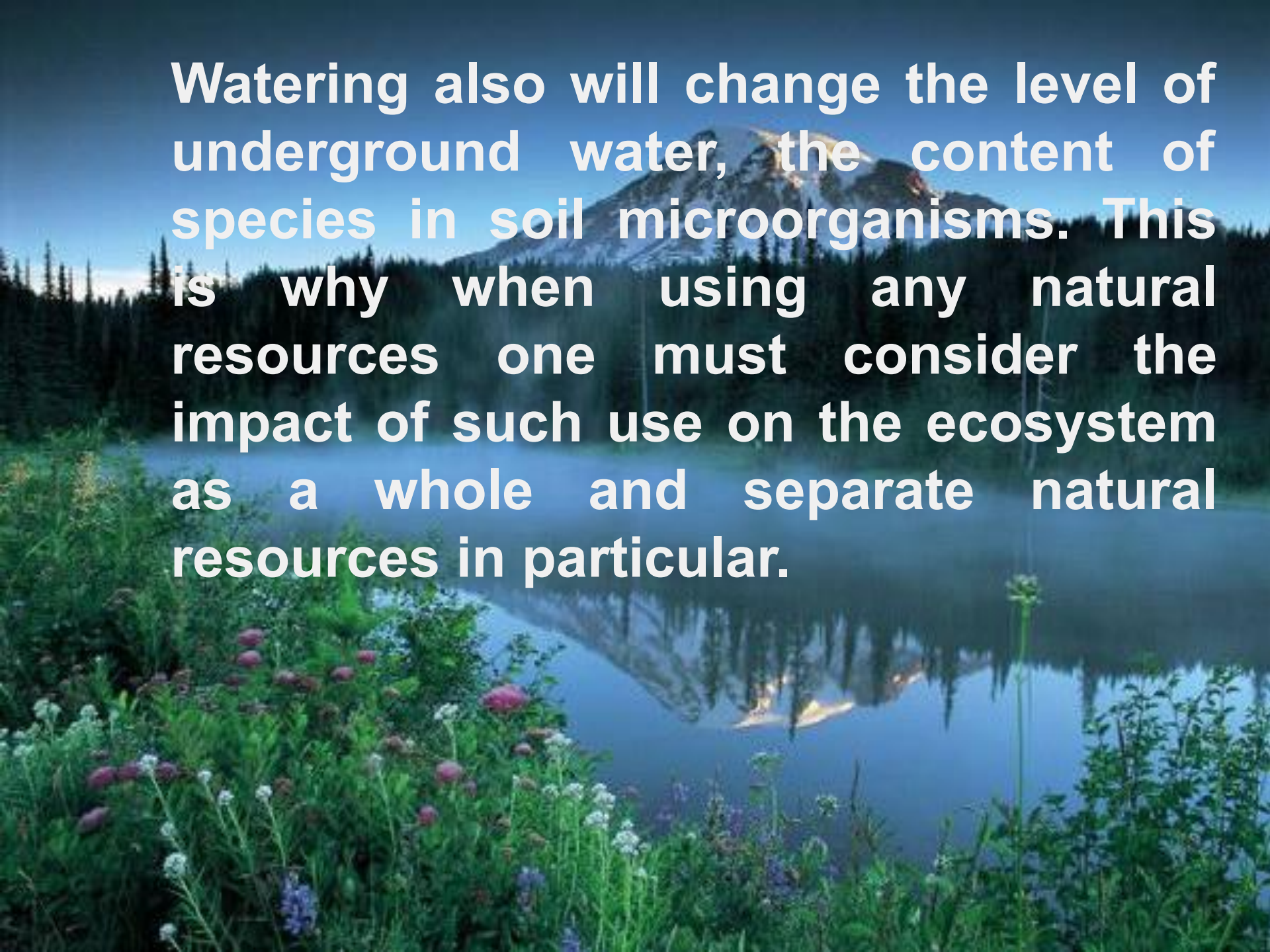


It is necessary to remember that the natural resources are a part of ecosystems, in which all ecological components are interrelated.





**Watering also will change the level of underground water, the content of species in soil microorganisms. This is why when using any natural resources one must consider the impact of such use on the ecosystem as a whole and separate natural resources in particular.**





# Protected Areas

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One of forms of environment protection being of exclusive value is ***protected areas***.

The *forms* of protected areas:

- Reserves;
- Wildlife sanctuaries;
- Natural monuments;
- National and natural parks;
- Botanical gardens;
- Biosphere reserves.



# The Biggest Protected Areas on the World

- ◉ National Park of Greenland – 7 million hectares;





# The Biggest Protected Areas on the World

- ◉ The Central Kalahari Game Reserve, Botswana – 5.3 million of hectares;





# The Biggest Protected Areas on the World

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- ◉ Wood Buffalo National Park,  
Canada – 4.5 million of hectares.

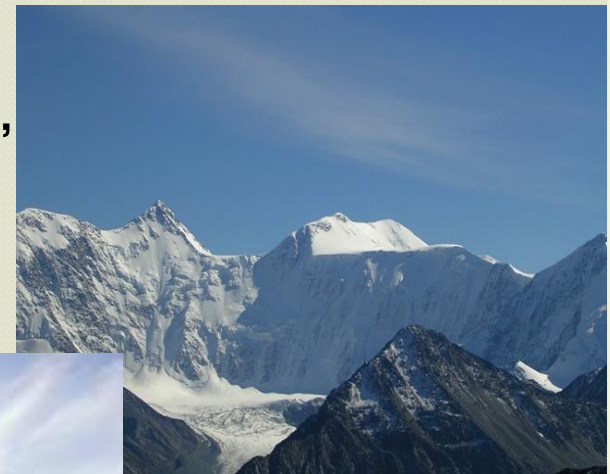




# Reserves on the Territory of Kazakhstan

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- There are operating 10 reserves:  
Aksu Zhabagly, Barsa-Kelmes, Almaty Reserve, Naurzumsky, Kurgaldzhinski, Markakolski, Ustyurt, Alakol, West Altai, Karatau.





# National Nature Parks in Kazakhstan

- There are 8 National Nature Parks:  
Bayan Aul, Ile-Alatau, Altyn Emel,  
Kokshetau Burabay,  
Karakaralinskiy,  
Katon-Karagay, Charyn.





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- In June 1992, at the World Forum in Rio de Janeiro the Convention on Biological Diversity was signed and ratified by more than 100 states of the world. The main aim of the Convention shall be to sustain the rich diversity of life on Earth and sustainable use of its elements.



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- ◎ The International Conference on Biosphere Reserves (Seville, 1995) developed the Seville Strategy for Biosphere Reserves and the Role of Biosphere Reserves in the 21<sup>st</sup> century.



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**The biosphere reserves shall fulfill three complementary functions as follows:**

- ◎ **protection to sustain genetic resources, biological species, ecosystems and landscapes;**
- ◎ **the function of development to promote sustainable economic and human development;**



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- ◎ the function of material and technical support to promote and encourage activities in the field of research, education.



# Monitoring

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- ◎ **The concept of monitoring was introduced into the scientific literature in early seventies of the last century, and it means observation and exercising control over changes in the state of biosphere and ecosystems, populations, organisms influenced by human activities, and also the atmosphere, the water, the soil and human health.**



*The environmental control system incorporates three major types of activities:*

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- ◎ Tracking and control is a systematic environmental monitoring;
- ◎ Forecast is to determine probable changes of weather under the influence of natural and anthropogenic factors;
- ◎ Management is measures and actions to regulate the state of environment.



# Two Main Groups of Standard Indicators:

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- ❖ Sanitary and Hygienic Indicators
  - Maximum permissible concentrations (MPC) of contaminants in the air, water, soil, food products;
  - Maximum permissible emissions (MPE) of contaminants in the air, water bodies.
- ❖ Ecological Indicator
  - Regarded as a measure of anthropogenic impact on ecosystems



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**An important indicator of the state of environment is *the health of population*, the criteria of which are the infant mortality dynamics, congenital anomalies of newborn infants, diseases of children and adults.**



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With the intent to build harmonious relations between the nature and society it is necessary to solve ***three the most important tasks:***

- 1. To form a new type of social and ecological thinking eliminating an exclusive consumer approach to the nature;*



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1. *Wide publicity, enlightenment and education of social and ecological problems accompanying development of human civilization;*
  2. *Developing a business mechanism of nature management providing full coordination of individual, collective and national interests in the area of environment protection and rational use of natural resources.*



# Environmental certification of enterprise

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# What is ecological certification?



*Environmental (ecological) certification* is a form of environmental regulation and effective measures for environmental protection and improvement of the ecological situation. .



**Environmental passport** - a document containing information about the level of use of the nature user resources (natural, secondary, etc.) And the impact of its production on the environment, as well as information about permissions on the right of nature, regulations impact and size of payments for pollution of the environment and use of natural resources.





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- ⦿ Ecological passport of the company refers to its basis and technological documentation, it should be in every enterprise.



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- ◉ Environmental Passport gives you the opportunity to analyze the ecological state of the enterprise and the environment in the region, to compare the ecological and economic performance with other better environmental protection measures.



## Environmental Passport contains the following structural elements:

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- title page,
- information about the developer of environmental passports
- content,
- general information about the users of natural resources,
- environmental and economic indicators,
- information about products,
- a brief description of production,



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- information on the consumption of energy,
  - ecological and production figures,
  - information on land use,
  - information about permissions (licenses) for the use of natural resources and environmental protection activities,
  - Environmental Action Plan,
  - a list of references.



**Environmental certification of enterprise**

**environmental assessment of production in terms of rational use of natural resources**

**consumption of raw materials**

**consumption of energy**

**consumption of natural resources**

**emissions of pollutants per unit of production**

**assessment of the negative impact on the environment**

**Gross amount of disposing**

**Gross number of discharges**

**Gross amount of solid waste**

**availability and effectiveness of treatment facilities**

**relationship management "enterprise - environment" by levying pollution charges**



## The environmental passport of the enterprise reflects the three groups of indicators:

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1<sup>st</sup> group: indicators of influence on a state of the environment;

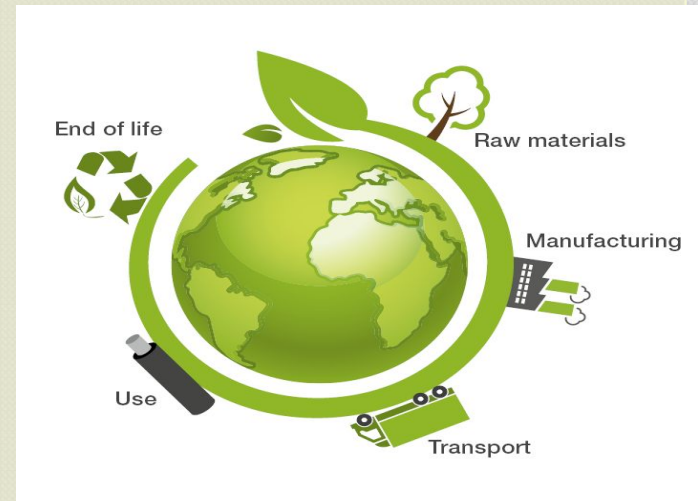
2<sup>nd</sup> group: indicators of organizational and technological level of environmental performance of the enterprise;

3<sup>rd</sup> group: general and specific indicators of cost-benefit analysis for environmental activities.



# The first group includes the following indicators:

- environmentally friendly products;
- the impact on water resources;
- the impact on the atmosphere;
- impact on material resources and waste production;
- the impact on land resources.





# The second group includes such parameters as:

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- equipment pollution sources pollution control equipment;
- capacity of existing sewage treatment plants;
- progressivity used cleaning equipment;
- the ability to control the operation of pollution control equipment;
- the rationality of the existing organizational structure of the environmental performance of the enterprise;
- specific indicators of organizational and technological level of environmental performance of the enterprise.



# The third group of indicators

**It includes a general indicator of the ratio of the economic effect of environmental protection measures to the total amount of expenses for their implementation and a set of partial indicators.**

## **These include:**

- the share of capital expenditures for environmental protection in the total capital cost of the enterprise;
- the share of current expenditure on environmental protection in the total current cost of the enterprise;
- share of expenses for the protection of air pool in the total expenditure on environmental protection;
- the proportion of the cost of protection and rational use of water resources in the total expenditure on environmental protection;
- share of costs for the destruction and disposal of solid and liquid waste in the total expenditure on environmental protection;
- share of expenses for the development and implementation of advanced technologies (low-waste, non-waste, drainage, etc.) in public expenditure on R & D;
- the share of costs for the services of outside organizations on environmental protection in the total cost of the enterprise.



Drawing up of the ecological passport is quite complicated procedure, so it is usually drawn up not by the enterprise, and on his behalf by a commercial organization having a license.

Work on the ecological passport now paid under the arrangement with a commercial organization

Environmental Passport signed by the director and the head of the regional organization of environmental protection and natural resources. Subsequently, the document specifies it made the necessary changes.



# Conclusion

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The main purpose of the environmental certification is to provide a wide range of users of information for scientific, organizational and practical tasks aimed at environmental management. We give a systematic summary of the data on the current state of natural complexes of the territory and the impact of anthropogenic factors. This certificate is intended for the territory of the administrative area, but can be used for other territorial entities. By the passport attached atlas thematic maps drawn and general ecological map of the territory. At the end of the document given to the conclusion of the environmental situation, which is actually an environmental certification of the territory.



# REFERENCE

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