



**GEOECOLOGICAL AND FARM STRESS LEVEL
(ON THE EXAMPLE OF KHOJAABAD DISTRICT)**

Yusufjon Ismoilovich Ahmadaliyev

Fergana State University, Doctor of Geographical Sciences, Professor

Xoshimov Abdumutalibjon Mamadalievich

Teacher of Andijan State University

Mamadaliev Javlonbek Abdumutalib oglu

Fergana State University, 2nd year master's degree in Geography

Annotation

In this article, the indicators of agrodemographic, agrotechnical, agrochemical and agro-ameliorative pressure categories of the region in the structure of agricultural anthropogenic pressure were calculated and evaluated using corrective scores.

Keywords: geoecology, strategy, agro-demographic, agrotechnical, agrochemical, agromeliorative, agricultural anthropogenic pressure, population density, homogeneous, underused land, urbanized land, irrigated land, ecological base land, perennial forests.

In today's rapidly changing world, the impact on all sectors is becoming more pronounced over time. As a result, changes are taking place in the use of land, which is an integral part of our lives.

In particular, it should be noted that one of the processes observed in the use of land resources is the growing level of geo-ecological and economic stress in the region. Observing these processes, research and forecasting of the region is one of the important aspects in the organization of the correct use of agriculture. The reason is that it is impossible to imagine other industries without agriculture.

In accordance with the Decree of the President of the Republic of Uzbekistan "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan" signed on February 7, 2017, legal principles and mechanisms for implementation were approved [1], large-scale reforms are underway. The third direction of the Action Strategy, "Priorities for Economic Development and Liberalization" and the third section, "Modernization and accelerated development of agriculture," can be seen as another confirmation of the growing attention to agriculture in our country.

At the initial stage of this third study, the level of geo-ecological and economic stress of lands within the natural-agricultural regions will be determined. In this way, the level of natural protection of landscapes is analyzed using quantitative indicators of agricultural anthropogenic pressure and qualitative indicators.

In the calculation of agricultural anthropogenic pressure, two interrelated indicators are obtained. First, the degree of change in the natural composition of the land fund of each district is determined. To do this, using geoecological monitoring, the composition of the district land fund is divided into ecologically homogeneous (similar) groups and evaluated (Milyus, 1987; 1984; Kochurov, 1999;



Ahmadaliev, 2000). Current agricultural land types are classified into 5 ecologically homogeneous groups. From the references on the distribution of the land fund of the districts of the region by lines (Land Fund of Andijan region 0.1 2020; Figure 22) determine the categories and types of land corresponding to the ecologically homogeneous group. Groups in this classification are given scores from 1 to 5 depending on the change in the natural composition of the area (Table 1).

The share of each group in the administrative district land fund is determined, multiplied by the appropriate score and divided by 100. The result obtained shows the degree of change in the natural composition of the district soils.

Table 1 Land resources by ecologically homogeneous groups Classification

Name of ecologically homogeneous groups	Ball	More compatible land categories	Basic land types (Figure 22, line 33)
"Ecological base" lands	1	Conservation, health, recreation, cultural significance; forest; water fund and reserve lands	Forests, shrubs, underwater and other unused lands
Less used lands	2	Agriculture; reserve lands	Gray lands, hayfields, pastures, lands in the state of reclamation construction
Perennial trees	3	Agriculture; forest; lands of settlements	Orchards, vineyards, mulberry groves
Irrigated crop areas	4	Agriculture; lands of settlements	Irrigated arable lands, gardens
"Urbanized areas"	5	Lands of industry, transport, communication; settlements; agricultural lands	Various infrastructure, housing, streets, squares and other lands

The table is calculated on the basis of data from the State Committee for Land Resources, Geodesy, Cartography and State Cadastre of the Republic of Uzbekistan according to the table developed by Doctor of Geographical Sciences, Professor Yu.Ahmadaliev (Yu.Ahmadaliev., 2014., p. 76).

Scientists who have studied in this area, taking into account the geomorphological structure of the landscape, can see differences in some aspects. This is because the area is large and the terrain is varied. The table in this study, which we have calculated, is adapted to the irrigated plains.

We will study the calculations of this research work on the example of Khojaabad district. As of January 1, 2020, the district land fund is 22,886 hectares, of which pastures are 2,040 hectares. Therefore, the classified area is 20846 ha. amount is obtained. Forests belonging to the category of "ecological base"



lands of the region cover 39 ha, including 37 ha. terracotta, no shrubs, submerged lands 854 ha. Other lands not used for agriculture are 6184 ha. It makes up 34 percent of the area.

Gray lands in the category of low-use lands are 278 ha, lands without pastures and hayfields, lands in the state of reclamation construction are 133 ha. 2% of the total area.

Perennial trees 3213 ha. of which 2638 ha. orchards, 259 ha. vineyards, 316 ha. It makes up 16 percent of the total area.

In agriculture, the area of irrigated arable land is 11,567 ha, and the area of irrigated arable land is 13052 ha. 38 percent of the district's territory.

The most ecologically complex areas are “urbanized” lands. This category includes the part of the farmland occupied by the building, roads, trails, streets, courtyards and squares, lands under public buildings. The area of this type of land in Khojaabad district is 2060 hectares. Of which: 532 ha. Land occupied by the castle, 619 ha. Road, trail, cattle roads, 632 ha. Public courtyard street area roads, 277 ha. Incorporates social buildings. this category is 10 percent.

Thus, the rate of change of the natural composition of lands in the territory of Khojaabad district is 2.88, ie:

$$(34 \cdot 1 + 2 \cdot 2 + 16 \cdot 3 + 38 \cdot 4 + 10 \cdot 5) : 100 = 2,88$$

The above calculations were carried out in 14 administrative districts of Andijan region.

The second group of indicators characterizing the anthropogenic pressure of agriculture consists of 4 blocks (Ahmadaliev, 2000; Bashkin, 1991; Kochurov, 1999;).

First of all, the agro-demographic type of agricultural anthropogenic pressure is studied. Indicators for this type of QXAB are the number of rural population per 1 sq. Km (per capita) and irrigated arable land per capita (per hectare).

In the second row, the amount of agrotechnical pressure is studied. As indicators of this type of pressure every 1000 ha. the number of tractors of all models (pieces) corresponding to the sown area and per 1000 ha. the number of agricultural machines (pcs) coming to the crop land will be examined.

The third row takes into account the amount of agrochemical pressure. 1 as the main indicators. chemical mineral fertilizers (H, P₂O₅, K₂O) and chemical plant protection products are obtained.

In the fourth row, the share of total irrigated lands (in percent) in the land fund and agricultural lands is studied from the indicators of agro-ameliorative pressure.

Taking into account the above lines, an evaluation scale for all indicators by districts (by region) is developed (Table 2), and the assessment is carried out by administrative districts. Certain methodological rules are followed in compiling a special evaluation scale (evaluation level indicator) for the selected evaluation indicators. We will create a scale based on the districts of Andijan region. This scale was also created for the territory of 14 administrative districts within the irrigated foothills of the region.

Attention is paid to the fact that the indicators on the rating scale form separate stages, the interval between them is interrelated. Particular attention should be paid to the separation of assessment groups during this study. This is due to the fact that the assessment scores given to each group are different, so the final indicators may differ significantly, which may incorrectly reflect this situation. To do this, first the edge (largest and smallest) numbers are determined. Then the difference-total interval between



them is found. This intermediate number is divided by the number of groups of any number. Typically, in economic geographic research, events and happenings are evaluated in groups of three or five. Indicators of agricultural anthropogenic pressure (ASR) also fluctuate over a much larger range, so the assessment was conducted across five groups.

Table 2 Agriculture in the districts of Andijan region anthropogenic pressure measurement scale

AAP types	AAP indicators	Points corresponding to AAP indicators				
		5	4	3	2	1
Agrodemograph	The density of the rural population per km ²	Above 911	684-910	457-683	228-456	227 and past
	Irrigated arable land per capita, sotix	Less than 6	7-13	14-20	21-27	28 and older
Agrotechnical-caviar	To each 1000 ha. the number of tractors of all models, corresponding to the crop area, pcs	More than 12	10-11	8-9	6-7	5 and less
	To each 1000 ha. the number of agricultural machines per hectare, pcs	More than 72	56-71	40-55	25-39	24 and less
Agro-Chemical	1 ha. amount of mineral fertilizers (H, P ₂ O ₅ , K ₂ O) applied to the soil, kg	Above 486	428-485	370-427	312-369	311 and less
	1 ga. ground, chemical plant protection agent, kg	Above 17	15-16	13-14	10-12	10 and less
Agromeli-orativ	The share of irrigated lands in the land fund, percent	Above 69	63-68	62-57	56-52	51 and past
	The share of irrigated arable land in the structure of agricultural lands, percent	Above 89	73-81	64-72	55-63	54 and past

The table is compiled by the author for the administrative districts of the Fergana Valley.

Each type of KXAB (AAP - Agriculture anthropogenic pressure) is evaluated on a 5-point scale, and the final grade is found as an integral indicator using the following formula:

$$KXAB = \frac{\sum_{i=1}^n K_i \cdot III_i}{1000} \quad (3.1)$$



Here,

K-Indicator of agricultural anthropogenic pressure types;

1,2,3, ..., n - number of pressure types involved in the assessment;

$\text{III}_{\bar{o}}$ is the score on the regional evaluation scale of pressure types;

1000 - common divisor.

Since most of the indicators in the second and third rows are distributed through centralized administrations, it is important to note that their amount varies depending on the crop area of the district. Therefore, most of these indicators may have the same or similar results for the administrative districts within the province.

The calculations are performed according to the methodology and formulas mentioned above. Let's consider it on the example of Khojaabad district of Andijan region.

The density of the rural population in this district, which reflects the **agro-demographic** pressure, is 1 sq. Km. 554 people per hectare (Table 3.5), in the assessment scale of the districts of Andijan region, this indicator is 3 points (Table 3.2), irrigated arable land per capita is 10.5 sots, and the corresponding score on the assessment scale is 4 was.

From **agrotechnical** pressure indicators per 1000 ha. The number of all types of tractors on arable land is 376 units, including 19 driving tractors, 51 mowing tractors, 11 tractors in the district, which is 4 points on the rating scale. The total number of agricultural machines is 697, including 39 seeders, 5 cultivators, 178 harrows, 51 cultivators, 23 sprayers, 10 mineral fertilizers, 12 different combines. These machines are for every 1000 ha. crop yields are 29.4 per hectare, which corresponds to 2 points on the evaluation scale.

1 ha of **agrochemical** pressure types. The amount of mineral fertilizers applied to the field is 509 kg. if the plant chemical protection agent is 15 kg., the scores on the rating scale are both 5 and 4, respectively.

The share of irrigated lands in the area of **agro-ameliorative** pressure types is 50.5%, the score on the rating scale is 1. The irrigated area relative to agricultural land is 53.4%, which is equal to 1 on the regional assessment scale. Thus, the final indicator of agricultural anthropogenic pressure in Khojaabad district is 4.52, ie:

$$KXAB = \frac{554 \cdot 3 + 10,5 \cdot 4 + 11 \cdot 4 + 29,4 \cdot 2 + 509 \cdot 5 + 15 \cdot 4 + 50,5 \cdot 1 + 53,4 \cdot 1}{1000} = 4,52$$

The calculations were carried out in all administrative districts of the region.

To determine the level of geo-ecological and economic stress of lands, these indicators in the natural-agricultural areas of Andijan region, ie the degree of change in the natural composition of soils (1) and indicators of anthropogenic pressure on agriculture (2) are combined.

The above assessment is a very complex process based on statistical data. The effects of the study of AAP by scientists on different geographical crusts are also of course different from one another. For this reason, we will dwell briefly on AAP.



The assessment is based on the degree of resistance of natural and economic complexes to the effects of natural and economic processes. This effect is divided into reclamation, chemical, technical and demographic types and has been studied more closely in the literature on geography and agriculture (Kravchenko, 1986; Pereuplatnenie pahotnoy ..., 1987; Brauchinsky, 1988; Bashkin, 1990; Maksudov, 1990; Bashkin et al., 1991; Morozova et al., 1992).

In the field of geography, by studying the anthropogenic pressure in the composition of the above KXAB (AAP), it can make the necessary suggestions for improving the environment taking into account the socio-economic geographical factors. Agrotechnical, agro-ameliorative and agrochemical aspects are one of the tasks of more ecological scientists. Geographers, on the other hand, can warn of possible adverse events and processes in the future with their suggestions up to a certain limit.

Agrodemographic pressure in Andijan region is more complicated than in other regions. The reason is that we know that the area is small and the population is large. Territories with varying relief are gradually being developed and population density and arable lands are being stabilized. At the regional level, this situation has been consistent in recent years

The work on improving the reclamation of the Andijan region has changed radically since independence. At the present time, while studying the agro-ameliorative condition and drawing the necessary conclusions, the main thing is not to forget about economic, environmental and social productivity, and the proposals made to the environment must have a positive impact. Otherwise, it is natural for the population to be deprived of agricultural land, which can lead to negative consequences such as salinization and desertification.

Agrotechnical and agrochemical pressure are closely related, and in moderation, techniques, chemical fertilizers, and chemical drugs used against plants provide income as a basis for plant growth and development. Excessive use of machinery will increase the density of the soil layer, and the chemicals will affect not only the flora and fauna, but also humanity.

It can be said that the region will have at least some necessary methodological material to draw a reliable scientific "conclusion" from the economic, geographical and geoecological point of view, as well as to improve the territorial organization of rational use of land resources.

List of used literature:

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