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URBANIZATION PROCESS AND URBOECOLOGICAL STATE OF CITIES IN UZBEKISTAN

Abstract. *A comparative analysis of the concepts of human ecology, social ecology and urban ecology is carried out. The process of urbanization and urban ecological processes in Uzbekistan are analyzed. During the analysis, it was established that the slowness of urbanization processes in the republic, the weak formation of the territorial-urbanistic structure, as well as the relatively large number of urban settlements in some regions of the country are associated with natural conditions and the scale of space. It is concluded that the ecology of many cities is currently at the level of republican sanitary standards mainly due to the weak development of industrial production.*

Key words*: human ecology, social ecology, urboecology, human settlement, city, urbanization, degree of urbanization, maximum permissible level, air pollution, freshwater quality.*

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ПРОЦЕСС УРБАНИЗАЦИИ И УРБОЭКОЛОГИЧЕСКОЕ СОСТОЯНИЕ ГОРОДОВ В УЗБЕКИСТАНЕ

Аннотация. *Проведен сравнительный анализ понятий экология человека, социальная экология и урбоэкология. Проанализированы процесс урбанизации и урбоэкологические процессы в Узбекистане. В ходе анализа установлено, что замедленность процессов урбанизации в республике, слабая сформированность территориально-урбанистической структуры, а также относительно большое количество городских поселений в некоторых регионах страны связаны с природными условиями и масштабами пространства. Сделан вывод, что экология многих городов в настоящее время находится на уровне республиканских санитарных норм преимущественно из-за слабого развития промышленного производства.*

Ключевые слова: *экология человека, социальная экология, урбоэкология, населенные пункты, город, урбанизация, уровень урбанизации, предельно допустимая концентрация, загрязнение воздуха, качество пресной воды***.**

Introduction and problem statement. After the independence of the Republic of Uzbekistan, serious attention is being paid to the health of the population, improvement of the ecological situation, including urban ecological conditions, in various regions of the country. In particular, extensive work is being done on the development of settlements and medical infrastructure, the protection of public health, and the development of social spheres.

At the same time, along with the socio-economic achievements, some issues are waiting for their solution. In particular, the health of the population varies within small regions, especially in areas related to the geographical location of the natural and social environment and the urban economy. This situation requires studying the demographic and social development aspects of the population of the area and development of the flagship cities of the region.

The genetic and functional types of Uzbekistan's cities have their own characteristics, the network and location of cities have changed a lot in the last quarter of a century under the influence of various factors. This makes it urgent to study the territorial, socio-geographical

aspects of the problem, as well as to study the ecology of the republic's cities and its impact on the health of the population.

The aim and objectives of the work. The purpose of the research is to reveal a comparative-geographical analysis of regional differences in the development of the urbanization process in Uzbekistan and a description of the general social development index. For this, the following tasks were defined: 1) description and analysis of the process of urbanization in the republic; 2) analysis of urboecological conditions of republican cities.

The main part. Human settlements, especially urban areas, have their own urboecological conditions. Due to the development of society and the achieved technological achievements, the ecological organization of cities differs significantly. In Uzbekistan, the level of urbanization was low until the middle of the 20th century, and the cities had mostly oriental architecture. Most of the cities of the republic have grown on the basis of ancient settlements.

Method and methodology. Within social geography, urban geography, social ecology, and urboecology, population, population location, health, and ecology of settlements have been thoroughly studied by many scientists. Among them V.P. Kucheryavyy [13], B.B. Prokhorov [15], A.N. Tetior [18], A.E. Gutnov & V.L. Glazychev [4], Yu.Sh. Shodimetov [16], M.I. Nazarov & Z.N. Tozhieva [14], N.K. Komilova [9-12], E.A. Akhmedov [1], O.B. Atamirzaev [3]. However, it should be noted that the issue of urbanization and urban ecology of Uzbekistan has not been deeply studied within the framework of social geography.

Urboecology is an object of study of urban ecology that studies urban biogeocenoses: landscape, natural territorial resources, soil cover, atmosphere, surface and underground water, biota (primarily human), their changes under anthropogenic influence during the socio-economic development of the city [13, 17, 18].

Results and discussion. In the territory of Uzbekistan, in the first half of the 1st millennium, cities such as Bukhara, Kat, Tuprakkala, Afrosiyab, Kesh, and Termiz were established. Trade and crafts played a key role in the genesis of cities in the developed Middle Ages. For example, Poykent (Boykent) in the Zarafshan oasis was a typical merchant city [3].

European-type modern cities or quarters (Skobelev, New Tashkent, New Bukhara (Kogon), etc.) started to be built in the last quarter of the 19th century, when Turkistan was conquered by Russia [1].

From the period when the republic was a former Soviet, preliminary decisions on the types and standards of population settlements were made. Based on them, New Urganch, Khiva, Old Bukhara, Kogon, Kattakurgan, Samarkand, Jizzakh, Urgut, Tashkent, Kokand, Margilan, Fergana, Chust, Andijan, Namangan, Termiz, Bekbudi (now Karshi), Shahrisabz, Gijduvan, Karmana, Mirzachol, Asaka, Kitab, Kovunchi (now Yangiyol), Ursatevskii (now Khovos), Chimyan settlements were included in urban settlements [1, 3].

The development of industry and service sectors in Uzbekistan, the construction of new types of residences and the development of the population demanded their re-typing. In 1961, a special decree was adopted establishing a commission for the reconstruction, planning and beautification of cities and their repair, and including them among cities and towns. According to it, it is decided to grant the status of towns to settlements with a population of more than 2 thousand and where 2/3 of the population are workers, and settlements with a population of 7 thousand or more and 2/3 of the population are not employed in agriculture [1]. According to it, between 1970 and 1989, 86 settlements were given city status, 12 new cities were established. Between 1939 and 1989, the number of cities in Uzbekistan increased 5 times from 25 to 124 (Tables 1 and 2). At the same time, the number of towns increased during this period.

During this period, along with the granting of city status to settlements, 7 settlements with slow development of urban architecture and infrastructure, industrial production and service sectors were excluded from the ranks of cities [1-3].

In 1989, in terms of the number of cities in the republic, Tashkent, Kashkadarya region and Karakalpakstan, on the contrary, Syrdarya, Navoi, Jizzakh and Khorezm regions were distinguished by their small number.

Table 1

Dynamics of the number of cities (towns) in Uzbekistan

№	Regions of Uzbekistan	1926 y.	1959 y.	1970 y	1989 y.	2020 y
1.	Karakalpakstan	3	5	8	12	12
2.	Andijan	1	2	3	11	11
3.	Bukhara	1	3	3	10	11
4.	Jizzakh	1	1	1	7	6
5.	Navoi		1	1	6	7
6.	Namangan	1	1	3	8	8
7.	Samarkand	2	2	3	10	11
8.	Syrdarya		1	1	5	5
9.	Surkhandarya		2	2	8	8
10.	Tashkent	1	7	10	18	17
11.	Ferghana	3	4	4	9	9
12.	Khorezm	1	2	2	8	3
13.	Kashkadarya	1	2	2	12	12
	Uzbekistan	15	33	43	124	120

The table was compiled by the author based on the data of the Statistics Agency under the President of the Republic of Uzbekistan.

In accordance with the increase in the number of urban settlements, the level of urbanization in the republic has increased. However, while the number of cities has increased rapidly, the urbanization gap has grown slowly (Table 2). This situation is explained by the small size of most cities and the fact that they were founded in the 80s.

Table 2

Indicators of urbanization of Uzbekistan (1970-1922)

№	Regions of Uzbekistan	1970 y.	1979 y.	1988 y.	2000 y.	2008 y.	2009 y.	2010 y.	2022 y.
1.	Karakalpakstan R.	35,6	42,4	48,3	48,2	48,5	50,4	50,3	49,0
2.	Andijan	24,1	28,7	33,0	30,1	29,2	53,6	53,3	52,2
3.	Bukhara	27,1	32,9	35,9	31,1	29,2	38,8	38,6	36,7
4.	Jizzakh	11,4	27,4	29,1	30,2	29,8	47,4	47,2	46,8
5.	Navoi	31,4	41,7	42,7	40,4	39,5	49,6	49,4	48,9
6.	Namangan	28,7	34,4	38,4	37,6	37,1	64,7	64,6	64,8
7.	Samarkand	30,4	41,7	32,2	27,1	25,1	37,4	37,2	36,8
8.	Syrdarya	29,7	31,4	33,9	32,1	31,1	41,3	41,3	42,6
9.	Surkhandarya	16,0	19,2	19,7	19,9	19,1	37,2	37,0	36,2
10.	Tashkent	39,8	43,1	46,1	40,4	39,3	50,1	50,0	50,2
11.	Ferghana	33,0	33,4	33,6	29,1	27,8	58,8	58,6	56,2
12.	Khorezm	18,5	20,1	29,5	23,8	21,8	34,2	33,9	33,1
13.	Kashkadarya	16,5	25,2	25,5	25,4	24,6	43,6	43,4	42,8
14.	Tashkent c.	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
15.	Uzbekistan R.	**36,6**	**41,2**	**42,1**	**37,4**	**35,8**	**51,7**	**51,5**	**50,8**

The table was compiled based on the data of the Statistics Agency under the President of the Republic of Uzbekistan.

According to the data of 2022, 51.2 % population of the Republic of Uzbekistan or 17932.6 thousand people lived in urban areas (Fig. 1). Since the economy was mainly specialized in agriculture until the 2nd half of the last century, and the cities that appeared in the 2nd half of the century were developed at the level of resource collection and initial distribution, the majority of small cities are in the republic. In most cases, these small towns also serve as district centers. Currently, the republic has a population of 1 million, 2 cities with a population of more than 500 thousand and 5 large cities with a population of 250-500 thousand, 10 large

cities with a population of 100 thousand to 250 thousand, 24 medium-sized cities with a population of 50-100 thousand.



Figure 1. Number and share of the population of urban settlements of the Republic of Uzbekistan (2019)

The figure was prepared by the author based on the data of the Statistics Agency under the President of the Republic of Uzbekistan.

Table 3

In 2009-2018, the level of air pollution in the cities of Uzbekistan (0-4 low, 5-6 moderately high, 7-13 high, 14-very high)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Angren	4,61	6,25	4,74	4,30	4,72	5,12	4,71	5,32	5,30	4,94
Andijan	2,65	2,39	2,66	3,05	3,35	2,94	3,80	3,32	3,62	3,46
Bekabad	2,25	2,27	2,74	2,83	2,79	2,88	3,20	3,67	3,92	3,93
Bukhara	4,48	4,48	3,51	3,37	3,22	3,38	2,98	3,58	4,32	4,30
Gulistan	2,03	2,11	2,23	2,19	2,18	1,85	1,89	2,33	2,37	2,53
Denov	1,77	1,86	1,98	1,50	1,49	1,49	1,32	1,45	1,22	1,10
Kogon	0,74	0,61	0,70	0,89	0,60	0,80	0,97	1,20	1,21	1,30
Kharshi	1,39	1,34	1,32	1,28	1,32	1,30	1,30	1,26	1,25	1,26
Kitab	1,15	1,15	1,17	1,15	1,17	1,15	1,17	1,13	1,13	1,14
Kokand	2,98	2,86	2,64	2,55	3,04	2,29	2,36	2,62	2,79	2,61
Margilan	1,07	1,15	0,96	0,77	1,00	1,23	1,20	1,28	1,43	1,31
Mubarak	0,31	0,32	0,32	0,31	0,32	0,33	0,33	0,34	0,35	0,49
Navoi	4,22	3,89	3,72	3,50	3,17	2,93	3,59	3,90	4,06	3,97
Namangan	1,97	1,55	1,29	1,56	1,72	1,93	2,26	3,00	2,95	3,20
Nukus	4,42	4,98	4,65	4,09	4,31	4,01	3,95	4,43	4,55	3,39
Samarkand	1,80	1,55	1,36	1,24	1,62	1,83	1,90	1,74	1,55	2,33
Sariosiyo	3,06	3,72	3,23	2,29	2,60	2,00	1,59	1,43	1,23	1,17
Tashkent	3,66	3,37	3,32	3,63	3,85	4,04	3,51	3,55	4,10	3,66
Urganch	1,19	1,13	1,77	2,18	1,82	1,90	2,02	2,11	1,24	2,06
Fergana	3,51	3,48	2,98	2,94	3,57	3,84	4,10	4,52	4,38	3,73
Chirchik	2,70	2,51	2,75	2,86	2,69	2,95	3,61	3,61	3,41	3,46
Shahrisabz	1,16	1,15	1,18	1,17	1,15	1,15	1,17	1,14	1,14	1,14
Yangiyol	0,37	0,43	0,55	0,49	0,54	0,54	0,57	0,43	0,41	0,37
Nurabad	1,45	1,19	0,91	0,84	0,68				1,41	1,75

Source: [4, p. 172].

As ¾ of the republic is occupied by Kyzylkum and partly by Karakum deserts, the air is dry and dusty. Salty dust rising from the dried bottom of the Aral Sea, located in the North-West, damages the area with a radius of 400-500 km. For example, the air pollution level of the city of Nukus located in this zone (average 4.28) was higher than that of the industrialized city of Fergana located in the East of the country (average 3.71) during the studied period (Table 3).

In addition to natural sources, automobile traffic is the main source of air pollution in all cities. Only in industrialized cities some industrial facilities are added to them. There are different sources of air pollution in republican cities. In particular, the air dust level in the republic is 1.3 times higher than the maximum permissible concentration (MPC) in the cities of Nukus and Bukhara, and it is 0.65 in the city of Tashkent. In industrialized cities such as Angren, Almalyk, Bekabad, Navoi, Chirchik, the air is polluted by industrial enterprises as well as natural sources. In the cities of Angren and Almalyk, a systematic local increase of MPC was observed for some pollutants. In particular, in Angren in 2017 and 2018, SO_2, CO, NH_3, and O_3 were on average 1.1-1.1, 1.0-1.3, 2.0-1.3, and 2.0-2.2 times higher increased than MPC, respectively. In the city of Angren, 2 lignite-fired thermal power plants are listed as sources of air pollutants. The city is considered the most polluted settlement in the republic [4].

In general, the air quality of most of the urban settlements of the republic currently meets the requirements of the MPC developed by the state control bodies, some components, in particular, the WHO and EU standards for NO_2 and CO, almost the same for SO_2 [4].

All cities in the republic are provided with centralized clean drinking water. Drinking water chemical, physical, biological; it meets the standards of health and sanitary control bodies in terms of organic derivatives, pH, hardness, dry residue and other indicators, and there have been no serious epidemic cases related to the quality of drinking water.

In the following years, the collection and removal of household and industrial waste in the republic was established regularly in rural areas as well as in cities. Waste processing has also been established in large cities. Only centralized sewage system is not available in all urban settlements. In small cities and towns, there is an opportunity to dispose of sewage in a natural way without harming the environment, especially the health of the population, due to the lack of dense population.

Conclusion. The following historical geographical features are prominent in the development of cities in the republic. For a long time - until the end of the 19th century, Asian-type cities developed in the territory of the republic. There are cities in the territory of the republic (Samarkand, Khiva, Bukhara, etc.) whose history dates back to about 3,000 years ago. Towns and city quarters with European-style architectural design began to form in the second half of the 19th century.

During the 20th century, the level of urbanization in the republic increased from 18% to 41%, and in the new century it increased from 50%. 124 out of 1182 urban settlements in the republic have the status of cities. Small cities and towns make up the majority, and the economy of most of them is limited to agriculture, services, and partial resource extraction and primary processing of raw materials.

Urboecological conditions of the cities of Uzbekistan - the level of air pollution, drinking water, the level of provision of communal services currently meet the standards of sanitary-epidemiological and health facilities. However, as the population increases in the region, the consumption of natural resources, including fresh water and minerals, and the development of industry may in the near future destroy the urboecological conditions of cities.

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