



## Northern Fergana hills and their features

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ABSTRACT

The article discusses the natural-geographic conditions of the Northern Fergana hills and the factors that create them. The meaning of the term "adyr", geological, tectonic, geomorphological structure, climate, ground and surface waters, soils, representatives of the flora and fauna of the Northern Fergana adyrs.

**Keywords:**

valley, Northern Fergana, geological structure, deposits, tectonic structure, geomorphological structure, hill climate, underground water, surface water, hill soil, hill vegetation, fauna.

### Introduction

The Fergana Valley is located in the eastern part of our country and consists of the bottom of a tectonic concave formed in the upper reaches of the Syrdarya River between the mountains of Mugiltag, Kurama, Karamazar, Chatkal, Fergana, Otoynoqi, Alay, and Turkestan. Only on the western side, it is narrow (9-40 km) and connects to the Dalvarzin and Mirzachel plains through the "Fergana" and "Khujand" gates. The area is 19.2 thousand km<sup>2</sup>. The length of the Fergana Valley from west to east is 370 km, the average width is 80-100 km, and the maximum width is in the eastern part, reaching 150 km. The territory of the valley has an almond-shaped form sloping towards the center and from east to west. Administratively, the Fergana Valley includes the Namangan, Fergana, and Andijan regions of Uzbekistan, part of the Osh region of Kyrgyzstan, and part of the Khujand region of Tajikistan.

Approximately 15.8% of the land area of the Republic of Uzbekistan is accounted for by hilly areas. Of these, 4.48% are low hills, 6.77% are medium-height hills, 2.33% are high hills, and the remaining 2.22% are plains behind the hills, hill range hollows, and river valleys.

The hilly landscapes of Northern Fergana are located in the front of mountains of the Chatkal, Kuramin, and Fergana mountains, and contains the Southern and Southeastern, eastern parts of the mountains. The hilly landscapes of Northern Fergana are bordered on the upper side by mountains and on the lower side by the plains of the valley through sloping plains.

### Analysis and results

There are different interpretations of the meaning and essence of the hills as they are spread in Central Asia and neighboring regions. For example, Z.A. Svarichevskaya (1965) showed that the height of the hills in the case of the Fergana depression increases from 550 to

1200 m from west to east, and their average absolute height is 700-900 m [7].

According to F.N. Milkov (1970), "hills are located in the desert and semi-desert zones of the Central Asian mountain front, which is typical for the Neogene period. The hills consist of various elevations and river valleys as well as concave and flat hills. The hills are located below the mountain and include heights of 1000-1500 m above sea level. They are well preserved in Fergana and Hisar valleys" [4].

A. Hamidov (1984) includes areas of the territory of Uzbekistan from 500 m to 1200-1400 m above sea level in the Adir region. He notes that the hills form the majority of Tashkent, Fergana, Andijan, Namangan, Samarkand regions, the suburbs of Yangier, Jizzakh, Karshi cities, Shakhrisabz, Denov, Nurota, Gallaorol, Bostanliq regions. It divides hills into lower and upper hills according to geomorphological and hydrobiological characteristics. It shows that lands up to 500-800 m above sea level reach the lower hills, and lands up to 900-1200 m high reach the upper hills [8].

P. Baratov (1996) describes the Adir region as follows: "The hills include lands with an absolute height of 400-500 m to 1200 m, and in some places up to 1500-1600 m. Due to the elevation of the relief, the amount of precipitation increases, the summer temperature is lower than in the desert, and typical and dark gray soils are distributed. These are the reasons for dense and high growth of plants" [1].

The concept of Adir is defined in the National Encyclopedia of Uzbekistan as follows: "Adirs are located in the mountainous regions of Central Asia, at heights from 400-500 m to 1000-1500 m above sea level, and have a characteristic relief consisting of uneven hills. They are often separated from high mountains by shallow tectonic depressions" [9].

According to P. Baratov, M. Mamatkulov, A. Rafikovlar (2002): "The hills consist of alluvial-proluvial deposits laid down in the Quaternary period. The hills were raised in the Quaternary period. Their average height above sea level is 600-1200 m, and in the eastern part of the Fergana basin, the average height is 600-

-1200 m, and the absolute height reaches 1500-1700 m. Their watery parts are mostly flat, their slopes are divided by small streams and ravines" [2].

Based on the above considerations, the hills are geomorphologically low elevations located in front of the mountains, they are separated from the mountains by shallow tectonic depressions and plains, their absolute height is from 400-500 m to 1200-1600 m. It is an area consisting of narrowed uplands, semi-desert and dry steppes [6].

The hills of Northern Fergana extend 18 km from west to east, and 23.3 km from north to south (the longest part is 42 km, the shortest is 12 km) [6].

Territorially, Uychi, Chortoq, Yangigorgan, Kosonsoy, Namangan, Toraqorgan, Chust and Pop districts of Namangan region are located in the hilly zones, occupying the northeastern, northern and northwestern parts of the region. The hills are located in the foothills of the Chotkal and Kurama mountains, and include the southern and southeastern parts.

So, the Northern Fergana hills are bounded by the hills at the foot of the Kurama and Chotkal mountains in the north and northwest, in the east by the Moylisay hills of Kyrgyzstan, and in the west by the Asht hills of Tajikistan.

Geological structure, tectonics, development history and geomorphological conditions of hills F. Middendorf, N.P. Vasilkovskiy, S.A. Kushnar, S.S. Shults, Yu.A. Skvortsov, A.I. Islamov, G'.A. Mavlonov, G.F. Tetyukhin, V.N. Weber, N.A. Kogaylar studied by Geological structure of hills. The Northern Fergana hills consist of deposits of the Neogene and Cretaceous periods, and the deposits of this period consist of Pliocene siltstone and clay. Sand, sandstone and conglomerate layers are found among them. They come to the surface in the watery parts of the Uychi-Chortoq hills.

The sediments of the Cretaceous period are divided by scientists into four complexes. They are divided into Sokh, Tashkent, Mirzachol and current Syrdarya deposits.

The deposits of the Sokh complex consist of alluvial-proluvial rocks and are located close to the surface of the earth in the peripheral

parts of Chust-Pop, Kosonsoy and Uychi-Chortoq hills. These deposits are gray in color, and their thickness ranges from 20-40 m to 110-160 m [6].

The thickness of the deposits of the Tashkent complex ranges from 5-10 m in Chust-Pop and Kosonsoy hills, from 30-40 m to 140-150 m in flat areas. In the Uychi-Chortoq hills, there are loess-like rocks above the Tashkent level, and lower Quaternary and Neogene rocks below. A. Maqsudov (1990) shows that gypsum is characteristic for the part of the Tashkent complex that protrudes from the surface of the earth [5].

Deluvial deposits of the Mirzachol complex are found in very small areas in the Chust-Pop hills. The deposits of the Syrdarya complex are located mainly in the adiroidi plains, that is, on the lower terraces of streams. They mainly consist of quaternary alluvial deposits such as sand and sandstone with a thickness of 1 m.

Tectonic structure of hills. From the tectonic point of view, the Fergana Basin experienced a geosynclinal period in the Paleozoic. The formation of folded structures in large discontinuities ended at the end of the Paleozoic and the beginning of the Mesozoic. In the Cenozoic, new fold uplifts and breaks occurred.

Northern Fergana hills consist of 4 anticlinal (Kosonsoy, Chortoq, Uychi, Chust-Pop) and 3 synclinal (Abdusamad, Chust, Peshqorgan) structures. These anticlines and synclines have different effects on the formation of landscape-ecological conditions.

The structure of the Kosonsoy hills is an anticlinal rise consisting of rocks of the Neogene-early Quaternary period, it is 25 km long, 14-15 km wide, the slope is 10-12° in the northwest, 7-8° in the southeast, the slope decreases from the q part to the edges. The structure of the Chortoq hills is occupied by anticlinally folded Neogene - early Quaternary rocks. The axis stretches 33 km from the southwest to the northeast, its width is 2-3 km, the slope of the northern wing is 2-6°, and the southern one is 2-7°. The Paleozoic foundation is located in the core of the Uychi anticline, and Mesozoic, Paleogene, Neogene, and early Quaternary rocks are formed on its wings. In

the Uychi structure, belonging to northern Fergana, Namangan region, Neogene - early Quaternary rocks are exposed. The slope of the northern arcs is 40°, and the southern part is gradually flattened and the slope decreases to 28°. Chust-Pop anticline stretches 40 km from southwest to northeast, 10-13 km wide, axis azimuth 60-65°. The slope of the southern slope with an asymmetric structure is 10-13°, and the northern slope is 3-5° [6].

The synclinal depressions of the hills are mainly located in the interstices of the hills. In particular, there are Abdusamad and Chust in the Chust-Pop hills, Koqumboi and Kosonsoy in the Kosonsoy-Toraqorgan hills, and Peshqorgan hollows in the Uychi-Chortoq hills. They have heights from 600 m in the west to 800 m in the east. The Abdusamad basin stretches for about 33 km from west to east, with an average width of 4 km. The eastern part stretches for 6 km from north to south and connects to the foothill plains. The depression slopes from north to south and the eastern part is deeper. The slope of the Chust basin, sloping from north to south, stretches for about 14 km; the average width is 10 km. The Kosonsoy bog is approximately 7 km from west to east and 12 km from north to south. A concave slope to the south. Kokumboi bog slopes from north to south and stretches 15 km from west to 14 km from east. The Peshkurgan basin is approximately 14 km long and 13 km wide from north to south [6].

Geomorphological structure of hills. According to the geomorphological structure, the hills were formed under the influence of erosion-tectonic, erosion-denudation, permanent and temporary running water, and they are divided into alluvial proluvial terraces:

1. Erosion-tectonic type of broken hills;
2. Alluvial-proluvial flat plains of the Upper Pleistocene strongly broken into the erosion-denudation type;
3. The alluvial-proluvial type formed under the influence of permanent and temporary flows includes alluvial-proluvial fragmented plains of the Middle Pleistocene, alluvial-proluvial and alluvial plains of the Upper Pleistocene, conical expansions and plain terraces carved by the work of rivers.

The Northern Fergana hills are a complex part of the Fergana geosyncline, which is divided into erosion-tectonic and denudation accumulative relief types. The type of denudation relief of the hills is well developed, and it can include flat, slightly raised watershed, steep slope (greater than 30°), moderate slope (up to 30°), and slightly sloping relief types.

Chust-Pop hills have a latitudinal direction, the northern slopes have a slope of 45°-70°, and the southern slopes have a slope of 10°-15°, that is, an asymmetric structure. The absolute height is 616-857 m. The top of the ridge is covered with medium-sized rocks. It is 40 km long and 7-8 km wide. Usti is divided by Tuzlisoy, Morguzorsoy, Olmosoy, Govasoy and Chustsoy valleys. Most of the time, it is occupied by 100-300 m long flat uvals and dry valley-like sediments in the submeridional direction [6].

Kosonsoy hills stretch from southwest to northeast for 30 km, width is 5-15 km. The absolute height of the Suvayirgichi part reaches 800-900 m, and it is covered with loess. The terrain has flat-surfaced uvels and dry depressions with a width of 80-200 m to 300-500 m. The hills are carved by the valleys of Toldisoy, Shorbuloqsoy, Rezaksoy, Sumsarsoy, Kosonsoy and Karasoy. It rises 50-100 m or more compared to the surrounding plains [6].

Between Kosonsoy and Uychi-Chortoq hills, there is the Koqumboy chukma, the surface of which is flat and decreases by 120 m from north to south. In the left part of the Kosonsoy range is the Girvansoy valley.

Uychi-Chortoq hills stretch from southwest to northeast from Girvansoy to Derissoy, 12-14 km wide, 33 km long. The absolute height ranges from 640 m to 960 m. In the north-west there is the Iskovot-Peshkurgan depression. Watersheds consist of flat or slightly sloping surfaces 1-1.5 km wide in the submeridional direction. It is connected with the valleys of Girvonsoy, Namangansoy, Chortoksoy, Kengsoy and Sassiyoqsoy. The valleys are 1-2 km wide and 130-150 m deep. There are many unnamed dry streams; they are 0.5-0.8 km wide and 40-70 m deep [6].

In the northern part of the Chust-Pop hills, the Akhcha-Tashkurgan adirorti valley (with an absolute height of 725-770 m), the Sarikamish-Varzik valley (790-1000 m), in the northern, northwestern part of the Kosonsoy hills There is Karnon-Shoyon-Baymoq bog (715-930 m). In the southern parts of the hills, adiroidi slope plains were formed at different distances to the Syrdarya valley. The slopes of the Uychi-Chortoq hills are 4-8 km, the absolute height is 395-540 m, and they are filled with river valleys at a depth of 1-3 to 5-10 m. Chust-Pop and Kosonsoy hill slopes are 5-8 km north of Syr Darya, the absolute height is 395-575 m, carved with river valleys from 1-3 to 5-6 m [6].

The climate of the hills. According to the climatic conditions of the Northern Fergana hills, it belongs to the semi-desert climate type of the temperate climate region. Its climate is formed depending on its geographical location, topography, atmospheric circulation, solar radiation, winds and anthropogenic factors. In the hills, it is possible to distinguish climate types of pre-hill, high and low hills and back-hill plains (according to the information of Kosonsoy and Chust weather stations). The average annual air temperature is 13.5°C at an altitude of 400-500 m above sea level, 12.5°C at an altitude of 600 m, and 7.5°C at an altitude of 1500 m [6].

The winter climate changes depending on the morphological characteristics of the hills. At an altitude of 1200-1500 m above sea level, the average temperature from May to September is higher than 10°C, while the rest of the time is lower. The absolute minimum temperature was observed on the upper hill (Khazratisha). It is equal to -31°C, and strong cold (from -15-20°C to -1°C) is observed in this region [6].

In the lower hills, the temperature can drop from -20°C to -25°C. The sum of negative temperatures is equal to 500-1000°C. The average minimum temperature in January is -6.5°C [6].

The first cold season falls in the fourth week of October in the upper hills, and in the second week of November in the lower hills. The summer climate is characterized by a maximum of 41°C and it corresponds to the lower hills. The temperature of summer, i.e.

July-August, reaches 39°C in low hills, 38°C in medium-height hills, and 36-37°C in high hills and behind hills [6].

The amount of precipitation in the hills depends on cloudy days, topography and seasons. Cloudy days are 79 days in the lower hills and 103 days in the high hills and behind the hills in a year, while cloudless days are 132.5 days in the lower hills and 97 days in the high hills and behind the hills. Annual precipitation amounts to 200 mm in the hills at an altitude of 450-500 m above sea level, 250 mm at an altitude of 500-600 m, and 600 mm at an altitude of 1000 m. At an altitude of 450-500 m above sea level, the maximum rainfall occurs in March-April, at an altitude of 1000-1500 m, in April-May. The thickness of the snow cover also increases from low hills to high hills. For example, in low hills, the maximum thickness of soil is 16 cm, while in high hills it is more than 20 cm [6].

According to the data of the Chust-Pop weather station, the amount of annual precipitation in the hills of Chust and Pop in the western part of the region reaches from 100 mm to 200 mm. According to the data of the Kosonsoy weather station, the average annual rainfall in Kosonsoy, Yangigorgan and Uychi hills will increase from 220-260 mm to 300-400 mm. 70% of precipitation falls in December-May, and 5-8% falls in July-August [6].

The hills of Northern Fergana are affected by the winds of different directions according to the seasons. In January, 50-60% of winds blow from the east, 30% from the north. Same thing in July. In spring (April), the wind blows 40-50% from the east, 30% from the north, and 20-30% from the southwest [6].

Local mountain-valley winds are also characteristic of the hills. They are usually caused by the upward movement of hot air during the day, and after cooling down in the evening, it blows into the valley or from the top to the bottom.

Groundwater. In the region of hills, the surface of underground water is 15-20 m deep. In the depressions of the Adir range and lowland plains, it can be from 2-3 m to 5-10 m below the surface of the earth, depending on the slope of the relief. Also, in the upper parts of the pre-

hill plains and conical expanses, groundwater lies 10-15 m below. In the middle parts of the plains, the surface of underground water rises much higher and is 5-8 m. In the peripheral parts and in the lowlands between the expansions, the underground water lies very close to the surface of the earth. They are even 0.5-1 m deep in some places, which affects the re-salination of soils [6].

The level of seepage water in the plains is at a depth of 0-20 m in the adiroldi plains, and it seeps to the surface in remote areas. The level of seepage water in the peripheral parts of the cone spreads changes throughout the year. The deepest period of the water level is observed in October-December, and the time when it is close to the surface of the earth is observed in March-June.

During the irrigation periods of cultivated fields, the regime of seepage water in the marginal part of the plains and in the lowlands between the plains differs from the underground water regime of the massifs under irrigated agriculture. During the growing season of plants, due to the large amount of water flowing into the cultivated fields for irrigation, the maximum level of seepage water occurs in spring and summer, and the minimum in autumn.

The level of mineralization of Sizot waters varies widely from 1-2 g/l to 10-12 g/l. The seepage waters of the Norin and Syrdarya rivers are formed between sand and gravel deposits, and its level varies depending on the river level [6].

When the river overflows, the water seeps into the alluvial deposits and causes the rise of the seepage water level of the banks and terraces. As a result of the reduction of river water in the autumn and winter months, the level of seepage water also decreases. This corresponds to January and February. The amplitude of the water level is 0.5-1.5 m. The average level of mineralization is 0.5-0.9 g/l [6].

In the hills, seepage waters are very deep, and only in some places they come close to the surface of the earth. For example, where the sloping plains of Shoyon-Baymoq and Tergachi districts meet the Kosonsoy hills, seepage

waters are located close to the surface of the earth. In this place, as a result of the strong movements of the Neogene-Quaternary period, impermeable rocks of the Neogene period come closer to the surface of the earth and sometimes come out. The level of mineralization of Sizot waters is high. Since the development of the hills began, seepage water began to leak out in some areas. Floodwaters also appeared on the banks of streams and on the slopes of large hills. Some of them are strongly mineralized, leading to salinization and formation of saline landscapes.

Surface water. The surface waters of the Northern Fergana hills consist of streams and irrigation canals.

From west to east Sarvaksoy, Chodaksoy, Uygursoy, Sharansoy, Jiydalisoy, Murildisoy, Kandisoy, Tuzlisoy, Olmossoy, Govasoy, Sherbuloksoy, Koksaraksoy, Sumsarsoy, Kosonsoy, Karasuv, Duvanasoy, Girvansoy, Podshootasoy, Namangansoy. Sharansoi, Jiydalisoi, Murildisoi, Tuzlisoi etc. are fed by spring waters. Pununsoy, Chodaksoy, Uygursoy, G'ovasoy, Koksaraksoy, Kosonsoy, Podshootasoy etc. are fed by the snow and ice of the Chotkal system. Podshootasoy receives water from the Kengtur glacier at an absolute height of 3700 m. When it enters the Nanay basin, it divides into Namangansoy and Chortoksoy tributaries. Below (to the south) from the villages of Buloqboshi (Namangansoy) and Baliqkol (Chortoqsoy), underground spring water also joins these rivers. Kosonsoy receives water from snow and groundwater, partially from a glacier at an absolute height of 3300 m. At the same time, Chortoq, Yertikan, Varzik and Jiydalisoy reservoirs were built.

The hills are also irrigated by pumping water from the canals of Northern Fergana. The length of the Northern Fergana Canal (ShFK) is 165 km, it receives water from the Norin River, the average water consumption is 40-75 m/sec. In order to irrigate the hills, the Big Namangan Canal (KNK), which receives water from the Norin River, was also built [3].

Soils. The Fergana Valley is the oldest agricultural land in Central Asia, and its soil, especially its plains, has turned into an oasis of cultural soil. Soils in their natural state can be

found in the Karakalpak steppe, in the hilly region and in the mountains of Central Fergana. The soils of the valley form the height regions and change mainly from its flat part to the watersheds in the following order: in the banks of the Syr Darya and other rivers, brown, salt-sandy, shortob, alluvial-meadow and wetlands; gray soils in hill and post-hill plains; brown and brown mountain forest soils in medium-altitude mountains; high meadow steppes are composed of sooty brown soils.

The soils of the Northern Fergana hills have been studied by many experts, and the main data were obtained as a result of the scientific researches of B.V. Gorbunov (1957), M.A.Pankov (1957), S.N.Shuvalov (1957), A. Maksudov (1990) planned

Although the hilly landscapes of Northern Fergana are mainly gray soil types and gray-brown soils occupy large areas of the region, among them are brown meadow steppe, gray oasis, grass tloqi gray oasis, irrigated meadow, swamp-meadow, oasis irrigated swamp-meadow, dense and underdeveloped yellow-brown soils, as well as sand dunes, salt marshes, sho 'rtobs occupy small areas. In addition to these, there are also soilless areas, i.e. lands unsuitable for human economic activity, such as drifts, gravels, and ravines (see Table 1).

**Table 1**  
**Distribution of hilly soils of Northern Fergana (thousand hectares)**

	Type of soil	Namangan region
1	Dark gray soils	30.5
2	Typical gray soils	122.1
3	Pale gray soils	197.0
4	Meadow-gray and gray-meadow soils	32.2
<b>Total</b>		<b>381.8</b>

*Note: It was prepared based on the information of the regional office of the cadastral agency of Namangan region.*

Large areas of the hills of Northern Fergana are mainly occupied by gray soils and brown soils. Also, in the region there are light brown meadow steppe, gray oasis, meadow gray oasis, irrigated meadow, swamp-meadow, oasis,

dense and underdeveloped forest. fine soils are also found in small areas. In addition, salt marshes and marshes were formed in the valleys of the hills, in the depressions between the hills, where underground water is on the surface. Today, their area is under the influence of anthropogenic factors, that is, as a result of the irrigated agriculture carried out in the region. is expanding.

In the south-west of the hills, gray-brown soils are scattered on top of ancient proluvial-alluvial deposits with skeletal loess, and gray soils are scattered in the east.

Yellow-brown soils are found in the southwestern regions of the hills of the Pop district, where the annual rainfall does not exceed 100-150 mm, and the average annual temperature is 13.5°C. occurs. The topsoil usually consists of a thin, easy-to-split, light-gray loose layer of small stones and gravel. The thickness of this layer does not exceed 2-3 cm. Below it is a 10-20 cm brown layer. The bottom of this layer consists of compacted rocks, and in its upper part there is a gravel layer. The thickness of the gypsum layer does not exceed 25-30 cm. In general, gray-brown soils are characterized by the absence of a turf layer, the presence of clay and gypsum. The amount of organic matter on the soil surface does not exceed 1%. Pale gray soils on top of skeletal loess proluvial deposits are located in the northwest of the Pop hills, while light gray soils on top of coarse skeletal alluvial-proluvial deposits are located in the centers of Pop district, that is, Govasoy and Rezaksoi. is located in the south of Chorkesar village and in the submeridional direction between the districts of Chust and Toraqorgan. Typical gray soils covered with loess and loess are located in the submeridional direction between Kosonsoy and Yangikurgan districts, from the northern and northeastern sides of Yangikurgan district to the foothills.

Pale gray soils on top of alluvial-proluvial deposits with loamy soils are located in the meridional order in Chortoksoy, Namangansoy, Kosonsoy, Chustsoy, Fovacoy, Rezaksoy.

Gray meadow-oasis soils on top of saline, loess alluvial-proluvial deposits continue north from the city of Chust to Rezaksoy in the form of a semi-colony.

The typical gray soils on top of the rough skeletal alluvial-proluvial deposits begin in the north of the Chust channel, i.e. from the village of Karkidon, and reach the foothills in the form of a semi-circle.

The rocks forming gray soil consist of sand, loess and loess. In the cross-section of ice soils, turf, humus layer, alluvial-carbonate parent rock layers are clearly distinguished. The humus layer is usually gray in color with a slight brown tint. Its thickness is 15-18 cm, this amount is slightly reduced in pale ice soils. The amount of humus is 1-1.5% in light gray soils, 1.5-2.5% in ordinary gray soils, and 3-4% in dark gray soils [6].

According to the laws of the altitude region, the soils of Adir are yellow-brown and pale in the hills up to 400-600 m above sea level, typical gray in the hills up to 600-900 m, and dark gray in the hills up to 900-1600 m. soils are scattered. Annual precipitation is 150-250 mm in low hills, 300-550 mm in high hills. The average monthly temperature in the high hills is 25°C, which is 3-4°C lower than the desert and 5-6°C higher than the temperature of the mountains [6].

Plant cover. The geographical features of the hills have influenced the distribution of the flora to a certain extent. The main vegetation of the lower hill consists of sedge and sedge, which form a green carpet in early spring. Q. Zakirov said that the Adir region of our Republic is an ephemeroïd region, consisting of color and brown. The types of plants that can be found in it include: fluff, sedge, desert mint, etc. are found. On the upper hills, almond, izen, teresken, akshuvak, ravoch, gulkhairi, andiz, beklaroti, shirach, ajrik, wheat, tar, desert cabbage, pea and others are found. Plants are not evenly distributed on the hills. The reasons for this are anthropogenic factors and climatic conditions, i.e. the amount of precipitation, air temperature, air humidity, as well as the level of underground and surface water supply.

The hills of Northern Fergana consist of various wild plant species, medicinal, decorative and relict plants. Among them, medicinal, alkaloid, vitamin, essential oil, sapoin, honey, etc. are in a special place. Medicinal plants include 3 types of tea grass, ermon, water pepper, scorpion



grass, sedum, yarrow, yarrow, immortelle, sedum, blueberry and some of the andis. types are widespread. In the oases of Govasoy, Chodaksoy, Rezaksoy, Uygursoy and Kosonsoy, the presence of 40-50 distribution areas (reserve areas) of tea grass, 20-30 of erman, 10-20 of water pepper, and 30-40 of boymodoron was determined. Among essential oil plants, there are distribution zones of marmarak, tograykhan, deer grass [6].

It has been found that vitamin plants are widespread in the Adir regions, among which several types of blackberry and sedum are of particular importance. In these places, ordinary namatak, Ko'kan namatak, Samarkand, Begger, Fedchenko namatak are scattered. Their areas are several hundreds of hectares.

Animal world. Since the representatives of the animal world of the Northern Fergana hills are mobile, they can be found in the fields and mountains. Reptiles, rodents, predators, and various representatives of birds adapted to the hot and dry climate are scattered here. Rabbits, foxes, wolves, boars, badgers and many types of rodents can be found here.

In the hills of Northern Fergana, you can find rats, woodpeckers, field shrews, lizards, hedgehogs, sea turtles, and some representatives of snakes. In the groves along the streams, birds create a unique biotope. In almost all water bodies, muskrat, Podshootasoy and Govasoy brooks are occasionally eaten by beavers.

Many animals and birds found in different landscape zones of the Northern Fergana hills are included in the "Red Book of Uzbekistan" due to the fact that they are disappearing due to the influence of human economic activities.

The increase in toxic and harmful substances in the air, the pollution of running water, the reduction of pastures, and the displacement of irrigated land from the agricultural structure lead to the deterioration of the ecological conditions of the fauna of the Northern Fergana hills.

### Conclusion

The natural-geographic conditions of the Northern Fergana hills are created under the influence of the above-mentioned factors,

which lead to the development of economic sectors specific to this place.

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