

PRESENT SITUATION, DIRECTIONS OF DEVELOPMENT AND PROBLEMS OF TERRITORIAL ORGANISATION OF VITICULTURE IN THE MOUNTAINOUS SHIRVAN ECONOMIC REGION**Bakhtiyar GAHRAMANOV***Institute of Geography named after H. Aliyev, Ministry of Science and Education of Azerbaijan, Baku, Azerbaijan
bextiyarqehremanov@gmail.com***Abstract:**

The study's main objective is to analyze the current state of the territorial organization of viticulture in the Mountainous Shirvan economic region for the period 2010-2021 and to determine the direction of its development. The study also examines the problems of specializing in wine growing as the main crop in the region. To this end, research objectives have been set, such as the determination of the rate of development of viticulture in the Mountainous-Shirvan economic region and the differences between economic regions in terms of the development of viticulture and the identification of the factors that have led to them, and detailed analyses have been carried out. In the article, the collection and analysis of statistical data, the ranking of the regions by the area of agricultural land and the working patterns of the people have been performed. The data of the State Statistical Committee and the Digital Elevation Model (DEM) are the main database of the research. The software ArcGis (10.3) has been used for the mapping of the territory.

During the research carried out, an increase in the area under vines was observed in the region. However, the opposite trend, a decrease in production, was noted. At the same time, there has been a decline in productivity over the years. In individual economic districts of the region, including Shamakhi district, the area under vines increased by 41% and production by 3.5 times, while in Ismayilli district the area under vines increased by 21%, but production decreased by 25.2%. The main reason for this is that the productivity of the vineyards in the region has been reduced by up to two times as much. As a result, with the decline in productivity, the planting habits of the population and their interest in viticulture have diminished or shown only partial interest. There have been major changes in the area planted in the Agsu and Gobustan regions. In both regions, there was a change in agricultural area and, consequently, a decrease in vineyard planting. The interest in planting vineyards in the Agsu region, which was in third place in the planting ranking in 2015, has fallen to seventh place in 2021. It was found that viticultural specialisation was not clearly defined or registered by sector in the studies carried out in the region. The article concludes that, despite the presence of wineries in the region, viticulture is not the main area of specialisation. Due to a trend in production and productivity, it has been observed in certain regions that wineries have experienced a decline in supply.

Key words: viticulture, Mountainous-Shirvan, territorial organization, cultivated areas, production, productivity, population employment, farming habits.

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СУЧАСНИЙ СТАН, НАПРЯМКИ РОЗВИТКУ ТА ПРОБЛЕМИ ТЕРИТОРІАЛЬНОЇ ОРГАНІЗАЦІЇ ВІНОГРАДАРСТВА ЕКОНОМІЧНОГО РАЙОНУ ГІРСЬКИЙ ШИРВАН, АЗЕРБАЙДЖАН**Бахтіяр ГАХРАМАНОВ***Інститут географії ім. Г. Алієва, Міністерство науки і освіти Азербайджану, м. Баку, Азербайджан
bextiyarqehremanov@gmail.com***Анотація:**

Основною метою дослідження є аналіз сучасного стану територіальної організації виноградарства економічного району Гірський Ширван, Азербайджан, за період 2010-2021 рр. та визначення напрямів його розвитку. У дослідженні також розглядаються проблеми спеціалізації на вирощуванні винограду як основної сільськогосподарської культури економічного району. З цією метою були поставлені дослідницькі завдання: визначення темпів розвитку виноградарства в економічному районі Гірський Ширван та відмінностей між адміністративними районами щодо розвитку виноградарства, а також визначення факторів, що призвели до них. У статті проведено збір та аналіз статистичних даних, ранжування адміністративних районів за площею сільськогосподарських угідь та структурою зайнятості населення. Основною базою даних дослідження є дані Держстату Азербайджану та цифрова модель рельєфу (ЦМР). Для картографування території використано програмне забезпечення ArcGis (10.3).

Протягом досліджуваного періоду в економічному районі Гірський Ширван спостерігалось збільшення площ під виноградниками. Водночас, з роками спостерігається падіння обсягів виробництва та врожайності. В окремих районах, зокрема в Шамахинському районі, площі під виноградниками зросли на 41%, а виробництво в 3,5 рази, в той час як в Ісмаїлінському районі площі під виноградниками зросли на 21%, але виробництво знизилось на 25,2%. Основною причиною цього є те, що врожайність виноградників у регіоні скоротилася майже в два рази. Як наслідок, зі зниженням врожайності, інтерес населення до виноградарства зменшився або став лише частковим. У Агсуському та Гобустанському районах відбулися серйозні зміни в структурі сільськогосподарських площ і, як наслідок, скорочення посадок виноградників. Частка виноградарства в Агсуському районі, який у 2015 році займав третє місце в рейтингу площ під виноградниками, у 2021 році впала на сьоме місце. Встановлено, що виноградарська спеціалізація не була чітко визначена чи зареєстрована в економічному районі. Незважаючи на наявність в регіоні виноробних підприємств, виноградарство не є основною сферою спеціалізації. Виявлено, що в деяких адміністративних районах виноробні зіткнулись зі зниження обсягів постачання через тенденції до зниження обсягів виробництва та врожайності.

Ключові слова: виноградарство, Гірський Ширван, територіальна організація, посівні площі, виробництво, врожайність, зайнятість населення, сільськогосподарські звички

Introduction

Viticulture is the leading branch of agriculture and has a special role in providing employment and food to the population. In some economic regions of our republic, this field of agriculture is particularly specialized and is considered the main source of income of the population. The development of viticulture is related not only to the availability and use of arable land, but also to the development of other light industries that support its development, including the development of winemaking, the availability of bottling facilities, transportation costs, labor force, location of facilities and the development of technologies used.

The issues of territorial organization of viticulture are related to wine production and the increase of its variety. Sustainable viticulture is defined by the OIV (2008) as the “Global strategy on the scale of the grape production and processing systems, incorporating at the same time the economic sustainability of structures and territories, producing quality products, considering requirements of precision in sustainable viticulture, risks to the environment, products safety and consumer health and valuing of heritage, historical, cultural, ecological and landscape aspects (OIV, 2016).

A number of studies have been carried out in the field of territorial organization of wine-growing areas. These were mainly carried out in two directions. In the first direction, studies that emphasize the territorial organization of viticulture, the geographical differentiation of viticulture, grape or grape characteristics (Mulet et al. 1992; Biasi et al. 2012). On the other hand, it included studies focusing on the geographical differentiation of soil potential or vineyard suitability (Bramley & Lamb, 2003; White, 2003). Analysis of the climate in a wine-growing region is essential to understand its suitability and sustainability for wine production (Carbonneau, 2023). In addition to determining the climatic and soil characteristics of wine-growing regions (Parra & Vaudour, 2004), the definition of grape plantation boundaries is very important for viticulture (Testic, 2002) because it allows comparisons between wine-growing regions and provides additional opportunities for farmers and entrepreneurs to evaluate relevant varieties and areas (Jones et al., 2010).

Although the Mountainous-Shirvan economic region differs from other regions in terms of relief, water resources, plant and soil cover, it is not distinguished by a sharp speed from the point of view of specialization of the economy. According to Pashayev and Agakishiyeva (2015a), the specialization of viticulture and winemaking typical of previous periods in the region has been broken, and specialization in new areas has not yet been clearly formed. The main grape varieties are Shirvan shahi, Kishmishi, Marandi and Madrasa (Pashayev & Agakishiyeva, 2015b).

The main purpose of the research is to study the current situation of the territorial organization of viticulture in the Mountainous-Shirvan economic region, to analyze the changes in the cultivated areas, production and productivity. At the same time, by analyzing the

trends and directions of the development of viticulture, it is necessary to determine the internal features of the region. For this purpose, the following research goals have been set:

1. Determining the rate of development of viticulture in the mountainous Shirvan economic region;
2. Differences between economic regions due to the development of viticulture and the determination of the factors that create them.

2. Materials and methods

2.1. Study area

The Mountainous Shirvan economic region, located in the southeastern foothills of the Greater Caucasus, includes Shamakhi, Ismayilli, Agsu and Gabustan administrative regions. The economic geographic region borders Guba-Khachmaz in the northeast, Sheki-Zagatala in the northwest, Aran and Shirvan Salyan in the south, and Absheron Khizi economic regions in the east (Fig 1). The total area of the region is 6060 km², and the population is 326.8 thousand people. According to these guidelines, it covers 7% of the country's territory and 4% of its population.

2.2. Methods

The method of statistical data collection, systematization, analysis, comparative analysis, and processing was used during the research. The article is based on the materials obtained by the State Statistics Committee during the years 2000 and 2021 (Table 2), ArcGIS 10.3 software was used in the preparation of maps on the territory (Fig 1, 3).

2.3. The current state of viticulture in the mountainous Shirvan economic region

Mountainous-Shirvan economic region is one of the regions specialized in viticulture and distinguished by wine production in our Republic. So, if we look at the statistical indicators, we will see that the area of grape cultivation in the Republic was 15,436.6 ha in 2010, and 15% of it belongs to the economic region (Fig. 2). According to this indicator, it ranked second after Ganja-Dashkasan economic region. However, in the next 5 years, that is, in 2015, this figure was 19% of the total share, and in 2021, it increased to 19.8%. In the mentioned period, between 2010 and 2021, the cultivated area of grapes in the region increased by 4% from 2373.3 ha to 3031.3 ha, and then the growth rate increased by 8% and reached 3163 ha. Currently, it ranks first in the country in terms of the area of grape cultivation.

As for the production of grapes in the republic, the leadership in the field of cultivation has not been recorded here. When comparing economic regions, it is known that Gazakh-Tovuz economic region has 26% of grape production according to the indicators of 2010. Baku and Nakhchivan Ottoman Republic took the next 2nd and 3rd places with an indicator of 11%. However, the production of grapes in Mountainous Shirvan economic district is very low. In 2015, a similar trend continued, with the increase in grape production in the country, a decrease in the share of the economic region in grape production was

observed. In 2021, there was an increase in production by region, but a decrease in its total share was recorded when compared to economic regions. Thus, as in previous years, the Gazakh-Tovuz economic region ranked 1st, accounting for 32% of the republic's production. Guba-Khachmaz (12%) and Absheron-Khizi (9%) economic regions are next. Overall, the share of Mountainous-Shirvan was 9% in 2010, 8.2% in 2015 and 8% in 2021.

If we look at the productivity of grapes in the republic, there are significant differences between economic regions and a tendency of increase and decrease. So, according to the statistical indicators of 2010, the highest productivity belongs to Nakhchivan O.R and this figure is equal to 141.2 cents/ha. This indicator is above the general average of productivity for the country. Productivity in the Mountainous-Shirvan economic region is equal to 44.4 cents/ha, which ranks last according to this figure. It means a 5 percent increase compared to the previous 5 years. Despite all this, when compared with the general indicator of the productivity of the Republic and the productivity of the regions, the growth in the Mountainous-Shirvan economic region is insignificant and incomparably less.

2.3.1. Shamakhi district

Shamakhi district is one of the most important districts in the Mountainous-Shirvan economic district

in terms of cultivated areas and production of grapes. If we look at the statistical indicators, we will see that Shamakhi district takes the first place in terms of the scale of grape cultivation areas. Thus, in 2010, 47% or 1123.3 ha of grape cultivation areas in the region, 54% or 1640 ha in 2015, and 61% or 1919 ha in 2021 fell to the region (Table 2). In the mentioned period, i.e. in 2010-2021, grape planting increased by 31% in 2015 compared to 2010, and by 15% in 2021 compared to 2015.

In general, an increase of 41% or 793.7 ha of grape cultivation was observed in 2010-2021. In Shamakhi district, an increase in the production of grapes has been recorded. In 2010, grape production accounted for 39% of the economic region, in 2015 this figure was 51%, and in 2021 it was 68%. Production increased by 91% (5947.8 tons) in 2015 compared to 2010. Overall, grape production in Shamakhi region increased 3.7 times between 2010 and 2021, which is a high indicator. The highest productivity of viticulture in the region was recorded in 2003, when the indicators were equal to 110 cents per ha. Between 2010 and 2021, the tendency of increase and decrease in the yield of grapes was observed. Thus, in 2010, productivity was 50.4 cents per hectare in the region, in 2015 it increased by 6% compared to the previous 5 years to 53.6, and in 2021 it increased by 9% to 58.6.

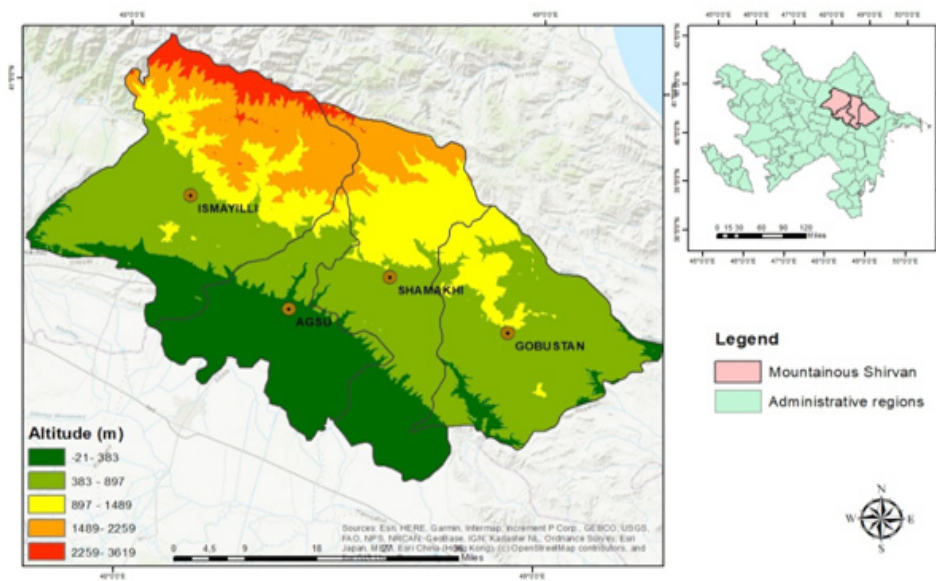


Fig. 1. Study area

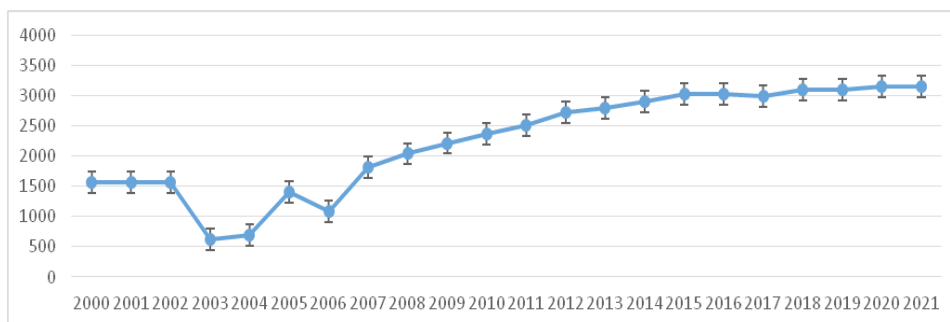


Fig. 2. The trend of vineyards by cultivated area between 2000 and 2021 in Mountainous-Shirvan economic region. Prepared by the author based on statistical data (Regions of Azerbaijan, 2022)

2.3.2. Ismayilli district

If we look at the statistical figures, we will see that Ismayilli district is ranked second in terms of the extent of grape cultivation areas. Thus, in 2010, 36% or 860.4 ha of grape cultivation areas in the region, in 2015 35% or 1048 ha, and in 2021 34% or 1089 ha fell to the share of the region (Table 1). During the period 2010-2021, grape plantings increased by 18% in 2015 compared to 2010, and by 4% in 2021 compared to 2015. In general, an increase of 21% or 228.6 ha of grape cultivation was observed in 2010-2021.

A decrease in grape production was recorded in Ismayilli district. In 2010, grape production accounted for 39% of the economic region, in 2015, this figure was 27%, and in 2021, it was 15%. Production decreased by 0.4% in 2015 compared to 2010. Overall, grape production in Ismayilli district decreased by 25.2% between 2010 and 2021, which is a high indicator.

The highest productivity of viticulture in the region was recorded in 2005, when the indicators were equal to 111.3 cents per ha. Between 2010 and 2021, the tendency of increase and decrease in the yield of grapes was observed. Thus, in 2010, productivity was 46.4 cents per hectare in the region, in 2015 it decreased by 23.4% compared to the previous 5 years, and in 2021 it decreased again by 42% to 26.5.

2.3.3. Aghsu district

Aghsu district is one of the districts of Mountainous-Shirvan economic district, which differs in terms of cultivated areas and production of grapes. Thus, when analyzing the size of cultivated areas, it is known that in 2010, 15% or 367.6 ha of grape cultivated areas in the region, 10% in 2015, and 4% in 2021 fell to the region. (Fig. 2). In the mentioned period, i.e. in 2010-2021, grape plantings decreased by 16% in 2015 compared to 2010, and by 2.6 times in 2021 compared to 2015. During the years 2010-2021, a sharp decrease of almost 3 times of grape plantings was recorded.

An increase and decrease trend in the production of grapes was recorded in Aghsu region. In 2010, grape

production was 17% of the economic region, in 2015 this figure was 18%, and in 2021 it decreased to 13%. Grape production increased by 37% (867.6 tons) in 2015 compared to 2010. Overall, grape production in Aghsu region increased by 65% between 2010 and 2021, which is a high indicator.

The highest productivity of viticulture in the region was recorded in 2011, when the indicators were equal to 66.7 cents per ha. Between 2010 and 2021, the tendency of increase and decrease in the yield of grapes was observed. Thus, in 2010, productivity was 16.8 cents per hectare in the region, in 2015 it increased twice compared to the previous 5 years to 35.3, and in 2021 it increased by 77% compared to 2015 to 62.4 cents. yet it has been.

2.3.4. Gobustan District

Gobustan economic district lags behind other regions in terms of viticulture planting area and production. So, according to statistics, Gobustan district ranked last in terms of the scale of grape cultivation areas. In 2010, 0.8% of the grape cultivation areas in the region, 1.4% in 2015, and 1.2% in 2021 fell to the share of the region. During the period 2010-2021, grape plantings increased sharply by 2.1 times in 2015 compared to 2010, and by 13% in 2021 compared to 2015, the share of the region is quite low when compared within the region.

In the Gobustan district, an increasing trend has been registered in the production of grapes. In 2010, grape production accounted for 5.7% of the economic region, in 2015 this figure was 4.5%, and in 2021 it decreased to 3.8%. However, if the share by region is not taken into account, grape production reached 500 tons in 2010, 572 tons in 2015, and 697.5 tons in 2021. Overall, grape production in Gobustan district increased by 38% between 2010 and 2021, which is a good indicator.

The highest productivity of viticulture was recorded in 2007, when the indicators were equal to 146 cents per ha. Between 2010 and 2021, the tendency of increase and decrease in the yield of grapes was observed. Thus, if in 2010 the productivity was 38.6 cents per hectare in the region, in 2015 it decreased by more than 2 times

Table 2

The modern state of territorial organization of viticulture in the Mountainous-Shirvan economic region and the main indicators for economic regions. Prepared by the author based on statistical data (Regions of Azerbaijan. 2022; Agriculture of Azerbaijan. 2022)

<i>Economic districts</i>	2010			2015			2021		
	Cultivation (ha)	Production (ton)	Productivity (cent.ha)	Cultivation (ha)	Production (ton)	Productivity (cent.ha)	Cultivation (ha)	Production (ton)	Productivity (cent.ha)
Aghsu	367.6	1449.3	16.8	307.2	2316.9	35.3	117.4	2389.9	62.4
Ismayilli	860.4	3393.9	46.4	1048.0	3408.0	37.6	1089	2711.0	26.5
Gobustan	20.0	500.0	38.6	43.3	572.0	18.8	37.6	697.5	47.7
Shamaxı	1125.3	3379.1	50.4	1632.8	6528.2	53.6	1919	12476.0	58.6

compared to the previous 5 years to 18.8, and in 2021 it increased by 2,5 times compared to 2015 to 47. It was 7 cents per ha.

3. Results and discussion

In the Mountainous-Shirvan economic region, the cultivation area of viticulture is different from other regions, but it is lagging behind in terms of production and productivity. Within the region, only Shamakhi and Ismayilli districts differ sharply. In both regions, the share of cultivated areas and production of grapes is quite high in the region. However, it is quite difficult to say the same opinion about Agsu and Gobustan regions. If we look at the cultivated area and the production, there are serious improvements in the mentioned period, but if we make a regional comparison, there is no significant difference in the direction of specialization of viticulture in the region (Fig. 3).

In Table 3, the general structure of farming in the region is given, and the place of viticulture among the farming habits of the population and the priority of farm areas were studied by ranking according to the cultivated area. As it is clear from the table, the reason why the Mountainous-Shirvan economic region cannot specialize

in viticulture is that it is not ranked first among the viticulture cultivation areas in the economic regions that make up the region, and it is registered only as the second cultivation area in Shamakhi and Ismayilli districts. These indicators have not changed in 2015 and 2021.

In Agsu and Gobustan districts, in 2015 and 2021, there was a serious change in the cultivation habits of vineyards among the population. Thus, the vineyards in Agsu district, ranked 3rd in 2015, dropped to 7th rank in 2021. In the Gobustan district, the situation is stable, and in both years, vineyards ranked 5th in terms of cultivated area.

4. Conclusion

During the research, the development dynamics of viticulture in the Mountainous-Shirvan economic region between 2010 and 2021 was studied. In the region-wide analysis, an increase in the area of grape cultivation was observed, but the expected result was not achieved in production. Along with the production of grapes, there is a decrease in productivity over the years. According to this indicator, the Mountainous-Shirvan economic region of Shirvan lags behind other

Table 3

Classification of Mountainous-Shirvan economic region according to the area of farming and farming habits of the population. The mentioned numbers indicate the position of the cultivated land in terms of scale, and zero indicates that the cultivated land is not available in the region. Source: Prepared by the author based on statistical data (Agriculture of Azerbaijan, 2002: 104)

Croplands	2015					2021				
	Shamaxı	Ismayılı	Agsu	Gobustan	Mountainous Shirvan	Shamaxı	Ismayılı	Agsu	Gobustan	Mountainous Shirvan
<i>Grains and legumes</i>	1	1	1	1	1	1	1	1	1	1
<i>Cotton</i>	0	0		0	10	0	0		0	10
<i>Tobacco</i>	8				9					9
<i>Sugar beet</i>	3				8			5		6
<i>Sunflower</i>	9				7					7
<i>Potato</i>	5	5	5	4	5			6	4	4
<i>Vegetables</i>	6	4	4	2	4		4	3	3	5
<i>Watermelon plants</i>	7				6		5	4		8
<i>Orchards and berries</i>	4	2	2	3	2	3	2	2	2	2
<i>Vineyards</i>	2	3	3	5	3	2	3	7	5	3

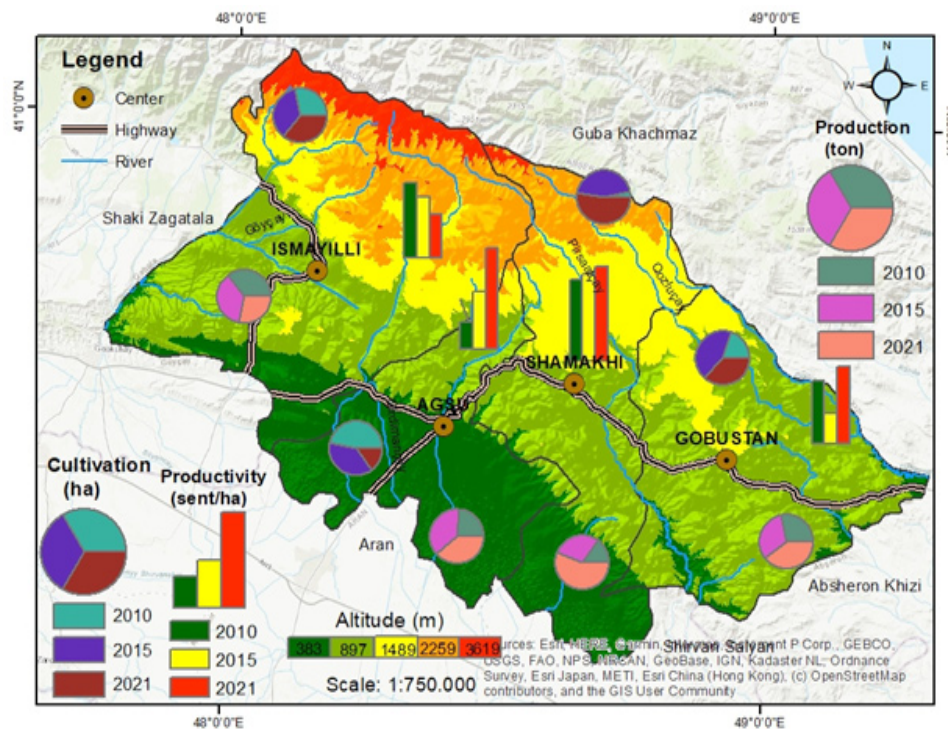


Fig. 3. Distribution of viticulture in economic regions of Mountainous-Shirvan.

Source: Prepared by the author in ArcGis 10.3 based on statistical data (Agriculture of Azerbaijan, 2002: 404)

regions specializing in viticulture and is not specifically specialized in viticulture.

Viticulture has declined in the last 21 years in some economic districts of the region. Grape production continued to decrease in other regions, except for Shamakhi region, the main vineyards of the economic region. As a result of the research, it was determined that grape plantings in Shamakhi district increased by 41% and production by 3.5 times. In Ismayilli district, although the increase of cultivated areas was recorded by 21%, the production decreased by 25.2%. The main

reason for this is that the productivity of vineyards in the region has decreased by up to 2 times.

When analyzed from the point of view of the farming habits of the population, serious changes have occurred in the agricultural fields in Agsu and Gobustan districts. There was a change in farm areas in both regions, and as a result, there was a decrease in the planting of vineyards. Although viticulture is considered more efficient than cereal crops and does not require more time to rest the soil.

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