Ecological regulation and reduction of environmental pollution

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Basic concepts

Environmental standardization is a special research and regulatory and legal activity to justify environmental quality criteria for the environment and develop standards for permissible anthropogenic impacts, environmental regulations and rules based on these criteria for all basic forms of economic activity.

Regulation in the field of environmental protection - scientific, legal, administrative and other activities aimed at establishing various standards - maximum permissible environmental impact standards, environmental quality standards, as well as state standards and other documents in the field of environmental protection, subject to compliance which do not degrade ecosystems, conservation of biological diversity and environmental safety of the population is guaranteed.

The purpose of environmental regulation is the management of nature use on the basis of knowledge of the laws of the functioning of natural systems and the organization of activities without disturbing them

Basic concepts

The main task of environmental regulation is the development and justification of the scientific and methodological basis for standardization in the field of human life safety and gene pool conservation, environmental protection and rational nature management. The tasks of environmental regulation also include the approbation of technological developments in practice, bringing them to standards and introducing standards to the rank

The modern system of environmental regulation includes:

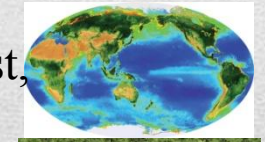
- *standardization,*
- *licensing of certain activities* in the field of environmental protection, as well as
- *environmental certification* (mandatory or voluntary) in order to ensure environmentally safe implementation of economic and other activities

The object and subject of environmental regulation

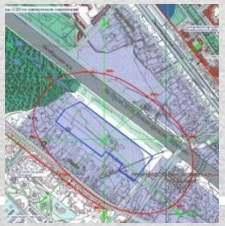
The object of ecological rationing is a set of anthropogenic factors affecting ecosystems and their individual elements (including natural resources, human beings), as well as environmental factors affecting humans that are subject to regulation.

For example: objects of ecological rationing:

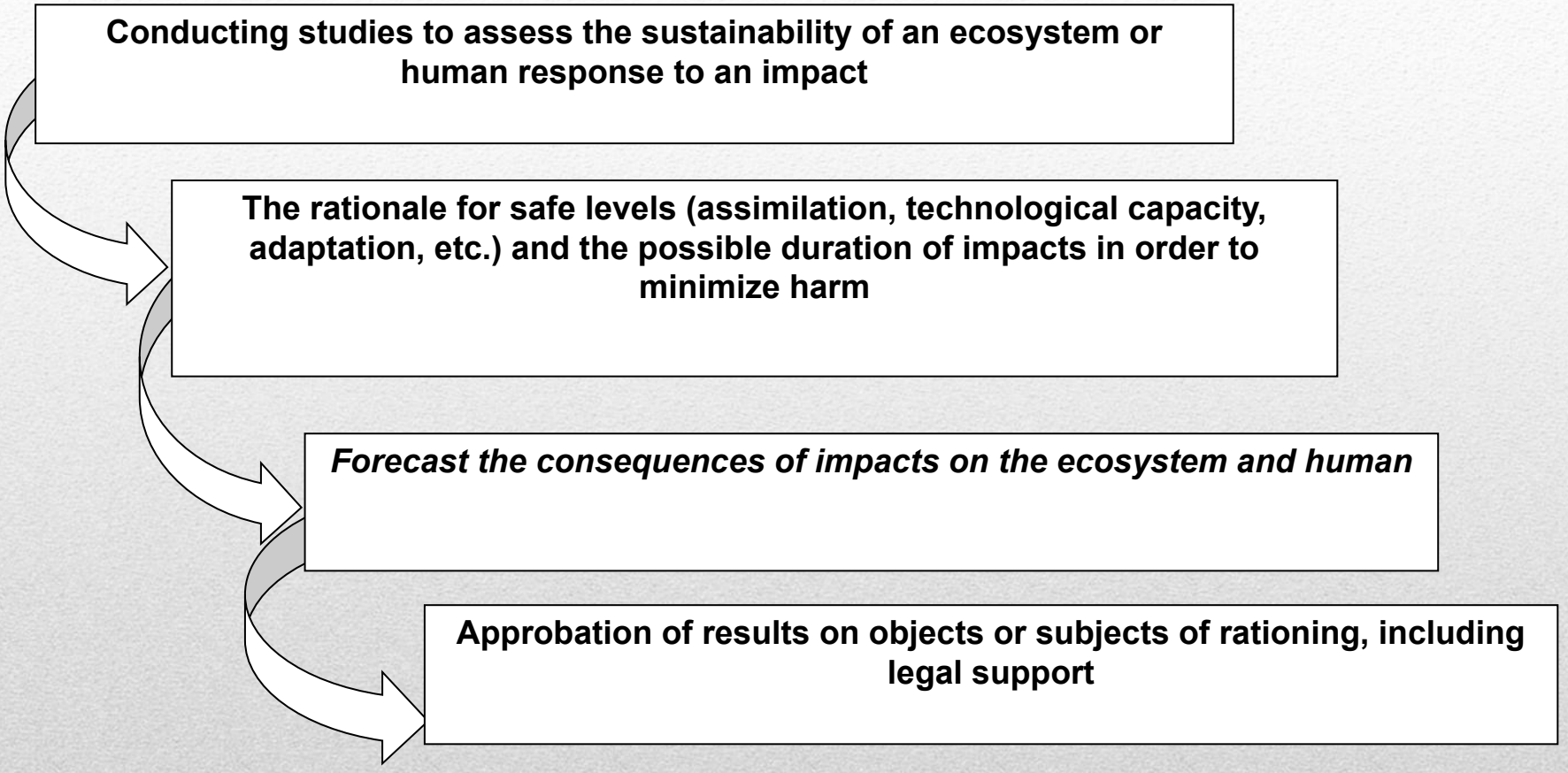
- the entire biosphere,
- a small part of the forest,
- City area,



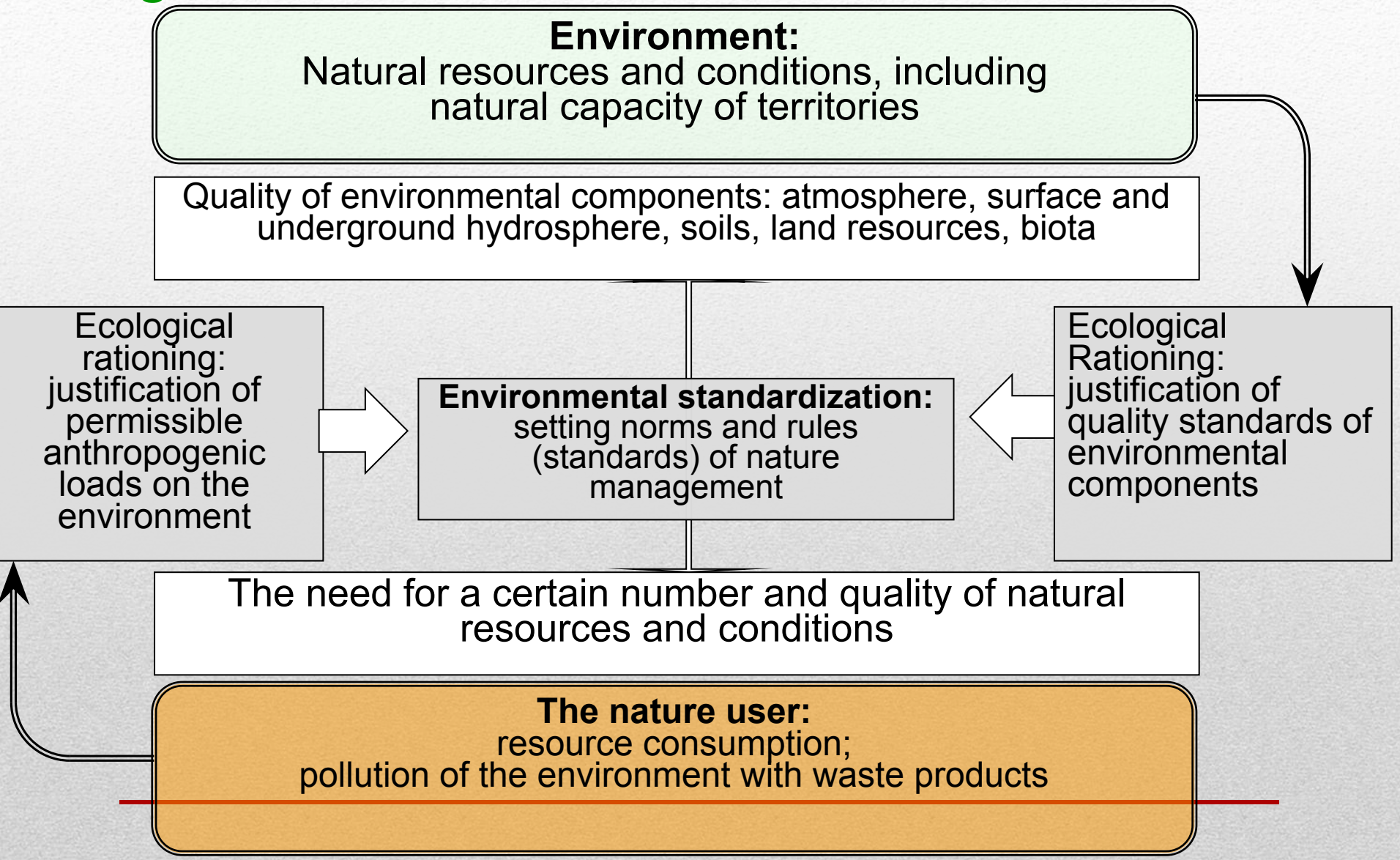
- a particular population of a particular species,
- The human habitat in the narrow sense? (housing, production premises, etc.).



Stages of implementation of environmental regulation



Ecological rationing as a basis for effective environmental management



Экологическое нормирование как основа для эффективного управления природопользованием

Связь экологического нормирования с другими направлениями природопользования

Ecological regulation and management of nature management

Environmental regulation is set at the following levels:

- economic process (investment, planning, deployment, design, operation);
- economic entities (environmental and economic and other indicators of the activities of enterprises);
- branches of the economy (construction, fuel and energy, etc.).

It is necessary not just to develop environmental standards "for all occasions." The most important moment is the quality of the standards themselves, their adequacy to the real state of natural systems and their sustainability.

The effectiveness of environmental regulation is ensured by:

- conformity of standards to the modern level of science and technology, international standards;
- objectivity and legality;
- obligatory execution by all subjects and responsibility for non-fulfillment.

Ecological rationing as a basis for reducing anthropogenic loads

Conservation measures

Organizational and technical
They are aimed at strict observance of the technological regulation of production, regulation and control over the operation of the equipment, its technical condition, the quality of raw materials, the norms of its use.
Are connected, first of all, with management, functioning and structure of production

Engineering
Creation, improvement of technological processes, creation of new equipment, mechanisms, materials used in the production of products, products.
Are directed on perfection of technological processes on release of production. To prevent unacceptable anthropogenic loads, it is necessary to take into account environmental constraints already at the design and creation stage of new processes and apparatuses, machinery and equipment; together with the creation of the main production equipment, also the medium-protective equipment

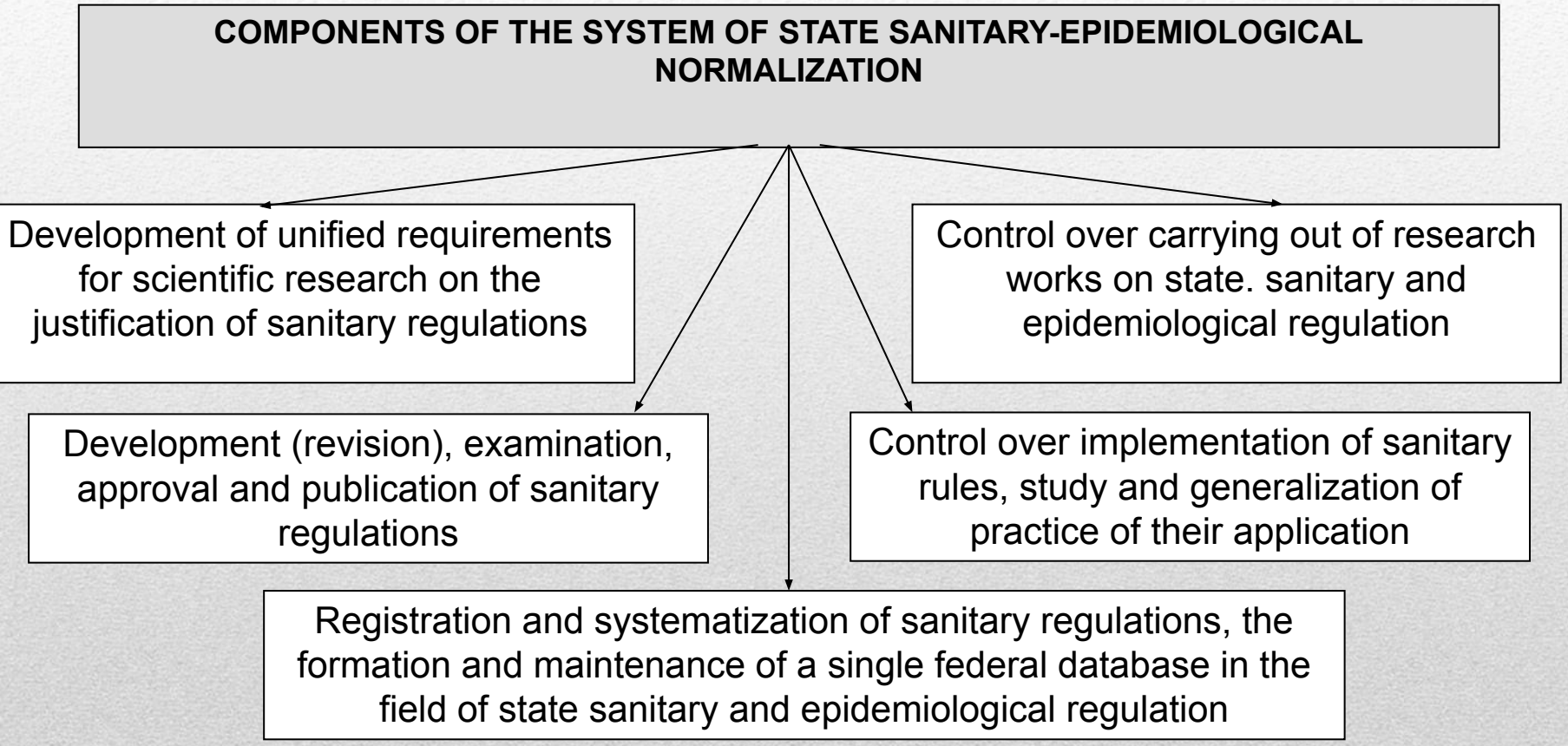
Scheduled
are carried out according to the long-term program of the enterprise; are realized in precisely planned terms taking into account the prospects of the enterprise development
Example: choosing the location of new prom. objects taking into account the relative location of other sources of pollution; organization of sanitary protection zones, etc.)

Operational
Performed in an abnormal mode of operation of enterprises (accidents, fires, destruction of technical systems, etc.). In case of critical situations, specific action plans are developed (emergency response plan, oil spill response plan, etc.).

The need to develop environmental standards and control their implementation

Sanitary and hygienic rationing in Kazakhstan

Sanitary and hygienic standards - qualitative and quantitative indicators, observance of which guarantees safe or optimal conditions for human existence.



Sanitary and hygienic standardization

MPC is the amount of a pollutant in the environment, with constant contact or exposure for a certain period of time that does not affect human health and does not cause adverse effects in its offspring.

Currently, more than 1100 MACs for substances in water have been installed, more than 1,300 - in the ambient air. Also, relatively safe exposure levels (SHRAs) for more than 400 substances have been established for ambient air.

СФЕРА ДЕЙСТВИЯ САНИТАРНО-ЭПИДЕМИОЛОГИЧЕСКИХ НОРМАТИВОВ

- Планировка и застройка городских и сельских поселений
- Потенциально опасные для человека химические, биологические вещества и отдельные виды продукции
- Продукция, ввозимая на территорию Казахстана
- Водные объекты
- Атмосферный воздух в городских и сельских поселениях, на территориях пром. организаций, воздух в рабочих зонах производственных помещений, жилых и других помещениях
- Сбор, использование, обезвреживание, транспортировка,
- Эксплуатация производственных, общественных помещений, зданий, сооружений
- Продукция производственно-технического назначения, товары для личных и бытовых нужд и технологии их производства
- Пищевые продукты и добавки, продовольственное сырье и контактирующие с ними материалы и изделия, а также технологии их производства
- Организация питания населения
- Питьевую воду и питьевое водоснабжение населения
- Почвы, содержание территорий городских и сельских поселений, пром. площадок
- Жилые помещения
- Условия работы с биологическими веществами, биологическими и микробиологическими организмами и их токсинами

Basic principles and problems of formation of the system of ecological rationing

The development of domestic environmental regulation goes in the following areas:

- ecosystem rationing;
- transition from unified standards to standards that take into account the specific features of the state of the environment in the regions
- rationing based on perceptions of acceptable risk;
- rationing on the basis of ideas about the best available technologies

Ecosystem regulation

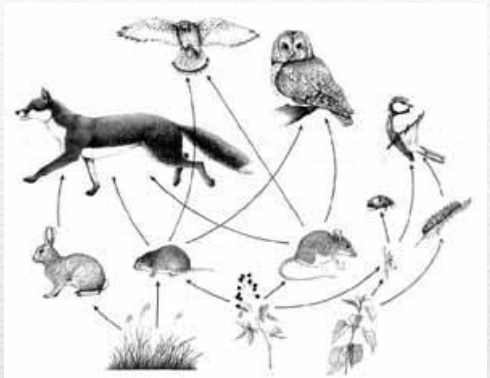
Ecological normative of an ecosystem is the boundary of a quantitative change in the parameters of an ecosystem, established from the condition of preserving its structure and functions, as well as all ecological components necessary for recording in economic activities.

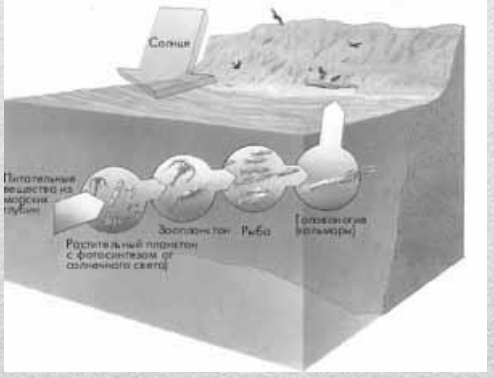
When establishing this standard, the rate of change in the parameters of the ecosystem, estimated by a person, is adopted.

In determining the parameters of ecosystems subject to rationing, proceed from the main features that characterize the quality of the ecosystem. This is its productivity, the level of diversity of products of the required quality, sustainability.

An ecosystem approach to standardizing the quality of environmental components requires consideration of the natural relationships between them, for example, migration routes of chemical elements, exposure thresholds on biota, and the like.

Example: Norms for the content of nutrients and pesticides in soils should take into account the requirements for the quality of water bodies (including underground ones) located within agricultural lands





Ecological (ecosystem) rationing

Principles of ecological standardization of quality of components of the natural environment:

- the principle of the goal (priority of long-term consequences for society and nature in general over the short-term economic interests of individual users of natural resources, regional interests over local, etc.);
- the principle of anticipation (the organization of research on the development of the standard should precede the beginning of the planned impact);
- the threshold principle (establishment of critical thresholds for the impact of economic activity, the non-exceeding of which guarantees first environmental safety, and then the interaction of public and ecological systems, ie creation of noocenosis);
- the principle of self-regulation (taking into account not only positive but also negative feedback in economic activity, observing the balance of positive and negative environmental effects in the systems of stimulating social and economic development);
- the principle of a "weak link";
- the principle "no longer means better" (transition to the path of intensification of technical and economic development due to maximum qualitative perfection with minimal quantitative growth);
- the principle of reducing the specific risk (the development of only such areas of growth in material consumption, under which the reduction of anthropogenic load per unit area and unit of output)

MAIN APPROACHES TO ENVIRONMENTAL NORMALIZATION

1. An approach that preserves the basic features of the methodology of hygienic rationing; the object is not man, but other biological species:

- *limit loads are set for individual substances (or their mixtures, but with a known ratio of components);*
- *laboratory experiments - the basis for obtaining standards;*
- *use the parameters of the organism, not the ecosystem level.*

2. An alternative approach: hygienic rationing is only an analog for solving the problem of rationing:

- *a benchmark that sets the criteria for assessing ecosystems - explicitly declared anthropocentrism (the criteria of evaluation are set by a person based on his needs, the need for a healthy OS is one of the most important);*
- *when setting criteria for assessing local ecosystems, take into account their polyfunctionality (the most important functions are ensuring the necessary contribution to the biosphere processes, satisfaction of the economic, social and aesthetic needs of society);*
- *the limits of the maximum loads must be "variant" (they are different for different ecosystems);*
- *the standards are differentiated depending on the physico-geographical conditions of the region and the type of ecosystems;*
- *standards differentiate in time: less stringent for existing technologies, more stringent for the near future, even more stringent for the planned production and new technologies;*
- *normalize the integral load, expressed in relative units, rather than the concentration of individual pollutants;*
- *Among the indicators of the state of the biota for normalization, the main ones that reflect the most important regularities of its functioning are selected; preference is given to integral parameters;*
- *the definition of standards is possible only in studies of real ecosystems located in the load gradient, i.e. Only on the basis of the analysis of dose-effect relationships at the ecosystem level.*

Disadvantages of hygienic rationing

- emissions are often multicomponent, in a particular situation it is impossible to operate with the standards for individual substances or their mixtures;
- forms of toxicants in nature are most often different from those used in experiments and for which standards were created;
- in laboratory experiments (usually short-term), adaptation processes and, especially, population and biocenotic effects that can play a key role in determining the fate of ecosystems are not taken into account;
- finding critical loads for certain species, even "key" or most sensitive, is a very long way to determine the standards for the whole ecosystem (it requires a model in which the argument for the ecosystem parameters is the abundance of all major species and the definition of critical loads for all these species).

Rationing based on acceptable risk methodology

The main elements of the system of rationing based on the calculation of acceptable risk:

- the establishment of levels of acceptable risk, based on economic and social factors, the construction of mechanisms for state regulation of security;
- Monitoring of the environment, risk analysis for vital activity of the population and forecasting of emergency situations;
- making decisions on the appropriateness of carrying out protection measures;

- rational allocation of funds for preventive measures to reduce risks and measures to reduce the scale of emergency situations;
- implementation of preventive measures to reduce the risk of emergencies and reduce their consequences;
- emergency rescue and recovery operations in emergency situations.

Приемлемый экологический риск - это риск, уровень которого оправдан с точки зрения как экологических, так и экономических, социальных и других проблем в конкретном обществе и в конкретное время.