POPULATION, SETTLEMENT, AND TERRITORIAL CHARACTERISTICS OF SAMARKAND REGION

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Abstract. *The article analyzes the population dynamics, legal names of locations and territorial-spatial structure of Samarkand region, which is the largest region of the Republic of Uzbekistan in terms of demographics. Within the framework of the study, the population density of the districts of the region, the level of urbanization and the processes of urban agglomeration in recent years are scientifically covered. Also, the correlation between ecological and economic constraints in territorial development and the location of labor resources is studied, and recommendations are developed for the formation of a sustainable spatial strategy.*

Keywords: *Samarkand agglomeration, demographic load, spatial analysis, urbanization, population density, Zarafshan oasis, migration balance.*

Аннотация. *В статье анализируется динамика населения, юридические названия населенных пунктов и территориально-пространственная структура Самаркандской области, крупнейшего региона Республики Узбекистан по демографическим показателям. В рамках исследования научно освещены плотность населения районов области, уровень урбанизации и процессы городской агломерации в последние годы. Также изучена взаимосвязь между эколого-экономическими ограничениями территориального развития и размещением трудовых ресурсов, разработаны рекомендации по формированию устойчивой пространственной стратегии.*

Ключевые слова: *Самаркандская агломерация, демографическая нагрузка, пространственный анализ, урбанизация, плотность населения, Зарафшанский оазис, миграционный баланс.*

Introduction

The territorial distribution of population is the integral result of a long-term interaction between society and nature. It reflects not only the distribution of population numbers across administrative units, but also the network of settlements, the labor market, transport flows, the use of land and water resources, the coverage of social services, and the spatial proportions of ecological load. For this reason, studying population geography is of great importance for scientifically substantiating territorial planning, infrastructure investment, and sustainable development policy.

One of the most important conceptual tasks of modern economic geography, demography, and regional economics is to determine the patterns of ensuring and managing the optimal balance between demographic potential and territorial space. In the long-term sustainable development strategy of the Republic of Uzbekistan, particular priority is given to the spatial planning of regional demographic processes, the systematic modification of urban agglomerations, and the optimization of the regional labor market. Today, scientifically studying the territorial aspects of Samarkand region—which holds a distinctive leading position in the country's demographic system and ranks first in the republic in terms of permanent population—is of extremely urgent socio-economic importance.

Samarkand region holds the leading position in the republic in terms of population, accounting for nearly 12 percent of the country's total demographic potential. This indicator places on the territorial system not only significant production and consumption potential, but also a systemic ecological-demographic load. The distribution of the region's population, the dynamics of natural growth, and migration flows are sharply differentiated spatially, being clustered mainly along the Zarafshan hydrographic basin and international transport corridors. Such a high degree of spatial concentration, on one hand, increases economic activity, while on the other hand, it deepens the shortage of land and water resources in the oasis zone and creates exo-demographic passivity in the piedmont and desert zones.

At the same time, the urbanization processes taking place in the region have entered an entirely new geopolitical and geoeconomic stage. In accordance with the decisions of the Senate of the Oliy Majlis of the Republic of Uzbekistan, the administrative-territorial boundaries of the city of Samarkand have been expanded, and together with its surrounding satellite systems it is being transformed into a large megapolitan agglomeration and granted the status of a "million-plus city," fundamentally changing the region's traditional spatial-territorial architecture. Under these conditions, scientifically assessing the demographic capacity and spatial load of the territorial system, and analyzing the invariants of population settlement within strict regularities, form the fundamental basis for shaping a sustainable spatial strategy.

The relevance of the topic is determined by three factors. First, high natural growth continuously increases demand for housing, education, healthcare, drinking water, and transport. Second, the administrative urban-rural classification may not fully reflect the actually built-up territory and everyday functional links. Third, integrating population statistics, cadastral data, road network data, and satellite data into a unified geodatabase increases the accuracy of territorial decisions. According to World Bank data, under conditions of rapid urbanization in Uzbekistan, the lack of detailed geospatial data limits the planning of land, infrastructure, and services.

Literature Review

The study of population and settlements in the Republic of Uzbekistan is being actively developed within three closely related but distinct scientific directions:

Demography — the study of birth rates, mortality, marriage, divorce, migration, age and sex composition, and demographic forecasts;

Population geography — the study of population numbers, density, territorial distribution, and regional differences;

Settlement geography — the study of the network of urban and rural settlements, their hierarchy, functions, interconnections, agglomeration, and settlement systems.

Below is a brief overview of the work of Uzbek researchers who have conducted studies in these directions.

M.Q. Qorakhonov is one of the scholars who made a major contribution to the formation of the demographic research school in Uzbekistan and Central Asia as a whole. He conducted research on the historical-demographic development of the population, processes of birth, death, and natural growth, changes in population size and composition, demographic policy, and long-term demographic forecasting. Under his leadership, the first comprehensive demographic forecasts for the population of Uzbekistan were developed between 1962 and 1980. His work co-authored with A.A. Qayumov, "Demographic Problems and Population Geography of Uzbekistan," is one of the important studies linking demography and population geography.

Z.M. Akramov was one of the founders of the scientific school of economic and social geography in Uzbekistan. He conducted research on the economic-geographic zoning of territories and the territorial organization of production and population. The significance of Z.M. Akramov's population research is reflected in the following areas: studying population distribution in connection with the territorial structure of the economy, identifying territorial relationships between natural resources, production, and population, assessing population and settlement systems within economic regions, and forming the scientific school of population geography in Uzbekistan.

E.A. Ahmedov is one of the leading urban geographers who studied the cities of Uzbekistan from an economic-geographic perspective. His research covered the following areas: the geography of Uzbekistan's cities, the formation of new industrial cities, the functional types of cities, urban networks and their territorial distribution, and urbanization and the socio-economic development of cities. His work "Cities of Uzbekistan" covers the theoretical and practical issues of urban geography. These studies serve as an important methodological basis for classifying settlements by function, size, and economic potential.

O.B. Ota-Mirzayev is one of the researchers who comprehensively studied demographic processes, urbanization, migration, and population distribution in

Uzbekistan. His main research areas include: assessing urbanization as a demographic process, changes in the urban-to-rural population ratio, the impact of migration on settlement development, forecasting population distribution, and territorial management of the urbanization process. In his approach, urbanization is interpreted not merely as an increase in the share of urban population, but as the territorial reorganization of population, production, services, and infrastructure.

A.S. Soliyev is one of the leading representatives of the scientific school of population and urban geography in Uzbekistan. His main research areas include: population distribution and settlement systems, urban networks and hierarchy, urbanization and urban agglomerations, rural settlement geography, economic zoning, regional economics, and the economic-geographic position of cities. His work, co-authored with S.K. Tashtayeva and M.M. Egamberdiyeva, "Geography of Cities," covers the formation, distribution, and development of urban networks and systems, as well as issues of modern urbanization. In addition, the monograph "Villages of Uzbekistan: Geography of Rural Settlements," co-authored with M.I. Nazarov, reveals the influence of terrain, water, soil, agro-climatic resources, economic specialization, and transport conditions on the formation of villages.

A.A. Qayumov is one of the accomplished scholars in the field of population geography and demographic forecasting. His research covered the following areas: the reproduction of population, territorial differences in demographic processes, future changes in population size, economic and natural factors of population distribution, and the analysis of territorial demographic problems. This research is one of the important works serving to unite demographic and geographic approaches in Uzbekistan.

M.R. Boriyeva is one of the scholars who deeply studied family demography and fertility processes in Uzbekistan. Her research examined: territorial differences in fertility, the demographic function of the family, reproductive behavior, marriage and divorce, family size, and differences between rural and urban families. These studies are an important factor for forecasting the future demographic capacity of settlements. Her work "Fundamentals of Population Geography and Demography" systematically presents urban and rural population, settlement geography, and the main demographic processes.

Z.N. Tojiyeva is one of the leading representatives of the modern geodemography and population geography movement in Uzbekistan. Her main research areas include: geodemographic processes, population growth and distribution, rural population and rural settlements, territorial demographic differences, population composition, the labor market and employment, and demographic forecasting. In her research, Z.N. Tojiyeva has assessed population numbers, growth rates, village density,

distances between villages, distribution by economic region, and the share of large and very large villages.

Among the researchers who specifically studied the population, settlement, and territorial characteristics of Samarkand region, the works of L.Z. Ibragimov, A.M. Mavlonov, and T.A. Abdimo'minov deserve particular mention. For example, L.Z. Ibragimov's research provides comprehensive data on population employment and labor market geography, the dynamic changes in the urban population of Samarkand region and its structural characteristics, the territorial features of urbanization processes in the region, the growth rates of the urban population, and changes in its demographic composition (age-sex structure, migration processes, employment levels, and social structure) [2, 5, 6]. A.M. Mavlonov's research provides data on the current state of urban settlements in Samarkand region and their socio-economic, cultural, and geographic development [3]. T.A. Abdimo'minov's research thoroughly addresses the territorial aspects of population distribution in Samarkand region and the factors influencing it, along with proposed solutions [1].

However, given the recent administrative-territorial reforms, the institutional liberalization of internal migration, and the transition of urbanization to an intensive phase, there is a growing need to re-examine the demographic-spatial system of Samarkand region on the basis of new scientific principles.

Main Part

Samarkand region is located in the central part of the Republic of Uzbekistan, in the middle course basin of the Zarafshan River. The area of the region is 16.4 thousand km². It borders Navoi region to the northwest, Jizzakh region to the northeast, Qashqadaryo region to the south, and the Republic of Tajikistan to the east. The territory mainly consists of the plains of the Zarafshan basin and the surrounding Zarafshan and Turkestan mountain ranges (Oqtog', Qoratog', Chaqilikalon, Amankutan). The continental climate and the presence of river basins have long created favorable conditions for dense population settlement in this area. The Zarafshan River is the main source of life for the region and a decisive hydrogeographic factor in the territorial distribution of the region's population.

The historical framework of population settlement was formed by the Zarafshan valley, ancient trade routes, and irrigation networks. The city of Samarkand serves as a multifunctional core, concentrating administrative, educational, healthcare, tourism, industrial, and logistics services. The districts surrounding the city—Samarkand, Toyloq, and Jomboy—are connected to the core through daily labor, education, and market commuting. At the same time, Urgut district, with its large population mass, handicrafts, trade, and intensive agriculture, functions as an independent secondary growth pole.

In the western and central valley direction, the numerous rural settlements of Kattaqo'rg'on, Narpay, Ishtixon, Pastdarg'om, Payariq, and Oqdaryo districts have developed in a linear-network pattern along irrigated lands and roads. In the northern Qo'shrabot and southwestern Nurobod districts, the complexity of natural conditions, water supply, and economic specialization make population settlement relatively sparse. Thus, the region's population space is not a simple system subordinate to a single center; rather, it is a multi-tiered system consisting of a metropolitan core, secondary centers, valley corridors, and peripheral rural zones.

As of April 1, 2026, the population of Samarkand region amounted to 4,396,800 people (11.4% of the total population of the Republic of Uzbekistan) (Table 1) [4]. With this indicator, the region ranks first among the regions of Uzbekistan. Population density is 262.7 people per km². Of these, 1,601,900 people live in urban areas, and 2,794,900 people live in rural areas. The number of men in the region slightly exceeds the number of women, with men making up approximately 50.4% of the population and women 49.6%. This is explained by the slightly higher share of male births in natural birth indicators. According to statistical data, the region's population is growing at an average annual rate of approximately 1.8–2.0%. This indicator shows the need to expand housing stock, preschool and general education, primary healthcare, water supply, and public transport in line with the spatial growth of the population.

Distribution of the population by district

T/r	Name of territory	Area (thousand km²)	Population (thousand people)	Population density	Urban population (ming kishi)	Rural population (ming kishi)	Number of MFY	Number of urban-type settlements	Number of cities	Number of village
Region total		16,77	4396,8	256,3	1601,9	2794,9	1126	88	11	1899
1	Samarqand sh	0,124	607,6	5000	607,6		215	3	1	
2	Kattaqo‘rg‘on sh	0,011	97,3	9500	97,3		36	1	1	
3	Kattaqo‘g‘on tumani	0,720	306,6	215,7	56,8	249,8	69	8		172
4	Bulung‘ur tumani	0,760	211,9	272,2	46,2	165,6	55	3	1	143
5	Ishtihon tumani	0,720	289,3	391,9	77,1	212,3	62	12	1	165

6	Jomboy tumani	0,340	199,1	352,9	43,3	155,9	38	5	1	152
7	Narpay tumani	0,440	236,1	526,4	68,7	167,4	57	3	1	133
8	Nurobod tumani	4,790	169,2	34,1	18,8	150,4	39	1	1	95
9	Oqdaryo tumani	0,290	181,7	454,4	69,7	112,0	35	10		105
10	Pastdarg‘om tumani	0,870	401,5	450,7	101,2	300,3	107	12	1	162
11	Paxtachi tumani	1,380	157,2	112,0	30	127,3	59	7		132
12	Payariq tumani	0,990	286,2	216,9	78,5	207,7	65	9	2	210
13	Qo‘shrabot tumani	2,160	147,4	66,9	13,6	133,8	45	2		137
14	Samarqand tumani	0,430	284,8	647,9	17,6	267,2	74	2		91
15	Toyloq tumani	0,280	232,2	808	28,6	203,6	50	3		87
16	Urgut tumani	1,120	588,6	511,3	247,0	341,6	111	7	1	115

The majority of the region's population consists of the working-age group, with the able-bodied population accounting for approximately 57–58%. This represents an enormous opportunity for the region to benefit from a "demographic dividend," that is, to create new production capacities. However, the high birth rate increases the burden on social infrastructure (schools, kindergartens, hospitals).

A distinctive feature of the demographic indicators of Samarkand region is that a significant share of the population (approximately 63.5%) still resides in rural areas. However, in recent years strategic reforms have been implemented to increase the level of urbanization.

Territorially, the population is more densely settled in rural areas, while the urban population makes up approximately 36–37% of the total. The region is one of the country's largest demographic and economic centers. Given that the share of urban population nationwide exceeds 50%, the relatively lower indicator for Samarkand region reflects its system of numerous and large rural settlements. At the same time,

the administrative classification may not fully capture the de facto urbanized built-up area and daily commuting zone surrounding the city of Samarkand.

Among the districts, Urgut (42.0%), Oqdaryo (38.4%), Narpay (29.1%), Payariq (27.4%), and Ishtixon (26.6%) have relatively high urbanization indicators. Although the official urban population share in Samarkand district is only 6.2%, it is directly adjacent to the regional center and has strong suburban connections. This paradox clearly demonstrates the need to measure administrative urbanization and morphological-functional urbanization separately.

Qo'shrabot (9.2%), Nurobod (11.1%), and Toyloq (12.3%) districts have low urban population shares. However, Toyloq's proximity to the city of Samarkand and its 2.2% growth rate suggest that, despite its rural administrative status, it may be an area where urban functions are intensifying. It is scientifically important to verify this through data on built-up land dynamics, commuting, and service utilization.

Samarkand region has 11 cities, 88 urban-type settlements, and 1,899 villages. The city of Samarkand (607,600) and Urgut district (588,600) together account for 27.2% of the region's population. When Pastdarg'om (401,500), Kattaqo'rg'on district (306,600), and Ishtixon (289,300) are added, the population share reaches 49.9%. Thus, nearly half of the region's population is concentrated in five administrative units. This concentration is not accidental — it results from the pull of major urban functions, fertile and irrigated land, transport junctions, a network of historical settlements, and employment opportunities.

The city of Samarkand ranks first in nominal population, with Urgut district a very close second. However, the settlement pattern of these two territories differs: the city of Samarkand is dominated by a compact, high-density urban space, while Urgut consists of a polycentric structure combining a district center, urban-type settlements, and a dense rural network. Consequently, the same absolute population figure requires different spatial solutions for organizing infrastructure services.

The highest population growth in the region was observed in Urgut (2.3%), Toyloq (2.2%), Oqdaryo, and Jomboy (over 2.1%) districts. Some of these areas are characterized by proximity to the Samarkand agglomeration, while others are marked by high natural growth and dense rural settlement. The city of Kattaqo'rg'on (1.2%), Paxtachi (1.4%), Narpay, and the city of Samarkand (over 1.6%) showed relatively low growth. A low growth rate does not automatically indicate economic decline; it must be analyzed together with factors such as age structure, housing capacity, migration balance, and the mismatch between administrative boundaries and the functional urban area.

As of April 1, 2026, the ethnic composition of the population of Samarkand region was as follows: Uzbeks 89.4%, Tajiks 6.7%, Russians 1.2%, Ukrainians 0.21%,

Armenians 0.19%, Tatars 0.16%, Koreans 0.15%, Kazakhs 0.13%, Azerbaijanis 0.13%, Roma 0.12%, Belarusians 0.09%, Turkmens 0.04%, Jews 0.04%, Karakalpaks 0.03%, Kyrgyz 0.01%, Moldovans 0.01%, Lithuanians 0.01%, Georgians 0.01%, Germans 0.00%, and other nationalities 1.89%.

The results of the study reveal two contrasting yet complementary processes for Samarkand region. On one hand, population and high-level services are concentrating around the city of Samarkand; on the other hand, nearly two-thirds of the region's population lives in rural areas, and the large rural districts account for a major share of demographic growth. For this reason, territorial policy should not be limited to expanding the urban core alone or developing rural infrastructure separately — urban-rural linkages must be managed as a single functional system.

Abdimo'minov and Abduxoliqova noted that population distribution in Samarkand region is linked to historical, natural, and economic factors [1]. This study builds on that conclusion with a new statistical cross-section, highlighting the mismatch between agglomeration proximity and the official urbanization indicator. For example, although the official urbanization level in Samarkand district is low, its adjacency to the large city intensifies the real process of urbanization. Therefore, administrative status alone is insufficient for classifying a territory as urban or rural.

World Bank analyses of Uzbekistan show the relationship between urbanization and labor opportunities, and the impact of housing and mobility constraints on migration [7, 8]. A study on Central Asian cities notes that large urban areas often expand in a fragmented and leapfrogging manner [9]. In the Samarkand agglomeration, assessing this risk requires comparing built-up surface growth with population growth. If the rate of land consumption exceeds population growth, low-density sprawl will increase transport costs, reduce agricultural land, and raise infrastructure costs.

Based on the results of the targeted research conducted, the following recommendations are proposed:

Creating a unified geodatabase for population monitoring;

Delimiting the functional Samarkand agglomeration;

Planning Urgut as a secondary growth pole;

Optimizing the hierarchy of services in rural areas;

Preventing uncontrolled expansion of construction into undeveloped land;

Pursuing differentiated policies for peripheral territories;

Linking demographic forecasts to infrastructure planning;

Introducing an open and verifiable indicator dashboard.

Conclusion. As of April 1, 2026, Samarkand region has a permanent population of 4,396.8 thousand, making it the demographically largest territory in Uzbekistan. Although the average density across its 16.8 thousand km² area is 262.2 people/km²,

this figure does not reflect the significant internal disparities between the valley, the agglomeration, and peripheral zones.

Of the region's population, 36.4% live in cities and 63.6% in rural areas. Urbanization by district ranges from 6.2% to 42.0%. The gap between the low official urbanization rate of Samarkand district and the real urbanization process occurring around the central city demonstrates the need to assess administrative and functional urbanization separately.

The city of Samarkand, along with Urgut, Pastdarg'om, Kattaqo'rg'on, and Ishtixon, together account for nearly half of the region's population. The fastest growth has been observed in Urgut, Toyloq, Oqdaryo, and Jomboy. These areas are priority zones for investment in housing, transport, and social infrastructure.

In the first quarter of 2026, natural population growth amounted to 18,303 people, while the migration balance was −1,302 people. The demographic balance corresponds to the overall population growth and confirms that natural increase is the leading factor in population growth.

For effective management of population settlement, official statistics, administrative boundaries, GHSL/WorldPop population grids, Sentinel-2 built-up surface dynamics, cadastral data, road network data, and social service data should be integrated into a unified GIS. Such a system would enable precise measurement of territorial disparities, early detection of new construction hotspots, and infrastructure placement aligned with actual needs.

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