

The Role Of Water Supply Sources In The Landscape Formation Of The Historical Cities Of Uzbekistan

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ABSTRACT: *The work covers studies and analysis on the development and growth of the territory of the ancient cities of Uzbekistan, taking into consideration the features of open water supply. The types of water sources and their influence on the formation of the landscape of historical cities in the antique, medieval and colonial periods are discussed and analyzed. The predetermining graded organization of additional smaller channels and irrigation ditches is stated. Besides, we revealed and studied the experience and principles of the irrigation and landscaping system distribution, which contributed to the formation of favorable sanitary-hygienic, microclimatic, recreational and aesthetic conditions, as well as grounded the conjugation of water and green plantings.*

Keywords: *landscape of historical cities, irrigation and landscaping system, hauzes, hiyobons, urban development, mahalla.*

1. INTRODUCTION

The emergence and development of a city is associated with the topographic and landscape conditions of the region. All natural forms of the landscape - terrain, water, and vegetation provide the basis for the formation of a city and along with socio-economic factors determine the features of its territorial and planning development. But the high-priority condition for the city formation and development of their landscaping system in local climatic conditions was the availability of a water supply source.

Due to the significant extension of the territory from the North to the South and from the West to the East, as well as the specifics of natural and climatic conditions, ancient centers of settlement on the territory of Uzbekistan emerged in the oases of the large rivers' valleys such as Syrdarya, Amu Darya, the valley of the river Zeravshan and other rivers formed in the Pamir-Altai mountain systems (Fig. 1).

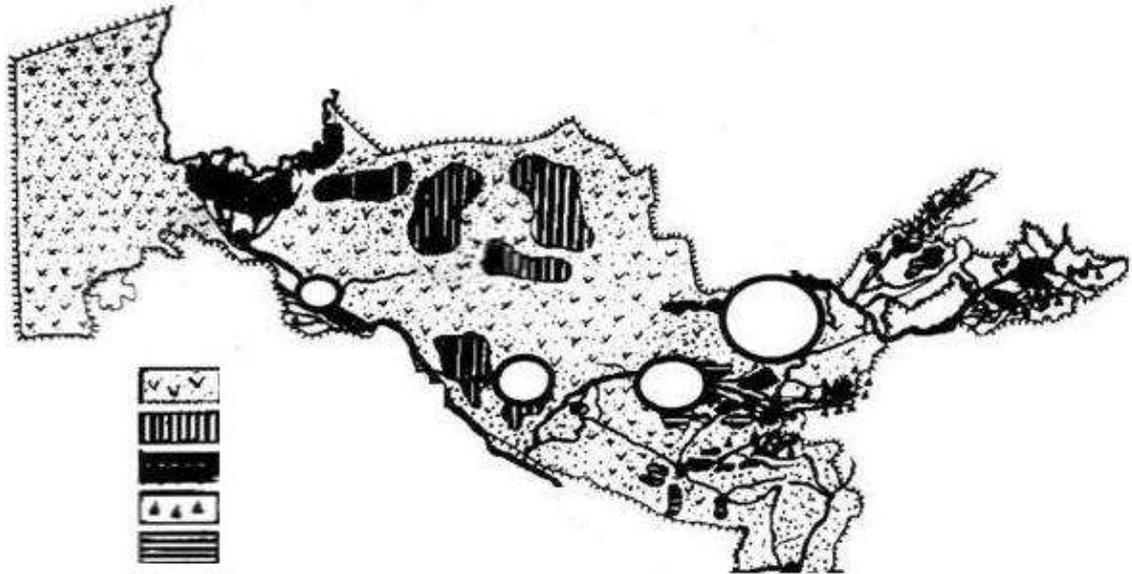


Figure 1. Layout of water resources and vegetation on the territory of Uzbekistan:

1 - herbs, bushes. 2 - saxaul, 3 - riparian woodland, 4 - juniper stands,
 5 - deciduous. O - the main historical cities of Uzbekistan. (5)

In the historical past, when the cities of Uzbekistan did not have such a developed territorial and planning structure as now, the cities were formed on rivers, near large rivers or in the regions well supplied with water by means of artificial channels - irrigation ditches, branching from the main water supply source - a large river or channel (1).

For example, ancient Tashkent - Shash developed northerly of the river Bozsu diverted from the Chirchik water system; ancient Samarkand (Afrasiab) was formed on the right bank of the river Siab - diverted from the Zeravshan water system; ancient Bukhara developed northerly of the Shahrud channel diverted from the Amu Darya water system (Fig. 2).

The study of historical materials on ancient and medieval cities showed that in the past they were well irrigated, landscaped and developed.

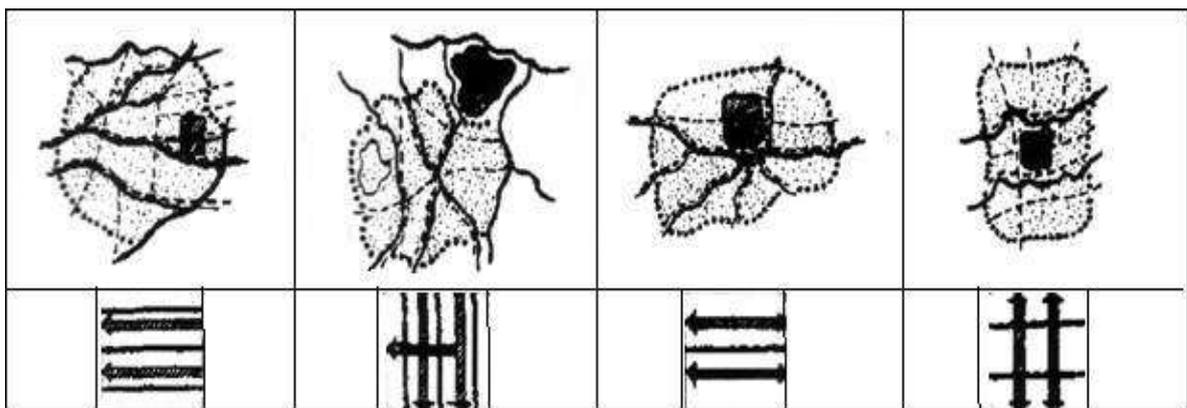


Fig. 2. Influence of the local hydrosystem on the development and landscaping of cities in the ancient and medieval period: 1 - Tashkent, 2 - Samarkand, 3 - Bukhara, 4 - Khiva. (5)

Descriptions of Greek and Arab historians can serve as evidences of this fact. For example, Quintus Curtius Rufus wrote about early medieval Samarkand, with the settlement of Afrasiab. He noted that in the period of Alexander the Great in 329 BC, Marakanda was a well-fortified and developed city, and its people were courageous, noble and highly cultured. The Arab geographer of the Xth century al-Istahri, who was amazed with the fertility of the

Sughd region, wrote: "... Sogd - I don't know any place, where, having climbed on something high, your gaze would not fall on such a green and pleasant place... There is a fortress in every city and village, which shines in the intervals of greenery as if (green) a clothing of green brocade, woven by water channels and decorated with sequins of castles. Sogd is the most fertile of the countries of Allah, there are the best trees and fruits, in all its dwellings there are gardens, hauzes and running water; rarely when a street or house does not have a ditch with running water"[2]. These materials indicate that the formation and development of vegetation and, moreover, the level of urban landscaping was associated with the presence, volume and arrangement of water sources.

The system of channels was of a quite importance, and disruptions in water supply or destruction of water supply sources led to the termination of life in the ancient settlement or their displacement outside the developed territories. For example, the massive destruction of the lead channel Djakardiz in 1220 by the troops of Genghis Khan, which was the main water supply source for the Afrasiab settlement, caused the subsequent death of the city. The destruction of the channel was so tragic, that the population, deprived of their only water supply source, left the city forever. As Samarkand, the city was re-emerged in the XIII-XIV centuries, in a southern direction outside of Afrasiab. In the same way, once developed and landscaped cities of ancient Khorezm - Khiva and Urgench re-emerged on the destroyed ashes, as well Shakhriyabz, Termez, and Tashkent moved from the places of their foundation. [3].

With the growth of the population and the need to develop new territories, most cities fully or partially moved to neighboring territories, favorable for water supply. With the development of cities and the shifting of periphery territories from the main water supply sources, there was need for the creation of channels branched from the head of large rivers.

From the main channels (for example, in Tashkent – the Bozsu channel, in Samarkand – the Dargom channel) a network of ditches was diverted, distributed over the territory of the city depending on the terrain [4]. The distribution of water, as a rule, was followed by landscaping, and the more evenly irrigation ditches were distributed, the more evenly the network of green spaces was formed.

The shift of cities towards the channels had influence on the development of a network of the main streets formed along channels and large irrigation ditches. The influence of hydrography on the development of the planning structure of cities and the distribution of green spaces was reflected in the formation of the landscape appearance and the arrangement of recreational places [5]. For instance, Samarkand in XIII-XIV centuries developed on the spring-fed streams of Sangresan, Navodon and Djakardiz branched from the Dargom irrigation system, the source of which was the Zerafshan River. Tashkent was formed in the western, southwestern and northwestern directions on the water streams of Karakamysh, Ankhor, Aktepe and others branched from the Bozsu irrigation system, the source of which was the Chirchik River. Bukhara developed in the southern, western and northern directions relative to the Shahrud channel and its branches (Fig. 3).

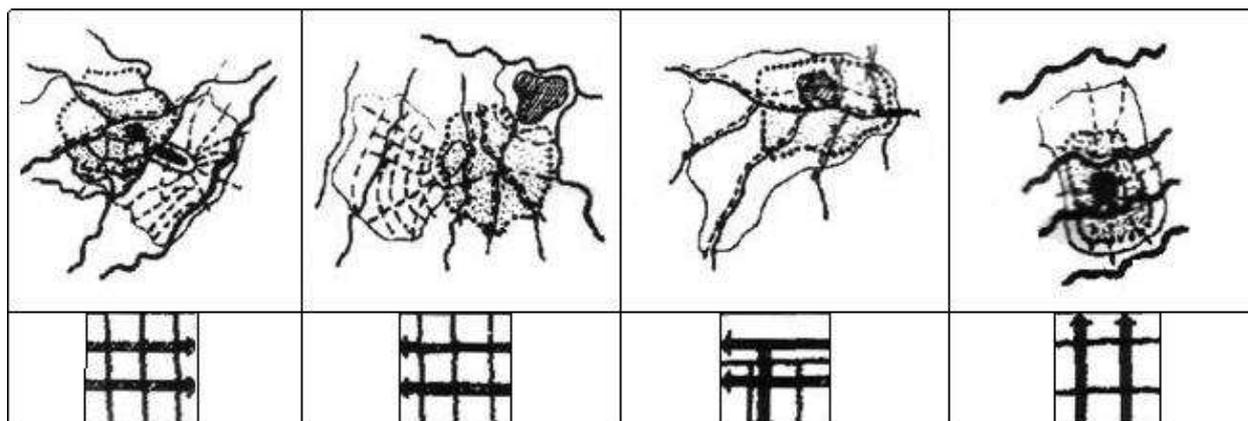


Fig. 3. The influence of the hydrographic system of the region on the development and landscaping of cities during the colonial period:

1 - Tashkent, 2 - Samarkand, 3 - Bukhara, 4 - Khiva. (4)

The need for water supply in the expanding urban regions predetermined the construction of additional smaller channels or ditches deeply into the buildings, perhaps, therefore, the layout of the districts, streets which were also arranged along the main networks, did not have a clear planning structure. The close planning and spatial arrangement of green spaces and sources of open water supply made it possible to create cities - green oases, as can be judged from historical descriptions.

For example, the historian Ibn Khaukal wrote that "... in Samarkand, with a few exceptions, there is not a single street and homestead without running water, and only few houses have no gardens". Similar statements can be found when describing the medieval cities of Bukhara, Termez, Khojent, Shakhrisabz and the cities of the Fergana Valley.

After determining the historical features of water supply, irrigation and landscaping of ancient cities, it should be noted that the open water supply system (channels, irrigation ditches, hauzes) was multifunctional and, above all, was practically necessary. The functions of water supply were closely connected with the functions of irrigation of the territory. At the same time, it is important to note that the features of cities irrigation were very rational in terms of water distribution in the city.

The irrigation system had a consistent planning distribution: from the large channels, with primary settlements formed, channels of the second order were branched to the developing territories of the city, and then a smaller water network was drawn deep into residential districts, passing through yards where inhabitants often arranged small reservoirs (hauzes). In addition, in the centers of districts, large water reservoirs were set up, performing a complex of practical, recreational, sanitary and hygienic functions. Such water reservoirs played an important role, such as:

- reservoirs for drinking and service water;
- centers for the organization of entertainment and leisure;
- microclimatic zones;
- places of aesthetic pleasure.

We can say that the organization of irrigation and landscaping of medieval cities consisted of several levels and was a rather complex system:

- large irrigation channels passed through the central districts of cities, along which green walking alleys - hiyobons - were arranged;

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- middle-sized ditches passed through residential districts, through the centers of the mahalla and served as sources of water supply for large khauzes, around which green "mahalla centers" were formed - zones of communication and leisure of the population;

- a small irrigation ditch network was diverted from the middle ditches and passed through residential yards, irrigating vegetable gardens and sometimes small ponds around which shady places of rest were set up for family members.

2. CONCLUSIONS

The conjugation of irrigation system and landscaping contributed to the even distribution of the water-green system of the city, which increased its microclimatic and sanitary impact on the urban environment. According to historians, it turned into a paradise oasis of coolness, against the background of hot and dry weather conditions of the local climate. In addition, the rational arrangement of the system of green spaces on the territory served to uniformly distribute the structure of recreational functions.

The historical heritage of the organization of the water supply system, irrigation and landscaping of cities shows that in the local climate, open water supply sources played a key role in all life processes, including the formation of the urban landscape. The multifunctionality of water, its utilitarian, irrigational, sanitary and aesthetic properties, dictated the rational distribution of water sources in the city.

The open water supply system - channels, irrigation ditches and hauzes, formed in accordance with the natural and planning structure of the city, determined not only the nature of the landscape, but also the location of recreational zones: green hiyobons were set up along the large channels and irrigation ditches - a kind of walking parks; ditches of medium size served as a source of landscape formation for organizing leisure places and rest for the inhabitants of the mahala; the small irrigation ditch network permeated residential districts served as a source of landscape organization and resting zones in the yards of households.

Despite the complexity of urban planning and functional planning problems of modern cities of Uzbekistan, the revealed experience and principles of distribution of the irrigation and landscaping system on the territory of medieval cities, which contributed to the formation of favorable sanitary and hygienic, microclimatic, recreational and aesthetic conditions can be considered highly rational and vital for the current application.

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