



## EXPERIENCE IN DESIGNING LARGE CITIES IN COMPLEX ENVIRONMENTAL CONDITIONS

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**Summary:** *This article describes the stages of urban planning, the problems of aesthetic improvement of the master plan spatial environment in accordance with the lifestyle of the population, methods and principles of solving the problems of material and spatial organization of leisure activities of the population.*

**Keywords:** *Urban planning, master plan, project, interior, shear, agglomeration, demographic factors, profile, landscape.*

Since gaining independence, Uzbekistan, in accordance with complex structural transformations, has been taking consistent steps to improve and develop the organizational structure of environmental quality management and nature management. In the context of ongoing economic reforms, the transition to market relations, the growth of population and cities, an increase in the volume of transportation, the intensification of agricultural and industrial production, solving the problems of environmental protection and related issues of rational use and reproduction of natural resources has become a major state task.

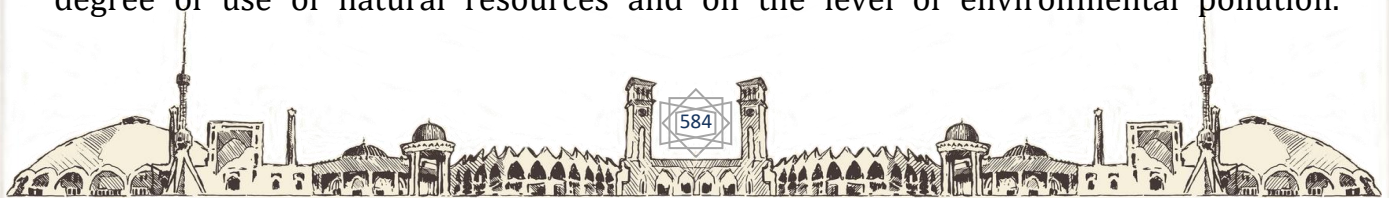
It should be noted that the effective implementation of reforms is facilitated by a good legal framework.

The system of environmental protection and nature management in Uzbekistan was formed back in the 60-80s of the last century.

The reforms carried out in Uzbekistan since the attainment of independence contribute to the successful solution of the tasks of overcoming economic difficulties on the way from a centralized planned system with administrative-command principles of management to a market economy, achieving economic and financial stability.

In the context of the transition to a market economy, it is necessary to ensure an effective combination of macroeconomic planning with environmental policy aimed at implementing the transition from the protection of individual elements of nature to the overall protection of ecosystems and ensuring sustainable development of the country.

The prospects for the country's economic development cannot be viewed in isolation from its impact on the environment. At the same time, the effectiveness of environmental protection is not always adequate to the efforts expended. Structural changes taking place in the economy of Uzbekistan have an undoubted impact on the degree of use of natural resources and on the level of environmental pollution.





Therefore, during this period, the economic aspects of environmental decision-making, that is, the integration of environmental and economic policies, acquire special importance. In these conditions, the State Committee for Nature Protection of the Republic of Uzbekistan pays special attention to pursuing a policy aimed at introducing resource-saving and low-waste (clean) technologies, new types of services, entrepreneurship, etc. with a wide range of economic instruments.

The Aral Sea crisis is a formidable warning to the entire world community about how rapid and large-scale the environmental threat can become for the whole region due to unsustainable use of natural resources. Only twenty-five years ago, no one attached any serious importance to this. Although the fact that the Aral Sea began to dry up was noticed more than 100 years ago. At that time, its cliffs were exposed on the western shores, and part of the bottom was exposed on the shallow southern and eastern shores. From 1858 to 1894, Aybugir Bay completely dried up in the south. In 1989, the Aral Sea was divided into Small and Big. The Small Sea became a flowing body of water, and the Big Sea became closed. In such a short period, the fourth largest enclosed body of water in the world disappears from the face of the earth, and a population equal in number to the whole state of Europe is at the epicenter of the crisis.

It was assumed that the possible reasons for this process were a decrease in the amount of water in the Amu Darya and Syrdarya rivers flowing into the Aral, a decrease in the amount of precipitation falling on the surface of the lake and its immediate environs, an increase in air temperature and stronger winds.

The sharp drop in the water level in the sea and its division into two parts necessitated the development of improved methods for calculating the terms of the water balance. Currently, many researchers (including foreign ones) are looking for ways to mitigate negative consequences by preserving its parts, as well as regulating water consumption in its basin.

Excessive pollution of water resources and their depletion as a result of an extensive approach to the use of natural resources has become one of the main causes of the ecological crisis in the Aral Sea zone.

The Aral Sea crisis and its consequences in terms of the scale of their impact on the environment and climate have no analogues in the world and have become the subject of close attention not only to the states of this basin, but also to the world community. As a result, prerequisites have been created for reaching a consensus between the states of the region on pricing in water use, planning the use and management of water resources, cooperation and joint use of databases for the sustainable provision of water to economic sectors in all states of the basin, effective water quality management and overall environmental health improvement. situation in the Aral Sea basin.

### **Foreign experience**





The national economic value of the lands of sandy deserts is much less than the value of lands in oases, which makes it possible to occupy these territories for inhabited places in an unlimited amount. However, the development of the territory of sandy deserts is associated with huge expenses for the improvement and consolidation of sands, on which it is impossible to plant trees and shrubs without adding fertile soil.

In desert conditions, water is the main factor in the emergence of populated areas and their further development. Water supply is carried out in various ways: by transport (by rail, by car, by plane, etc.), laying canals and water conduits, drilling artesian wells and wells, as well as by evaporating salt water in special installations using various types of energy (solar, atomic, etc.). Thus, in the city of Krasnovodsk, located on the eastern coast of the Caspian Sea, water is delivered by tankers from Baku; to the settlements of Darvaza and the Sulfur Plant located in Central Kara-Kum, water is delivered by plane from Ashgabat; In the city of Shevchenko (Mangyshlak peninsula), the first in our country experimental atomic seawater desalination plant, with a capacity of about 5 thousand m<sup>3</sup> of fresh water per day, operates. The territory of the sandy desert of the Central Asian republics belongs to the non-seismic zone.

The planning structure of inhabited places in a sandy desert is primarily due to the need to create a space isolated from the desert, to preserve its coolness and shade inside.

In areas with a forward view of sand movement and an active wind regime, small villages or individual buildings have a streamlined shape that does not impede the movement of the wind-sand flow. This form was proposed and implemented by the geographers E. Ostanin and A. Znamensky in Nebit-Dag. Villages or houses with a streamlined shape are located with their long side in the direction of the prevailing wind. On the short windward side, a rounded fence is arranged, and on the leeward side, where sand usually accumulates in the vortex zone, the fence has the shape of an incoming acute angle. Villages or buildings built according to such a plan are not covered with sand, since the wind-sand stream, approaching the streamlined structure, bypasses it, without losing speed and without depositing sand.

A vivid example of this is the city of oil workers of Turkmenistan, Nebit-Dag, created in the post-war period. Northeast winds prevail here, as a result of which the sands move forward from the foothills of the mountain ranges of the Big and Small Balkhan, sweeping through the city. The conditions for the development of plants here are extremely unfavorable, especially because of the highly saline sea sands, on top of which there are accumulations of mobile sands in the form of dunes.

The layout of Nebit-Dag is designed in such a way that the direction of the wide main streets coincides with the direction of the prevailing northeastern winds, along which wind-sand streams pass freely through the city without depositing sand. The territory of the residential areas does not have a through blowing, and the saw wind seems to bend around the inner space of residential courtyards.





This, obviously, is due to the fact that on streets parallel to the direction of the wind, the air speed increases due to the narrowing of the section of the wind flow at the entrance to the street space. As a result of this, the phenomenon of suction occurs to some extent from residential yards. The roadways and sidewalks are usually designed so that they do not contribute to the accumulation of sand drifts.

It is interesting to consider the zoning of residential buildings by number of storeys in Nebit-Dag. In the peripheral parts of the city, where the influence of unfavorable factors is the strongest, there are mainly 1-storey buildings with adjoining plots, forming a reliable screen that protects the inner parts of the city from external negative influences. The central part of the city is built up with multi-apartment 2 and 3-storey sectional buildings.

An example illustrating what has been said is the city of Karmil in the Negev desert (Israel) shown in the general plan diagram. Buildings in the districts adjacent to the public center of this city have a linear layout. Here, residential buildings of mixed number of storeys, divided into compact residential groups by narrow streets, seem to be a typical technique for the desert zones of the city, in order to reduce distances, all utilities and some industries are concentrated in groups of residential buildings.

In principle, the organization of the residential area was adopted in the development of Beersheba (Israel), where multi-storey buildings create a protective screen around the plots built up with low-rise buildings with courtyards near the apartment.

Of interest is the work of French designers for living conditions in the Sahara. So, when designing the city of Kansado (Mauritania) with a population of 35 thousand people, they had to solve complex problems - creating a favorable environment in conditions where there is no fertile soil, not a single tree. Fresh water supplies are very limited. The designers had to look for a type of dwelling that would be suitable for the conditions of a particularly arid region.

The planning structure of the residential part of the city of Kansado is solved in such a way that service establishments and pedestrian roads are located in the central part of residential areas; residential buildings are divided into residential groups by narrow pedestrian streets with shaded houses; low-rise buildings, occupying the maximum site.

Here, special attention was paid to the architectural and spatial organization of the city through the concentration of residential buildings and the combination of various volumes of houses.

In the residential development of new settlements in Iran (in oil-bearing regions), 1-storey block houses are used with apartment courtyards with an area of 20-30 m<sup>2</sup>. Additional premises (bathrooms, kitchen) for all four apartments are located in the center of the block and communicate with the living rooms only through the courtyard ... The presence of a small open courtyard allows you to be outdoors around the clock





during the warm season to avoid the device of a special flight room (in the form of verandas or loggias).

The house with a compact layout is also used in the Sahara. A distinctive feature of this house from the type of houses used in Iran is the different arrangement of the courtyard. If in the first case the courtyard is located at the entrance to the apartment, replacing the front one (the traditional method of locating the courtyard in the people's dwelling of the countries of the Near and Middle East), in the second case, the courtyard is located at the back of the apartment so that you need to pass through the living rooms. This creates certain inconveniences in the operation of the home.

The most common is a semi-detached 2-storey house with apartments on two levels and a compact plan, an example of which is a residential building in Rabat, Morocco. Each apartment here has a courtyard on the ground floor with a common room and a terrace on the second floor with bedrooms. Such a house provides favorable conditions for daytime rest (courtyard of the first floor) and night sleep (terrace on the second floor). In addition, blocking buildings into single massive volumes increases their inertial qualities and reduces the area of external surfaces exposed to thermal effects of the environment.

### **Domestic experience**

One of the priority areas in the development and implementation of master plans for cities, regional centers and urban settlements is urban planning ecology, aimed at assessing and improving the environment of urban settlements.

The main task of environmental protection is to improve the microclimate of the settlement, i.e. protection of air, water bodies, soil from pollution by industrial emissions and household waste; reduction of street and industrial noise; increasing the sanitary and hygienic efficiency of green spaces; development of unsuitable for building lands for green spaces.

The rationale for measures to protect and improve the environment is based on the research, calculations and monitoring of the existing sanitary services and the developers of the master plan.

When developing the section "Protection and improvement of the environment" of the master plans of urban settlements Khazarasp, Pitnyak (Druzhba) and Shavat of the Khorezm region, pre-design studies of the state of atmospheric air, water and soil cover were carried out.

A feature of the region is an extra-arid climate, characterized by large amplitudes of fluctuations in annual and daily temperatures, very hot summers, little cloudiness and humidity, negligible rainfall - the average annual rainfall fluctuates around 120mm / year. Dry air and intense solar radiation cause strong evaporation of moisture, which affects green spaces, especially along highways.

Analysis of changes in vegetation in recent years shows an increased impact of salt accumulation and deflation. These processes determine the desertification of the natural environment of the Southern Aral Sea region. When the channel dries up, tugai





are intensively desertified. In desert places, salt- and dry-resistant plant species are introduced into the species composition.

The state of soils, grounds and vegetation is determined by the impact of both technological (industrial, energy, utilities, vehicles) and natural sources, and correlates with the state of atmospheric air, surface and ground waters.

The landscaping system laid down in the projects of master plans is multifunctional. It takes into account the need to preserve and replenish natural resources, create favorable microclimatic conditions, perform protective functions, and improve the aesthetic qualities of the landscape.

When developing greening projects at subsequent stages, the selection of an assortment of trees and shrubs should be carried out depending on the location of the green areas, taking into account the complex of all functional loads.

In one case, the decorative value of rocks may prevail (landscaping of planning centers, parks, boulevards), in another case, the height of trees and their viability (sanitary protection zones from industrial facilities, landscaping along highways) are important, in the third, the depth and ramification of the root system and drought resistance (planting to strengthen river banks and canals flowing in ravines).

Urban conditions have a very strong influence on the condition and longevity of trees. A high level of air and soil pollution, soil nutrient deficiency, as well as deterioration of the water and air regime of soils reduce the vital functions of trees, and reduce their natural life expectancy. Therefore, urban green spaces need special care and constant maintenance. The improvement services should already have a program of necessary forestry activities (thinning, clarification of valuable species, sanitary felling, as well as measures to combat pests and diseases, selection of an assortment of planting material, depending on the ecological state of the environment and the sustainability of vegetation).

The development of the section "Protection and improvement of the environment" made it possible to identify a number of main factors affecting the sanitary and hygienic state of cities. The figure shows a schematic in the image of a comprehensive assessment of the state of the environment, the main components are: pollution of atmospheric air, water bodies and soil and vegetation cover; territories with uncomfortable micro-climatic conditions; areas with a high level of noise and radiation, pollution from mobile sources.

After a summary assessment of all components, the city's territories with varying degrees of environmental condition and favored for urban planning are classified.

The formation of the sanitary and hygienic qualities of the urban environment is greatly influenced by:

natural and climatic factors that determine the thermal regime of open spaces and buildings;

conditions for the rehabilitation of urban areas;





conditions for the dispersion of harmful emissions from stationary (industrial enterprises, heating and gas distribution stations, boiler houses, gas stations) and mobile sources (highways, railway and air transport).

The master plans of the cities of the Khorezm region provide for long-term and priority environmental protection measures.

Long-term measures include: the creation of a unified system of greening the city, the development of existing industrial enterprises through reconstruction and refurbishment.

Priority measures include: removal of enterprises that pollute territories (oil depots, warehouses of agricultural chemistry, etc.) outside the city limits, repair of engineering networks and communications of water supply and sewerage, repair of the drainage system, creation and strict observance of water protection zones, uninterrupted organization of removal of household waste.

Complex measures for environmental protection and rational use of natural resources.

The complex of measures for environmental protection includes:

-technological conditions for the implementation of environmental requirements (reducing the toxicity of car engines, improving the production and processing technology, achieving the optimal level of equipment of industrial, energy and municipal facilities with modern gas cleaning, dust collecting and water treatment equipment, ensuring the treatment of wastewater and contaminated surface runoff to a degree that meets the regulatory requirements for discharge into surface water bodies-canals, removal and processing by industrial methods of household and industrial waste, modernization of industry with the transition to low-waste and non-waste technologies);

- urban planning directions for the implementation of environmental requirements (elimination of environmental risk zones that pose a threat to the safety of public health, remediation and rehabilitation of areas subject to a strong technogenic load; elimination of noise discomfort zones on the territory of residential and public buildings (equipment with existing screen devices, green plantings with sustainable species composition, etc.); the formation of a safe environment in residential buildings due to the removal of enterprises and industries that pollute urban areas.

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