NATURAL GEOGRAPHICAL FACTORS AFFECTING THE FORMATION AND DEVELOPMENT OF HUMAN SETTLEMENTS IN BUKHARA REGION

Ahrorbek Usmonov

Samarkand State University. Uzbekistan.
Phone: (+998) 91 312-92-76. Email: ahroru85@gmail.com
ORCID ID 0009-0005-5680-5806

Abstract. In recent years, the rapidly growing population in Uzbekistan, the industrialization of the country's economy, the growing demand for usable land, and the demand for settlements are also increasing. In particular, as a result of an increase in the density of the population in urban centers, various natural, socio-economic and ecological problems arise. The development of human settlements is somewhat complicated, especially in parts of the Oasis, which are surrounded by desert. In such areas, a sharp decrease in water content in recent years, an extremely low amount of precipitation, as well as a high level of evaporation, a high level of salinity directly negatively affect the network of human settlements of the population. This article provides a Geographical survey of the human settlements of the Bukhara region, located in the central part of the Bukhara Oasis. The article presents suggestions and recommendations on the specific geographical position of human settlements in the territory, population, history of formation, net of human settlements, problems of human settlements and their solution, and considerations on the prospects for development.

[Ahrorbek Usmonov. **NATURAL GEOGRAPHICAL FACTORS AFFECTING THE FORMATION AND DEVELOPMENT OF HUMAN SETTLEMENTS IN BUKHARA REGION.** *Researcher* 2025;17(12):1-5]. ISSN 1553-9865 (print); ISSN 2163-8950 (online). http://www.sciencepub.net/researcher. 01. doi:10.7537/marsrsj171225.01

Key words. Human settlement; Bukhara region; Bukhara Oasis; net of human settlements; rural settlements.

INTRODUCTION

At times when people on Earth began to move from a nomadic way of life to a more sedentary one, they settled primarily in geographically accessible settlements. Geographical location, water, geological structure, relief, natural resource, climatic and other natural geographical factors were the main factors in the formation of such settlements on Earth, where humans live constantly.

LITERATURE ANALYSIS AND METHODOLOGY

The role of geographical factors in the formation of population settlements is extremely high, and to what extent such factors are significant in the formation of population settlements, many scientists have studied, evaluated them from an impact point of view. For example, D.Adams, J.Gottman, Yu.G.Saushkin, A.S.Soliev [9], A.A.Soatov, M.A.Kadirov [11], A.M.Mavlonov [5], O.L.Muhammedov [10].

In desert conditions, the formation and development of human settlements is inextricably linked with natural conditions. In this regard, Sh.S.Zokirov said that "The natural environment and some of its components affect the geographical distribution of settlements, cities and resorts, the way of life of people (for example, the rhythm of work, the choice of clothes, nutrition). That is why the practical importance of evaluating landscapes for urban planning purposes is great" [15].

GENERAL GEOGRAPHICAL DESCRIPTION

Natural geographical factors are the main ones in the formation of human settlements in the Bukhara region. When the Bukhara regional area is analyzed naturally, this province is located in the lower Zarafshan natural geographical district. 88% of the municipality's territory is covered by a desert zone. The surroundings of lower Zarafshan county are surrounded by Kizilkum desert (north and west), Sandiklikum (southwest), Eshekchi dunes (south) and Kuyimozor, Kumsulton, Azkamar heights (east). The climate of the county is arid, and the amount of fat is extremely low (100-120 mm). Lower Zarafshan county is made up of 3 continuously inhabited oases. Of these, 2 are ancient Bukhara and Karakul oases, while the next is a relatively young Korovulbazar Oasis. A special place among these oases is the Bukhara Oasis, which occupies a large area and covers the main settlements in itself.

The Bukhara Oasis is counted from the ancient and always special oases of the Zarafshan Valley. Their history, economic, social life has been associated with the Zarafshan river of the valley for centuries. Of course, today the Bukhara Oasis occupies a special place with its socio-economic potential. Archaeologist and Orientalist scholar V.A.Shishkin wrote that he had

the right to say "the oasis of Bukhara – the gift of Zarafshan" when he called the first part of his book "Varakhsha" (1963) [16]. The famous scientist noted in this book that the Zarafshan River has supplied water to the inhabitants and economic networks of the region for centuries. For these researchers, knowledge of the geographical position, boundaries, relief, history of geological and hydrological development of the Oasis is the basis in their study of the development and potential of the oases, in their prediction for the future [13].

The Karakul Oasis was formed in the lower part of the Zarafshan River, southwest of the Bukhara Oasis and after the Bukhara Oasis. The surroundings of the Oasis are surrounded by the steppe of the Eshekchi, The Rodent, the counter and the chest. The base of the Oasis consists of alluvial-lake deposits [12].

The territory of the region consists mainly of 2 ancient (Bukhara and Karakul) and 1 relatively young (Korovulbazar) Oasis. Oasis settlements occupy 11.4 percent of the province's territory. The oases of the Bukhara region and the more than 403 thousand hectares of sands that exist around them are the famous scientist studied by Nazarov during 1971-1974 [13].

RESULT AND DISCUSSION

P.Barotov borders the Bukhara Oasis naturally geographically as follows. "The Bukhara Oasis is 102 km long, with an average width of 50-55 km, with the widest land reaching 70 km. The elevation of the Zarafshan Valley in this section varies around 200 m to the west and 250 m to the east. The Bukhara Oasis is considered a plain with a slight slope to the southwest, divided into several parts through irrigation stations. And next to the watering stations, hills have formed, the relative heights of which reach 2-8 meters. The Bukhara Oasis is bottomland to four tributaries of the Zarafshan River. The first row is located on both parts of the river, with a relative height of 1-1,5 m, and a width of 1,5-2 km. The relative height of the second row (from the riverbed) is 2-5 m, and from 6 km wide it reaches 50 km in some places (on the meridian of the city of Bukhara). The third row is without being wide- the unknown consists of alluvial plains rising from the second row. Finally the fourth oldest bottomland is located on the Autobach, Kiziltepa, lower plateau, which surrounds the Bukhara Oasis"[2].

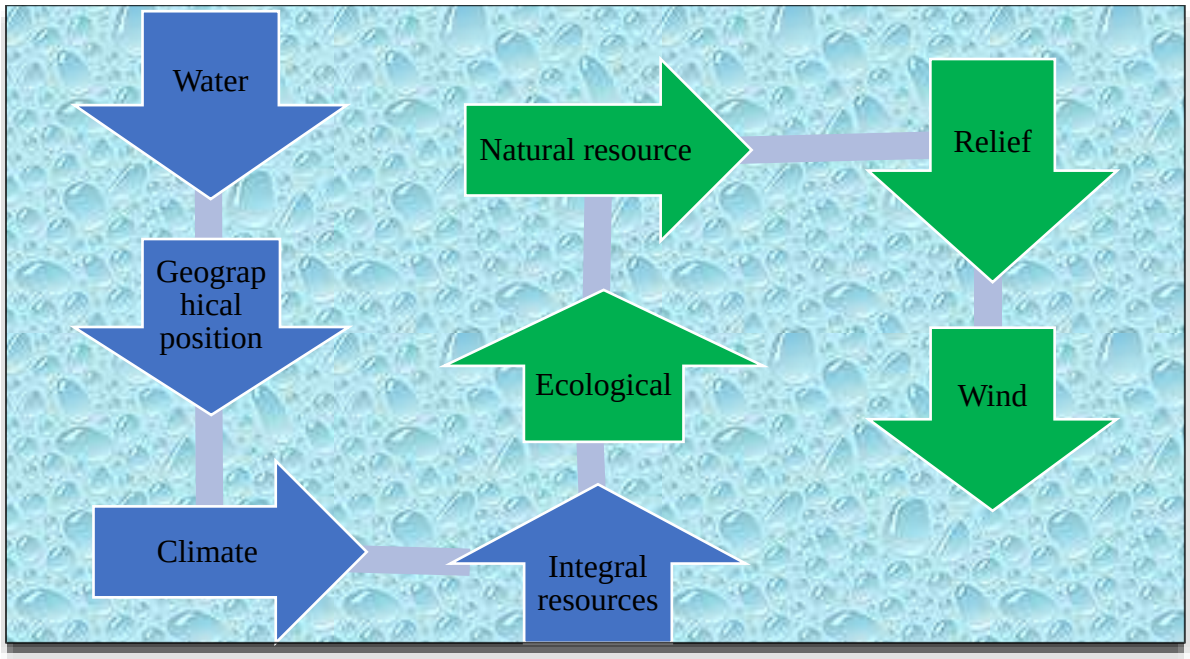

Fig.1. Natural geographical factors affecting the formation and development of settlements in the Bukhara region.

In the image above, natural geographical factors affecting the formation (water, geographical location, climate, integral resources) and development of settlements in the Bukhara region (ecological, natural resource, relief, wind) are arranged in sequence from the point of view of their importance. It should also be taken into account that these factors can be a factor in the development of both the formation and the formation for the territories of which it is located. We can see that the formation of the first settlements in the region certainly depended on water resources.

Indeed, the first civilizations that arose when mankind began to live on earth more grass, were formed mainly along water bodies. For example, Mesopotamia along the Euphrates and Tigris rivers, Egypt along the Nile river, and Indian civilization along the Indian and Ganges rivers were formed as the hearth of early civilization. The importance of the Amudarya, Syrdarya and Zarafshan rivers in the formation of the first settlements on the territory of our country is extremely high. The network of settlements of Samarkand region in the middle reaches of the Zarafshan River and Bukhara region in the lower reaches began to form from a very old time. The above of the river flows mainly through the territory of Tajikistan.

Zarafshan is a river flowing from the territory of Central Asia, which begins at the Zarafshan glacier at 3154 meters above sea level at the confluence of the Turkestan, Zarafshan and Hisar ranges. The length of this glacier is 24,5 km, the width is 1,7 km, and the thickness is 200 meters. Referring to the toponym Zarafshan, in Persian “zar” means gold, “afshan” means blower, i.e. blower. The Zarafshan River was called differently in different regions and periods. Among other things, Avesto’s monuments also contained the names of “Dytia”, “Obi Kohak” in the Beaver, and again the river in forms such as Sugd, Jirt, John, Somjan, Nomiq, Haramkom. Miles from Zarafshan River in the 1st century BC. In the 2-1st millennium AD, irrigation farming began to take place along the river valley by releasing canals. The Zarafshan River is named after Mastchoh until the origin and confluence of the Fandarya, its first tributary. The Mastchoh river flows very quickly in a narrow trough (the width of the river is 25 meters) on a high slope and flows many deposits with it. The Zarafshan River joins more than 200 small tributaries in the mountainous part. In the mountainous part, the river flows low at an average of 7 meters per kilometer. It then takes the name Zarafshan after its confluence with the Fandarya near the ancient village of Varzaminar or present-day Ayniy. Zarafshan River is divided into two branches near Samarkand city. It is the White river that flows towards the North and the Black river that flows towards the South. These networks merge again in the village of Khatirchi, resulting in the Miyonkol island, which has a length of 100 km and a width of 15 km.

Table 1. **Canals released from the Zarafshan river.**

№	Name of canals	Uzunligi (km. hisobida)	Water consumption (m^3 sek.)	Irrigated area (hectares)
1	Kalkonota	23,3	5,5	3440
2	Kanimex	59,8	13,5	10539
3	Shafirkon	20	25,0	9579
4	Sultonobod	40	17,0	10833
5	Pirmast	40	9,0	7058
6	Kharkonrud	29	16,0	8008
7	Vabkentdaryo (Khitfar)	48	49,5	40179
8	Shahrud (Rudizar)	65,5	35,1	48916
9	Khayrabod	60,1	15,0	10486
10	Saribazor	-	18,0-20,0	21501

From the above table data, we can see that in the 60s of the last century, the importance of the Zarafshan river in the population and agriculture of the Samarkand and Bukhara regions was extremely high. More than 170,000 hectares of land of these provinces were irrigated annually through the Zarafshan river canals alone. Among these channels, the Shahrud and Vabkentdarya channels were distinguished in the population and have not lost their importance to this day. Extensive land development as well as irrigation of thousands of hectares of land have left no impact on the Zarafshan River. Today, the importance of the Zarafshan river for the economy of the Bukhara region is declining. At present, the river ends at Amudaryo in the Sandiklikum desert at a distance of 25 km. The length of the river to this desert is 877 km. The average annual water consumption of the river is 165 m^3, with a maximum of 930 and a minimum of 30-35 m^3.

The importance of the Zarafshan River in the formation of settlements in the Bukhara region was extremely high. This can also be seen through the numbers above. The conclusion is that “Bukhara is the gift of the Zarafshan River”, as is “the gift of the Egypt – Nile”. Today, however, as a result of the heavy use of water in the upper and middle reaches of the river, the construction of many reservoirs, the sending of water through the old Tuyatortar canal to the Sangzar river, and through the old Anhar canal to Kashkadarya, the Bukhara region hardly reaches river water. To date, the importance of Amudarya in the agricultural sector of the region has increased. Mainly through the Amu-Bukhara and Amu-Karakul canals, the territory of the region is irrigated. Amudarya plays an incomparable

role in determining the future prospects of human settlements in the Bukhara region.

The factor of geographical position also has a special place in the formation and development of human settlements in our region. In particular, while this factor serves as a developmental factor for some destinations in the area, it acts as a limiting factor for the rest. In particular, the geographical position of the Bukhara region is somewhat unfavorable, and there are natural obstacles to the expansion of human settlements in a horizontal direction, mainly due to the fact that their surroundings are surrounded by the Kyizlkum desert. On the contrary, the fact that the relief consists of planes makes it possible for the destinations to grow in a vertical direction. The factor of geographical position also plays an important role in determining the prospects for future development of settlements of the Bukhara region.

In the formation and development of human settlements on the surface of the Earth, the climate and its components (temperature, pressure, humidity, wind, solar radiation, precipitation, growing season, etc.) always leading. A number of studies have been carried out in countries such as the United States, Italy, Canada, Japan, Switzerland in assessing the place of climate in the settlement. In this regard, Moscow (A.A.Dimitrev), Riga (N.S.Temnikova), Dushanbe (Kh.Mahmuov), and in our country Tashkent (A.V.Khisamov), Samarkand (G‘.R.Pardayev) and Bukhara (Yu.M.Petrov) in cities such as [7].

Looking back on history, the settlements where people lived from time immemorial, the regions were first selected that were climatically conducive to human habitation and economic activities, and the first urban and rural settlements were also located in such places. The climate factor is also leading in the formation of human settlements in the Bukhara region. The settlements are as if they were a living organism, they are “born”, “live” and “die”. When we see these three concepts as one mechanism, one of the main forces that drives this mechanism is climate. Poykent is a settlement of residents who have fully experienced this mechanism. Poykent is the ruins of an urban settlement located 44 km southwest of Bukhara. The city existed as a major settlement from the 4th to 3rd centuries BC until the 11th century AD. In the formation of the city, Karakuldarya, one of the major tributaries of the Zarafshan River, was the main one. As a result of the drying out of the water of this tributary, the climate of the area began to change dramatically, and the population began to gradually abandon this settlement. To date, only the ruins of the city have survived [13].

Today’s global climate changes are particularly effecting human settlements the most. Mitigation and adaptation to climate change and its consequences plays an important role in determining the future prospects of human settlements. Directly in the Bukhara region, the climate is one of the main factors in the formation and development of human settlements. All human settlements in the Bukhara region are located mainly in the desert zone, being one of the fastest-facing regions to global climate change.

“Human settlements are areas inhabited and engaged in labor activity, covering the area from a small rural settlement to a megalopolis scale. Settlements
are important in considering prospects for adaptation to climate change, both because they represent concentrations of people and because buildings and other infrastructures offer ways to manage risk and monitor or control threats associated with climate extremes and other non-climate stressors [6].

The formation and development of human settlements of the Bukhara region is influenced by the factors listed above, as well as the relief, ecological, wind, integrative resource (land and water) mineral and other natural geographical factors.

Today the region is threatened by a number of geoecological problems. Including the increasing shortage of running water, the increase in dust days, the decrease in groundwater levels, the increase in salinity levels of agricultural land. The occurrence of such problems in recent years is mainly due to a sharp increase in population numbers, the lack of rational use of cross-border rivers and other reasons. Troubleshooting or mitigating the above problems is one of the pressing issues of today.

By solving the water problem, several of the above geoecological problems can be solved. In particular, the region is geographically located in the sharply continental part of the temperate region, and the demand for water will be very high, especially during the summer “chilla” period. During this period, the channel water is also sharply reduced.

Under these conditions, it can be a good solution for each household to use “small reservoirs” that collect spring and winter precipitation. For example, the roof of most house in rural areas today is covered with hard cover (slate). Through a single centralized system, rainwater is collected into “small reservoirs” established in the hut, and during the summer “chilla” period, each hut will be able to irrigate its irrigated land in its area for 1-2 months.

We know that 1 millimeter of rain produces 1 liter of water on $1m^2$ surface. Observations show that the roof section of the huts in the district, covered with hard cover, occupies an average surface area of up to 60 m^2. the average rainfall in the region is around 120-140 millimeters. It follows from this that on average, in apartments covered with a solid coating of 60 m^2,

around 7,800 liters of water can be collected in one season.

CONCLUSIONS AND SUGGESTIONS

In conclusion, water resources remain relevant in the formation of human settlements in all regions located in the Bukhara Oasis, including in the all districts, where water is the most basic, and in determining the future prospects of the territory.

Conclusions and proposals to determine the prospects for the development of human settlements in the Bukhara Oasis and mitigate the existing geoecological problems in the area:

1. To introduce the project of "small reservoirs" in each apartment as soon as possible.
2. Due to the limitations of land resources, it is necessary to develop standards regarding the size and structure of new apartments under construction in rural areas.
3. It is advisable to increase the scale of building multi-storey houses in the agro-suburbs of the district center and the area and save limited land and water resources through this.
4. Residents located adjacent to the desert zone should be protected from the desert zone through natural barriers and protect the territories from desertification.

In the consequence of, the location of the Bukhara region is not naturally geographically favorable. This in turn has its own negative impact in determining the future prospects of the settlements in the area.

LIST OF LITERATURE

1. Абу Бакр Муҳаммад ибн Жаъфар ан-Наршахий. History of Bukhara. / Persian Rasulov translation (reprint). - Tashkent: East Bayaz,1993. – P.23.
2. Barotov P. "Natural geography of Uzbekistan" – T.: 2005. – 106 p.
3. Кличев О.А. Л.А.Зиминнинг Research in Bukhara // Scientific journal of the messages of the National University of Uzbekistan. – Тошкент: 2016. – №1-2. – P.13-15.
4. Леггет Р. Geography and geology. – М.: Мир, 1976. – 558 с.
5. Mavlonov A. "Desert urbanization" monograph. Bukhara: 2015.
6. Noor. S., Fatima. M. "Impacts of climate change on the human settlement and their possible adaptive measures: An overview from Pakistan.
7. Пардаев Ғ.Р Zoning of cities according to their climatic characteristics // Urgent problems of natural and economic geographical zoning. –T., 2004. -P. 38-39.
8. Рафиқов А.А. Geoecological problems. –T.: Ўқитувчи, 1997. –112 б.
9. Soliyev A.S., Nazarov M. "Villages of Uzbekistan" Tashkent. Science and technology publishing house. 2009.
10. Soliyev A.S., Tashtayeva S.K., Egamberdieva M.M. "Urban geography" tutorial. Tashkent: 2018. 3-41 b.
11. Toshov.X.R, Kholov.Yo, D. The human settlements of the vibrant district and the theoretical foundations of their organization. NSU scientific newsletter 2023. 691-693 b.
12. Toshov.X.R., Ne'matov.A.N., Qalandarova. D.D. "Oases of the desert zone and their rational organization (on the example of the Bukhara region).
13. Toshov X.R., Rahimov O.H., Hikmatova G.I. "Water value". Bukhara, 2018.
14. To'rayev H. History of Bukhara. Bukhara, "Durdona", 2020. -9, -54 p.
15. Зокиров Ш.С. Anthropogenic and applied landscaping. –T.: University, 1998. – 68 p.
16. Шишкин В.А. "Varakhsha". M.: 1963.-8 p.

8/2/2025