CURRENT STATE OF AGRICULTURAL LAND USE OF NAMANGAN REGION AND ITS ENVIRONMENTAL ANALYSIS

Alimdjanov Nozimjon Nimadjanovich

Namangan State university, teacher of the Department of Geography and Environmental Protection

Abstract: Land resources are one of the main foundations of sustainable development and food security in Uzbekistan, where most of the population depends on agriculture. The ecological state and rational use of these resources are becoming urgent issues, especially under conditions of climate change and growing population needs. This study analyzes the ecological situation of irrigated agricultural lands in Namangan region, focusing on challenges such as soil salinity, waterlogging, and declining fertility. The research is based on ecological and agrochemical zoning methods, examining the distribution and accumulation of mineral fertilizers depending on soil type, relief, and farming practices. Results show that mineral fertilizer use in the region averages 160 kg per hectare annually, with significant variation among districts. Improper use of fertilizers and toxic chemicals contributes to environmental degradation, including soil and water pollution. The study emphasizes the importance of ecological approaches in determining fertilizer norms, accounting for soil-ecological conditions, and introducing advanced land reclamation and irrigation practices. These measures are essential to ensure sustainable agricultural productivity while minimizing environmental risks.

Keywords: Land resources; Namangan region; irrigated agriculture; soil fertility; ecological zoning; agrochemical pressure; mineral fertilizers; nitrate pollution; sustainable land management; reclamation.

Introduction. Land resources form the basis of the economic strength and sustainable development of any state. For Uzbekistan, where a large part of its population lives in rural areas, relying on the agrarian sector, the ecological state of land resources and their rational management are one of the pressing problems. In

recent years, the issue of increasing population, the need to ensure food safety and the effective and environmentally sustainable use of land resources against the background of climate changes requires special attention. In particular, the reclamation of irrigated land in Namangan region has been deteriorating over the years, with environmental problems such as re-salinity, waterlogging and reduced soil fertility. Such cases have a direct negative impact on the size and quality of agricultural production. The analysis of the ecological status of agricultural land is today considered relevant due to the following factors:

- Limited land resources. In Namangan province, irrigated land is very limited and maintaining their productivity is an important strategic task. Along with the increase in population, the demand for food is also increasing, which is leading to more intensive land use.

- Increased risk of land degradation. Soil fertility is declining as a result of water resource shortages, improper reclamation work, and improper crop rotation. Re-salinity and erosion of the land reduces farming efficiency and creates environmental problems.

- Anthropogenic pressure on the environment is increasing. As a result of the growth of industrial, transport and agricultural activities in the region, soil, water and air are polluted. All this directly or indirectly affects land resources.

Materials and methods. Our country's agriculture uses more than 19 million hectares, including 3.1 million hectares of irrigated arable land, to grow food and food products for the needs of the population and raw materials for the economy. The use of mineral fertilizers is of great importance in increasing the productivity of these lands. However, as a result of their improper use, large amounts of nitrates accumulate in agricultural products, enter wastewater, settle in the soil and are released into the air, which worsens the ecological situation. The rate and timing of mineral fertilizer application to cultivated plants depend on the plant variety and climatic conditions. It is observed that the agrochemical maps (cartograms) developed for the differential distribution of mineral fertilizers used

are based on the requirements of soil and plants for a particular fertilizer, but the landscape and ecological conditions of the area are not fully taken into account.

The method of ecological and agrochemical zoning and mapping can be used to develop territorial standards for the systematic use of mineral fertilizers for plants, to clarify their negative effects on the environment, and to obtain the intended yield with the minimum of these effects, applicable to all regions. This zoning allows for the determination of the amount of chemical substances for each region that does not affect natural biogeochemical processes and does not cause negative ecological conditions. It is appropriate to study the type of geographical landscape and its relief, soil mechanical composition and type of farming in the designated areas as the smallest unit. As a result of the use of high doses of fertilizers and toxic chemicals, the biogeochemical balance changes in favor of inputs, and as a result, the agrochemical pressure on the site increases. In fertile soils, the accumulation of nitrogen is 30 percent compared to the inputs.

Accordingly, as a result of the addition of fertilizers from the soils located in the upper regions to the fertilizers used, this figure is approximately 24 percent in sloping lands. For this reason, it is important to take into account the accumulation of agrochemicals when determining the rate of nitrogen fertilizer in arable farming. As a result, positive ecological conditions arise. This prevents the contamination of products, arable land and river waters with nitrates. In the inter-hill plains of the Namangan region, geochemical communication is two-way, and the accumulation of chemicals is twice as high as on sloping lands. Despite their low solubility, the movement and accumulation of toxic chemicals, especially herbicides, also depends on the hypsometric position of the site. For example, on slopes with a slope of 0.5-10 degrees, herbicide leaching is almost not observed. However, on fields with a slope of 3.5 degrees, 130 days after the application of herbicides, their amount in the lower areas increases by 4 times compared to the upper areas, and in areas with a slope of 60, 7 and 8-8.50 degrees, respectively, by 9-20 times. Considering that the entire territory of the Namangan region has a certain slope, it

is possible to understand how important this information is and how important it is to take this factor into account when using mineral fertilizers.

The second factor affecting the agrochemical pressure in the region is the mechanical composition of the soil. In terms of leaching of mineral fertilizers, soil types are arranged in the order of sand - loam - clay (silt), and in sandy soils with high water permeability, the loss of nutrients is high, while in areas with silty, dusty, heavy mechanical soils, high levels of contamination with nitrates, heavy metals, and toxic chemical residues are observed. Environmental pollution by chemicals and loss of nutrients are directly related to the specialization and crop rotation of agriculture in the region, as well as the type of crops grown.

Results and discussion. Based on the table below, a predictive map is developed and compared with the administrative map, ecologically appropriate norms for the use of agrochemical fertilizers can be determined for each economic entity. The areas with the highest probability of contamination by mineral fertilizers are considered to be the valleys, the lower part of the conifers, and the plains located in the foothills. It is advisable to work on the above situation when determining the norms for the use of chemicals in these areas (on the cartogram). In Namangan region, an average of 47,455 kg of mineral fertilizers are used in agriculture per year. The total area of irrigated agricultural land in the region is 282,150 hectares. This means that an average of 160 kg of mineral fertilizers is used per 1 hectare of cultivated land. (Table 1.)

Table 1.

Amount of mineral fertilizers used on irrigated lands of the region

Districts	Agricultural land	Nitrogen	Phosphorus	Potassium	Total amount of mineral fertilizers (kg)	Average mineral fertilizers per 1 hectare (kg)
Uchkurgan	24186	5441	1174	539	7154	290
Uychi	20990	3553	694	306	4553	210
Narin	15942	3002	645	242	3889	240
Chartak	19448	1461	208	76	1745	80

Yangikurgan	26741	1500	216	55	1771	60
Pop	39618	5160	932	241	6333	150
Chust	33319	3958	652	169	4779	140
Kasansay	23624	3252	542	137	3931	160
Mingbulak	37863	4777	1036	388	6201	160
Namangan	21439	2960	594	198	3752	170
Turakurgan	18980	2619	512	216	3347	170

The table was compiled based on data from the Namangan regional agricultural department.

These figures differ by district, and this difference indicates that mineral fertilizers are distributed only depending on the specialization of the districts in agriculture. It is observed that mineral fertilizers are allocated less to the districts of Chortok, Yangiqorgon, Chust, Pop, located in the low mountains and foothills of the region, while this indicator is higher than the regional indicator in districts such as Uchqurgon, Uychi, and Naryn, located in the lower reaches of the river valleys and conifers, which are considered areas of intensive agriculture. If we evaluate the above agrochemical zoning criteria, the accumulation of nitrogen in these areas is 30 percent of the input, and the risk of agrochemical pollution due to fertilizers coming from the above regions increases even more. Therefore, in the territorial distribution of agrochemicals, taking into account not only the demand of soil and plants for chemicals, but also the soil-ecological condition of the site will give the expected positive effect.

Conclusions

It is clear from this that agricultural products grown on land contaminated with various chemicals contain a large amount of toxic killers. It is necessary to organize the application of mineral fertilizer mixtures to the soil, taking into account soil fertility, completely exclude nitrogen fertilizers from vegetable and melon crops, prohibit the application of liquid nitrogen to pastures, comprehensively repair 74 thousand hectares of irrigated land, build, re-adjust and capital level 10.4 thousand hectares of collector-drainage networks, introduce

advanced irrigation methods, and implement comprehensive measures to prevent soil salinization and flooding.

REFERENCES

1. Boymirzaev K.M., Mirzakhmedov I.K. Fergana Valley oasis waters and their hydrogeological characteristics // Information of the Geographical Society of Uzbekistan. 2019. Volume 46. - B. 44-47.

2. Alimdjanov N.N. Yer resurslarining meliorativ holatini yaxshilashning ekologik geografik jixatlari // O‘zMU xabarlari. – Toshkent, 2021. -№3/1/1 Tabiiy fanlar. B-178-181

3. Ahmadaliyev Y.I., Alimdjanov N.N. Hududlarni barqaror rivojlanishida yerdan foydalanishning o‘rni va axamiyati// O‘zbekiston geografiya jamiyati axboroti. –Toshkent, № 56. 2019.- B.51-56

4. Ahmadaliyev Y.I. Yer resurslaridan foydalanish geoekologiyasi. Monografiya -T.: «Fan va texnologiyalar» nashriyoti, 2014. -158 b

5. Alimdjanov N.N.Agrokimyoviy ifloslanishning oldini olishning landshaft-ekologik asoslari // O‘zbekiston ekologiya xabarnomasi. Toshkent. 2021 yil fevral, № 2 (233) B-21-23

6. Берлянт А.М. Картография. М.: Аспект Пресс, 2011. 336 b.

7. Востокова Е.А., Сущеня В.А., Шевченко Л.А. Экологическое картографирование на основе космической информации. М., 1988.Т.

8. Akaboyev I.Z., & Ayubova Z.Y. (2025). GEOGRAPHICAL CHARACTERISTICS OF THE POPULATION DISTRIBUTION IN NAMANGAN REGION BY ALTITUDE REGIONS. Экономика и социум, (1-2 (128)), 33-38.

9. Akaboyev, I. Z., & Mirabdullayev, B. B. (2020). THE IMPORTANCE OF ELECTRONIC MAPS IN THE DISTRIBUTION OF AGRICULTURAL. *Theoretical & Applied Science*, (4), 123-126.