



## Problems Of Protection And Reproduction Of Trees And Bushes In Mountain Conditions Of The Middle Zerafshan Valley.

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**Abstract:** The article provides information that the mountains surrounding the Middle Zerafshan Valley were completely covered with trees and shrubs during periods of weak anthropogenic influence. The contribution of forests to an increase in spring and river water in the mountains, a decrease in soil erosion is shown. The possibility of afforestation is substantiated by the example of planting trees and shrubs on an experimental site in the Gobdin mountains.

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**Keywords:** Middle Zerafshan valley, Zerafshan river, Turkestan ridge, Zerafshan ridge, spruce, shale, almond, degradation, tree, bush, stream, spring.

### Introduction.

Population growth on the planet and in its various regions from year to year increases the anthropogenic load on nature, which aggravates the degradation (poverty) of nature. Desertification is a striking manifestation of natural degradation. Anthropogenic load is the sum of direct and indirect impact of human activities on nature. Due to the impact of human activities, the desertification process is intensifying not only in the plains, but also in mountainous areas. This is especially noticeable in the mountains at low and medium altitudes. The mountains surrounding the Central Zerafshan Valley belong to the group of low and medium mountains. All mountains are used as pastures, and flat areas are partially used for dry-farming cereals. At a time when the influence of human activity was insignificant, the mountains were covered with trees and bushes. Now trees and shrubs remain only in the remote part of the mountains, where they are difficult to reach. In other places, trees and bushes are intensively cut down. Due to the large number of livestock in the pastures compared to the capacity of the pastures, the centers of desertification with a radius of 3000-4000 meters have formed around the villages and are expanding every year. The article provides information, suggestions and recommendations on how to prevent these problems and improve the mountain nature.

The main goal of the research highlighted in the article is the conservation and restoration of the nature of mountain landscapes, the improvement of mountain nature based on reliable factual data.

Mountains are a place of accumulation of atmospheric precipitation and moisture in the air. In the

mountains, at both low and medium altitudes, the amount of precipitation is higher than on the plains, and when air currents reach mountain slopes, moisture in the air condenses in cracks in rocks, sand-soil cavities, collects in the form of water droplets in relatively cold conditions and comes out as a source. As the altitude of the mountains increases, the amount of precipitation and air humidity will be greater than on the plains, and, naturally, spring water will increase.

In order for most of the precipitation in the mountains to be absorbed by the soil and between sediments, vegetation, trees and shrubs must be dense, otherwise precipitation will wash away the soil from the slopes, and most of it falls into surface streams. For this reason, the density of vegetation in the mountains, the abundance of trees and shrubs leads to an abundance of spring and river water. The article examines this problem using the example of the mountains surrounding the Middle Zerafshan Valley.

The Zerafshan River, which originates in the east from the Mastchoh highlands, stretches for about 800 km and ends in the sands of the Sandikli Desert near the Amu Darya in the west. Zerafshan valley consists of three parts: Upper Zerafshan is surrounded by high mountains and continues to the city of Penjikent. To the west of this city, the river valley expands, the speed of the current slows down, and the part to the west from the city of Navoi to the so-called Khazor corridor is called the Middle Zerafshan. After the Khazor corridor, the flat part of the river is called the Lower Zerafshan, and it includes mainly the Bukhara and Karakul oases.

The mountains south of the valley belong to the Zerafshan ridge and face the Chakilkalon,

Karatepa, Zirabulak and Ziyovuddin mountains north of the valley to the Turkestan ridge, Chumkartag and Nurata ranges. The Nurata mountain range consists of Gobdintog, Karakchatag, Aktag and Karatag from east to west. To the north of these mountains lies the Nurata ridge, which runs parallel to them. These listed mountain ranges belong to the group of medium (2000 meters) and low (1000) meters.

The highest peak of the Turkestan ridge is 2621 meters in Chumkartag, the highest peak of the Nurata ridge is the Hayotbashi peak (North Nurata ridge) - 2169 meters. These mountains descend from east to west and merge with the plains in the west, turning into hills, which are mainly used for pasture, as they are not very high. On the northern and southern slopes of the Nurata Mountains, there are streams of different lengths, and only the largest of them flow all year round. There are villages in the river valleys, and their size also depends on the amount of river water. The average long-term water consumption of large rivers ranges from 0.50 m<sup>3</sup> / sec to 1.02 m<sup>3</sup> / sec (Omonkotonsai). Reservoirs were built to collect water in large streams. Reservoir Karatepa in Omonkotonsay (between the Chakilkalon and Karatepa mountains (18 million m<sup>3</sup>), Koltosinskoye reservoir in the Nurata mountains in Tosinsoy (water volume 22 million m<sup>3</sup>), Kuksaroy reservoir (southern foothills of Aktag), water volume 7 m<sup>3</sup> Okchop reservoir, (1.5 million m<sup>3</sup>).

The mountains in the southern part of the Nurata ridge cannot be a strong barrier to air masses coming from the west, since they extend in latitude. Therefore, the amount of precipitation is low even at an altitude of 1500-1700 meters above sea level. Since there are no meteorological stations in the Nurata mountains, it is difficult to say for sure whether the amount of precipitation changes from low to high points, and increases by the same amount from west to east of the region. The eastern slope of the Chakilcalon Mountains and the Omonkoton Basin differ from this general change. For example, the average amount of long-term precipitation at the meteorological station in Urgut is 485 mm, and at the meteorological station at an altitude of 1300 meters in the Omonkoton river basin - 881 mm. [8] This is the largest figure for the foothills and mountains of the Samarkand region. The reason for the large amount of precipitation in this area is that the Chakilklon mountains are oriented to the northwest, which to some extent impedes air flow from the west along the Zeravshan Valley. The Omoncoton River Basin also has this barrier law. The upper part of this brook, that is, the northern, north-western exposure of the slopes at an altitude of 1300-1700 meters, serve as a "trap" for trapping moisture. For this reason, steppe, forest-steppe, natural vegetation cover and mountain brown soils are formed in an area with a large amount of precipitation.

In the low mountains located on the westernmost outskirts of the Central Zeravshan, a typical semi-desert nature is formed on Mount Ziyovuddin (Zeravshan Range) and Mount Karatag (Turkestan Range). All parts of the mountains surrounding the Middle Zeravshan Valley are used as permanent and temporary pastures. Only on the tops of the mountains and on the gentle slopes of some streams are used for agriculture.

**Main part.** At a time when the influence of human activity was low, that is, 400-500 years ago, the Nurata Mountains were covered with dense trees and shrub forests. There is a lot of historical information about this, including the fact that Alexander the Great conquered Samarkand in 328 BC. and hunted in the foothills, near the Chakilkalon Mountains, 40-45 km east of Samarkand. According to the historian Curtius Rufus, this place, covered with dense forest, was called Bazair. [3] According to M.E. Masson, the area where the hunt took place was in the area of the village of Kingir, not far from the modern city of Urgut. In this work, Curtius Ruf asserts that the mountainous regions of Samarkand surrounding Penjikent were covered with impenetrable dense forests. According to M.E. Masson, in the early Middle Ages the mountains of Urgut and Karatepa were covered with dense forests [8]. According to G.A. Arandarenko, at the beginning of the 19th century on the slopes of the Turkestan and Zeravshan mountains, juniper trees, trees, shrubs and other plants grew densely [1]. As the population grew, the demand for charcoal increased, and trees in the mountains surrounding Central Zeravshan were felled and sold. According to G.A. Arandarenko, 34 thousand trees were cut down annually in Upper Zeravshan for the extraction of pistachio coal. 30,000 large juniper trees were cut down for shipment to Samarkand and Bukhara, and trees and bushes were cut down in the Zeravshan basin, which was transported across the Zeravshan River. The same information was shown in his works by A.P. Fedchenko [13] K.Z. Zakirov [4] V.I. Zapryagaeva [6] E.P. Korovin [7] I.P. Popov [9] P.K. Zakirov [5] A. Rakhmatullaev [11].

In the mountains that now surround Middle Zeravshan, trees and bushes remain far from villages, only in the upper parts of the mountains, which are difficult to reach. In such places, there are prickly almonds (*Amygdalus spinosissima*), bitter almonds (*Amygdalus bucharica*), pistachio (*Ristacia vera*), mountain elm (*Ryus communis*), buckthorn (*Lonicera nummuriifolia*), hawthorn (*Cotoneaster cacarcasifra*), juniper (*Juniperus seravschanica*, *turkestanica*), spruce (*Acer semenovii*), blackberries (*Berberis oblonga*), namatak (*Rosa Alberti*, *R. Beggeriana*, *R. kokandica*) and others form dense trees and shrubs in areas with low anthropogenic load at an altitude of 1300- 1400 meters where there is more moisture.

Spiny almond resistant to severe drought, heat and cold. It grows densely among rocks even at an altitude of 700-800 meters in the western part of the Nurata Mountains. The granite and sandstone plots are especially favorable for the cultivation of this species. Due to the large number of cracks in the rock and the fact that the rocks are insoluble in water, cracks retain moisture from precipitation and condensation, which is also a favorable condition for prickly almonds.

In the Nurata Mountains, juniper is a common tree species that grows well at low altitudes from 1300 to 1400 meters in conditions with low rainfall. To prove this, during a landscape expedition in 1971, about 500 juniper groves were discovered in the central part of the Aktagsky ridge (10).

The juniper growing area is located in the Takaboisay Sharillaksay river basin at an altitude of 1300-1500 meters above sea level, on the western side of Takatau peak (2004 m), which is the highest point of Aktag. The nearest inhabited mountain is a village called Langar, where a spruce tree grows 8-10 kilometers from the village. The distance is short, but the intermediate road leading to the pine trees is blocked by rocks. For this reason, cattle and sheep do not graze where juniper has survived. The village of Takaboisay, closest to the juniper groves, is 20 km to the south. Some old juniper trees are over 5 meters high. Among them there is a juniper in the middle of Aktag, in a place called the Maidan pasture, which is deified, therefore it was not cut down. Passers-by tie rags to the branches of this tree for various purposes.

Juniper groves in the Takaboisay basin on the Aktag ridge are trees preserved in the arid climate of the westernmost part of the Pamir-Alai. Therefore, the area where juniper grows should be protected by the status of a special order. It is necessary to study in detail the flora and fauna of this region, which among these species of plants and animals can be found and those listed in the Red Book.

Juniper groves are protected at an altitude of 1500-1600 meters in the mountains in the Nurata Nature Reserve located in Sentobsoy, Ukhumsay and other river basins of the Nurata Range. Juniper is also rare in the Karatepa Mountains and in the highlands of the Chakilklon Mountains.

To test the natural growth of juniper and other native trees and shrubs in the mountains and foothills surrounding the Middle Zeravshan Valley, a monitoring site was established in the village of Eshmontop in the eastern part of Mount Gobdin, where bitter almonds (*Amygdalus bucharica*), sage (*Ulmus Pumila*) were planted. uchkat (*Lonicera nummuriifolia*), namatak (*Rosa Beggeriana*). For planting them, monolithic stones (crystalline shales) were dug to a depth of 20-25 cm under thin stony soil, and the bottom of the branches was covered with rocky soil. Of these 6 species of trees and shrubs planted, the seedlings of juniper, prickly almond and elm sprouted, and the rest dried up without rising. The reason for this is not in natural conditions, but in our mistake. Firstly, the depth of 20-25 cm was not enough, in such a rocky area it was necessary to prepare a depth of 40-50 cm. Secondly, the root system of the seedlings was weak. Of these six species of trees and shrubs planted, juniper, elm and prickly almond have grown two to three times more than when planted in nine years, and they continue to grow. [12]

The monitoring site is located at an altitude of 780 meters above sea level, on the western slope of a small ridge in the easternmost part of Mount Gobdin, where a strong wind blows. The soils are composed of thin stony, typical gray soils, under which are crystalline schists of the Paleozoic era, which have come to the surface in many places. Vegetation is represented by rare mixed groups of ephemeral-ephemeroid plants. The following table presents a nine-year analysis of the development of trees and shrubs planted at the monitoring site.

**Development of trees and shrubs planted at the monitoring site in the village of Eshmontop, eastern part of Mount Gobdin, (cm)**

№№	Тип дерева и кустарника	2011	2012	2013	2014	2015	2016	2017	2018	2019
11	Арчы ( <i>Juniperus seravschanica</i> )	51	63	73	84	93	97	99	102	106
22	Карагач ( <i>Ulmus pumila</i> )	57	69	77	108	121	144	152	164	170
33	Миндаль колючий ( <i>Amygdalus spinosissima</i> )	90	105	130	148	162	185	210	232	290

From these planted trees and shrubs, prickly almonds and elm develop well. For nine years, almonds have grown 3.2 times, and elm - 3.0 times. Prickly almond is one of the most common shrubs in the lowlands of Uzbekistan at medium altitudes, grows well with roots between stones and rock crevices. For this reason, it grows densely in places where boulders accumulate. Their height is 2-3 meters, and since the thorn of the bush is sharp and strong, cattle and sheep do not eat it, but the goat eats its small branches and bark. Its fruit is bitter and contains an oil that is used medicinally because it contains amygdil. (fourteen)

Karagach (gujum) prefers a mixed environment, so it is widely planted as a hiding place on large roadsides in the arid climate of Uzbekistan. The bulk of the trees planted as a fence on the edge of the Samarkand-Tashkent road in the Samarkand region consists of elm. Karagach is also a tree that is resistant to heat and cold, low humidity. One type of elm, porcelain elm, provides a good shade. For this reason, it is also planted as an ornamental tree.

Archa is a slow-growing and perennial tree species, adapted to grow in a wide variety of climatic conditions. Also grows well on rocky soils with many rocky cracks. Because its branches are thick, strong winds can break the juniper or damage it. For this reason, juniper grows well on slopes sheltered from the wind. On the monitoring platform that we created, juniper development has increased from 51 cm to 1.06 m in nine years. Archa develops more slowly than prickly almonds and elm. However, in an arid climate made up of these crystalline shale rocks, where strong winds and annual precipitation are around 300 mm, the growth of juniper in the mountain and foothill plains is the most important evidence of its prevalence during periods of low human influence.

We also plan to plant other types of drought tolerant native trees and shrubs at the monitoring site. There is great scientific and practical importance of trees and shrubs planted on the monitoring site, which grow well in natural conditions. The scientific significance lies in the fact that in all the mountains surrounding the Central Zeravshan, it is possible to carry out afforestation, plant a variety of trees and shrubs, taking into account climatic features. For example, Zirabulak, Ziyovuddin mountains, Karatag in the Nurata ridge, prickly almonds, bitter almonds, uchkat, cotoneaster frame, rose hips, acantalimon, bitter almonds, elm, apple, hawthorn, in the mountains of medium height, boxwood (*Aceris semenovii*) (*Berber oblonga*), rose hips (*Rosa Beggeriana*), beets (*Epbredra distachya*) and others. (4)

Vegetation in mountains and hills, including trees and shrubs, is a natural component that increases water in mountain springs and streams, protects the soil

from leaching, enriches wildlife, provides the population with medicinal plants and, finally, brings aesthetic pleasure to the population. At present, population growth and, as a consequence, an increase in the number of livestock from year to year increases the anthropogenic load on the nature of the mountains, primarily on plant resources. All parts of the mountains surrounding Central Zeravshan are used as pastures. Livestock grazing around the villages is several dozen times more than the norm. Thus, within a 5,000 meter radius around the villages, the natural grass cover has been reduced to varying degrees, replacing nutritious types of grasses with less nutritious species. At present, centers of desertification are forming around the villages, depending on the number of livestock in them, with a radius of 2500-3000 meters and 3000-4000 meters. Due to the fact that the vegetation in these territories has significantly decreased in number and types, soil erosion is increasing, and spring and river water is decreasing.

Due to the growing demand for fuel from the growing population, trees and bushes preserved in the mountains are also cut down by the locals for use as firewood and sold. Therefore, on the slopes of the mountains in the middle reaches of the Ingichka River in Gobdinskaya mountain, there are almost no almonds left.

If the existing forests and shrubs in the mountains are not preserved, measures are not taken to increase them, strict measures are not taken to strengthen control over the protection of mountain nature, large areas of the mountains will become stony, barren, deserted in 10-15 years. Water in springs and streams decreases sharply, and some dry up.

#### **Conclusion: T**

he sharp decline in the number of trees and shrubs in the mountains, which were covered with dense bushes and forests, at a time when the impact of human activities on the mountains surrounding the Middle Zeravshan Valley was small, was caused by anthropogenic impact, not climate change. Proof of this is the preservation of juniper and other trees and shrubs in remote, inaccessible areas of the mountains.

The monitoring site in the village of Eshmontop, in the easternmost part of Mount Gobdin, to determine whether trees and shrubs in the mountains are growing in their current natural conditions, and the fact that juniper, elm and almond have been growing well for nine years is proof that the mountains were covered with trees. It is necessary to expand this experience and carry out works on forestation in the mountains.

In order to preserve the forests, shrubs and old rare trees that have survived to this day in the

mountains, nature conservation laws should be tightened and so that the population knows that they will face the prescribed punishment for every illegally cut tree.

Trees and shrubs in the mountains, streams and hillsides, especially old trees, need to be marked separately, and the forestry representatives of the region must be provided with the latest space photographs and maps compiled on this basis to determine where they grow.

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