STATE REGULATION ON THE MANAGEMENT OF NATURAL RESOURCES INTHE FIELD OF AGRICULTURE IN AZERBAIJAN

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Summary

The article provides information on the directions of state regulation in the field of food and agriculture, and presents the FAPDA classification developed by FAO. The main focus of the article is on the direction of natural resources management of food and agricultural policy. The issues related to the ineffective use of land and water resources in Azerbaijan were analyzed, and ways to eliminate existing problems related to soil salinization and irrigation water shortage were indicated in the article. The article also provides information on the importance of globally and nationally significant agricultural heritage systems (GIAHS və NIAHS) in terms of achieving the goals of state regulation of the agricultural sector, such as ensuring the sustainability of agriculture and the development of rural areas and increasing employment and profitability in the regions through the processing of agricultural products and the development of agrotourism. Then the article the possibility of identifying the north-western region of Azerbaijan as a NIAHS site was evaluated.

Keywords: *state regulation, state policy, globally and naturally important agricultural heritage systems, GIAHS, NIAHS, sustainability of agriculture, soil salinization, irrigation water shortage.*

JEL: *Q18, Q34, Q38. A*

UDC: *338.43+330.15] (479.24)*

There are several directions of state regulation and/or state policy in the agricultural sector. The main goal of the state regulation in this field is to ensure the sustainable development of the agricultural sector and increase the income and livelyhoods of people engaged in the production of agricultural products.

Generally, public policy can be defined as the course of action taken by public authorities to solve a problem. Public policy is expressed in a set of laws, regulations and policy frameworks implemented through programs and projects. A political decision, on the other hand, determines how to achieve a particular strategic outcome by specifying what needs to be done and by whom. Policy decisions monitored by FAPDA are designed to address problems in the food and agriculture sectors of developing countries and are reflected in a law, bill, decree, ministerial circular, presidential decree, or any other official statement. This classification can also be considered as directions of state regulation. The classification developed by FAO [1], the country's food and agricultural policy covers the following policies:

• Consumer-oriented policies are policies that improve food security and nutrition outcomes through measures such as fuel tax changes, social safety nets, market support programs, and nutrition and health assistance programs.

• Producer oriented policies are policy decisions in support of producers that include actions such as public procurement from farmers at fixed producer prices, provision of inputs to smallholders or strengthening agricultural extension services, market support policies, natural resource management and regulation, and comprehensive institutional and organizational changes and adjustments;

• Trade-oriented and macroeconomic policies are policies that support consumers and/or producers through measures such as changing tariffs on food imports, export restrictions, introducing technical barriers to trade, or implementing a bilateral or multilateral free trade agreement, in addition to macroeconomic policy.

This classification is the key to the Food and Agriculture Policy Decision Analysis (FAPDA) programme, as it constitutes the method through which public policies are analysed and compiled in the FAPDA tool.

This article focuses on the policy of natural resource management as one of the areas of state regulation. The Natural Resource Management component of the FAPDA classification defines policies regarding the conservation and management of natural resources, which, among other things, lead to solutions for the conservation of the ecosystem and habitat. This decision covers measures that promote the protection, conservation and sustainable use of biologically diverse ecosystems and habitats.

Effective management of natural resources includes their sustainable use. Currently, agriculture is one of the human activities that have a negative impact on the environment. This includes both methane gas released into the atmosphere by farm animals, carbon dioxide emissions released into the atmosphere from the burning of forests to create new farmland, and soil and water pollution from the misuse of fertilizers and pesticides in plant cultivation.

Currently, the countries around the world are trying to ensure the sustainable development of the agricultural sector. Some countries choose intensive methods for this, others - extensive ones. Usually, well-developed countries try to use the achievements of science and technology in the development of the agricultural sector, in other words, they aim to intensively develop the sector. The intensive development of agriculture is an important activity in terms of supplying the population with food products, i.e, ensuring food security. However, intensive development involves ample use of natural resources. On the other hand, the extensive development of the agricultural sector is not entirely positive in terms of sustainability. For example, traditional, i.e., extensive irrigation of agricultural fields leads to the depletion of water resources and soil salinization. As can be seen, both intensive and extensive methods have their own advantages and disadvantages. Research in this direction is ongoing, but one thing is known for sure that if we do not achieve sustainability in the agricultural sector, it will be very difficult to provide sufficient food to the world population in the near future.

In this regard, ensuring the sustainability of agricultural activity is a priority for many countries. As in many countries of the world, there are certain problems related to the sustainability of the agricultural sector in Azerbaijan. It includes issues on all three pillars of the sustainability concept. However, the main focus should be on

ensuring environmental sustainability. Because the problems related to effective and sustainable use of land and water resources in the country are more acute.

Due to the use of flooding and furrow irrigation, both water shortage and soil salinization are widespread in the country. Currently, approximately 600 thousand hectares of irrigated land (1.44 million hectares) in the country are in a salinized state, of which 224 thousand ha are more severely saline lands. The lands most exposed to salinization are in the Kura-Araz plain. Besides, in Siyazan, Khizi regions, partly in Absheron economic region, Nakhchivan MR, Jeyranchol, Acinohur plain, etc. there are also saline soils in places. If timely measures are not taken against salinization, which greatly reduces productivity, its area expands and leads to the degradation of soil and vegetation in a larger area.

In Azerbaijan, salinization develops mostly around large rivers. Because water in large rivers is taken for irrigation by large-scale canals and transferred to a distance of tens of kilometers. Since most such channels are channels with soil coating, half of the water seeps into the soil and raises the level of groundwater in the lower layers, as a result, harmful salts and other substances from the ground rise up to the fertile layer of the soil. In addition, farmers closer to canals irrigate their fields more intensively with the intention of taking advantage of the abundance of water. Such intensive irrigation further aggravates the consequences of canals. That is, on the one hand, the water filtered through the sedimentary canals, and on the other hand, excessive flooding accelerates the rise of the groundwater level. Thus, groundwater is the main cause of salinization.

The main reason for soil salinization is that the soil is not used according to agrotechnical rules. This includes the use of traditional irrigation methods. In general, farmers' knowledge about plant agrotechnics is at a minimum level, since education in the agricultural field is very low in the country. All the farmers growing crops in the Kura-Araz region think that if they give plenty of water to the land, they will get plenty of crops. But in reality it is not like that. First, each plant has a water norm according to its vegetation period, and this water norm is sufficient for the plant's nutrition, and it also creates conditions for protecting the soil from salinization. Although farmers can give some boost to plant growth by irrigating fields more often, it also accelerates soil salinization, which after a few years also causes a sharp drop in productivity.

Another reason for rapid soil salinization in the country is that the drainage systems built during the former Soviet Union are currently in a state of disrepair and have not been updated for quite a long period of time.

Although there are discussions about the restoration of saline soils in the country, the main activities related to the issue are not carried out. Although the farmers are educated about the use of the rotation system, as well as usage of modern irrigation systems in order to protect the quality of the soil, there is no special control and accounting system in this regard.

Land washing or cleaning is an activity that requires large financial investment. Therefore certain subsidies may be provided by the state for the implementation of this activity.

The use of traditional irrigation methods not only leads to soil salinization, but also causes the depletion of water resources. In the survey conducted in 2020, it was

determined that 55% of farmers noted that they had difficulties with irrigation. Climate changes that have occurred on a global scale in recent times have also created problems related to irrigation in the country. In some periods, the water level in the Kura River, which is the country's main source of irrigation, falls too low, so seawater fills the riverbed and farmers are forced to irrigate their fields with seawater. This leads to the degradation of the land and the reduction of farmers' income due to low productivity.

At the same time, the fact that most irrigation canals are soil-coated results in large water losses during transportation. Moreover, the lack of a registration system related to the use of irrigation water leads to the lack of information on the exact volume of water used, and therefore to problems in the collection of payments related to irrigation. In addition to getting irrigation water at discounted prices, farmers sometimes choose not to pay at all for the irrigation water they use is they could not use water for the entire period of time, for example 3 times, instead of 5 times. As a result, irrigation water is used inefficiently.

At present, a number of measures are being implemented by the government in order to effectively use irrigation water in the country and eliminate the mentioned problems. In this regard, the main direction of the state policy is to promote the use of modern irrigation methods (drip, pivot, spray, etc.). For this purpose, imported modern irrigation systems are offered to local farmers at discounted prices. On the other hand, subsidies intended for intensive orchards in the country apply only to orchards planted using modern irrigation methods. At the same time, state control over the activities of Water User Associations is currently being strengthened in the country.

Another issue related to the efficient use of land and water resources in the country is the control of the use of fertilizers and pesticides used in the production of agricultural products. Currently, the use of fertilizers and pesticides by farmers in the country is supported by the state. These inputs are sold to farmers at discounted prices. The purpose of this support policy is to increase the productivity of agricultural crops. However, there are cases of improper use of fertilizers and pesticides by farmers in the country. Improper use of these inputs leads to the pollution of land and water resources, as well as the accumulation of harmful residues in the manufactured products. As a result, there are serious negative effects on the environment and people's health in the long run.

Another aspect of environmental sustainability is the impact of agricultural activities on atmospheric air. The contribution of methane gas emitted into the atmosphere by cattle in agriculture is huge. One of the ways to overcome this problem worldwide is to reduce the number of cattle. Currently, the Azerbaijan government provide subsidies for animals born through artificial insemination. The main purpose of this support is to improve the breed composition and productivity of local animals. For this purpose, activities related to the creation of intensive farms consisting of purebred animals are being carried out. But at the same time, this regulation implemented by the government aims to reduce the number of animals, thereby reducing the pressure these animals exert on the environment.

Generally, ensuring the stability of the agrarian field is always in the center of attention. In this regard, there are many initiatives related to the use of both the

achievements of the modern era and the traditions collected so far to ensure the sustainable development of the agricultural sector. The best practices in the field of agricultural production are activities that ensure a decent level of income, along with the sustainable and economical use of natural resources. Such activities should always be learned and taught to other farmers. In this regard, FAO's GIAHS program is very interesting. The GIAHS represent not only stunning natural landscapes but also agricultural practices that create livelihoods in rural areas while combining biodiversity, resilient ecosystems and tradition and innovation in a unique way [2]. GIAHS initiative aims to set the basis for global and national recognition, dynamic conservation and sustainable management of agricultural heritage systems and their associated biodiversity, knowledge systems and cultures.

The GIAHS methodology was developed by FAO, and the identification of GIAHS sites in the country is ensured as a result of assessments by global experts. However, in a number of cases, sites that do not fully meet the specific criteria are not registered as GIAHS sites, and therefore are ignored. For that reason, many countries register such sites as Nationally Important Agricultural Heritage Systems (NIAHS). Although NIAHS sites are not considered important at the global level, they are considered important sites at the country level. Another advantage of defining NIAHS sites is the need to formulate a specific legislation and enforcement mechanism for their identification and support. Thus, after such a mechanism is established, all measures, from the identification of sites to the support of their activities, are carried out under strict state control and regulation. At the same time, identification of NIAHS sites is a faster process. In this regard, identification and support of locally important agricultural systems can act as one of the important directions of state regulation related to ensuring sustainability in the agricultural field and protecting natural resources.

Besides having ancient history and traditions, Azerbaijan is also an agrarian country. People have been engaged in both crop growing and animal husbandry here since ancient times. From this point of view, there is a high probability of the existence of GIAHS or NİAHS sites in the country.

NIAHS sites are always formed in connection with the production of one or more agricultural products. To determine such sites in the country, the existing GIAHS methodology for the initial period can be used. From this point of view, for the beginning the products of which the country has the largest share in global trade can be considered.

Azerbaijan has favourable conditions to produce hazelnuts, persimmons, honey and number of other local traditional agricultural products due to its climatic and geographical features. The country ranks 4th for persimmon production and it is among the leaders in export of persimmons. The country is the second largest exporter of persimmons after Spain with 125,772 tons. Azerbaijan provides about 20% of the world persimmon exports. The country also ranks 3rd in the world for hazelnut production and the it is among the leaders in hazelnuts exports, it is the third largest exporter of shelled hazelnut after Turkey and Italy with 22,000 tons (for 2020) providing 8% of the world hazelnut exports [3].

Although Azerbaijan is a small country, its natural and geographical environment is quite complex. 9 out of 11 climate types exist in the country.

Therefore, the country has conditions for the cultivation of the most diverse plants. The high biodiversity in the country also increases the possibility of identifying numerous NIAHS sites in the country. For this reason, it is appropriate to implement the identification of such sites in the country in a phased manner. The process can be implemented in 14 economic regions successively.

The north-western region of the country (the territory of Sheki-Zagatala economic region) was selected for evaluation in the article. Shaki-Zagatala economic region is one of the 14 economic regions of Azerbaijan. It borders Russian Federation to the north and Georgia to the west. Region consists of Balakan, Zagatala, Gakh, Shaki, Oghuz and Gabala administrative regions (rayons). This region of the Caucasian mountains is bordered with Russia in the north and Georgia in the west, and consequently the demographic characteristic of the region is an integration of diverse cultures, customs and languages. These geographical features have determined the way of life of the inhabitants. Because of such diverse ethnic composition, a complex social organization functions peacefully, where diverse cultures and value systems co-exist in symbiosis with their natural environment. Therefore, culture and value systems of this region is fundamental to their sustainable lifestyle. Residents of the villages in the target region carry out their agricultural practices in close interaction with nature. They use sloping pastures to graze their animals, get water from rivers to irrigate their fields, place beehives in the foothills, and collect grass from the mountains and forests, which they use as an ingredient in many products and as medicine. In return, bees participate in pollination of plants in forests and farms, and sheep and goats play an appropriate role circulation of substances in nature.

Although the region is famous for the production of many agricultural products, the main products are hazelnuts, persimmons and honey. There is a high probability that there is a NIAHS site for persimmon production in the region. In terms of natural and geographical features of the region, there are favourable conditions for the cultivation of persimmons. The local population has some knowledge and skills related to persimmon cultivation. Persimmons are an economically important product for residents. There are a total of 12,698 hectares of persimmon orchards in Azerbaijan, of which 11,454 hectares are of fruit bearing age [4]. Five regions (Goychay, Shamkir, Agdash, Khachmaz and Balakan) account for 55% of the total persimmon area of the country.

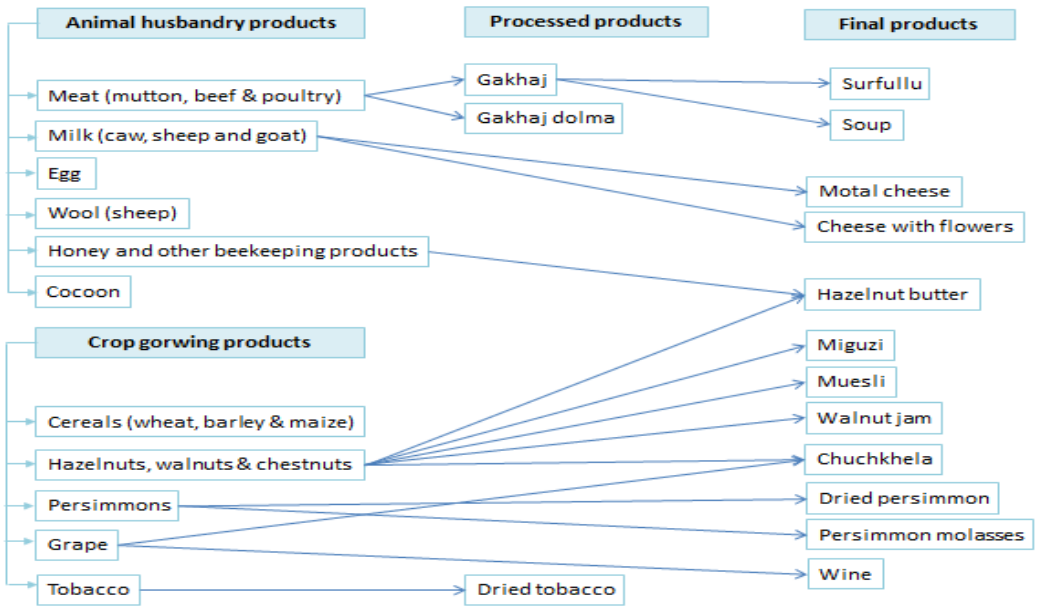
Since the product cannot be kept fresh for a long time, most residents process the product by drying after harvesting, which allows it to be stored for several months, during which they sell it in small batches to provide food and other necessities for their families. In addition, persimmons are processed in the target region by both traditional and industrial methods. Various products are produced from persimmons in the region. The target region is one of the popular persimmons growing zones in Azerbaijan. Furthermore, persimmon orchards here are an important element of the local landscape.

In the region, farmers benefit from traditional food storage practices. This mainly includes drying and storing various fruits. Locals have adopted traditional methods of storing various fruits, as well as meat, for longer period. One of the most dried fruits is persimmon. Most families in the region are engaged in drying this fruit.

It should be noted that dried persimmons have a certain share in the diet of residents of the target region. Various food products (persimmon molasses, candies with persimmon, etc.) are made from them and dried persimmons are used both as a dessert and in the preparation of various dishes.

This region is known not only for persimmons, hazelnuts and honey, but also for many other agri-food products that play an important role in terms of sustainability and livelihoods of the target region. A brief description of these products is presented below.

Graph 1. **Food and agricultural products produced in Sheki-Zagatala region**



Source: prepared by the author using the data collected in the survey conducted by the author in 2021, in the framework of the "Development of sustainable and inclusive local agri-food systems in the North-West region of Azerbaijan" implemented by FAO

Overall, the agricultural production system in the target region is crucial for the livelihood and food security of the inhabitants which are mostly engaged with farming, animal herding and food processing. It also contributes directly to the United Nation's 2030 Sustainable Development Goals. The designation of this region as a GIAHS site and implementation of its action plan, ensuring a dynamic conservation will have positive effects in the income of the beneficiaries (SDG's 1, 2,8), offering better jobs and equal opportunities (SDG's 5,9,10), better education quality (SDG's 4,12), sustainable and more resilient environment (SDG's 3,6,7,11,13,15) as well as offering them a better lifestyle.

In terms of agro-biodiversity, Azerbaijan is the richest country in the South Caucasus in terms of the total number of species of flora. The plant species found here make up 66% of the total number of plant species growing in the South Caucasus. Azerbaijan is also rich in relict species belonging to the third period, the representatives of which are more common in all zones. There are 240 endemic plant

species in Azerbaijan, which is not found anywhere else in the world, which is about 6% of the total flora.

The north-western region is characterized by a diverse landscape, more densely forested than other regions of Azerbaijan. Wild food-plants growing in mountain forests include pears, apples, hazelnuts, kernel cherry, pomegranate, sumac, mashed potatoes, hawthorn, cherries, etc. can be noted.

There are two natural reserves in the region. Zagatala State Nature Reserve which is one of the oldest nature reserves in the country established to preserve the irreplaceable soil-protective and water-repellent properties of these forests, to protect low-lying settlements and arable lands from floods, to protect the natural complex, flora and fauna of the southern slope of the Greater Caucasus. And Ilisu State Nature Reserve established to restore forests, to prevent soil erosion and floods. There are many endemic, rare and endangered plant species in these reserves.

The following policies and strategies to protect traditional production and processing systems in the NIAHS site could be proposed: increasing public awareness; protecting the biodiversity/agriculture and ecosystem; protecting experiences, technologies and agricultural traditional knowledge; economic development of the site; protecting the site landscapes; protecting and improving cultural activities in the site; developing community-based agritourism; supporting local producers in the production, storage, sale and marketing of traditional products, as well as in obtaining food safety certificates; facilitating the creation of local producer groups; promotion of local agri-food products to foreign markets.

reservation of traditional agricultural activities in some parts of the country does not mean limiting the use of modern technologies. On the contrary, the activities that have come to this day using traditional methods are further improved with the help of modern achievements of science. For example, after preparation of dried persimmon, it can be packed, labeled and transported using modern methods. At the same time, compliance with food safety requirements is also required in the production of such products. These requirements sometimes necessitate certain changes in the traditional production method.

In conclusion, the followings can be mentioned as the main directions of state regulation related to the preservation of natural resources in the country: protection and restoration of land and water resources, ensuring compliance with agrotechnical rules, as well as encouraging the use of sustainable agricultural practices, including supporting traditional agricultural practices that protect the environment.

LITERATURE

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