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SUSTAINABLE AGRICULTURAL PRODUCTION IN AZERBAIJAN: CURRENT SITUATION AND MAIN TASKS

Hamza Khalilov¹

Summary

Agriculture is the traditional production field of Azerbaijan. Vine-growing silkworm-breeding and fruit-growing fields are widely spread here since ancient times. As the great part of the country territory has mountainous relief, cattle breeding has always played important role in the life of people living here. The agriculture and agricultural processing sector provide more than a half of non oil exportation. The volume of production in agriculture, including plant growing and animal husbandry, is increased in recent years.

The current situation of sustainable agricultural production in Azerbaijan is analysed and recommendations for improvements put forward in this article.

Keywords: Azerbaijan, agriculture, sustainable, subsidy, resources

Introduction

Agriculture remains a major pillar of Azerbaijan's economy, contributing substantially to its GDP (5 percent in 2014), providing employment and safety nets in rural areas (37 percent of total workforce in 2013). The agriculture and agricultural processing sectors provide more than a half of non oil exportation. The agriculture sector has good potential to make important contributions to economic growth, diversification, poverty reduction and employment creation in rural areas of Azerbaijan. The country is endowed with fertile agricultural land in the lowlands. More than half of the territory is used for agricultural purposes, including cultivation, pastures, and rangeland.

After restoration of independence in 1991, the Republic of Azerbaijan had serious economic problems. The period of 1991-1995 was characterized by economic chaos and regression and during this period Azerbaijan had food shortage. But in the last 15 years Azerbaijan has gained much success in the direction of food security.

As a result of agrarian reforms, 2239 collective farms, state farms and other agricultural enterprises were closed down and liquidated and instead of them different economies of organizational-legal forms. The farm privatization reform in the mid-

¹ Professor

1990s led to the redistribution of land to some 843,200 small private farms of 2.02 ha on average, a large share of which (96%) have between 1 and 5 hectares. Agriculture is 99.9 percent private, out of which 66.8 percent of specialized agricultural producers consist of family-villager, 32.8 percent housekeeping and only 0.2 percent farming. And it should be noted that more than 90% of agricultural production is produced on these small farms.

One of main goals for Azerbaijan today is to remove dependence of the economy on oil and assure expansion of economic development to rural areas. Being the third biggest sphere in Azerbaijani economy after oil and construction agriculture possesses the biggest share in employment (in 2013, 37.1% of total employed population was working in agriculture, and only 1% in oil sector). Employment also has a significant influence on poverty reduction in rural areas.

1. Overview of Agricultural Production

Agriculture plays an important role in the economy of Azerbaijan. Share of agriculture in GDP amounts 5%, about 2/5 of employed people and more than 7% of fixed assets on branches of economy comes to agriculture. The agriculture and agricultural processing sectore provide more than a half of non oil exportation. (Table 1)

Table 1. Role of agriculture in economy of Azerbaijan Republic

	Indicators	2011	2012	2013
1.	Gross Domestic Product billion manats	52.1	54.7	57.7
2.	Total value added generated in Agriculture, forestry and fishing			
	- Billion manats	2.6	2.8	3.1
	- Share in GDP, %	5.1	5.1	5.3
3.	Number of the employed population – thousand persons	4375.2	4445.3	4521.2
4	Number of employed people in agriculture, forestry and fishery			
	- one thousand people	1657.4	1673.8	1677.4
	- share in employment, %	37.9	37.7	37.1
5.	The total volume of export – billion US dollars	26.6	23.9	24.0
6.	Non oil export– one billion US dollars	1.5	1.6	1.7
7.	Exportation on Agriculture and agricultural processing sectore			
	- billion US dollars	0.74	0.86	0.91
	- share in non oil export, %	49.3	53.8	53.5

Source: State Statistical Committee of the Republic of Azerbaijan [14]

The volume of production in agriculture, including crop production and animal husbandry increased in last ten years (table 1). But in 2014 agricultural production decreased compared to 2013. As, total volume of grains decreased for 20.9%, wheat for 23.6%, potato for 17.5%, vegetables for 3.9%, sugar beet for 7.5% (agro.gov.az).

In 2000-2013 growth rate of agricultural production was higher than growth rate of the population of the country by 3.6 times. In this regard in 2000-2013 the volume of agricultural production per the person was increased by 1.6 times.

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Figure 1. Index of physical volume of agricultural production at the comparative prices, in % to previous years



Source: State Statistical Committee of the Republic of Azerbaijan [14]

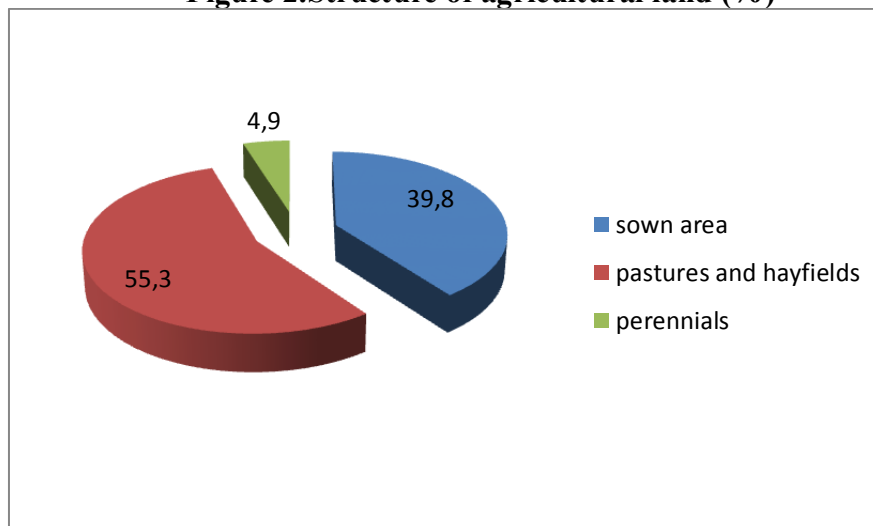
Resource base of agriculture

A. Land areas

At the beginning of 2014 total area of the lands suitable for agriculture was 4769.8 thousand hectares. It makes more than 55,0% of the territory of the country. 1884.3 thousand hectares of lands suitable for agriculture are arabale lands, 230,3 thousand hectares are perennials, 2614,2 thousand hectares are under pastures and hayfields areas.

The structure of total area according to destination is given in the following schedule.

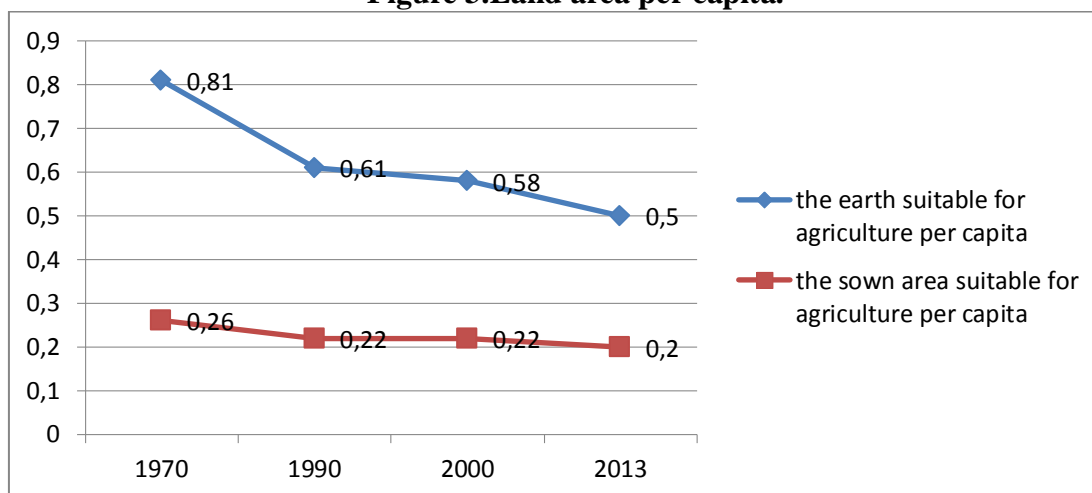
Figure 2. Structure of agricultural land (%)



Source: State Statistical Committee of the Republic of Azerbaijan [14]

At the beginning of 2014, there was 0,5 hectares of the land area per capita and 0,2 hectares of a cultivated area per capita. Due to the increase of the population of the country, decrease is observed in these indicators (1 schedule)

Figure 3. Land area per capita.



Source: State Statistical Committee of the Republic of Azerbaijan [14]

According to data of The State Committee of Land and Cartography of the Azerbaijan Republic 56,9% of land fund belong to state, 23,5% to municipalities, 19,6% belong to private property. Only 1435,2 hectares of lands the irrigated (30.1%). In 2013 1431.8 hectares or 30,0% of lands suitable for agriculture, including 1209.1 hectares or 64.2% of cultivated area, 158.8 thousand hectares or 69% of perennials belonged to irrigated areas.

B. Water resources

Azerbaijan is among the countries with limited water stocks. Only 10 billion cubic meters of land water stocks or 30% is formed in the territory of the country, 70% is formed in neighboring countries. In other words dependence of the country on abroad is equal to 0,7 coefficients. The volume of underground water stocks of the country suitable for use is estimated by about 9 billion cubic meters. About 1/3 of water stocks are used now.

In recent years 12-12.5 billion cubic meters of natural sources was used for the purpose of economic activities. About 11 billion cubic meters of this comes to share of agriculture, hunting and forestry.

In 2013 the total volume of water consumed in amount of 5746 million cubic meters. The water used in this direction was equal to 69.8% - the general water consumption in the country.

C. Technical provision

By the end of 2013 there were 23,5 thousand tractors, 2,1 thousand combine harvesters in agriculture of the country. 13,9 tractors for each 1000 hectares of a cultivated area, 2,1 combines for each 1000 hectares of the grains. Measures are taken in this direction..

Institutional characteristic of producers

At present the following farm categories implement activities in agriculture:

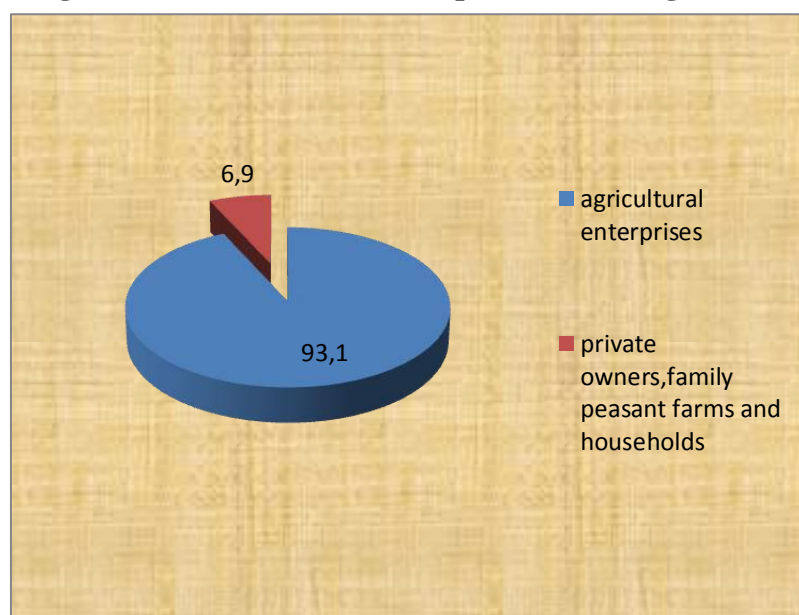
Agricultural enterprises - include the economic forms in agrarian sector with the legal entity status (agricultural production cooperatives, joint ventures, the small and rent enterprises) created on the basis of auxiliary industrial, transport, also research, educational and methodical. At the end of 2013 in the country there were 1337 agricultural enterprises.

Family peasant farms and households- cover farms of families living in rural areas, also personal household farms. People living in villages have personal plots in line with land areas allocated for continuous or temporary use by land reforms. These lands are used for production of plants or animal husbandry.

Private owners - freely acting, without creating the legal entity. Private owners are engaged in production, processing and sale of agricultural product. At present, number of these farms amounts more than 2330.

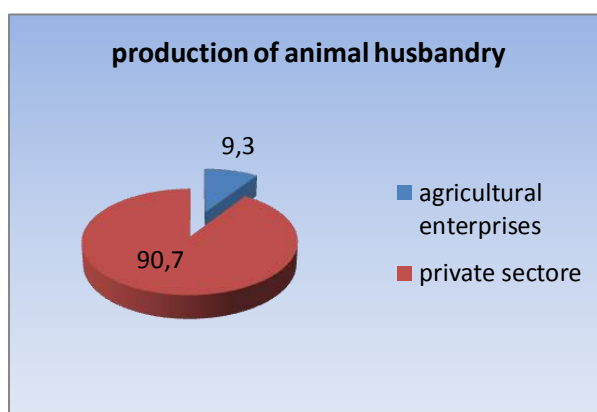
In production of agricultural production the last two farm types dominate. In 2013 more than 9/10 of the total agricultural production, both plant growing and animal husbandry, fell to their share.

Figure 4. Structure of the total production of agriculture



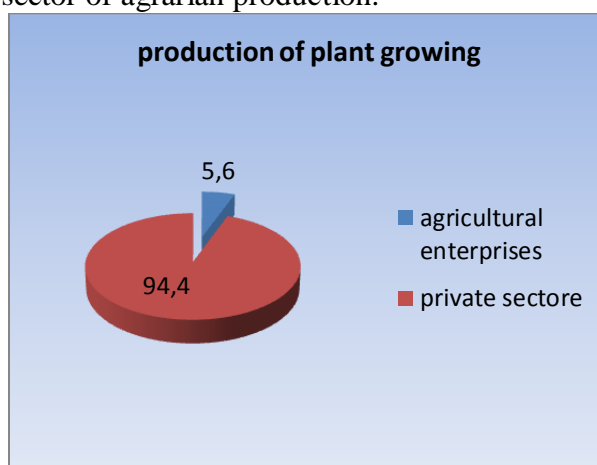
Source: State Statistical Committee of the Republic of Azerbaijan [14]

Share of plant growing in total agricultural production amounted 51.4%, share of animal husbandry amounted 48.6% in 2013.



Source: State Statistical Committee of the Republic of Azerbaijan [14]

Plant growing is multi-sectoral. Grains, vegetables, fruits, grapes and cotton have advantages in this sector of agrarian production.



Source: State Statistical Committee of the Republic of Azerbaijan [14]

The main production indicators of 2013 were as following (table 3)

Table 3. Main production indicators of plant growing (2013)

	Name of product	Cultivated area thousand hectares	Volume of production	
			Total, thousand tons	Per capita, kg
1.	Grains	1074.1	2955.3	310*
2.	Cotton	23.5	45.2	-
3.	Tobacco	1.2	3.5	-
4.	Potatoes	65.3	992.8	107
5.	Vegetables	77.6	1236.3	133
6.	Cucurbitaceous	28.5	429.8	46
7.	Fruit and berries	113.9**	853.8	92
8.	Grape	13.1**	154.1	16

* Net weight

** Fructiferous

Source: State Statistical Committee of the Republic of Azerbaijan (www.stst.gov.az)

At the beginning of 2014 in the country there were 2703,3 thousand heads of cows and buffalos, 8630,5 thousand heads of sheep and goats, 25172,7 thousand heads of poultry.

Production indicators of the main products of animal husbandry are given in the following table:

Table 4. Production of the main products of animal husbandry in 2013

Name of product	Production volume, thousand tones	Production per capita, kg
Meat (slaughtered weight)	297.9	31.7
Milk	1820.5	193.7
Egg million pieces	1401.5	149 ədəd
Wool (physical weight)	16.8	1.8

Source: State Statistical Committee of the Republic of Azerbaijan [14]

The level self-sufficiency by agricultural production

The level of self-sufficiency by agricultural products can be considered satisfactory, excepting grains. In 2013 the level self-sufficiency on the grains made 64,5%, while on potatoes this figure amounted 97,6%, on vegetables 102,9%, on melons 100%, on fruits 121,8%, on meat 92%, on milk and dairy products 76,2%, on eggs 96,8%.

Export of agricultural products

The considerable part of the fruits, vegetables and potatoes is exported. The main indicators in 2013 were as following:

Table 5. Export of the main agricultural products in 2013

	Volume of exports		Cost of exports, million US\$
	Thousand tons	Compared to the volume of production (%)	
Potatoes	53.9	5.4	21.5
Fresh vegetables	65.5	5.3	55.6
Fresh fruits	173.2	20.3	173.3
Fruits and vegetables canned food	8.7	14.2	12.0
Fruit and vegetable juice	9.8		9.9
Grape wine	0.4(bilion decalitre)	53.1	6.9
Tobacco	3.5	100.0	10.8
Cotton fiber	4.0	33.0	5.7

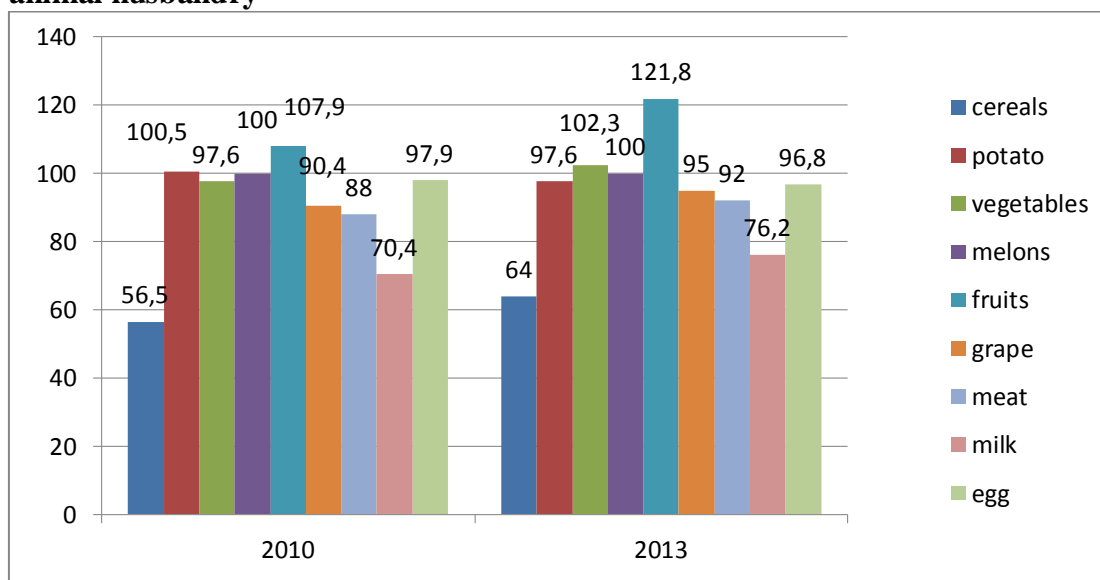
Source: State Statistical Committee of the Republic of Azerbaijan [14]

2. Situation of Sustainable Agriculture

The increase of the role of agrarian sector in economy is important for development of long-term agricultural production and ensuring food security in Azerbaijan. The physical volume of agricultural production increased by 1,87 times in 2000-2013, 1,33 times in 2005-2013, 1,18 times in 2010-2013. Development of

agriculture is accompanied by the increase of the level of self-sufficiency by main food stuffs. In recent years, the tendency of improvement of self-sufficiency indicators on all main food stuffs is observed.

Figure 5. The level of self-sufficiency by the main products of plant growing and animal husbandry



Source: State Statistical Committee of the Republic of Azerbaijan [14]

At the same time, we can specify the following aspects of provision a sustainable development of agriculture:

- The increase of agricultural production is not accompanied with environmental pollution, and also accumulation of substances harmful to a human body in products of plant growing and animal husbandry. The level of use of mineral fertilizers and means of chemical protection in agriculture of the country was not at the high level. According to SSC in 2013, only 16 kg of mineral fertilizers (by calculation of 1005 nutrients) were used on each hectare of crops. In grain fields, which hold 2/3 of total arable lands, the amount of fertilizers on each hectare made 20 kg. This figure on the cotton areas made 30 kg, on potato areas 28 kg., vegetable and melon 24 kg., on orchards 12 kg. Along with it, in 32% of cultivated areas fertilizers weren't used at all. [2, 76-77]. Low level of use of chemicals means low level of yield, but is estimated as positive circumstance from the point of view of that, environment isn't polluted.
- Rather low role of agriculture in emission of the polluting substances into atmosphere. According to data of the Ministry of Ecology and Natural Resources of the Azerbaijan Republic, only 0,07 thousand tones of the polluting substances were released into atmosphere (including 0,01 thousand tones of sulfuric SO₂ anhydride, 0,03 thousand tones of CO carbon monoxide, 0,1 thousand tones of nitrogen oxide – NO₂) in 2013 from agriculture, forestry, and fishery. It makes less than 0,4% of total amount of the released harmful substances into the atmosphere. [3, 79]. The volume of the polluting substances

released into the atmosphere falling on unit of GDP (kg./thousand manats) in agriculture was 345 times less compared to average values on economy. "energy Intensity" of the Azerbaijani agricultural production still is not high. In 2013 in structure of material expenditures of agricultural production share of oil products made 8,4%.

- c) Azerbaijan is in a zone of an arid climate. Therefore in the country the sustainable development of agriculture is based on an artificial irrigation. At present 137 water barns with the total volume of waters more than 22 billion cubic meters are used for providing the irrigated lands of the country (also for the ecological and power purposes) with water. According to data of Azerbaijan Amelioration and Water Management JSC the total length of irrigation channels makes 51,8 thousand km., including main channels of 2.2 thousand km., inter farm channels of 8,0 thousand km., domestic channels of 41,6 km. About more than 1/3 of lands (559 thousand hectares) are irrigated mechanically, including 350 thousand hectares in electrified way, 68 thousand hectares with diesel pump stations, 141 thousand hectares by artesian wells[16].
- d) The soil erosion in mountainous and foothill areas of the country, salinization tendency in main grain production areas, also existence of dangerous floods, makes important implementation of large-scale protection measures of the land and melioration. Complex ameliorative works were carried out to more than 600 thousand hectares of irrigated lands. From the irrigated areas, 288 thousand hectares are open fields, 308 thousand hectares are the closed areas, 13 thousand hectares are covered (surrounded) with vertical drainage systems. In the drainage areas 9,6 thousand km of open, more than 9,2 thousand km of the closed drainage networks, more than 6,2 km initial collectors, 4,7 thousand km of the main collectors were created (total 29, 7 thousand km)[16].
- e) In development of agriculture the attention is paid to preservation of biodiversity. To prevent erosion of soils and desertification, also restoration and preservation of the vegetation cover, specific measures - like establishment of forests and forest lines are taken. Much attention is paid to development of fish breeding in rural areas, also development of poultry farms with breeding of bird species for hunting (for examples quails). All of these measures play important role in conservation of resources and natural species.
- f) The process of formation of environmentally friendly economy has begun in the country. In 2012 the law of the Azerbaijan Republic on "Environmentally friendly agriculture" was adopted. The new farms producing environmentally friendly products have begun their activities in the country, and also the network of "green markets" is formed.

3. Policies for Promoting Sustainable Agriculture

At present, multiple policies are held to support sustainable agriculture in the Republic of Azerbaijan. The main directions of these policies and strategies are reflected in the concept documents and programs accepted by the state. The Decree of the President of the Azerbaijan Republic of 29 December, 2012, the development concept

«Azerbaijan 2020: The prospect»», the Law of the Azerbaijan Republic, «On Organic Agriculture », «Law on Amelioration and Irrigation of the Azerbaijan Republic» approved as the order of the President of the Azerbaijan Republic on 25 August, 2008, «The State Programme on Reliable Food Supply of Population in the Azerbaijan Republic (2008-2015)» approved as the order of the President of the Azerbaijan Republic of May 22, 2004, «State Program on Summer/Winter Pastures, Effective Use of Meadows and Desertification» are the most important official documents in this regard.

In the Development Concept "Azerbaijan 2020: The prospect" it is planned to continue the measures of state support according to the international experience in the forthcoming period for intensive and effective stimulation of development of agrarian sector. At the same time, strengthening of measures for improvement of ameliorative and irrigational works, prevention of erosion of soils, salinization of the irrigated arable lands, increase fertility of the soil, production of environmentally friendly agricultural production is stimulated in the country.

According to the specified provisions, the following measures are carried out to support sustainable agriculture:

3.1. Support for providing sustainable increase in agriculture.

In modern condition the measures of the state support for sustainable development of agricultural production are carried out in Azerbaijan Republic. We can indicate the following main directions:

Application of tax incentives. In order to improve the financial state of agricultural producers, in 2001 the parliament adopted the law where agricultural producers were exempted from all types of taxes (excepting land taxes) for 5 years. In 2003, 2008 and 2013 the law was prolonged for the next 5 years. The measures applied in this direction provide simplification of tax burdens for agrarian producers.

Leasing of production means on favorable terms. In revival and development of agriculture the important role was played by means of production, first of all leasing of equipment. In this direction "Agroleasing" JSC was established in 2004. Agroleasing is financed by state budget and provides a leasing or sale of agricultural techniques to legal entities and individuals. And to provide advantage of leasing conditions, imported agricultural techniques were exempted from the import customs duties and value added taxes. The terms of leasing and sale have been improved by degrees, the coverage area of leasing have been enhanced, new technological equipment and new pedigree cattle have been included too. Discounts started being applied to the equipment which is leased.

Delivery of soft loans to agrarian producers. Agricultural producers and producers of foodstuff from agricultural raw materials are granted soft loans from National Fund For Entrepreneurship Support and State Agency on Agricultural Credits under the Ministry of Agriculture. The state Agency on the agricultural credits at the same time participates in implementation of preferential projects within the agreements concluded between the international organizations and financial structures.

Delivery of subsidies to agricultural producers. At present subsidies are provided to agricultural producers in several directions. And first of all, from the point

of view of ensuring food security these subsidies were directed on expansion production of grains. Since 2007 producers are given subsidies at a rate of the 40 manats for each hectare for cultivation grains. Along with it, support of the general production is carried out. With this purpose since 2007 subsidies started being applied to purchase of mineral fertilizers, fuel and engine oil too. On the other hand, rules of repayment of a certain part of property insurance by state budget were applied to insure the property of agricultural producers. The third direction of granting subsidies includes modernization of agricultural production in order to accelerate the development. Since 2008 specific subsidies are applied for high reproductive seeds of wheat and seedlings of high efficiency, also pedigree cattle imported from abroad.

Agricultural producers are provided different kind of subsidies in Azerbaijan. In accordance with decisions accepted by government, subsidies are given in the following directions:

- Giving grants via governmental budget to agricultural producers for fuel and motor oil in cultivating of arable lands. The main measurement for subsidies is 40 manats for 1 hectare of arable lands of agricultural products which are not GMO and perennial herbs. According to the information by Ministry of Agriculture, 51.8 million manats are given to producers in this direction in 2014.
- To increase the interest and motivation of wheat and paddy producers, 40 manats are given per a hectare of wheat and paddy by governmental budget. In accordance with the information given by Ministry of Agriculture for the harvest of 2014, 20.1 million manats were given to 150000 producers for sowing of wheat and paddy in 503.8 thousand hectares of land in the autumn of 2013.
- 70% discount of the cost of fertilizers for the agricultural producers (maximum level of grant must be 80 manats).

According to the information given by Ministry of Agriculture, 32.5 million manats were given to 81.9 thousand producers for 107.7 thousand tones of fertilizers for 642.5 thousand hectares of arable lands in 2014.

- Subsidies from state budget to farms for first and second reproductive seeds and saplings. Also, expenses for producing original, super elite and elite seed species at experimental farms of research institutes of Ministry of Agriculture are financed by state budget. In accordance with the information of the Ministry, 10 million manats of subsidies were allocated for seed producers in 2014.
- Import of pedigree cattles from abroad and sale of them with 50% discount to agricultural producers via leasing. For this aim 23.5 million manats were allocated from state budget in 2014.
- Application of 40% discount of primary cost of agricultural technical equipments which sold by leasing and given by "Agroleasing" PC (public corporation). These discounts are being applied since 2014 and 500 thousand manats have been allocated from state budget for this purpose [15].

To provide sustainable growth in agriculture on the long-term plan state financing of education and scientific researches, also development of infrastructure plays an important role.

3.2. Increase of efficiency of use of land and water

The measures which are carried out in these directions within a state policy can be divided into 2 groups:

- a) Creation of conditions for effective use of land and water resources by means of improvement of control facilities over them.

Following measures are planned to be taken in this direction:

- Inventory of land stocks, specification of their quality and quantity indicators;
- Definition and mapping of eroded, salted and low-salted and degraded lands and preparation of offers on their effective use;
- Preparation of electronic (digital) land and cadastral maps by administrative regions;
- The regular carrying out economic monitoring of environment (earth and water) and granting relevant information to producers;

- b) Preservation of water and land resources, carrying out meliorative and irrigational works, and support agricultural producers to carry activities in the respective directions.

State support in the specified sphere covers the following directions:

- Protection of soils, including construction of protective dikes and other protection devices for prevention flood waters, restoration and rehabilitation of irrigational infrastructure, their preservation and expansion, and also financing of these measures from the state budget. Share of state expenditures in this direction makes more than a half of the total means allocated from the state budget. The volume of budgetary funds for construction of objects of melioration and water management is consistently increased.
- Taking into account limited opportunities of agricultural producers preservation and operation of irrigational systems is carried by the state. Now these systems were transferred into fixed assets of Azerbaijan Amelioration and Water Management JSC.

Different projects are realized in noted spheres within cooperation with the international organizations.

3.3. Effective use of pastures, hayfields and prevention of desertification

The state policy on effective use of pastures, hayfields and prevention of desertification is realised according to the special State Program. The main goals of this programme include: effective use of summer and winter pastures and hayfields, prevention of erosion of soils on slopes, prevention of salinization on the foothills and low areas, improvement of the mechanism of use of state and municipal lands, development of structure of animal husbandry according to modern requirements, improvement of structure of forages production, food security of the country, preservation of environment, natural landscape and biodiversity and providing a sustainable development.

To reach these goals following tasks are put forward to be realised:

- improvement of the existing legal base for ensuring effective use of pastures and hayfields;
 - researche current state of summer and winter pastures, mapping and restoration of territories with strong erosion and salinization;
 - carrying out structural changes in animal husbandry and related sectors, development of the sectore in intensive way;
 - elimination of negatively influencing factors on fertility of soils;
 - planting of windbreak fields and carrying out forest meliorative measures for prevention water and wind erosion;
 - specification of territories sencitive to landslides and sharp erosion, preparation and carrying out measures for their strengthening by technical means (terraces, dams, walls, long-term plantings);
 - temporary removal from use of the lands which lost productivity and need restoration;
 - Carrying out measures for improvement of the state control over land fund
- Still, the state wasn't able to reach full realization of the tasks which were part of the program. Some of the intended measures weren't executed.

3.4. Support to formation of environmentally friendly agriculture

In the Law of the Azerbaijan Republic adopted in 2012 "About environmentally friendly agriculture" it was defined that state has set favorable economic and legal environment for attraction of investments into the projects of development of environmentally friendly agriculture, to import of high-yield plant varieties and breeds of animals which are widespread in the world, applications of scientific achievements and advanced technologies in environmentally friendly agriculture.

At the same time, in the Development Concept "Azerbaijan 2020: Prospection" it is noted production of environmentally friendly agriculture and food production will bestimulated[4].

Farms on production of environmentally friendly products started being established in the country. According to the decree of the President of Azerbaijan Republic of 14 January 2014 «About additional measures for improvement of activity of the agricultural market and food» the relevant government institutions were given instructions about creation of a network of the specialized and constantly functioning "Green markets" in Baku and other large cities.

For development of environmentally friendly agriculture development of the corresponding standards and formation of the institutional bases determined by the law has to be accelerated.

4. Constraints of Sustainable Agriculture Development in Azerbaijan

At present in Azerbaijan there are some aspects development of sustainable agriculture which don't meet the requirements of sustainable development. It is observed in the following directions.

In use of land resources

Development of agricultural production in the Azerbaijan Republic isn't followed by protection of land resources. It is shown in the following adverse directions:

a) In 2013 1431.8 hectares or 30.0% of agricultural lands, including 1209.1 hectares or 64.2% of arable lands, 158.8 thousand hectares or 69% of perennials are irrigated areas. [2, 49] More than 4/5 of production of plant growing is made on the irrigated lands. At the same time, the melioration systems and the irrigation equipment became outdated, in this regard the condition of the irrigated meliorative lands worsened. The wrong and not normalized use of water brought to that point when more than half of the cultivated area became salted.

b) Non-use of soil-protective technologies, wrong irrigation of lands, violation of the rules of use of lands leads to their erosion. Now more than 43% of land fund, 48.6% of lands of agriculture become eroded. The area of the eroded lands makes the 670 thousand hectares.

c) In the Azerbaijan Republic 54.8% of agricultural lands comes to the share of pastures and hayfields [3, 50]. As share of natural feed in feeding system is high pastures and hayfields, also forests are used for feeding of the animals more than the norms. In modern conditions lack of system of etching and congestion 12-16 beasts are grazed actually while it is allowed to graze 1-4 heads of a small cattle. Due to the lack of measures of restoration of fertility of lands, use of lands in non-compliance with agrotechnical rules and lack of carrying out necessary measures in many places violations of submeadow lands is observed. Violation of a soil steel layer on slopes brings to strengthening of processes of an erosion and desertification. According to data of relative organizations 60% of winter pastures and 70% of summer pastures become unsuitable.

d) Pollution of lands from non agricultural activities and becoming of the lands unusefull for agriculture is additional reason for unsuitable situation.

- As a result of mining of 30 thousand hectares of lands became unsuitable. Some territories on Absheron peninsular and Kura-Araz lowland are polluted with wastes of the local industrial enterprises, and it led to pollution of the soil and food. About 10 thousand hectares of land on the Absheron peninsular is polluted, and it negatively influencing biotopes leads to desertification. Now part of the territory polluted by oil was recultivated.
- In quite big areas the lands are taken out from production cycle. In 2013 the lands taken out of production cycle and used under constructions amounted 7.5% of the total area of the country [3, 51].

In use of water resources

From the point of view of providing a sustainable development of agriculture it is impossible to consider current use of water resources effective. In this direction we can point out the following main problems.

- a) On the basis of data of Azerbaijan Amelioration and Water Management Open JSC the level of water shortage in the republic in a year averages 3,7 km³, in dry years, more than 4,75 km³. Water reservoirs with total capacity of 640 million m³ remained on the lands (20% of the territory of Azerbaijan) occupied by

Armenia[14]. This fact causes the problems in efficient collection, distribution and use of water resources. Because of no regulation of water flow of inland rivers flood waters of spring and autumn is not collected and used. According to specialists every year 3,2 billion m³ of qualitative water is lost.

- b) During use of water resources in agriculture there are large-scale losses. No compliance of irrigation channels, collector drainage network and other local networks to necessary requirements of causes loss of considerable part of the irrigation water. According to official statistics in 2012 35,4%, in 2013 35.5% of natural water resources was lost during the transportation of water used in agriculture[3, 73].
- c) Water is not used efficiently during irrigation. Many modern methods of efficient use of water like drop, spraying are not applied and this leads to water loss. Such situation besides acceleration of salinization of the irrigated lands, leads to problems in irrigation of certain areas.
- d) The issues connected with a reuse of water resources in agriculture aren't resolved. For the purpose of reduction of the difficulties caused with limited water resources reuse of the drainage waters collected in the main collectors isn't provided.

About preservation of a biodiversity:

Salinization and erosion of the land plots, desertification processes, reduction of a biodiversity, increases risk of a genetic erosion.

In particular, as a result of violation of rich vegetation of pastures (about 1600 different kind of plants are used for a forage. Steppes, semi-deserts, subalpine and alpine pastures of the country belong to the most important ecosystems from the point of view of a biodiversity.) along with decrease in efficiency of pastures, the amount of valuable pasturable cultures decreases, the biodiversity decreases.

5. Tasks for Developing Sustainable Agriculture in the Republic of Azerbaijan

In modern conditions to ensure the sustainability of agriculture in Azerbaijan Republic the following tasks are to be taken into consideration:

5.1 Sustainable growth for the long-term period is mainly connected with replacement of extensive factors of development to intensive and increase of productivity. Modernisation of all sectors of agriculture will increase the impact of agricultural production to the nature and this factor should be paid attention. And this in its turn makes it important to put protection of land, water and vegetation resources as the priority of agrarian policy.

5.2. At present the main threats for a sustainable development of agriculture in Azerbaijan is aggravation of the problems like salinization, erosion and desertification. In this regard, appropriate measures have to be taken. Priority directions for achievement of these goals can be set as the following:

5.2.1 Capital reconstruction of meliorative and irrigational systems and combination with modern institutional structure of agrarian production. The existing

outdated systems were created in Soviet period taking into account large-scale collective farms and state farms. That's why these systems don't meet the requirements of the small-scale farms formed after the reforms in the second half of the 1990th. Thus, on the one hand, the old systems don't allow the solution of the problems connected with improvement of a meliorative condition of lands, and on the other hand, don't provide effective satisfaction of demand of producers for water. According to experts, 80-85% of new farms face problems in providing with water. As restoration of meliorative and irrigational systems and capital reconstruction requires large financial resources these measures should be taken under a special state program.

5.2.2. Modernization of water use taking into account efficient use and mitigation of influence of climate changes. Recently, climate changes cause the increase in torrential waters and flooding of the arable lands in Azerbaijan. Increasing temperature is another problem making water shortages more severe. The necessity of application of effective water management due to growing threat of floods and drought was also noted by the World Bank. Taking into consideration above mentioned, it is important to apply best practices on floods and water flow management, water reparation etc. Along with it, efficient use of irrigation water, broad application of progressive technologies of irrigation, assistance to producers and implementation of the stimulating measures has to be provided.

5.3. Increase of sustainability in agriculture is connected with protection of a biodiversity and genetic resources, restoration of a vegetation cover on meadows and pastures and ensuring their protection. The solution of this problem requires an integrated approach. In the medium-term period improvement of a meliorative condition of lands, sowing the seeds of cultivated and wild plants, the fight against the toxic pasture plants, application of periodicity in use of pastures, increase production of feed should be implemented. In the long term period it will be necessary to apply intensive animal husbandry and stimulating measures should be implemented.

5.4. Production directions and application of technologies according to requirements of sustainable development of agriculture. In the lowland areas as salinity-resistant plants should be planted. In mountainous and plateau areas, fruit trees and perennial grassy plants should be planted in order to prevent erosion. From the point of view of a sustainable development, application of the zero cultivation technologies in mountainous areas can be effective. Also, planting of varieties fitting to local climatic conditions should be implemented. At the same time it is needed to increase attention to development of organic agriculture, on the other hand, identification of genetically modified organisms, possible threats of use of these products is important.

5.5. Mitigate the effects of climate change. In present situation climate changes became more essential factor. Regarding the effects, climate changes may have on agricultural production, the following aspects of climate changes (according to the information provided by Azerbaijan National Academy of Sciences and Ministry of Ecology and Natural Resources) are very impressive:

- Increase of general temperature all around the country is observed. According to the results of latest researches, the temperature in the area of Azerbaijan has increased for 0.2-0.9 degrees during the last 100 years.

Depending on the regions the indicators differ. The maximum increase has been observed in Aran, the minimum has been observed in mountainous regions. But in high mountainous areas of Greater Caucasus the average temperature has increased for 1.1-1.3 times. Also, the number of cloudy days has decreased. According to 2nd national call in United Nations Framework Convention on Climate Change, the average annual temperature in Azerbaijan will increase for 3-6 C⁰ till the end of the century.

- Decrease of number of windy days is observed. On average 15-20 days a year. Also, the speed of wind has decreased.
- The annual amount of precipitation has decreased by 15-80 mm. Although the average of the country has decreased, in mountainous areas, especially in Sheki-Zaqatala region annual amount of precipitation has increased by 10 mm compared to annual average[6].
- Increase of abnormal climatic events (strong winds, blizzard, heavy rains, floods) is observed last years.

The changes in climate:

a) causing droughts (especially in Aran region) affects negatively on yields of agricultural crops. Not in line with this, climate changes makes suitable conditions for enhancing the production areas of some agricultural crops (dry subtropical crops, cotton).

b) causes soil falls, washing topsoils, strengthening of erosion creating strong floods in rivers.

c) accelerates desertification process. According to experts opinion in 15-20% of cases the desertification is connected to climate changes.

In accordance with above mentioned, to mitigate the effects of climate changes:

- regulation of water flows in mountainous rivers;
- ensuring more effective use of water resources;
- creation of drought-resistant crop varieties;
- application of Climate-Smart Agriculture.

Should be kept in account as the priority tasks in agricultural development.

5.6. Improvement of management of land and water resources and pastures on the basis of use of modern technologies. Application of IT technologies for monitoring and information, including establishment of early warning systems, carrying out mapping on the basis of use of modern 3D technologies, establishment of electronic cadastral database and so on are necessary steps in future.

5.7. Application of subsidies for organic production. At present, direct subsidies for organic production are not applied in Azerbaijan.

Although in the country the law of "About organic agriculture" was accepted, the mechanisms are not ready and application is not available. Certification of organic agricultural production is not available too.

At the same time it's possible to look forward for application of subsidies for organic production in future. Because juristic terms are convenient for that.

In the law "About organic agriculture" of Azerbaijan Republic, the motivation of farms moved to organic agriculture is one of the appointments of state regulation

(article 5). Besides of that, a separate article for financing of projects about improvement of organic agriculture by state budget of Azerbaijan Republic is included into the law (article 19).

In addition to above mentioned, the producers of organic products cannot use the benefits of discounts about fertilizers, compared with the general producers of agricultural products. Instead of it application of some other subsidies in order to cover the production costs, would be justified from the point of economy.

5.8. Development of human resources for sustainable agriculture. Taking into account insufficient knowledge of the main part of agricultural producers in the field of ecology, it is necessary to form complex and effective educational and consulting services in the respective direction.

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