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URBANISATION AND ITS RELATIONSHIP WITH THE ECOLOGICAL ENVIRONMENT

Abstract

Cities are multifunctional complex objects, in which various political, social and economic processes take place. The increase in the capacity of cities creates the process of urbanization, and its various extents affect the ecology of the city. In such a process, the health of the population, their labour activity, and indicators of the use of available resources deteriorate sharply. From this point of view, it is possible to understand the connection between cities and ecology, analyze the ecological situation of urban areas and develop measures aimed at eliminating the problems. This article focuses on the relationship between cities and urbanization with ecology and the factors that influence it. This article presents an analysis of the impact of cities and the process of urbanization on the ecological environment and approaches to it. The main idea is that we can achieve sustainable development through the widespread introduction of necropolises.

Keywords: *urbanisation, cities capacity, environmental modelling, ecological imbalances, dBA, population health, urban ecology*

Normurad Fəxrəddin Lətipov

Şəhərləşmə və onun ekoloji mühit ilə əlaqəsi

Xülasə

Şəhərlər müxtəlif siyasi, sosial və iqtisadi proseslərin baş verdiyi çoxfunksiyalı mürəkkəb obyektlərdir. Şəhərlərin tutumunun artması urbanizasiya prosesini yaradır və onun müxtəlif ölçüləri şəhərin ekologiyasına təsir göstərir. Belə bir prosesdə əhalinin sağlamlığı, onların əmək fəallığı, mövcud resurslardan istifadə göstəriciləri kəskin şəkildə pisləşir. Bu baxımdan şəhərlərin ekologiya ilə əlaqəsini anlamaq, şəhər ərazilərinin ekoloji vəziyyətini təhlil etmək və problemlərin aradan qaldırılmasına yönəlmiş tədbirlər hazırlamaq mümkündür. Bu məqalə şəhərlərin və urbanizasiyanın ekologiya ilə əlaqəsinə və ona təsir edən amillərə diqqət yetirir. Məqalədə şəhərlərin və urbanizasiya prosesinin ekoloji mühitə təsiri və ona yanaşmalar təhlil edilir. Əsas ideya ondan ibarətdir ki, nekropolların geniş şəkildə tətbiqi ilə davamlı inkişafa nail ola bilərik.

Açar sözlər: *urbanizasiya, şəhərlərin tutumu, ətraf mühitin modelləşdirilməsi, ekoloji balanssızlıqlar, dBA, əhalinin sağlamlığı, şəhər ekologiyası*

Introduction

The history of the emergence of cities goes back a long way. In ancient times, people were mainly attracted to areas with fertile soil and wetlands. Over the years, the development of trade and crafts created densely populated areas, and thus the first cities began to appear one after another. The improvement of living conditions in these settlements increased security, and the possibility of communication between people gradually increased the growth of ancient cities (Allaberdiyev, Rakhimova, Komilova, Kamalova, Kuchkarov, 2021:52-57). At the beginning of our era, very large city-states such as Rome, Athens and Sparta with a population of 1 million began to emerge. The emergence of the urbanization process can be conditionally divided into three stages:

1. In the first stage of urbanization, which lasted until the 16th-17th centuries, the townspeople mainly used local food and water sources, the energy of water and windmills, horses, domestic animals and manual labour prevailed in production. The wastes polluting the environment were mainly human and livestock waste. The environmental problems of the ancient cities were related to the contamination of water supply sources with these wastes, and as a result, the occasional outbreak of infectious diseases.
2. The second stage of urbanization coincided with the development of land and water transport, road development, and the opening of opportunities for the use of thermal energy for transport and production purposes. From the 16th century, the number of cities and their population grew significantly. At this stage, the level of the environmental impact of the increase in the share of industry in the city usually did not exceed the limit of its self-purification ability.
3. The beginning of the third stage of urbanization is associated with the industrial revolution in the 19th century, and this stage is characterized by a sharp increase in the impact on the natural environment (Latipov, Erkaboevich, 2022:188-196).

By the beginning of the 20th century, Great Britain symbolically achieved the status of the first modern urbanized state in the world, and other industrialized countries achieved this result only 50 years later, and thus a step was taken from the ancient history of urbanization to the stage of modern urbanization (Table 1, the chronology of the development of urbanization).

Table 1.

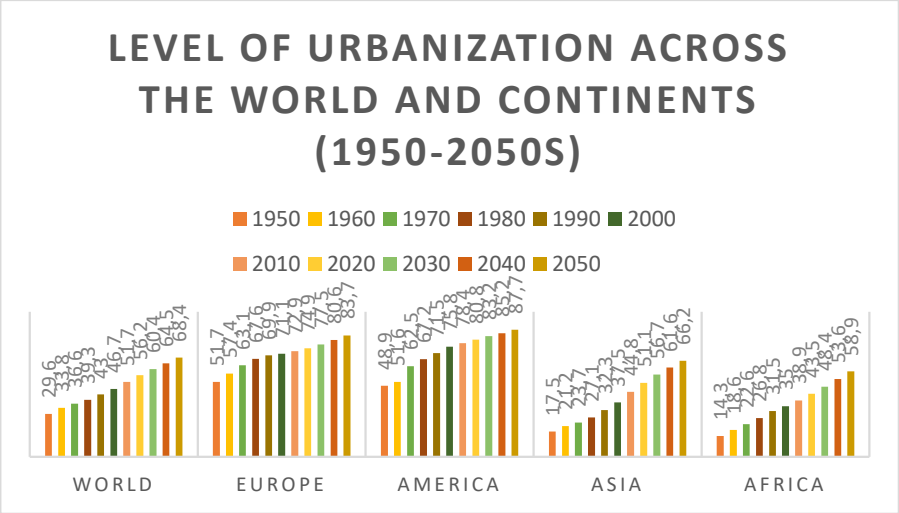
Development history of urbanization according to Tetior (2006) classification

Settlement	Character of the settlement	The time it happened
Village	Areas with populations of 50 to 100 people (examples include many areas around the Nile Valley)	About 10 thousand years ago
A small town	A city with a few thousand inhabitants (the Sumerian city of Eridu, an ancient city in present-day southern Iraq)	In the 4th millennium BC
City	Cities with a population of up to 50,000 and 5-8 people per 1 km2 (Cities of the Summer State)	3500 BC
Big city	A city with more than 1 million inhabitants (Rome)	44-10 BC
Megapolis	A city with more than 10 million inhabitants and an area of several thousand square kilometers (London, New York, Mexico City)	Since the 20th century
Agglomeration	A system of interconnected settlements around major cities (Bombay, Buenos Aires, Karachi)	The end of the 20th century
Megalopolis	Union of large agglomerations, including large and small cities (about 40 agglomerations in the distance from Boston to Washington, where 20% of the US population lives, 35 agglomerations between Chicago and Pittsburgh, Tokaido megalopolis, which includes 20 agglomerations)	The end of the 20th century
An urbanized country	A country whose natural landscapes have completely disappeared, replaced by cultural landscapes (England, small countries of Western Europe)	20th-21th century
An urbanized planet	Compression of the natural environment and destruction of biological diversity	A process that can be observed in cities that are moving towards sustainable development

The widespread process of urbanization in the world coincided with the second half of the 20th century and began to accelerate in all parts of the earth's surface. According to UN data, at the beginning

of the 20th century, urbanized areas occupied 1% of the entire earth's surface, while in 1950, 29.6%, 33.8% in 1960, 36.6% in 1970, 39.3% in 1980, and 43% in 1990 lived in cities. At the beginning of our century, the level of urbanization in the world was 46.7%, in 2010 it was 51.7%, in 2020 it was 56.2%, and this process is expected to increase between years (https://population.un.org/wup/DataQuery/, 2022) (Table 2).

Table 2.



Just as the economy affects the social sphere, the social sphere also affects the economy. It affects the economic sphere by increasing the level of knowledge and culture of a person, reducing morbidity, and creating comfortable housing and cultural and household conditions for city residents. Therefore, studying the dynamics and quality of life of the city population, and forecasting it is extremely important for the sustainable, proportional and consistent development of urbanization in general (Komilova, Rakhimova, Allahverdiev, Mirzaeva, Egamberdieva, 2021:302-312).

Literature review. The well-known geo-urbanist Yu.A.Pivovarov interpreted urbanization as a complex historical process of increasing the role of cities, urban lifestyle and urban culture in the development of society, which is connected with the spatial concentration of activity in a relatively small number of centres and regions of the socio-economic development of society.

E.B.Alaev understands urbanization as a socio-economic process that has intensified during the scientific and technological revolution, the increase of urban areas, the concentration of people in them, especially in large cities, and the wide spread of settlements. And expressed the opinion that it is a reflection of deep structural changes in social life. Urbanization as a global process is very complex and controversial, it has different forms. The main aspect of urbanization is expressed in the emergence of urbanized zones with the rapid development of urban settlements.

When studying the concepts of cities and urbanization, geographers approach them as a purely social phenomenon. In this case, cities of different sizes, and especially large centres, are a space that reflects a unique social environment, or in other words, an extremely dense location of the population in a relatively small area, its living conditions and lifestyle. If we compare rural and urban life, we can witness two polar opposites. In the city, indicators such as the lifestyle, employment, social status, behaviour, and health of the population are characterized by the fact that they are quite different from the countryside, and these aspects show the socio-geographical aspects of the city and urbanization. Just like there are two sides to a coin, there are pros and cons to urbanization and urbanization (Komilova, Haydarova, Khalmirzaev, Kurbanov, Rajabov, 2019:2364). If the high level of urbanization indicates the power of social, economic and political development of the state, its negative aspect is that due to the rapid growth of urbanization, it becomes difficult to regulate and manage it, and as a result, it can damage cultural life. In addition, the geocriminogenic situation, that is, the types of crime and its scope, is expanding. The worst aspect of urbanization is the deterioration of the ecological environment and

public health as the infrastructure of the social environment is formed, and the rise of various diseases (Komilova, Karshibaeva, Egamberdieva, Abduvalieva, Allanov, 2020:2093-2098).

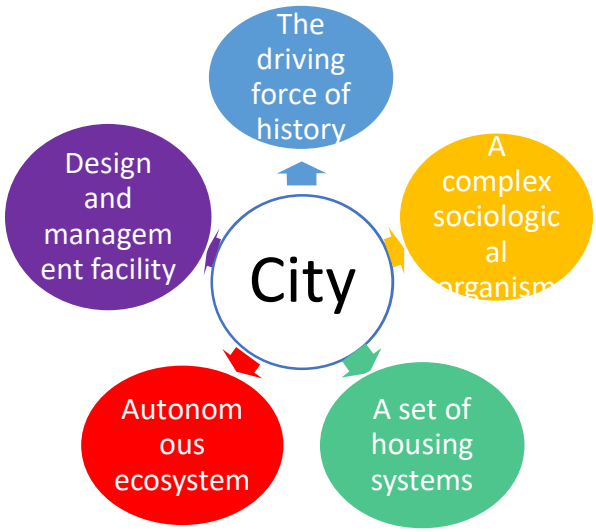
Materials and methods. Assessment of the ecological condition of cities remains one of the most urgent issues today, because of the development of science and technology, as a result of the large-scale development of territories, changes in the ecological environment are occurring at various levels. The state of the environment is based only on statistical data, which is known to the general public, but it does not fully reveal the real state. For this purpose, it is very important to combine experimental monitoring results with national statistical data. In organizing and improving such a process, we can accurately assess the environmental condition of cities and achieve sustainable development of cities in the future by applying a new method of mapping, focusing on quality indicators (Latipov, 2019:47-50).

In events devoted to environmental change and its negative consequences, it has been often said that the future of the world will be at risk if this analysis continues to deteriorate the ecological environment, for example, in the 1992 environmental event in Rio de Janeiro, the "Millennium Development Goals" Since its inception, the proportion of cities without improved water supply and sanitation has increased by 20 per cent, nearly 1 billion people still need clean drinking water, 1.4 billion people still live in homes without electricity, and 1 billion people suffer from malnutrition. According to 2010 UN data, 2.6 billion people in the world do not have access to modern sanitation and improved sanitation (Komilova, Latipov, Kahramanova, 2022:5836-5840). Due to the strong anthropogenic load, environmental problems in cities are becoming more acute, because many man-made processes are clearly expressed here: the removal or accumulation of large amounts of substances, the mass of substances, the creation of technical facilities and structures, the mechanical impact of mobile devices and residents on soil and vegetation, excessive amounts or cities are areas where almost no component of the habitat has escaped significant man-made changes due to the introduction of chemicals unusual for local landscapes. The concentration of industrial production in cities, high saturation with motor transport, and the presence of artificial structures and coatings intensify geochemical processes and disrupt the natural cycles of chemical elements and their compounds, which leads to radical changes in the natural landscape-geochemical conditions. At the same time, cities are powerful sources of man-made substances, providing them not only to the urban environment but also to suburban and regional migration flows. As a result, in terms of intensity of pollution and distribution area of pollution anomalies, many cities represent man-made geochemical and biogeochemical provinces in different natural environments. According to studies, the impact area of the city affects the environment of areas within a radius of 20-50 km from the city area, according to data, the ecological footprint of London also affects 125 km from its area. As a result of the penetration of man-made chemicals into the urban environment, an unfavourable ecological situation is formed in the zones of the strongest man-made influence, which threatens the health of the population and the state of natural elements of urban ecosystems (Latiopov, 2021:105-108)

However, it would be a mistake to attribute only negative environmental consequences to the functioning and development of cities. As noted by V.R.Bityukova, cities include the possibility of concentration of production and population, the use of complex engineering solutions and more efficient technologies to reduce the flow of pollutants into the environment and save resources, which also contributes to the wide spread of the urbanization process outside the cities. So, on the one hand, cities are areas of concentration of environmental problems, on the other hand, they are centres of innovation, where the necessary conditions for the gradual solution of most problems are formed (Kalonov, Latipov, Shirinova, 2021:15-18).

Recently, the social-ecological problems of cities have become more and more important due to the strengthening of the urbanization process and the fundamental change in the relationship between man and nature. Insufficient attention to the environmental factor causes problems in the development of measures aimed at preventing environmental problems both theoretically and practically. This requires that cities be considered as the main object of study in the context of environmental problems. Glazichev (1984) states that the following approach is necessary for the study of cities (Table 3).

Table 3.



It can be seen that the city is a complex and multifunctional object of study, and its analysis and evaluation from the point of view of one or another discipline may lead to several difficulties. Therefore, there is no single concept of urban area research. Over time, the problems of the city, their types and their scale have increased. Especially today, environmental problems are showing themselves as a kind of "background" to which the main attention should be paid. The most interesting thing is that these environmental problems appear and develop together with the emergence of cities. V.S.Visharenko (1988) in the retrospective development of cities divided their environmental condition into seven stages. But these stages are typical for Europe and the Middle East, and some ecological features may be suitable for other regions.

Ecological imbalances have existed since the beginning of cities, and have become widespread over time. In the early stages, the main focus was on environmental issues related to solid waste and improved water supply, but over time, pollution from industrial waste and vehicle emissions was added. Due to non-compliance with existing environmental requirements and regulations, the lack of environmental literacy among the population, the epidemic situation in many large cities on earth has led to the outbreak of infectious diseases, and due to severe environmental pollution, serious health problems and even death rates have been observed in urban residents. In Central Asian countries, including some cities of our republic, the quality of drinking water is not up to the required level, which causes specific endemic diseases in the region (Latipov, 2018:108-110).

American scientist L.Mumford (1982) divides the history of cities from an ecological point of view into three stages: 1st stage of the symbiotic relationship between the city and the environment; 2nd urbanization stage; 3rd stage of imbalance of growth and ecological situation. These stages are typical not only for cities in the Mediterranean but also for cities in developing countries today. In a slightly different way, cities in developing countries are experiencing a second phase.

Cities occupying a small area in the ancient past began to attract the surrounding areas with the increase of human needs, resulting in the emergence of modern urban agglomerations and highly urbanized areas. As a result of the emergence and development of such complex systems, instead of the areas occupied by natural landscapes, the increase of man-made and anthropogenic loads seriously affected not only the urban area but also the structure of the surrounding landscapes (Latipov, 2017:74-75). In a word, the impact of urbanization went beyond the city.

The analysis of the literature shows that in the study of urban ecology in our republic, only one aspect of the city, such as climate, soil, internal waters, fauna and flora, the health of the population living there, atmospheric air and its pollution, is analyzed, but a comprehensive study of the urban environment and the lack of analytical methodology makes it difficult to fully reveal the socio-ecological situation there. We can see that the integrated geographical study of the urban system is much

more developed abroad in the works of Yanitssky, Petrov, R.Park, A.S.Visharenko, F.Zeman, S.Jorgenson, E.Best, and P.Lavin (Kalonov, Latipov, 2021: 477-479).

In the 50s of the last century, more attention was paid to the issues of urban organization in the context of the tension between man and nature, and by the 70s, urban ecology was considered a multi-level integrated organism. Man and his needs occupy the main place in the center of foreign concepts in the study of urban ecology.

In the territory of the former Union, the first ideas related to this term can be found in the works of Sokolov, Kotelnikov, Saushkin, Sochava. Recognizing human ecology as one of the main directions, Sochava thinks about the importance of the ecological approach in geography in the correct use of nature, optimization of the environment and development of long-term forecasts of nature use. Later, the issue of creating an optimal geographical environment for the population through the study of human ecology became the main goal, and thus the study of urban ecology began to take a new shape. After that, studies on the content of the concept of "Ecopolis" and their organization began in scientific treatises. In these studies, mainly the opinions of citizens of small towns on environmental problems in their cities were studied (Kalanov, Latipov, 2018:79-80).

In our republic, the geographic approach to the study of the environmental condition of cities began in the 80s and 90s of the last century, and the analysis of the urban environment based on natural and demographic characteristics was carried out by Raimov and Tursunov. Major works have been studied within a single component of the urban environment, but a comprehensive study has not yet been carried out. In the work of Sokovkin, we can see the ecological connection between the location of production forces and air pollution in the capital.

Analyzing the ecology of cities allows us to study the problems in the area in two ways, that is, environmental problems within the city and problems of ecological interaction of the areas adjacent to the city. The study of the environmental condition of cities can be grouped from a socio-economic point of view as follows:

1. The problem of pollution of the urban environment;
2. The problem of rational use of natural resources;
3. The problem of public health and sanitary-hygienic indicators.

The problems of the first group include atmospheric air pollution and new types of pollution (noise, electromagnetic vibration and radiation), and pollution of the territory with solid (industrial, construction and household) waste. It should be noted that all components of the city are exposed to a certain amount of pollution, but it is important that this pollution does not exceed the norm. The main place of urban air pollution is occupied by various toxic gases emitted from industrial enterprises. It is for this reason that it is appropriate to thoroughly analyze the ecological factor in the placement of industrial enterprises. The types and composition of gases polluting the urban environment are different, and the fact that the permitted standard level for them does not have a clear size also leads to the deterioration of the city's atmospheric air. When comparing the climate of urban and rural settlements located in the middle latitudes, the following differences were observed:

Table 4.

According to the Stolberg (2000)

Meteorological factors	In urban versus rural areas
Total radiation	15-20% less
Ultraviolet rays in winter	30 % less
Ultraviolet rays in summer	5 % less
Sunlight	5-15 % less
Average temperature in summer	0.5-1˚C higher
Average temperature in winter	1-2˚C higher
Duration of the heating season	10 % less
Various mixtures - condensation particles - various gas mixtures	 10 times more 5-25 times more

Annual average wind speed	20-30 % less
-stormy	10-20 % less
-shtill	5-20 % higher
Total rainfall	5-10 % more
-in the form of snow	5 % less
-Days with less than 5mm of rain	10 % more
-cloudiness	5-10 % more
-return of foggy days in summer	30 % more
-return of foggy days in winter	100 % more
Relative humidity in winter	2 % less
Relative humidity in summer	8 % less
It's cooler	1.5-2 times less

The level of pollution leaves the city area and has a significant impact on its surroundings, and as a result, the ecological situation in the districts and towns between the cities is getting worse. Emissions to the atmosphere for all cities should be:

S/AR≤1;

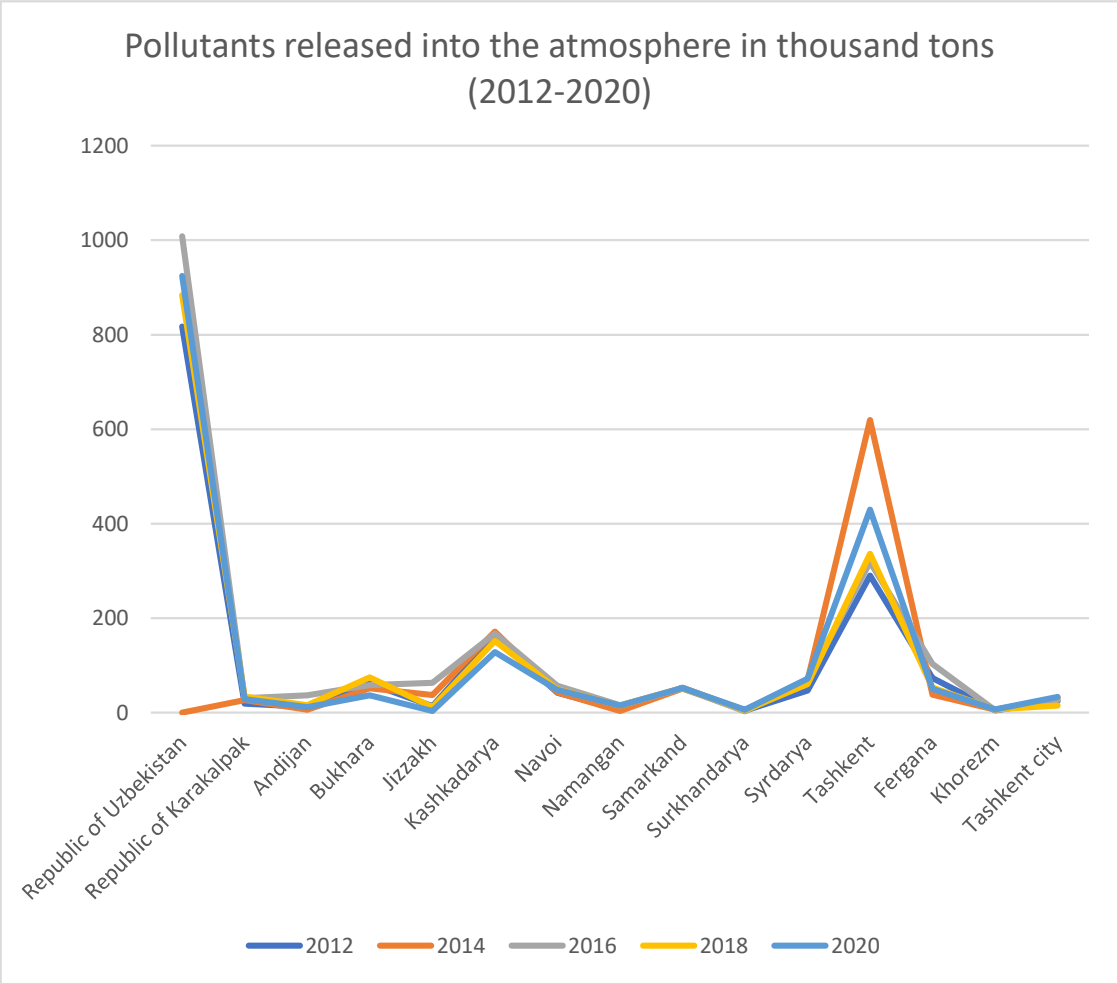
Here, S- the concentration of harmful substances in the air layer, AR-allowed rate.

This indicator is even more important in protected areas, treatment and recreational-tourist zones:

S/AR≤0,8;

According to the results of 2020, the total amount of gases released into the atmosphere in our republic amounted to 924.4 thousand tons, and we can see that this figure has increased significantly compared to previous years.

Table 5.



As a result of the development of science and technology, the negative effects of non-traditional sources of air pollution, such as noise, various vibrations, and radiation, are increasing. Factors such as increased traffic flow in cities, and the location of industrial enterprises near residential areas are the main causes of noise. In the cities of the Navoi region, the location of such large industrial enterprises close to residential areas has a negative impact on the quality of work and health of city residents. Studies show that noise levels in large cities are at risk of exceeding 1dBA in the coming years. The level of noise emitted from industrial enterprises ranges from 80dBA to 100dBA, which seriously affects the health of the population.

Improper use of natural resources also affects the ecology of cities. When classifying cities, the concept of "resource city" is used, considering that the cities of the Navoi region were also created on the basis of natural resources, it is not difficult to understand that there is a lot of work to be done in this regard in the region (Komilova, Latipov, 2022:209-213). Natural resources should be understood not only as minerals but also as rational use of soil, water, air, flora and fauna, which are the components of the life shell.

The dependence of the state of human health on the quality of the environment was proven in the last century. World Health Organization experts found that human health depends on 50-52% on lifestyle, 20-22% on genetic factors, 7-12% on the state of the health care system, and 18-20% on the environment.

In the small medical encyclopedia, health is the natural state of the body, its balance with the environment and the perfection of self-management, and the harmonious interaction of all organs and systems (Latipov, 2022:16-20).

Result. The negative impact of man-made factors on public health leads to the following consequences:

- decrease in working capacity and social activity in healthy people;
- the appearance of genetic diseases that threaten modern and future generations, causing the appearance of hereditary diseases (genotoxic effect);
- occurrence of oncological and related diseases;
- increase in the number of acute and chronic diseases;
- decreased immunity;
- deterioration of health of children living in polluted areas;
- reduction of life expectancy.

According to Markov, health indicators are divided into three groups: sanitary-demographic, morbidity and disability, and physical development. The use of public health indicators is the main indicator for the comparative analysis of the ecological condition of the regions with different levels of impact on the environment, and in this regard, the connection between the ecological condition of the region and the health of the population should be interpreted as a natural phenomenon.

The impact of urban pollution on health is confirmed by the following facts:

- there are international and regional differences in morbidity;
- high morbidity rates are observed in the population of industrial cities compared to the population of small and less polluted cities;
- increase in the incidence of diseases in the population living near industrial enterprises;
- changes in morbidity in groups of migrants.

The health indicators of the population, especially children, reflect the various effects of the environment on a person in a holistic form and therefore can be used as a criterion for evaluating its quality. Recently, there are two approaches to environmental quality assessment using public health criteria.

The first approach is to create a clear standard, by comparison with which opinions about changes in the quality of the environment. Such a specific standard may be the level of urbanization or the negative impact of the economy on the environment, but the health indicators of the population living in the area are considered the optimal standard.

A second approach is to develop indicators that can be used to assess environmental change, bypassing official statistics.

A comprehensive assessment of the quality of the city's environment from the point of view of public health, based on statistical indicators, the overall level of public health is determined and its regional analysis is carried out. A more detailed evaluation is then conducted based on the identified differences. It determines the level of morbidity and the quantitative and qualitative severity of the factors that cause it and analyzes separate groups of diseases.

Conclusion

Thus, there is an inextricable connection between urbanization and the ecological environment, and if we do not pay attention to environmental problems in urban areas in time, there is an inevitable risk that these problems will become more complicated in the future stages of urbanization.

References

1. Allaberdiev, R., Rakhimova, T., Komilova, N., Kamalova, M., Kuchkarov, N. (2021). Study of plant adaptation to the arid zone of Uzbekistan based on system analysis. Development of adaption of growing plants to the arid zone of Uzbekistan on the basis of system analysis Scientific Horizons, 24(10), p.52-57 https://doi.org/10.48077/scihor.
2. Latipov, N., Erkaboevich, E.H. (2022). The process of urbanization and its relation to the environment. *Web of Scientist: International Scientific Research Journal*, *3*(3), p.188-196. https://doi.org/10. 17605/OSF.IO/9U3SJ
3. Komilova, N.K., Rakhimova, T., Allahverdiev R.Kh., Mirzaeva, G.S., Egamverdieva, U.T. (2021). Ecological situation: The role of education and spirituality in improving health of population. International Journal of Health Sciences 5(3), p.302-312 https://doi.org/10.53730/ijhs.v5n3
4. Komilova, N.K., Haydarova, S.A., Khalmirzaev, A.A., Kurbanov, S.B., & Rajabov, F.T. (2019). Territorial structure of agriculture development in Uzbekistan in terms of economical geography. *J. Advanced Res. L. & Econ.*, *10*, 2364. https://doi.org/10.14505/jarle.v
5. Komilova, N., Karshibaeva, L., Egamberdiyeva, U., Abduvalieva, Z., & Allanov, S. (2020). Study of nozogeographic situation and its study on the basis of sociological survey. *Indian Journal of Forensic Medicine and Toxicology*, *14*(3), 2093-2098.
6. Latipov, N. (2019). Geourbanistic's role in socio-economic geography. International scientific review, (LXV), p.47-50.
7. Komilova, N.K., Latipov, N.F., & Kahramonova, D.Z. (2022). Some problems with creating a medical-geographical atlas map of Uzbekistan. International journal of early childhood special education, 14(2), 5836-5840. https://doi.org/10.9756/INT-JECSE/V14I2.656
8. Latipov, N. Factors influencing the territorial distribution of the population. Ekonomika, (9), p.105-108.
9. Kalonov, B.H., Latipov, N.F., & Shirinova, M.S. (2021). Environmental problems in the navoi region cotton field. Mirovaya nauka, (4), 15-18. DOI: 10.46566/2541-9285_2021_49_15
10. Latipov, N. (2018). International migration tours and works, p.108-110.
11. Latipov, N. (2017). Locality and factors affecting the population, p.74-75.
12. Kalonov, B.H., & Latipov, N.F. (2021). Characteristics of geographical location of the population of Navoi region. *International Journal of Progressive Sciences and Technologies*, *25*(2), p.477-479. http://dx. doi.org/10.52155/ijpsat.v25.2
13. Kalanov, B.H., Latipov, N.F. (2018). Geographical peculiarites of population in Novai region, p.79-80.
14. Komilova, N.K., Latipov, N.F. (2022). Classification of settlements on the basis of the ecological situation in the Novai region and the factors affecting the health of the population.Visnyk of V.N.Karazin Kharkiv National University, series Geology, Geography. Ecology, (56), p.209-213. https:\\doi.org\10. 26565\2410-7360-2022-56-15.
15. Latipov, N. (2022). Urboecology-interdisciplinary synthesis of geography and ecology. Middle European scientific bulletin, 24, p.16-20. https:\\doi.org\10.47494\mesb

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