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Analysis of existing methodological approaches in assessing the quality of the environmental condition of cities

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Abstract. The quality of the environment is largely determined by its ecological status. To describe the environmental condition of the area, it is necessary to have a certain number of specific indicators. Two groups of factors can be distinguished that describe the ecological situation of an area in terms of its impact on the population. The first assesses the natural conditions of the area and determines the comfort level of the natural environment for the life of the population. The second describes the level of environmental degradation and pollution as a result of anthropogenic influence.

Assessment of the comfort of natural conditions is related to the analysis of more than 30 parameters of the natural environment, more than 10 of which are related to climatic factors, and the rest describe the relief, geological structure, surface and underground water, flora and fauna, and the presence of natural conditions of diseases in the region.

The level of environmental pollution can be characterized by various plan indicators. The traditional method of evaluation is the use of parameters of permissible maximum concentration of pollutants (PPMC) as benchmarks. A complete assessment of pollution in different forms can be achieved by summing up the reduced PPMC values of all substances.

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Introduction.

The quality of the environment is largely determined by its ecological status. To describe the environmental condition of the area, it is necessary to have a certain number of specific indicators. Two groups of factors can be distinguished that describe the ecological situation of an area in terms of its impact on the population. The first assesses the natural conditions of the area and determines the comfort level of the natural environment for the life of the population. The second describes the level of environmental degradation and pollution as a result of anthropogenic influence.

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The study of areas of different sizes should be carried out based on the analysis of pollution data obtained from the same deployed monitoring network. Such networks do not exist in many countries, and data on the level of pollution are used to calculate emission values using simple calculation methods, using statistics from the State Statistics Committee and statistics from the Ministry of Water Resources. The variety of interaction of relations in the "population-production-

ecological environment" system includes the grouping of indicators proposed by L.I.Mukhina and T.G.Runova[1]:

Group 1 - indicators describing the current and prospective state of the studied parameters of natural, social, economic subsystems.

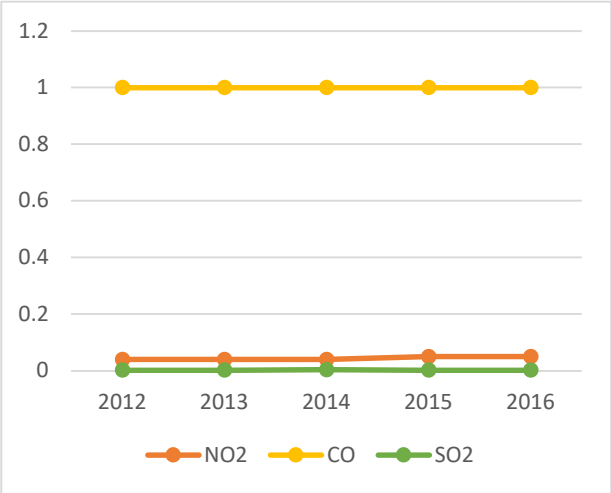
Group 2 - indicators used as a comparison to determine changes in subsystems. They form two subtypes: an indicator reflecting the initial state of subsystems and a conditional "standard". It is preferable to use them in evaluation studies, because on the basis of normative indicators it is possible to more accurately express the negative level of consequences that occur in subsystems.

Such a system of indicators primarily includes environmental quality standards represented by permitted rate (PR) norms for pollutants in air, water, soil, food products.

$\mathbf{X_o=C_o/PR_o;}$

where C_o is the concentration of the selected substance; PR_o - the amount of the substance in the permissible standard concentration in the area.

In some years, we can witness that the air pollution with various substances in Navoi city exceeds the permissible norm. (see 1-fig.)



1-**figure.** *The concentration of some toxic substances in the city of Navoi*

These indicators can help us to develop the Maximum Allowable Rate (MAR) to avoid negative consequences in the regions. The difficulty of developing quantitative and qualitative indicators of PR and MAR may depend on the nature of their specific area, the conditions of a specific region, the combination of natural conditions, the structure of the economy, the characteristics of the residential system, etc. Although the implementation of such normative indicators is important, they cannot be fully relied on for the following reasons:

1) development of these indicators for a small number of components of nature;

2) the high dependence of standards on the level of socioeconomic development of society means that they change over time;

3) the impossibility and inappropriateness of developing standards for all aspects of social, economic, and natural systems.

The calculation of the concentration of pollutants is carried out by the enterprise using the gross amount of harmful substances, and their total indicators in the settlement.

Group 3 - indicators of trends and levels of change of systems, which are achieved by forecasting the current state of systems compared to the past and future. These characteristics do not say much about the comfort or discomfort of the changes taking place for humanity, so a stage of real assessment of the consequences from the social and economic point of view is necessary.

Group 4 - should reflect the assessment of negative consequences:

- on the level of discomfort of changes in nature for bioecological living organisms;
- according to the level of demoecological-inconvenience for the population;
- techno-ecological - natural resources and conditions, on the level of inconvenience for economic activity.

Literature review.

It consists of evaluating changes in the environment according to the criterion of public health from a social point of view and evaluating changes affecting the preservation of biological diversity and gene pool from a bio-ecological point of view, which ensures the stability of biosystems. These non-economic evaluation indicators can be in the form of scores, categories, or pollution levels.

Many researchers have different approaches to the economic assessment of the state of the environment. For example, Mints and Preobrazhensky (1985) estimate the economic damage caused by environmental pollution or depletion of a particular type of resource; Runova (1985) the value of measures to maintain the state of the environment and natural complexes at the same level; Bronfman (1980) understands the environment to overcome the consequences of impacts that outweigh its potential for self-cleansing and restoration. Since it is very difficult not only to take into account all the relations between nature and society but

[1] Мухина Л.И., Преображенский В. С, Ретеюм Л. Ю. География, техника, проектирование//Новое в жизни, науке, технике. Сер. Наука о Земле. № 5. М

also to express them in the form of values, most of the literature on this topic is theoretical in nature. In practice, a combination of economic and non-economic evaluation is especially necessary today.

A comprehensive assessment of the ecological situation is carried out with the help of informational and methodological approaches of extensive research of natural components, factors, and types of effects. The use of information on components is one of the main methods of the comprehensive assessment of the state of the environment. For this, it is necessary to obtain integral indicators based on the convolution of individual components[2]. This process is very complex because it is necessary to take into account the abundance and diversity of industrial and production data.

Comprehensive assessment of regional systems plays a role in the formation of conditions for the specific type of use of their separate elements, groups, and their individual parts. At the same time, different combinations of the same elements (natural, infrastructure, etc.) are analyzed. A comprehensive assessment of the urban environment may include:

a) evaluation of the urban environment by functional areas (residential, production, recreation);

b) assessment of industry diversity of industrial enterprises and their location in relation to residential areas;

k) assessment of the development and quality of social infrastructure systems;

d) assessment of sanitary and environmental conditions (the comfort of natural conditions and level of anthropogenic impact on the natural environment, level of pollution of the natural environment, indicators of public health, etc.)[3].

Complex indicators combine individual indicators. A comprehensive assessment can be considered as a general classification of the area. In this case, the comparison can be made for the same directions of use of the territory, and the individual characteristics should be made in comparable indicators. The comprehensive assessment methodology includes the following steps[4]:

- selection and determination of types of use of territories and separate groups of territorial complexes. Factors are divided into natural, infrastructural, and population-related groups. In the development and development of new areas, special attention is paid to natural factors, the stability of landscapes, their ability to self-clean and restore, the comfort of natural conditions;
- to determine the characteristics of the elements that should be considered depending on the intended or existing use of the area and the critical evaluations given to them;
- development of a general evaluation algorithm combining private evaluations;
- determination of the importance of individual elements and their permissible rate for a certain type of use of the territory;
- selection of methods of mathematical analysis. A method based on the use of a qualitative approach can be chosen for the comprehensive assessment of regional systems;
-structural and complex mapping;
- expressing the comfort level of the area for a specific type of use.

Analytical methods for determining the complex hygienic characteristics of the environment include[5]:

- determination of threshold values and normative parameters of individual process factors;
-integral-genetically the same factors, characteristics of processes;
- a functional description of a process or phenomenon that combines genetically identical indicators of a complex environment;
-generalized - an indicator that completes and summarizes the sequential transition from individual assessment to complex assessment with the identification of genetically diverse environmental factors.

Research methodology.

A common shortcoming in all approaches to determining the quality of the environment is characterized by not taking into account the structure of the urban area when determining the permissible man-made impact. The simplest way to estimate the pollution of the area, taking into account the urban structure, is to determine the weighted average level of pollution calculated by the formula:

$$X = M_i \times Z_i / S$$

[2] The process of transition of substances from one state to another is understood.

[3] A B Sukhoveeva 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **381** 012087

[4] Ramaswami, A., Weible, C., Main, D., Heikkila, T., Siddiki, S., Duvall, A., ... & Bernard, M. (2012). A social-ecological-infrastructural systems framework for interdisciplinary study of sustainable city systems: An integrative curriculum across seven major disciplines. *Journal of Industrial Ecology*, *16*(6), 801-813.

[5] Fielding, J. E., Brownson, R. C., & Green, L. W. (2011). Understanding of determinants and their health impact. *Annual Review of Public Health*, *32*(1).

where X is the unit representing the average level of pollution, M_i is the area of the studied area; Z_i-level of pollution in that area; S- the total area.

For example, the area of the city of Navoi, which is the administrative center, is 0.06 km2, and the amount of gases released into the atmosphere in 2021 is 69,000 tons, and the average level of pollution is 0.03.

The assessment includes the correlation of any changes with the normative state of the population and the economy. There are 4 types of environmental impact assessment from the point of view of the creation of production facilities[6].

a) natural assessment - correlation of predicted changes in system properties with the same analog complexes outside the sphere of influence.

b) economic assessment - economic assessment of changes in natural conditions in the affected areas includes the calculation of direct damage to the activity of economic sectors, the state of production funds, and labor resources.

c) criteria of social assessment - environmental and economic conditions of human life support. Description of social conditions and their assessment in a broad sense includes sanitary-hygienic, aesthetic, and psychological conditions.

d) assessment of anthropogenic impact - is becoming one of the main directions of research aimed at optimizing the environment of human life.

Environmental impact assessment is carried out at 2 levels: impact level and consequence level.

Assessment of changes in natural-economic regional systems includes:[7]

- identification of the object - determination of the natural area or administrative-territorial unit, as the assessment is carried out within it;
- choosing a methodology for determining changes occurring in certain subsystems (natural, social and economic);
- to determine the system of indicators (in the form of natural or value) to evaluate the change in the quality of the environment, as well as to determine the criteria for the change. The need for a system of criteria is explained by the need to compare absolute indicators with normative (for example, sanitary and hygienic) indicators;
- a collection of cartographic materials to identify ecological stress zones.

Ecological stress can be calculated as the ratio of the level of impact on the area to the sustainability potential. Impact assessment can be done using absolute indicators or using point scores. When using absolute indicators of impact, they are compared with existing standards, which means that the assessment is actually relative. The same effect is manifested in different ways in different landscapes. Although there is much work on the regulation of anthropogenic loads in natural systems, there is no system of standards that takes into account all possible cases.

Another method used to evaluate impact is scoring. The advantage of this method is the ability to generalize indicators shown in different measurement units (Ratanova, Bityukova, 1994). Among the many approaches to impact assessment, it is important to develop a general methodological plan, where the main concepts and principles of impact assessment, the system of indicators are considered, and evaluation schemes are presented. Several attempts in this direction can be seen in the works of Israeli Khachaturov.

The impact of various elements of the socio-economic system on the environment has its own characteristics. The industry is one of the most important factors in pollution and the deterioration of the living conditions of the population. It affects almost all components of the natural environment (air, surface and underground water, soil, and plants). The amount of emissions into the atmosphere or into water bodies is analyzed with a relative assessment of the environmental impact of various enterprises. Pollutants affect humans and other living organisms to varying degrees. The indicator of the degree of harm of various substances is the toxicity coefficient, which is calculated by reducing the standards of the permissible average daily concentration (PR) of substances taken as a unit (usually carbon or sulfur dioxide). The toxicity coefficients of the substances are different (Table 2).

A conditional indicator of the total volume of enterprise waste is formed from the sum of conditional indicators of the volume of each substance (the actual volume of waste is multiplied by the toxicity coefficient). This is an approximate indicator of the level of exposure of a particular enterprise. Similarly, it is possible to estimate the volume of discharge of pollutants into water bodies.

Analysis and results.

In practice, there is a problem with data collection when conducting such studies. Data on the waste of some enterprises do not have a clear indicator or do not exist at all. In such a situation, indicators of the

[6] Jones, M. L., Randall, R. G., Hayes, D., Dunlop, W., Imhof, J., Lacroix, G., & Ward, N. J. (1996). Assessing the ecological effects of habitat change: moving beyond productive capacity. *Canadian Journal of Fisheries and Aquatic Sciences*, *53*(S1), 446-457.

[7] Amirova, N., Sargina, L., & Khasanova, A. (2020). Natural resource potential as a factor in the formation of the region's natural-economic system. In *E3S Web of Conferences* (Vol. 174, p. 02011). EDP Sciences

amount of harmful waste are obtained from the industrial enterprise. Statistical analysis of the obtained indicators is carried out. In the absence of such statistics, an approach based on the analysis of the network structure of production is used. Different types of industrial production have different effects on environmental components and human health. It is an important issue to develop a method of calculating environmental risk indicators for specific branches of production based on expert assessments. By in-depth analysis of the production capacity of the enterprise, and the structure of industrial production, it is possible to estimate the level of man-made influence on the environment of a certain city to a certain extent. The emission distribution radius is related to the intensity of emissions, and their properties of distribution in the natural environment.

Table 2 *Allowable maximum concentration of some harmful substances for atmospheric air of residential areas (mg/m³).*

Substance	Allowed average rate	The maximum permissible rate	Toxicity coefficient
Solids	0,15	0,5	3
Sulfur dioxide	0,15	0,5	1
Nitrogen dioxide	0,04	0,085	0,8
Nitrous oxide	0,06	0,4	1,2
Carbon monoxide	3	5	60
Ammonia	0,04	0,2	0,8
Hydrogen chloride	0,2	0,2	4
Hydrogen cyanide	0,01	-	0,2
Cadmium	0,001	-	0,02
Lead	0,0003	-	0,006
Carbon disulfide	0,005	0,03	0,1
Benzopyrene	0,000001	-	0,00002
Phenol	0,003	0,01	0,06
Formaldehyde	0,003	0,035	0,06
Hydrogen fluoride	0,005	0,02	0,1

One of the main sources of environmental pollution in large cities is traffic. Transport is one of the important factors of various pollutants, as well as other negative effects on human health and the environment. This factor is related to the age of vehicles and affects the unsatisfactory environmental condition of the cities of South-Eastern, and Eastern Europe and the Caucasus and Central Asian countries.

The impact of the population on the environment is manifested directly (pollution of the utility system, recreational load, etc.) and through economic activity. The direct effect of the population is demographic pressure. This indicator is the same as the population density indicator and is determined by the number of people per unit area. The activity of the population is not limited by the borders of the settlements, therefore, determining the outer border where the demographic pressure is applied is an important methodological task. Many researchers define these boundaries with work and social connections (distances of 30-40 minutes), which means an area with a maximum activity radius of up to 3 km. Outside these areas, population impacts occur during production activities, with the exception of recreational loads in recreation areas.

To date, the limits of direct impact on the environment are expanding within the borders of cities and large industrial centers. The boundaries of the impact zones are determined by the distance of 1.5 hours from the city center, that is, 40-60 km - for a large city; 7-20 km - for an average city; 5-7 km - for a small town.

In addition to the indicator of population impact on the environment, there is also an indicator of social importance. The social importance of environmental pollution is determined by the number of people experiencing this effect. This is related to the zones of influence of industry, transport, and other pollutants. The indicator of social importance can be expressed by the number of the population that is negatively affected in relation to the total population of the settlement.

The analysis of approaches to the study of the quality of the urban environment shows that cities are somewhat different from each other according to their origin and functions. An approach to the study of any object means a research strategy based on specific systems of concepts, principles, indicators, and methods[8]. O. N. Yanitssky summarized other interdisciplinary concepts of urban ecology and identified subject, object, and problem-oriented approaches[9]. The most important geoecological studies of cities can be seen in Barbash's 1986 study on the

[8] Бойден С. Комплексные экологические исследования человеческих поселений. ИМПАКТ 1986

[9] Яницкий О.Н. Экология города: зарубежные междисциплинарные концепции М.1986

example of the Moscow region. He focused on environmental factors[10]. We can see the analysis of approaches to the urban environment in the works of V. I. Blanutsa in 1990[11]. He pointed out that it is possible to evaluate on the basis of two parameters: on the basis of the processing of the original data and on the preservation of the integrity of the urban environment. In this context, initial information about the urban environment can be obtained through measurement, subjective assessment, or both, summarized in the form of a problem. The resulting general directions of research can be called statistical (if the measurement is based on the initial data processing indicator, then indicative), subjective and problematic.

The integrity of the city as a research object can be achieved through:

a) listing all indicators of the environment (industry) or separating the main indicator (integral);

b) calculation of derivatives of environmental characteristics (compared to initial indicators) (complex direction);

k) combine all indicators into a single causal model (functional direction);

As a result of the initial data analysis and the intersection of indicators of the integrity of the urban environment, we can see that several networks of approaches are emerging, and among them, there are 6 main ones (Table 3):

Table 3. *Approaches to the study of the quality of the environmental condition of cities*

Approach	**The main idea**	**Disadvantage of approach**	**The dominant aspect of the approach**	**Scientific directions that can be developed based on the approach**
1. Statistical network	Representation of many indicators of the urban environment and their changes	It does not represent the integrity of the urban environment	This is the initial stage of many studies conducted within other approaches	Nature conservation statistics
2. Statistical complex	Development of a method of systematization of various indicators	The integrity of the urban environment is calculated by statistics	It allows for a comprehensive assessment of the urban environment	Factor ecology of the city, index approach
3. Statistical-functional	Creating a functional model that allows combining different indicators	Currently, it is impossible to create a model that describes the city in general	It serves as a basis for the development of a normative forecast of the urban environment	Eco-economic modeling
4. Indicative-integral	Combining a separate indicator, based on it, a general assessment of the urban environment	The general indicator of the urban environment is not defined	It allows you to change the study of a complex object into a simple measurement	----------
5. Subjective-integral	It allows evaluating of the urban environment by processing the results of the social survey in the process of expert evaluation based on the holistic perception of the person of the urban environment.	Subjectivism	It tries to give a holistic understanding of the urban environment	Sociological survey, expert assessment
6. Complex problem	Identifying complex problems and taking measures to solve them by formulating the results of interdisciplinary research of the urban environment against the background of problems	Methodologically little studied	Focuses on the integrity of the urban environment through a set of issues	----------

[10] Барбаш Н.Б. Методика изучения территориальной дифференциации городской среды (пр. Москве) 1986

[11] Блануца В.И. Геоэкологические исследования крупного города М.1990

The choice of one of these approaches in the study of the urban environment is made taking into account the following requirements:

1) coverage of all types of information (corresponds to approach 6);

2) the possibility of generalizing the characteristics of all the main approaches (corresponds to the 6th approach);

3) maintaining the object's integrity (approaches 2-6);

4) quick implementation of research results into practice (approach 6);

It can be seen that the problem-complex approach fully meets these requirements, so it is appropriate to emphasize this approach in research.

A problem-complex approach to the study of the urban environment is a research strategy aimed at identifying, studying, and developing recommendations for the elimination of problematic situations caused by environmental pollution. A comprehensive assessment of the quality of the environment is carried out by drawing up territorial complex schemes of nature protection. They include a comprehensive detailed assessment of all factors that have a negative impact on the environment, public health, and material and technical facilities. Territorial complex schemes of nature protection include:

- description of the state of the natural environment with an assessment of the level of anthropogenic influences on the atmosphere, hydrosphere, lithosphere, flora, and fauna;
- analysis of sanitary-epidemiological service data to assess the health status of the population living in the affected area;
- prospects of economic development, information on the base of mineral and raw materials; formation of industrial centers, development of cities;
- analysis of existing and created systems of use of all types of resources;
- a possible change in the state of the natural environment as a result of anthropogenic influence, as well as a forecast of expected changes in the state of public health;
- identification of problem situations and problem areas through the comprehensive analysis of the territory;
- development of a comprehensive set of measures for nature protection and rational use of resources, improvement of existing conditions;
- technical and economic comparison of the proposed projects and selection of optimal complex measures in terms of social, economic, and environmental indicators, setting priorities.

In the process of comprehensive assessment, tasks are set to identify the main environmental problems and develop a strategy for nature protection. The advantage of this approach is the use of a wide range of indicators for the assessment of the area's natural capabilities and anthropogenic impact, the assessment of economic damage as a result of environmental pollution, and the development of environmental protection measures. However, experts point out a number of disadvantages of this approach. Assessment is carried out by administrative units, whose boundaries often do not correspond to natural boundaries or the sphere of influence of negative factors. In addition, there are no guidelines on the exact quantification of individual exposures, such as risk and toxicity, needed to obtain truly comprehensive assessments.

The methodological approach to the comprehensive assessment of the level of environmental stress in urbanized areas differs as follows:

- scope of research;
- a set of indicators that determine the level of certain types of effects;
- integration of integral indicators to obtain the final result;
- composition of administrative-territorial units where calculations are made.

When studying the quality of the urban environment, it is necessary to take into account the influence of the surrounding area, which interacts with the city. According to G. M. Lappo, it is impossible to study and design the city separately from its surrounding area[12]. However, most of the approaches are based on the evaluation of the quality of the urban environment and do not take into account the connections of the city with the surrounding areas. Suburbs have a great influence on all aspects of the activity of cities, their formation, and development. In turn, the city is the economic, political, and cultural center of the surrounding area. The increasing role and importance of cities and the complexity of the problems that arise in them will not fail to affect the interaction of the city with the surrounding areas. Surrounding areas experience the constant influence of the city and are formed under its influence, which is reflected in the functional organization of the area, and its economic specialization. The suburbs surrounding the cities have functions that ensure the vital activity of the cities (waste landfills, transport systems; a place to produce perishable agricultural products; providing the city with water, and building materials; a place for the recreation of citizens,

[12] Лаппо Г.М. Города на пути в будущее. М., "Мысль", 1987.

etc.). Therefore, it is important to constantly monitor the environmental condition of the surrounding area. Then it can ensure the sustainable and harmonious development of the area with ecological balance in the "urban-suburban" system, for which it should be resistant to urban influence.

The need for a joint study of the city and its surrounding areas is evidenced by:

1) the geoecological boundary of the city is becoming abstract;

2) the flow of pollution from outside to cities (influence of other cities, agriculture, etc.) and vice versa, the impact of the city on its surrounding areas, their scale depends on the factors that have a negative impact on all components of the environment;

3) the need to establish external zones of urban environmental protection has a positive effect on the quality of the urban environment (recreation zones).

In addition, it is appropriate to take into account the impact of anthropogenic pressure when analyzing the ecology of the city and its neighboring areas. B.I. Kochurov conducted research in this regard. It argues that the distribution and proportion of land according to the level of anthropogenic load allows for assessing the level of anthropogenic change of landscapes or administrative units[13]. The author introduced the concepts of absolute and relative stress coefficients to science, and they are determined by the ratio of land areas with high and low anthropogenic loads. According to the level of intensity of anthropogenic load, all lands are arranged on a 5-point scale (Table 4).

Formulas for calculating the intensity coefficients of the ecological and economic condition of the region have the following form:

$K_{absolute}$=AL1/AL5 $K_{relative}$= AL1+ AL2/ AL4+ AL5

Table 4. *Land classification according to the level of anthropogenic load*

Land classification	Anthropogenic load level (AL)	Scale
Infrastructure, industrial land, transport, degraded land	Very high	5
Perennial crops	High	4
Cultivated lands, forests, and pastures	Average	3
Natural nutrient soils	Low	2
Protected natural areas	Very low	1

In the study of the city and its surrounding area, it is important to analyze the natural components such as terrain, green areas, and climate parameters.

The role of terrain for environmental quality assessment is determined by whether the area is located in lowlands or high places. In the first case, the creation of favorable conditions for the accumulation of pollutants is understood, in the second - ventilation, and drainage, that is, the features of removing, washing, and distributing pollutants. Morphological features of the area can serve as a factor in its self-cleaning.

When assessing the environmental quality of the region, it is important to take into account the coverage of green areas in it, which are characterized by the fact that the regions play the role of a system that creates and restores the environment. The system of green areas is an important link of the agglomeration area and performs health, nature protection, recreation, and aesthetic functions. In connection with increasing environmental problems, it is of particular importance to maintaining a uniform system of green areas in urban agglomerations.

In assessing the quality of the environment, much attention is paid to the climatic parameters, especially the processes that limit the self-cleaning potential of the atmosphere (low wind speed, fogs, surface temperature inversions, etc.).

The relationship between the level of atmospheric air pollution and meteorological conditions is very complex. Therefore, it is more reliable to use complex indicators, rather than individual meta-parameters, to determine the causes of atmospheric pollution formation. There are a number of classifications of such indicators. V.V. Kryuchkov's developments are often used, he suggests evaluating the self-cleaning ability of the area based on the annual average wind speed of the area, the frequency of calm days, and the amount of annual precipitation. According to him, self-cleaning in the atmosphere almost does not occur when the average annual wind speed is less than 3 m/s, the frequency of calm days is 75-50%, and the amount of precipitation is less than 300 mm per year. The self-cleaning ability is shown on average when the wind speed is 3-5 m/s, the repetition of calm days is 30-50% and the amount of precipitation is 300-450 mm per year. The best appearance of self-cleaning occurs when the wind speed exceeds 5 m/s, 0-30% calm days, and annual precipitation of more than 450 mm, respectively[14].

[13] Кочуров Б.И. Структура географического прогноза и природоохранных проблем. М.1990

[14] “Экономико-географические проблемы Московского региона”. П/ред. Хрущева А.Т.,

This method is easy to use, but its main drawback is the incompleteness of the meteorological elements that affect the processes of accumulation and dispersion of compounds in the atmosphere.

In the analysis of the influence of weather conditions on atmospheric pollution, as well as in the inspection and design of enterprises, the index of atmospheric pollution potential (APP) developed by the Voeykov General Geophysical Observatory is most often used. This indicator represents how many times the average level of air pollution in a certain area will be higher than the conditional level due to the repetition of weather conditions in a certain area.

Conclusion.

Research conducted in the conditions of Uzbekistan showed that the accumulation of pollutants in the atmosphere depends almost exclusively on 2 parameters: repetition of low wind speed (0-1 m/sec.) and precipitation. It was determined that the wind speed that helps to remove harmful compounds from the city should be above 6 m/s (two views of the concentration of pollutants are important: 0-1 m/s for low emission sources and 4-6 m/s for high) and the percentage of precipitation capable of cleaning the atmosphere from pollution is 0.5 mm per day[15]. For this purpose, the self-cleaning potential (SCP) indicator of the atmosphere has been introduced, through which the monitoring of atmospheric pollution in cities leads to high efficiency.

$$\mathbf{ATP = (A_{sh} + A_t) / (A_y + A_s)}$$

Here, A_{sh} - days with a wind speed of 0-2 m/s; A_t - foggy days; A_y - days with more than 0.5 mm of precipitation; A_s - days when the wind speed is higher than 6m/s.

If the result is less than 1, the atmosphere of the region has a higher self-cleaning potential, and if it is higher than 1, atmospheric polluting processes are dominant.

In summary, there are several approaches to urban environmental assessment, and they assess the ecological environment in different ways. Among them, the fact that it is possible to achieve relatively accurate information and results is considered a problematic-complex approach.

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