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"DEFINING AREA'S WINE ID - SPECIFYING AREA'S ADVANTAGE"
Deliverable 3.2.1.: Recordng wine varieties & micro regions of production

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Този документ е създаден в рамките на проект „Разработване на идентичност на добива, почвите и местностите“/ДИОНИСОС, Договор за субсидиране B2.6c.04/01.11.2017 който се осъществява с финансовата подкрепа на подкрепа на Програма за трансгранично сътрудничество ИНТЕРРЕГ V-A Гърция-България 2014-2020, съфинансирана от Европейския фонд за регионално развитие и от националните фондове на страните Гърция и България. Отговорността за съдържанието на документа се носи от Институт по лозарство и винарство-Плевен и при никакви обстоятелства не може да се счита, че този документ отразява официалното становище на Европейския съюз и Управляващия орган.

Contents

The Project is co-funded by the European Regional Development Fund and by national funds of the countries participating in the Interreg V-A “Greece-Bulgaria 2014-2020” Cooperation Programme.

CHAPTER 1. Historical facts for the rise and development of vine and wine growth in the Haskovo and Kardzhali districts

1.1. Origin of viticulture and cultivation of the vine on the Bulgarian lands

Viticulture and winemaking have been and continue to be an important part of the history of the Balkan Peninsula. The grapes and the wine here have always been present at the table of local people. They have been ritually used for holidays, rituals, local customs and traditions of time immemorial, symbolizing the connection between the earth, the sky, the water, and the fire. Grapes and wine are symbols of the flesh, the blood, and the spirit. On substance and spirituality. For this reason, some customs have survived to this day, passed from generation to generation- from the era of the Ancient World, Thrace, ancient Greece, the Roman Empire and the Christianization of Europe. Evidence of the cult of the vine, its fruit - the grapes, and the fermented juice - the wine on these lands are numberless. This cult, according to archaeologists, was the most expressive of the Thracians. Testimonies can be seen by the dozens of discovered juvenile vessels, jugs, amphorae, boucles, goblets, rhytons and drawings, found during the excavations of tombs, fortresses and sanctuaries. They all show that the dawn of human civilization would not be so bright and full of myths and legends of heroes and gods, if there was no wine and paying tribute to his patron - the god of wine and joy Dionysus.

Patrick E. McGovern, in his book "*Ancient Wine. The search for the origins of winemaking*" (2009), notes that worldwide the number of varieties and clones of varieties selected today exceeds more than 10 000, as a consequence the development of the selection work, this list is constantly expanding. Much of them are cultivated and created through various selection methods: interspecific hybridization, inbreeding, selection of sustainable parents, clones of the best varieties, testing of affinities on different types of rootstocks, etc. The same author, cited by Bulgarian historian-archaeologists (*Marazov,* 2016*, Porozhanov et.al.,* 2017), claims that as a result of research in his laboratory he has proven the presence of wine chemical remains from Iranian pots dating back to about 7 400 BC.

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The same opinion is *Bot* (2010) quoting a number of scientists noted, that the cultivation and domestication of the grapevine appears to have occurred between the seventh and the fourth millennia BC, in a geographical area between the Black Sea and Iran. The grapevinevarieties grown in this region are gradually spreading in the Middle East, Middle East and Central Europe.

Todor Nachev (1981) in his rich scientific PhD work "*Vine Growing on the Bulgarian Lands from its Beginning to the 20th Century*", referring to more than 300 scientific works, summarizes, that during the Neolithic and Eneolithic /6-3th millennium BC/ on the Bulgarian lands there were the main factors determining the cultivation of the wild vine, the emergence of the basic, the first forms of the cultural vine *vitis vinifera sativa*. *D.C*. Such historical testimonies are the findings of charred grape seeds found near Lovech and Kardzhali proving the existence of some of the first cultural varieties of vines in the world. The local population has led a settled way of life in some caves, especially for the settlement, and along the river valleys that occur in northeastern Bulgaria, the sub-Balkan fields, the Thracian valley, Strandzha and Sakar.

From the archaeological excavations of the settlement mounds revealed that during the *Neolithic* and *Eneolithic* epoch, hoe work is already used in agriculture and was one of the main livelihoods for the local tribes lived at that time. The main agricultural tools were made of stone, horns and bones of animals (near by *Plovdiv* and *Stara Zagora*); horns with a groove for flint incisors. *Karanovski sickles* are from the early Neolithic and the oldest in Europe. Similar sickles are found in Asia Minor, Egypt, Northern Iraq, Persia and Palestine. From the same period dates and livestock. The sheep, the goat, the pig, the ox, were domesticated. The man used wool, skins, milk, meat, bones (*Mihov*, 1956; *Georgiev*, 1957). These data shows that from the 7th - 3rd millennium BC primitive agriculture and livestock permanently were part of the lifestyle of the man who inhabited these lands.

Favorable natural conditions such as climates, soils, waters are among the main factors and favorable to the cultivation of the vine on a certain territory (*Nachev*, 1981), and in terms of overcoming the production risk, the climatic characteristics of the region are the most significant (*Katerov et al.*, 1990).

Evidence of the existence of favorable climatic conditions for the growth of wild vines spread on the Balkan Peninsula during the *Neolithic* period was found in archaeological

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research findings of grape seeds dating from the same period in the present lands of Moldova (*Pelyach*, 1970), Bulgaria (*Kitov and Pavlov*, 1973), Greece (*Logothetis*, 1970; 1975).At that time, the presence of wild vine *Vitis vinifera silvestris*, near the Neolithic settlements is an important prerequisite for the cultivation of the vine in an area (*Nachev*, p.25). Wild vine was spread throughout our country: the Danube plain, the Black Sea coast, Southwestern Bulgaria, Thracian Lowland (*Stefanov and Kitanov*, 1962).

All that has been said here indicates, that in 6-3 thousand BC in Bulgarian lands originated the first forms of cultural vine *Vitis vinifera sativa*.

Nachev (p. 40-41), based on the scientific methods and published results of the studies of different authors, studies the grape seeds from Neolithic settlements in Kardzhali and in the village of Ezero /near Nova Zagora/. The results show that in southern Bulgaria, at the end of the *Neolithic* and the beginning of the *Bronze Age*/ the beginning of 3rd millennium BC / the cultivation of the wild vine was in an advanced phase and has already begun the cultivation of vines whose grape seeds bear the morphological features typical of the cultural vine (*Vitis vinifera sativa*). These vines closely approximate the local varieties of the ecological and geographic group - *prol. pontica Negrul*. Nachev's results from explored charred seeds of grapes from Lovech show that they date back to 1900-1500 BC (the beginning of the 2nd millennium), which proves that the local population in Northern Bulgaria has consumed grapes that resemble the grapes of local grapevine varieties: *Kokorko*, *Vinta*, *Mavrud varnensky*, *Garvan*, *Papazka black*, *Marash red*, *Pamid* and others.

1.2. Viticulture and wine making in the Bulgarian lands from Antique world to the late XX century

1.2.1. Viticulture and wine at Thracians of I-st millennium B.C. to VI century

Today's territory of the Balkan Peninsula was inhabited by 3 main ethnic groups - to the west - the Illyrians; the eastern parts and northwest coasts of Asia Minor - the Thracians, the southern part of the peninsula, the western coasts and the Aegean islands - the Greeks (Nachev).

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Porozhanov et.al., (cit., p. 179), based on literary sources studied by them, suggests that the earliest evidence of the use ofcultivated vines in the Thracian lands ofSoutheast Europe was obtained atarchaeological sites in Thrace datingback to the 3rd millennium BC. In the second and especially in the1st millennium BC archaeological datawas much more. In the1st millennium BC the source data of allkinds showed growing vines, winemakingand drinking thick unmixed with waterwine as one of the characteristic featuresof the Thracians. Furthermore, in thecultivation of vines and drinking wine,rites related to divine protection of fertilityand health are documented. The same authors, based on ancient written sources, illustrate the attitude of the Thracians to the cultivation of the vine and wine drinking:

1.The oldest evidences are theHomer's ones (IX-VIII c. BC). They referto the second half of the 2nd and firstcenturies of the 1st millennium BC. In Iliad, telling about the Trojan War (13th century BC), when talkingabout the Achaeans under the walls ofTroy (Anatolia), he gave information thattheir tents were full of wine, brought fromThrace (Europe) across the wide sea(Homerus, Ilias 9, 72), as Phrygia in AsiaMinor was called rich in vineyards (Homerus, Ilias 3, 184). But in the*Odyssey*, we present the Thracian priestMaron (Europe), who endowed *Odyssey*with goat winebag with sparkling red wineand 12 huge amphorae with sweet winewithout admixture - a wonderful drink -sweet as honey wine that he mixed withwater 20 times as much and a pleasantdivine fragrance scattered (Homerus, Odyssea, 9: 196-205).

2. *Plato* (427-347 BC) in his workLaws said that „...the Thracians, ingeneral, drink wine without mixing it withwater, both they and women, sprinklingtheir clothes with it, consider this as agood custom, bringing happiness."(*Platon*. De leg. 1, 637 d).

It is obvious that the Thracians, unlike the Greeks, do not dilute the wine with water. Moreover, sprinkling clothes with wine is a ritual = a good custom that brings happiness, undoubtedly related to health and rich crop, i.e. with the God Dionysus. Here, both the specifics of wine and the climatic features should be taken into consideration (*Porozhanov et.al.*, cit., p. 180).

The same authors conclude that the ancient Thracians have their own nameof wine. This is the word *zelas*, which is different from the Greek *oinos* and the Roman *vinum*and shows a very old own millennial tradition of wine growing and wine use. The authors areemphatic that the wine is permanently present in the rituals, in theeveryday life, in the festive cycle and

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the ceremony of the Thracians in ancienttimes, which makes determine the ancient Thracian territory as one of the cradles of the vine grouing, wine culture and cult of wine.

Prof. *Ivan Marazov*, a prominent scholar-tracologist (2016), states that the Thracians were connoisseurs of good wine, and this quality is recognized by the entire Antique world.It was therefore believed that the god of wine Dionysus was born in the lands of Thrace.The third generation of his Thracian dynasty is presented by Orpheus.The legendary King of *Cicones*, Maron, was a son (or grandson) of Dionysus himself.

These traditions have been handed down over the millennia to today, and have continued in folk beliefs, legends and rites. Bulgarian folklore has inspired a second life of the sacred past, reviving the vine and wine again, linking traditions as a bridge between the past and the future.Prof. Marazov wrote (2016):

"*Winery is a tradition not only with a past but also with a future. It has not interrupted these lands for more than five millennia. The steps of Dionysus resound today and its "divine drink" keeps its fragrances in his lands. There is hardly any other area of folklore where the Thracian pagan tradition, such as wine-making or, rather, wine-drinking has been preserved. There is a real "civilization of the vine and wine" that goes beyond the technological dimensions of its production and preserves itself in the nature of the holidays created by it. This attitude to the wine and the customs associated with it, proving that the old traditions are still alive. Because wine is a fire, flesh, blood, life. There is no official calendar or personal holiday, there is no meeting between relatives or friends that is not celebrated with a glass and a toast. And if one can claim some continuity between the ancient Thracians and the Bulgarians today, it can be sought in the general and enthusiastic attitude towards to the wine. Blood is thicker than wate, says a Bulgarian proverb.But it seems to taste wine is transmitted through blood*".

As a result of the specific natural, ethnic and production conditions, four wine-growing regions have been formed in ancient times (Roychev, 2012):

- Thracian (South) - formed in the beginning of the first millennium B.C. and covers the regions between Stara planina, Rhodope, Sakar mountain and Strandja. The most popular varieties are Pamid and Mavrud.

- Pontius (Eastern) - the second half of the first millennium B.C. and includes the lands along the Black Sea coast.The main varieties are Dimyat and Misket red.

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- Macedonian (Southwest) - from the 5th century B.C. up to the 3rd century and occupies the lands around the Struma and Mesta rivers, with varieties Broad leaved vine (Shiroka melnishka loza) and Keratsuda.

- Mizian (North) - from the 1st to the 4th century and occupies the lands to the north of the Stara planina to the Danube River.The main variety is Gamza, and Kocorco is less common.

1.2.2. Viticulture and wine in the First and Second Bulgarian State VII-XIV century

After the conquest of the Balkans from the Roman Empire, the viticulture and wine-making continued their development, and according to some information from this period, the cultivation of white vines on the Black Sea coast, especially around Achyalo and Mesembria (present-day Nessebar) (*Borislavov*, 2009).

A number of historical testimonies and sources prove that the vine and the wine were an important part of the lifestyle of the Proto-Bulgarians and the Slavs during the Middle Ages - from the foundation of the Bulgarian state (681) until its fall under Ottoman domination (1396). At *Khan Krum* (811) a special law against drunkenness was created. Following the adoption of Christianity as the official religion in 864 has stimulated viticulture and winemaking. Wine was a distinctive sign of well-being. This is mentioned in some documents (*Borislavov*, cit., P.55-58) - King *Peter I* (reigning the X-XI century, in the "Anonymous Bulgarian chronicle"), in “Shestodnev” (lat. *Hexaemeron*) by of John Exarch.In the „Gospels” of Tsar *Ivan Alexander* (XII-XIII century), a depicted miniature of cutting a vine with a koser[1]. In 1205 Count *Geoffroy de Villeardouen* and his knights, participants in the *IV Crusade*, found “…a magnificent wine in Assenovgrad”. The *Mavrud* (an old local variety), which the Crusaders tried, made them generous, and they spared the town and its inhabitants by pogrom. According to some studies, the wines from Melnik and Plovdiv in XIII-XIV century were traded in Dubrovnik.

During the Middle Ages in the *Bachkovo Monastery*, according to a typic from the end of the XI century, was given to the monks four cups of wine daily ration, and to the bigger holidays, such as Easter and Pentecost from six to eight cups. According to found clay cups of

[1]Koser - a type of Thracian viticulture tool similar to a small sickle.

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this age, the glasses have been with approximate volumes of 180-230 milliliters (Borislavov, p. 57).

1.2.3. Viticulture and wine during the period of Ottoman Empire XV-XIX century

At the beginning of the period viticulture almost lost because Islam bans the use of alcohol, including wine. The Bulgarian aristocracy has been destroyed, as well as many monasteries - the main producers of grapes and wine. However, information from the lawyer of *Mehmet II*, *Selim I* and *Suleiman I*, suggest that viticulture and wine within the empire were highly developed and, that the Ottoman law has had a positive attitude towards to the vineyards, the grapes, must and wine. According to *Nachev* (p. 109) positive attitude is dictated by the fact that the Empire was developed viticulture and wine for millennia, with very suitable soil and climatic conditions. The other reason is that the local population has been experienced in growing vines and making wine. The third reason was the lack of mildew and phylloxera. This was undoubtedly favorable for growing vines with little labor and resources. The Ottoman laws patronized the cultivation of vines - mostly table grapes, because grapes were a favorite fruit, and for Muslims and Christians, made syrups, sweets, jam. And the wine was taxed on the fact that it was produced and traded, and so it entered considerable funds in the Turkish treasury. A *tithe tax*(one-tenth part of something, paid as a contribution) on the vineyards of some farmers with developed viticulture reached up to 40% of the tithe of all plant production (ibid., p.110).

More testimonies of Bulgarian wine have given travelers, prisoners of war and adventurers, who passed through the lands of the Ottoman Empire. For example*, Adam von Kielsheim* (1616) said that "From Belgrade to Constantinoplethere is a little nice wine". But in the 60s and 70s of the XVII century there has noticed the rise in Bulgarian wine.French diplomat *Charles Peysonel* in his “Tract for Trade around the Black Sea” noted that “*Bulgaria produces too much red wine, but poor quality. Every year there are 5000-6000 cars from Russia and Poland to load these wines*”(*Borislavov*, p. 59-61). Here you can see a contradiction in the judgment of the French diplomat, that defines wine as "poor quality", while traded thousands of liters of wine.If the former is true, it is not possible for the second to happen, because wine was bought for thearistocracy and the rich in those countries. This evaluation should rather

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be seen as a sign of existing competition and leniency to wines from Eastern Europe at that time.

A little later in 1706, a compatriot of Peysonel, the french doctor *Paul Lukas*, made a compliment to the *Stanimashko wine* (wine from Asenovgrad). He was heavily impressed by "*local wine that is magnificent*", as well as by the size of the wine crates - barrels used by the local winemakers. This shows that the scale of production have been great and the wine was intended for trade, even locals wineries exported outside the empire (*Borislavov*, s.61).

During the Bulgarian Renaissance, with the opportunity offered to bulgarians to buy land in the 30s and 40s of the 19th century, the areas with vineyards increased. The wealthier Bulgarians have developed the wine trade, mostly for Austro-Hungary, Romania, Poland, Russia. Several specialized wine regions have been formed - Vidin, Pleven, Veliko Tarnovo - for red wines of the *Gamza* variety; Chirpan - variety of *Cherven misket*; Asenovgrad - *Mavrud*; Melnik - variety *Shiroka Melnishka vine*. *Georgi S. Rakovski* (1860) gives advices on how to grow vines, which vine varieties are appropriate, how to cut, etc.In addition, a great number of emigrants emigrating outside Bulgaria transmit their knowledge and experience to the Austro-Hungarian Empire and Moldova.

1.2.4. Viticulture and wine until the end of the 20th century

According to *Batakliev* (1927), the total area of the vineyards in Bulgaria until the Bulgarian Liberation (1878) was about 50 000 hectares.

After the Liberation, according to *Georgiev* (1898) for 1888 and *Sirakov* (1909) for 1897, the total area of the vineyards was -71 730 hectares and 114 815 ha respectively.After the phylloxera invasion, the areas were reduced to 41700 ha in the next 20 years (1917). After overcoming the phylloxera crisis in the 30s of the 20th century viticulture and winemaking emerging as high-yield sector in many regions of the country. The area of vines reaches 136200 ha. (Marinov, et.all., 1995)

In the 60s of the 20th century vine growing has a new upsurge and the area reaches over 220,000 ha. At that time the first and only up to now zoning of the viticulture in the country was made.Some local varieties are replaced by introduced, mainly French grape varieties, cuch as Chardonnay, Sauvignon Blanc, Merlot, Cabernet and others. But in the 70s

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and especially in the 80s Bulgaria begins to lose markets and areas under vines decreased by almost half (Katerov, et. al., 1990). At that time in Haskovo region is defined as an area favorable for cultivation of Merlot variety, with areas of this variety reaching half of all varieties.

1.3. Artifacts related to viticulture and wine production

The wealth of artifacts is the basis for the development of tourism in many of its varieties - cultural, historical, rural, wine and more. By artifacts Bulgaria ranks 3rd place in the world after Greece and Italy. These artifacts are a sign of the high material culture of the peoples inhabiting the Balkan Peninsula - Hellenes, Thracians, Romans, Slavs and Bulgarians. Most of these finds are related to viticulture and wine-making: tools, stone wineries, written monuments. Vine and wine have been inextricably linked to the traditions of the Thracians. Evidence of this is the rich and unique treasures - the *Pangurishte gold treasure*, the *Rogozentreasure*, the *Vulchentyn treasure* and others, showing a unique with its jewelery vessels used to drinking wine. These vessels are made with craftsmanship, difficult to apply today, even with modern equipment. The *golden mask of the Thracian king Teres* dates back to the 6th century BC. (discovered by *Georgi Kitov*), *Perprikon* - sanctuary of the Thracian, sanctuary of Orpheus nearby Tatul, reveal the cult of the Thracians to the god of wine – ZAGREY, honored later by the Hellenes and known to the world as Dionysus (*Dimitrov*, 2014).

More than 250 gold, silver and bronze *phialas*[2] (more than half of the finds dating back to the Ancient World) are of Thracian origin, found in the territories of Southern Ukraine, Romania and most of them in Bulgaria. The Thracian jugs, with which the wine was spilled on the phialas, make up about 1/3 of all found in the world - 90 units. The relative share of the *rhytons* is also large - a total of 40 units found on the territory of our country. In Thrace were found more and precious amphora-rhytons, some with strange structure (*Marazov*, ref, p.20). Furthermore, the signs of high culture and attitude to the vine and wine are also reflected in many other monuments - plate, drawings, reliefs, vessels, coins with grape and wine subjects, detected in all parts of the country (*Borislavov*, ibid).

[2]Phialas -a low cup used for liquids in sacrifices

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1.4. Artifacts and tourist sites in the districts of Haskovo and Kardzhali

One of the richest and still less thoroughly studied in the field of archeology and ethnography, is the region of Southeastern Bulgaria and more specifically the geographic area of the Eastern Rhodopes, the rivers Maritsa and Arda and Sakar Mountains, entering the administrative boundaries of the districts Haskovo and Kardzhali.

Undoubtedly the warm Mediterranean climate and beautiful nature have been attractive for living since prehistoric times. Cultural layers in these lands from different eras continuously provide information about how they lived, what were the manners and customs to this day. Much of the archaeological sites have not been fully explored, along with them there are newly discovered. All of these historical sites apply for funding to continue the studies have yet to discover their items, treasures, rituals and secrets to the world.

The lack of the most popular and most visited in our country - sea and ski tourism in the districts of Haskovo and Kardzhali, can be compensated and imposed as a destination for cultural and historical tourism, with an emphasis on the archaeological sites and natural landmarks. These places, with their beautiful nature and accessibility, are increasingly attracting tourists, and tourism can become one of the main sources of income and the creation of socio-economic synergies. Found dolmens, sanctuaries, remains of settlements, fortresses, churches, monasteries, etc. on these lands, prove that besides to a strong socio-economic life, spiritualism has also taken place. Vine and wine have always been part of the everyday life and traditions of the population on these lands.

The sacred Rhodope Mountains are alive, because is the intertwined the spirit of Thracians, Hellenes, Romans, Proto-Bulgarians and Slavs. The ancient gods and demigods, mythical heroes, fairies and beautiful daughters of the Rhodope Mountains still roam and live in it.There still hear their echo, their laughter. They dance around the sacred altars under the music and songs of Orpheus. They glorify the love of Orpheus and Eurydice. Eat from served gifts and drink the wine of Dionysus, wine harvested and aged in the hills of these mystical lands.

The territory of the Eastern Rhodopes and Sakar is dotted with sanctuaries, fortresses, hamlets and numerous stone facilities for the production of wine -*sharapani*, belonging to the ancient Thracians. Such sharapani were found and researched in the Megalithic Complexes

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near the village of *Kovil*, Krumovgrad municipality (img. 1) and the village of *Gorno Briastovo*, Mineral Bani municipality (img. 2). Sharapanas are dated by carbon analysis and refer to VIII-VI c. BC (Geleva-Tsvetkova, 2016).

A) Tourist sites related to viticulture and wine production

Image 1. Sharapana, village Gorno Briastovo / Sourse: https://privojda.com

The area of Sharapanite is located above the village of *Gorno Bryastovo* and is named after the preserved monuments of the ancient Iron Age in the region, representing sharpani or wineries (images 1 and 2). Sharapanas are carved in rocks in the form of circular or rectangular trays with a depth of up to 0.60 meters and a diameter of up to 2 meters and have drains for drainage of the liquid. Two by two troughs placed one below the other, are connected with a chute. Another similar sharapana dated from the megalith is found near the village of *Kovil*.

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Image 2. Sharapana, Megalithicsettlement, village Kovil / Sourse: Wikipedia.bg

Perperikon is an archaeological complex located 15 km from the town of Kardzhali.It was inhabited 8000 years ago, during the Stone Age, after which under the Thracians grew up in a sacred rock city, and later there lived Romans, Byzantines and Bulgarians.Perpericon was destroyed by the Ottomans in the 14th century. Today, there can be seen the remains of the ancient city of Perperikon, the tomb of the rulers, monuments from the antiquity, remains of a medieval fortress. Perperikon is the largest megalithic complex on the Balkan Peninsula. The studies in Perperikon (img. 3), near Kardzhali, in recent years prove that the whole area of the sanctuary is full with thousands of wine presses cut in the rocks, the majority of which are underground. Here was made the sacred fluid of God Dionysos in these mysterious pools, overflows and carved canals. With this wine the rituals and prophecies in the temple were carried out,and in the *days of Dionysos* Thracian clans performed wild orgies in drunkenness of the red drink. It is believed that Perperikon was one of the sanctuaries of god Dionysos.

"... When Octavian, the father of August, led his army somewhere in the distant parts in the ***Holy Mountain of Dionysos****,he questioned the god's oracle about his son, it was confirmed by the priests that his son would become master of the whole world, since wine was spilled over the altar, a smoke rose up over the top of sanctuary up to the sky, a sign such as what* ***Alexander the Great*** *himself received when he sacrificed the same altar."*

Gaius Suetonius Tranquillus

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Image 3. Perpericon / Sourse: perperikon.bg

Tatul is one of most magnificent megalithic monuments founded on our territoriesis. It is Thracian sanctuary located near the village of Tatul, just 200 m away and about 15 km from Momchilgrad.

Image 4. General view of the sanctuar–Tatul / Sourse: own archive

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The sanctuary is a rock massif and its the top - a truncated pyramid. The complex consists of two sarcophagi, a quadrilateral bed for the main altar and a three-meter well. It dates from the end of the 5th and the beginning of the 4th millennium BC. Evidenced for it is found pottery in the region (image 4 and image5). The rock pyramid and the tombs around it were formed in the 18th - 11th c. BC, when the sanctuary experienced its first big heyday.

Image 5. Carved grave cut in the Rock, II-nd millennium B.C / Sourse: own archive

There is a circle of clay altars on which the sacrifices were made around. There are found hundreds of cult objects - clay human idols and spindle of vertebrae, samples of vessels, objects of bronze, images of the Sun God. During the excavations in 2004-2007, there were found unique clay objects related to cult of the Sun- three wheels for models of the *Heavenly chariot* and part of a golden mask.In 2011 it was conducted campaign "*Wonders of Bulgaria*" was held and after an electronic vote and ***Tatul*** was selected as one of the 10 wonders of Bulgaria.

Numerous archeological monuments and artifacts are undeniable testimonies, that in the Balkan Peninsula, and in particular the area surrounding the Eastern Rhodopes, Arda and Maritsa rivers and Sakar Mountains and in northern Greece and the Aegean, proving that the cultivation of the vine and wine making in Europe, conscious human activity first were originated and evolved in these places.

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Cultural and historical evidence and facts related to the development of viticulture and wine production,in themselves represent a unique competitive advantage for the districts of Haskovo and Kardzhali,which is still insufficiently used, both in towards attracting more tourists and in promoting local wine production. This is an enormous opportunity for the two border areas to offer and advertise wine tourism in these places. The combination of tourism products and services on both sides of the border will create a much richer and diverse opportunities for recreation and enrich the image of the region as a destination for tourism.

1.5. Development of wine tourism in Bulgaria

For the economic benefits and dimensions of wine tourism, it is difficult to write and speak, but already in several world-famous wine-growing areas such as *Bordeaux*, *Champagne* (France), *Porto* (Portugal), *Napa Valley* and *Sonoma Valley* (California) *La Rioja* (Spain) attract thousands of tourists annually with this activity. The main purpose of visiting these tourists is the wine, which gradually unfolds on the basis relation "***terroir- vineyard -winemaking – wine***". All of this provokes a wide variety of offers - from tasting, touring the cellars, walking in the vineyards, nature, cooking courses, "do-it-yourself" wine, to relaxing in wine-spa centers. Gradually this "fashion" and its positives wich carries, have seen increasingly well in Bulgaria.

If we follow the real development of this kind of specialized tourism in Bulgaria, the beginning is still in the 70s and 80s of the XX century (Tzakov, 2011). At that time visits and tastings were organized for foreign tourists whose site was located near the Black Sea coastal cellars near Varna, Pomorie and Burgas. The idea of this type of visit was tourists to learn about the history, traditions and local culture related to our native wine, thus has expanded the proposed package. *Tsakov* (2011) points out that ***the beginning of organized wine tourism in Bulgaria can be determined in 1975 in the Lyaskovets winery***. *Liaskovets Winery* welcomed tourists, led by the state-run tour operator *Balkatourist*. At the beginning they are offered mostly pure varietal wines for tasting, and a little later the program has gradually expanded to include a tour of the manufacturing facilities of the company.In 1985 the winery was organized "Wine Museum".

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Since the 90's of the 20th century and in other regions of Bulgaria began the development of wine tourism, following the global processes of demand and supply, as a new marketing and management decision to improve the realization of the production. After the privatization and modernization of the wine industry, some owners of wineries have invested in the creation of a hotel and organize wine tours. The first pioneers are *Damianitsa* (Petrich), *Black Sea Gold* (Pomorie), *Vinprom - Asenovgrad*, *Todoroff* and *Villa Vinifera* (Brestovitsa, Plovdiv). New wineries such as *Katarzhina* (which is in the area of Haskovo), *Bessa Valley*, *Starosel*, *Chateau "Medovo"*, etc., also included wine tourism as a new business opportunity (*Alexieva*, 2009).

According to the National Vine and Wine Chamber in Bulgaria, by 2018, 310 cellars have been registered.Wine tourism offers nearly 63 cellars in 2008, 100 cellars by the end of 2014, and by 2018 their number is 115.I.e. almost double increase compared to 2008. Of these, only 12 cellars offer accommodation for 2014 (Terziyska and Georgiev, 2014) and now by 2018 they are 18. The main services offered by most wineries are tasting, eating, lecture by an oenologist, visiting their own vineyards and purchasing wine and souvenirs from their own shops (Dimitrov, 2014).

Specifically, in research from Bulgarian side under a project DIONYSOS the area of Haskovo and Kardzhali districts is that here wine tourism has also been offered for over 15 years, by some wineries such as: Katarzhina, Castra Rubra, Chateau Kolarovo and others, still opening their doors for visits. The cellars located along the Maritsa River between Sakar and the Rhodopes offer various interesting and attractive products, which will be discussed later.

1.6. Wine Roads

There are already numerous of scientific evidence and economic examples of the fact that economic unions in the form of "*Wine Roads*" carry a number of socio-economic benefits. The creation of "Wine Roads" is a prerequisite for achieving a multiplier effect and sustainability not only for the members of this type of cluster, but also for the region in which they operate by using both endogenous and exogenous competitive advantages of companies.In our survey conducted with the management of 20 cellars on the territory of Bulgaria in 2014 (*Dimitrov,* 2014, p.143)one of our questions in a survey - "does your cellar

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participated in clusters or another type of wine tourism association?", 30% answered "Yes", 25% answered "No" and the remaining 45% "Not participate". This proves that the association between winemaking enterprises is still at an early stage of cluster formation and is about to developing in this direction. *At the present time of this research project DIONYSOS '2018, on the territory of both regions Haskovo and Kardzhali still no established and functioning joint tourist product of wine tourism as a "Wine Road".*

Attempts to create wine roads

In Bulgaria, following the example of the leading countries with a well developed wine sector, offering wine products "Wine Roads", attempts are also being made to create such networks. Such experience is the initiative of the *Regional Chamber of Viticulture and Wine (Trakia)*, part of the *National Vine and Wine Chamber*. The project launched in 2007 and named "1333 Small Wineries" Program. The ambitious project is aimed at creating, promoting a business initiative and developing "Wine Roads", mainly in Central South Bulgaria. The program outlines several basic steps for the realization of the project idea, which are:

- ✓ Giving assignments for building vinification capacities;
- ✓ Organizing seminars for professional training;
- ✓ Establishment of a trade department for the National Vine and Wine Chamber, which liaises with the tour operators and the "Wine Roads" Administration, in order to attract and manage the tourist flows;
- ✓ Development of a strategy for the sale of the produced boutique wines, which includes the production and printing of labels, marketing researches, advertising activities in the country and abroad;
- ✓ Building and participating in the activities of the Regional Partnership Center in terms of funding under various EU Operational Programs.

In June, 2105 we conducted an interview with Mr. *Konstantin Madjarov*, President of RCVW-Trakia, under whose initiative the project started. He said that during this period he had relied on technical assistance from the Ministry of Tourism for identifying the tourist sites to be included in these 9 routes - the *Road of Bdin*;*Strimon*;*Orpheus*;*Dionysius*; *Etar*, *Hemus*;

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Madara;*Odessos* and the *Ancient Road of Thracian wine (F*ig. 1*)*. Three of these routes - *Orpheus Road*, *Dionysius Road* and *Ancient Road of Thracian wine*passing through the city of Plovdiv, with the tourist base including over 50 hotels, balneological sanatoriums and other resting places. The project also plans to build 15-20 new hotels. There is information about all the natural and cultural-historical landmarks of this Roads of all member municipalities. According to Madjarov, the problem is that there is no legal regulation and support for the economic initiative on the part of the state, and this is an obstacle to network development. Other problems are that tour operators are not aware of how to determine the routes and the number of wineries in the visit. This often leads to confusion and contradiction between cellars and tour operators. As can be seen on the map of RLWK-Trakia, two of these routes are planned to be on the territories of Haskovo and Kardzhali districts. Even a small part of the route "Orpheus Road" crosses the territory of neighboring Greece.

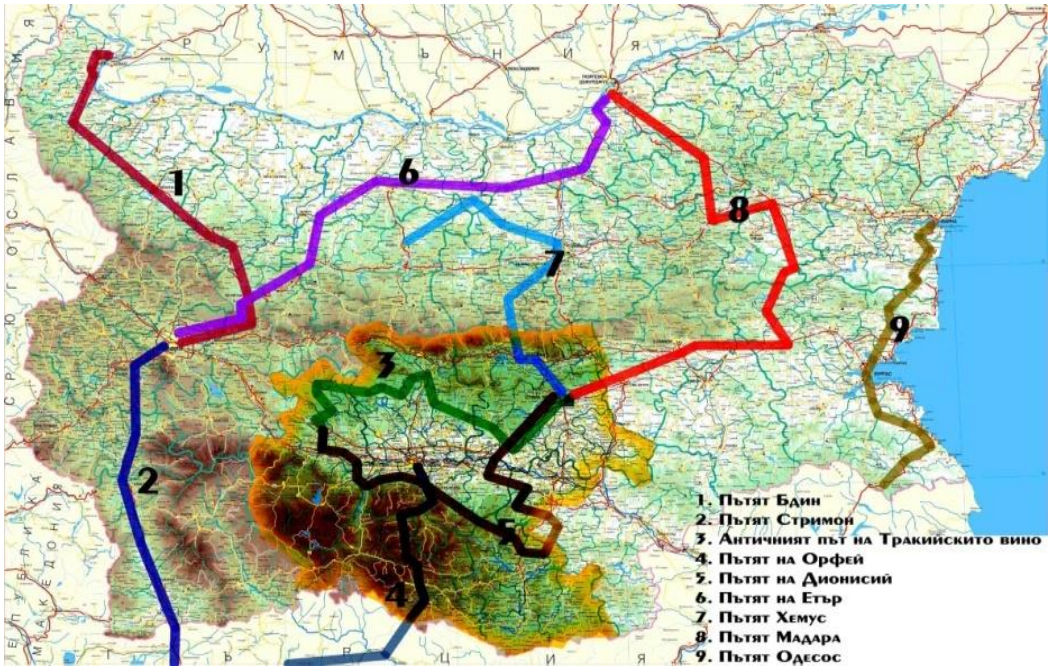

Figure 1. Map of Wine Roads in Bulgaria, publ.by RLVK-Trakia

Legend: 1. Road Bdin; 2. Road Strimon; 3. The Ancient Road of Thracian wine; 4. Road of Orpheus; 5. Road of Dionysius. 6. Road of Etar; 7. Road Hemus; 8. Road Madara; 9. Road Odesos

At the time of 2018, a joint idea is being developed to create and organize "***12 wine-culinary destinations throughout Bulgaria***". The initiative is part of project of Ministry of Tourism –"***Find and Share Bulgaria***", developed jointly with Ministry of Agriculture, Food and

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Forestry. At the end of 2018 this is expected to outline the two ministries and offer *12 wine-culinary destinations* covering the entire country. One of these future destinations is proposed to cover the region of Sakar - Topolovgrad, Harmanli, Lyubimets and Svilengrad[3].

It is clear that there are already some initiatives in creating cluster associations in the form of "Wine Roads".It is important, however, than private initiative by stakeholders (cellars, tour agents, tour operators, business, institutions, science) will have technical and financial support from the state in the face of municipalities and ministries.

In the studied areas - Haskovo and Kardzhali districts there are all factors, conditions, facilities and infrastructure for the creation and functioning of complex regional tourism products of wine tourism in the form of "Wine Roads". Wine cellars, convenient roads, tourist infrastructure, nature, cultural and historical heritage and traditions in viticulture and wine-making are opportunities and potential for sustainable development.

The organization of Wine Roads in Bulgaria should be based both on the production of quality wines, terroir and tourist potential of the regions. This requirement fully corresponds to the outlined 51 micro-regions for the production of quality wines with PDO and PGI.In some of the micro-regions there are only one or two cellars. The solution is to combine several micro areas in a tourist product as Wine Roads. A problem is rather in building a partnership to create a common, aggregate tourist product,which can enter different by economic status, business activity and non-profit entities,united around one product - the wine produced in the region. At the same time, all products associated with wine,tourism activities and services need to be standardized in a certain way in terms of quality, as covering those standards be subject to constant monitoring. It is necessary to adopt and introduce certain rules and procedures, which must be respected by all members of such an organization. There are already such well-functioning Wine Roads, and European practices show that only good relations and relationships between partners have a success in attracting and serving tourists. Cross-border areas, although they are far from economically more advanced centers, can attract tourists with exactly this kind of partner networks. Once built and established good connections and relationships can be added or improve existing products and services. Tourism and wine together create the conditions for diversification - combinations between

[3] http://bnr.bg/post/101002285/razrabotenite-12-vineno-kulinarni-destinacii-na-teritoriata-na-balgaria-shte-badat-obaveni-prez-esenta

wines and all types of tourism offered in cross-border regions. On the other hand, individual wine micro-regions can derive a number of benefits, if they specialize in the production of wines from local varieties that will be substantially different in aromas, flavors and character of West European wines. Tipical localwines madefrom local grape varieties (such as Gamza, Dimyat, Pamid, Keratsuda, Tamyanka, Mavrud and others), with typical local food combined with local holidays, panoramic tours, visiting local attractions will help enrich tourists with local culture and leave a lasting impression. Also, this kind of activities will create the opportunity for higher incomes and synergies. The traditions in the border regions will be maintained and developed.

The state has a very important role in the development of such networks, which should initiate and possibly assist mainly with financing and advertising Wine roads.

These European practices are not the only ones that show a purposeful policy in the imposition of wine tourism, along with wine tourism and the development of many other related activities. And Bulgaria and Greece are already members of RECEVIN and provided that they jointly implement collaborative products based on wine tourism, is a good prerequisite for future cooperation. Moreover, at the *International Wine Tourism Conference* held in Budapest, Hungary in April, 2018, part of the tourist companies specializing in the organization and supply of wine tourism are interested in the wine and culinary tourism of Bulgaria and Greece.

1.7. Wine festivals and exhibitions in Bulgaria

In our study (*Dimitrov and Dimitrova*, 2015) we draw attention to the fact that despite the increasing popularity and admirers of wine tourism, it is still not so popular in Bulgaria.The reasons for this are complex - lack of advertising, there are almost no clusters between those interested in the development of this type of tourism, regional and state support. There are generally no regional and state policies that can give a significant boost to enotourism, as is already known. Such support could be a purposeful and long-term tourism policy. Most tourism policies and strategies are based on regional development policies. In European rural development policies, the major role that tourism can play in their development is crucial. Some of these regional strategies for growth in wine tourism, referring to organization of wine

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festivals and events (*Taylor*, 2006). And precisely such a role can play wine tourism, as part of rural tourism products (*Marques*, 2006, cit. by *Tomljenovich*, 2006).

Wine Festivals and Wine Holidays

In the past 15 years, holidays and events, focusing on the vine and wine and the traditions and customs of the local population associated with them, have begun to take place in some regions of the country.

One of the most traditional and celebrated Bulgarian holidays is the *Feast of the vine-grower and winemaker*, whose patron is ***St. Trifon-Zarezan***. The holiday is celebrated at 1.02. (new style), but in most wine-growing regions of the country is celebrated on 14.02 (old style). The men go to the vineyards, and where they are cut off (cutting old shoots on the vine). Then they are watered with red wine, which symbolically "heals" the wound to make the crop more abundant). On the feast traditionally women get up early to prepare bread, appetizers and wine. The men go to the vineyards by cutting down the vineyards, and where they are cut off (cutting old shoots on the vine) they are watered with red wine, which symbolically "heals" the wound is more plentiful harvest. A priest prays to the Lord. The priest is for a good year and a plentiful harvest. Under the sounds of folk music all play people on the square. Drinking a lot of wine is a tradition in honor of the protector of St. Trifon-Zarezan. It is believed that the feast was celebrated in Antiquity by the Thracians in honor of *God Zagrey* - the god of wine, or as the Greeks have borrowed from them and called it - Dionysius.Later, with the acceptance of Christianity, the rituals, customs, and symbolism that the Thracians have expressed have been preserved. The holiday was not chosen by accident at this time of year. Then the weather gets warmer and begins to grow on the plants, including on the vine. This is the beginning of the biological development of plants. So Saint Trifon-Zerezan is a symbol of the reviving life, of the new.*Krasteva and Rafailova* (2009) report that in some parts of Bulgaria the feast is known as "*Carnival of Wine*" (Yambol), but is more popular as "*Cutting*" (Ivaylovgrad; Brestovitsa, Plovdiv).

In Melnik since 2012, every year the *Melnik wine festival* "*Golden Grape*" is held. Festival is held in early February, as guests are provided with the opportunity to enjoy Melnik's wines and appetizers produced in the region, combined with the folklore of the Pirin region.

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In the village of Brestovitsa (Plovdiv district), in the year 2018, on 18 and 19 September, an eighth edition of the International Festival "*Brestovitsa - Grapes and Wine*" was held. The festival is organized by the Municipality of Rodopi, Local Initiative Group (LIG), local wineries and non-governmental organizations. The main purpose of the festival is to popularize the local livelihood of the village of Brestovitsa - viticulture and wine making, and preserving the folk traditions and customs.

Like the French wine *Beaujolais nouveau* (a type of young French red wine), the city of Plovdiv has imposed its own festival and a reserved trademark of wine tourism - the "Young Wine Festival". For the first time the festival started in 2009 and gradually became one of the biggest cultural festivals in Plovdiv. It was founded on the initiative of the Council of Tourism - Plovdivand cellars in the region. The festival is held in the end of November every year, as wineries from all over Bulgaria present their wines. In the cultural program of festival there are various events - Dionysius procession, walk in Lipidarium, dance attractions, fire spectacle, concerts, exhibitionsand films. All combined with the taste of the young wines offered. In the current 2018, the festival will be held for the ninth time at the end of November. This year over 40 wine producers from all over the country are expected to participate with their new production. Organizers say the event has grown to a seven-day festival, with more than 60,000 visitors annually, according to official data.

At the end of July 2018, the 5th *Wine Festival in Bourgas* will take place, and the organizers declare that 35 wineries are participating, as well as elite wines from several countries - Italy, France, Argentina, Australia, Chile. In October, a second edition of the "Fish and Wine" Festival will be held in Burgas, where fish delicacies are combined with local wines.In the town of Kameno, Bourgas also have their own Wine Festival for two years, celebrated on 14th February[4].

In Stara Zagora from 2011 is organized *Avgustiada - Wine Festival and cultural heritage.*Its organized by October at Stara Zagora's Day. Wine producers, representatives of the food industry, connoisseurs of wine, gastronomy and cultural heritage, representatives of different spheres of business from the country and abroad participate in the festival. *Augustiada* is named after the Roman name of the city of Augusta Traiana. The aim of the

[4] https://dariknews.bg/regioni/burgas/ide-vtoriia-festival-na-vinoto-v-kameno-2078089

business, the municipality and wine lovers is Stara Zagora to create a sustainable tourist attraction, to draw attention to the cultural and historical heritage not only of the city's inhabitants, but also tourists from Bulgaria and abroad.

In Kazanlak, in the beginning of June, *Rose Festival* is held and for several years the program also includes the *Rose Wine Expo Festival*, which collects traders and manufacturers from all over the country. As the name of this festival suggests, only rosé wines from the local cellars are presented. The ultimate goal is not to give estimates and broadcast for winners, but to promote the wine and the specific culture it creates.Interesting is the slogan of the festival: "*Wine and roses again together in the valley of the Thracian kings*", which directly addressed to the rich history in this region associated with wine and Bulgarian rose oil. The festival combines a national competition "Golden Killix" for the best rosé wines in Bulgaria. This is a trade show of established and new wine-producing companies from the country and abroad, and a gourmet area for the enjoyment of senses with the presentation of innovative food and natural products partnering with wine or its derivatives. The rich art program accompanying the festival follows the idea of the ancient Thracian orfeadi and incorporates arts, music, dance and ***vinorel*** - a painting with wine. In the days of the event generously provides an opportunity for artists and their distinctive talents and artists from the region.

Wine Fairs and Exhibitions

Wine fairs and exhibitions are also considered as events, most of which contain wine tourism. Except that winemakers can expose and promote the best of their cellars, to visitors and wine lovers are given the opportunity to taste different wines from the native and world wine regions. One of the specifics of such exhibitions is direct contact *producer-consumer*, thus the wine lovers have the opportunity to learn more from the "spring" and enrich their wine culture. Many of the cellars of such forums offer a wide range of catalogs, brochures and other materials to advertise their own wine tourism.

The traditional Bulgarian exhibitions related to viticulture and wine-making are *Vinaria* - Plovdiv (February-March), VINOTUR (Varna - wine and tourism fair in early April), *Wine Salon* (in Inter Expo Center, Sofia in November). These events confirm the ever-increasing interestto the wines of producers, harvesters, tour operators and wine lovers and its cultural transformations.

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1.8. Festivals of wine and other holidays in Haskovo and Kardzhali districts

1.8.1. Festivals of wine and other holidays in Haskovo district

In the town Ivaylovgrad celebrated the feast of Viticulture and Winery in St. Trifon's Day – February 14. Several cellars operate in the municipality of Svilengrad, whose location is in the vicinity of the settlements, where the feast of the Viticultor and Winemaker - St. Trifon is traditionally celebrated. These are *Katerzhina Estate*, Winery "Lozev", Winery "*Dimitrovche*", Winery "*Mezek*". According to the owner of winery"Dimitrovche" Kostadin Stefanov, besides his cellar, another 4-5 cellars will soon be built and will open doors for visitors. The idea is to turn the village of Dimitrovche into a destination for wine tourism.

In the Municipality of Lyubimets on February14honored "*Viticultor and Winemaker Day*". The program also includes a competition for the best home-made wine. The winner of the contest is declared "King of Wine". The event organizes a culinary exhibition-bazaar of traditional dishes, lots of music, people and dances[5].

In the Harmanli Municipality, an accompanying event at the Festival Haramana, held on September 8th and 9-th, is organized by 4 local wineries an extreme wine tour "South Sakar 4x4". These are the family cellars - *Villa Bassarea*, *Bratanov Winery*, *Malkata zvezda Winery* and *Chateau Kolarovo*, which offer 4 wines for tasting, accompanied by local delicacies[6].

1.8.2. Festivals of wine and other holidays in Kardzhali district

Nowadays, the popularity of Kardzhali region is growing, thanks to the cultural and historical tourism, which is mostly connected with viticulture and wine-making Thracian heritage. According to Professor Nikolay Ovcharov - Perperikon, the sanctuary of God Dionysius, is visited annually by over 250 thousand tourists[7]. *The Perperikon Festival* has become an international art festival and has been organizing since 2001 in the shortest night - June 22. The program of the festival includes many cultural events - theater productions,

[5] http://www.lyubimets.org/index.php/news/3744-2018-01-29-08-15-42
[6] http://winetours.bg/extreme-wine-tour-4%D1%854/
[7]www.novjivot.info/08/17/4150

carnival and music scenes. The Perperikon spectacle, symbolizing ancient beliefs and prophecies related to wine, is interesting. The hidden purpose of the festival is that our journey from the mysterious past goes to the mysterious future. It links with the pan-European idea of preserving the rich diversity of cultural heritage.

On February 14, the Municipality of Kardzhali celebrates Trifon Zarezan - the wine-maker's festival in the area with tasting wines, music and dances.A Best Wine Competition is held, accompanied by a festive program[8].

Other holidays

Every year in Kirkovo Municipality, in the beginning of September, is organized a *Pepper Festival*, as a accompanied event is the contest for "*The most delicious homemade lutenitsa*"[9]. Among the tobacco crash, many tobacco growers have turned to some vegetable crops as a pepper as well. Kirkovo municipality, in addition to helping its fellow citizens in this new venture, has an ambitious look to make Kirkovo a rural and eco-tourism destination. Including wine tourismis perfectly fits into the concept of the municipality for tourism development. The international road to Greece and the Makaza Pass are within the boundaries of the municipality. With the steadily increasing flow of tourists and goods that are almost transiting, it is necessary to create tourist products to attract their attention. Another way is to create a market for agricultural and other goods that can attract Greek citizens from nearby to Kirkovo Greek municipalities.

In the town of Kardzhali is organized a *Banitca Festival*, which takes place in the middle of September. The program of a festival includes over 200 homemade recipes of banitca, a program of folk ensemble "Trakia", an art workshop, a craft alley, a photo exhibition and a folk costume[10].

Conclusion on potential for development of tourism in Haskovo and Kardzhali districts

- The region has the necessary tourist facilities (hotels, guest houses and restaurants), beautiful nature, unique and attractive archaeological sites.;

[8] https://opoznai.bg/events/view/den-na-vinaria-kardjali
[9] https://www.kirkovo.bg/index.php?pid=5,46&gallery_folder=3
[10] https://www.sabori.bg/ob-kardzhali/view.html?oid=96546

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- Wine cellars, some of which offer wine tourism, can successfully offer a wide range of individual (company) and joint tourism products, programs and packages.;

- Positive development for tourism in the area is that it has good accessibility - it is located at an important international crossroad. The relief is a hilly, relatively good and upgrading infrastructure. The area is bordered by two neighboring countries - Greece and Turkey, of which most of the tourists come from Haskovo.;

- Wine tourism can be diversified very well with other types of tourism.;

- Already there are the beginnings of joint tourism products of wine tourism between of four boutique wineries of the region's such as:*Extremewine tour "4x4"* - Day of the open doors of the cellars, as part of the *Haramana Festival* organized by the municipality of Harmanli and four of the boutique and sign of the region's wineries.;

- Transitional Mediterranean climate, characterized by hot summers and mild winters, suggesting the possibility of visits during all four seasons.Therefore Haskovo can become a destination for four seasons, and wine tourism allows offering all year round.

CHAPTER 2. Geomorphology, geology and climate in the region of the Haskovo and Kargzhali districts

2.1. Relief

The Haskovo and Kardzhali districts are located in southern Bulgaria and occupy part of the Thracian Lowland, the Eastern Rhodopes and the Sakar Mountain. Haskovo district is on the border with two countries - the Republic of Greece and the Republic of Turkey, Kardzhali district has a common border with the Republic of Greece (Fig. 2).

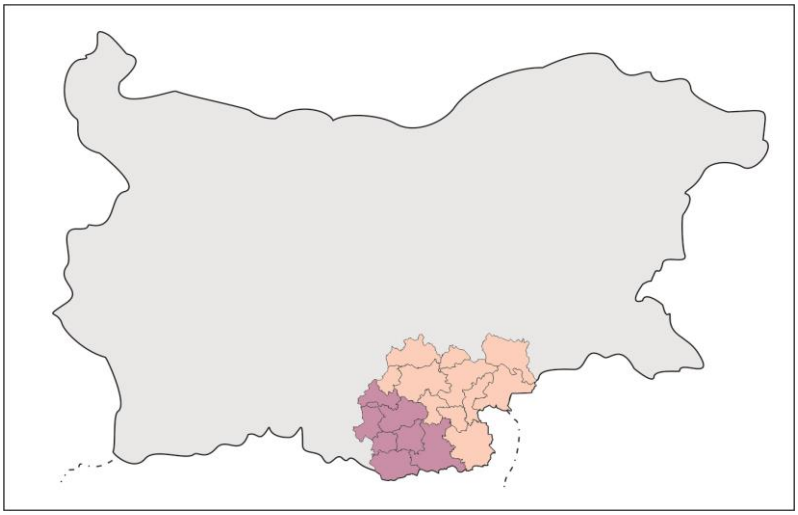

Figure 2. Haskovo and Kardzhali districts

According to the provisions and the territorial division of the Regional Development Law, Haskovo is included in the South Central Planning Region. This planning region consists of Plovdiv, Kardzhali, Haskovo, Pazardzhik, Smolyan and Stara Zagora. For its part, the Haskovo region is situated in the southeastern part of the South Central Region and includes 261 settlements distributed on a territorial basis in 11 municipalities - Haskovo, Dimitrovgrad, Simeonovgrad, Topolovgrad, Mineralni bani, Harmanli, Lyubimets, Svilengrad, Stambolovo, Madzharovo and Ivaylovgrad with total area of 5543 km² (Fig. 3).

The relief of the area is too diverse. The Northern and Central part is occupied by the Upper Thracian Lowland, characterized by the large, low-lying lands and high groundwater

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that contributes for the intensive use of the agricultural land. The flat nature of the relief and the fertile soils has a positive impact on the development of all branches and sub-sectors of agriculture, the construction of irrigation systems and transport arteries. To the south, an extensive area occupied by the low parts of the Eastern Rhodopes and the slopes of the Sakar Mountains. The Eastern Rhodopes are known as the cradle of the megalithic culture because they are the region with the highest concentration of megalithic monuments from the Thracian civilization.

Figure 3. Administrative-territorial structure of the Haskovo district.

To the north of the Arda River are the hills of the *Chukata* and the *Forest*, the *Valchepolska valley* and the Haskovo hilly land, which occupies a large part of the territory. To the west of the Arda River are Dragoynaridge and Mechkovets ridge. The highest peak in the eastern part of the Rhodope Mountains is *Mount Orlitsata* in Greece, which is 1483 m high. *Mount Mechkovetz* (Aida peak) - with its 860 m, is the highest point in the area.

The Eastern Rhodopes are a unique territory with rich and diverse flora and fauna. The strong Mediterranean influence, the geological past of the mountain and the peculiarities of

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the local life and culture have formedand preservedthe diverse habitats, which has led to extremely high biodiversity.

Traditional vineyards are grown in the area. The region is famous with the grape varieties Merlot, Cabernet Sauvignon, Pamid and Bolgar. The few wine centers on the territory of the region attract the supporters of the so-called “wine tourism”.

Haskovo Municipality is located in the central part of the South Central Planning Region, administratively belongs to the district of Haskovo. The Haskovo Municipality is located in north-western partof the Haskovo District. To the north it borders the Dimitrovgrad municipality, to the east with the municipalities of Simeonovgrad and Harmanli, to the west with the Mineralni bani municipality and to the south with the municipality of Stambolovo, the municipality of Kurdjali and the municipality of Chernoochene (Kardzhali district). Haskovo Municipality covers approximately 13.3% (739.8 km^2) of the territory of Haskovo District (5543 km^2). It covers 37 settlements - 1 city and 36 villages.

Haskovo has a key importance for the area, as it is the fastest and the shortest road connecting Europe and the Middle East.

The territory of the Haskovo municipality has a typical hilly relief and it is a northern extension of the Eastern Rhodopes, which is why it is called East Rhodope footpath or Haskovo hilly area – this is the used name for this region in the geographical maps.The hypsometric limits are between 50 and 400 meters above sea level.Horizontal subdivision of the relief is from 0.5 to 2.5 m / km² and vertical - from 25 to 100 m / km².

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The horizontal and vertical subdivision of the relief in the region of the East Rhodope footpath is not large, so the relief is favorable for the soil formation processes, transport, construction etc. The river valleys are slightly incised in the terrain, therefore their slopes are sloping, with a small slope and thier characteristics determine the typical slight hilly relief.

The specific relief character and its combination with the other components of the natural environment have a strong influence on the scale of development and the directions for the formation of the sectoral and territorial farming structure, its production specialization and its complex development.

On the territory of Haskovo municipality there are developed clay deposits, marble limestones, andesites and others. One of the clay deposits in the municipality of Haskovo is~~,~~ northwest situated of the village of *Nova nadezhda*. On the territory of the village of Garvanovo there are granites and andesites quarries Nine kilometers to the northeast of Haskovo and to the south-west of the village Krepost is located a quarry "*Krepost*" for marble limestone. Northeast of the village of Klokotnitsa there is a quarry "*Klokotnitsa*" formining of innert materials for construction.

Svilengrad Municipality is an administrative-territorial unit within the meaning of the Law on Administrative and Territorial Structure of the Republic of Bulgaria (LATSRB), a part of Haskovo District, and a statistical territorial unit of LAU 2 level (municipality) under the NUTS Nomenclature of the EU. The administrative center of the municipality is the town of Svilengrad. In accordance with the *Law of Regional Development Haskovo region*, respectively Svilengrad municipality is included in the South Central Region.

The territory is situated on an area of 705.37km^2, while the Svilengrad municipality occupies third place in size in Haskovo region. In the northeast it borders with the Municipality of Topolovgrad, while in the northwest with Harmanli municipality, in the west with the municipality of Lyubimets, in the south with Greece and in southeast with Turkey. At its northeastern side are the slopes of Sakar Mountain, in the southwest - the Eastern Rhodopes, and in the central part is the valley of the Maritsa River. Geographically the territory of the municipality includes parts of the Upper Thracian Plain, Sakar and Rhodopes. The municipality of Svilengrad includes 24 settlements: 1 town (administrative center) and 23 villages. The administrative center of the municipality of Svilengrad is the town of Svilengrad, which is situated along the two banks of the Maritsa River, at an altitude of 52 m.

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According to the landscape zoning, the territory of the municipality of Svilengrad is situated on the border between the East Rhodopes subregion and the Tundzha area with a natural boundary between them - the Maritsa river. The altitude varies mainly in the range of 150 - 200 m. The relief is slightly hilly, with the altitude decreasing from the northwest to the southeast. The eastern slopes of the Rhodopes from the south, the plain along the Maritsa River valley in the center and the Sakar Mountains in the north predetermine the functional distribution of the territory. Its central planar parts are occupied by highly efficient and fertile agricultural lands, while the southern and northern ones are covered with forests and they are poorly urbanized.

The landscape of Svilengrad municipality is diverse plain and hilly, with low hills. The central part is occupied by the Upper Thracian Lowland, characterized by extensive lowland landscapes and high groundwater, which contributes to the use of the agricultural land. To the northeast are the low level slopes of the Sakar Mountains, to the west the Eastern Rhodope Ridge Forest, and to the northwest - the Haskovo hilly land. The average altitude varies from 70 m (town of Svilengrad) to 703 m. The rock base is very varied. There are southern Bulgarian granites, crystalline shale, gneiss, marble, limestone, andesite and others.

As a consequence of the favorable natural environment, specific terroir and large scale investment in the wine production field, there are the beginnings of establishing image of a "***wine-growing***" area.

Harmanli Municipality is located in Southeastern Bulgaria, in the central part of the Haskovo district.The territory of the municipality is situated on the border of the Thracian Lowland, Sakar Mountains and the Eastern Rhodopes.Its territory has a diverse topography and changing altitude.Most parts of this territory is flat and the rest has mountainous and semi-mountainous relief.Two thirds of the settlements are located in the Sakar Mountains and one third in the Eastern Rhodopes.As an example, characterizing the diverse relief and changing altitude, can be given with the following two geographical locations: 1.The beginning of the *Harmanlian Gorge* (at 80 m height); 2.The end of the *Mominho-Klisur Gorge* (300 m high).It is accepted that the average altitude of the municipality is about 200 meters.

The flow of the Maritsa River divides into two almost equal parts the territory of the municipality. The tributaries of the Maritsa River - the *Harmanliyska* and the *Biserska River* run through the territory.

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The relief and prevailing moderate continental climate determine the diversity of plant species occurring in this region. The most common tree species are white and black pine, acacia, walnut, cedar, birch, ash. In the valleys of the rivers, the willow and the poplar grow. In the agriculture and horticulture sector, the most frequently cropped crops are vegetables, with the largest share of red pepper and tomatoes, gardens with watermelons and melons,and perennials such as vines. Grain crops are also grown - bakery and forage crops, as well as technical crops - mainly oriental tobacco varieties.

The municipality is famous for its beautiful nature. Here are a number of natural landmarks such as “Kumuriuka” and “Kurudere” - areas with natural waterfalls.The protected area “Defileto” is a gorge with exceptional natural beauty and a place for recreation.

Lyubimets Municipality occupies the southeastern part of South Central region within the Haskovo district. Compared to the total area of the South Central Planning Region - 22,365 km^2, the municipality occupies 344,26 km^2, or 1,54% of the territory.

The landscape of Lyubimets Municipality is diversed. It has a plain, hilly and low mountainous relief. The northern and central part is occupied by the Thracian Lowland, characterized by extensive lowlands and high groundwater that favor the use of agricultural land.

To the east are situated the low branches of the Sakar Mountains, to the south the East Rhodope Mountains, and to the west Haskovo hill land. The average altitude varies from 70 m (Lyubimets) to 703 m (Shinovets peak).

The rock base is very diverse, there are southern Bulgarian granites, crystalline shale, gneiss, marble, limestone, andesite, etc.

Ivaylovgrad municipality is part of the East Rhodopes physico-geographic area. The slopes of the mountains descend and overflow into the plains of South Thrace, which is on Greek territory.The relief is diversed, occupied by the low branches of the Eastern Rhodopi Ridge, which is between 70 and 700 meters above sea level.

The rock base is very colorful. There are southern Bulgarian granites, crystalline shale, gneiss, marble, limestone, andesites, etc. The relief is determined by smooth curves of the low Rhodope ridges, that “spilled” into wide valleys. The average slope of the relief is 4.8%. Many

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of these mountain areas are covered with poor skeletal soils and are deforested.Built from unstable sedimentary and volcanic rocks, characterized by intense erosion processes.

Relief and fertile soils positively influence the development of agricultural sectories, as well as the construction of irrigation systems.

Stambolovo municipality is located south of the town Haskovo, and is located in the northeastern part of the Eastern Rhodopes. The territory of the municipality extends from the Haskovo Plain to the Arda River, and is 22 km away from the town of Haskovo and 55 km from the town of Kardzhali.The municipality borders between Haskovo and Kardzhali districts and has an area of 277 km^2.

The geological structure of the relief is characterized by a wide diverse of rocky complexes and geological structures. A large part of the territory is covered with volcanogenic-sedimentary rocks of the Paleogene complex, composed of rhyolitic, andesitic,tuffs and tuffs mixed with different marine sediments. Metamorphic rocks, represented by gneiss, amphibolites, mica slates, etc. are revealed on the territory. In the valley of the Arda River there are formed stripes of alluvial deposits, composed mainly of sands and gravel with Quaternary age.

The relief of the municipality is intersected, semi-mountainous. In southwest, a vast of the area is occupied by low branches of the Eastern Rhodopes, whose spaces are covered with poor skeletal soils and are deforested.The Rhodopes is made up of metamorphic rocks, which are mostly deeply sunken and covered with Paleogene limestone, sandstone and conglomerates, or with mixed material of underwater volcanic eruptions - tufts, andesites and rheolites characterized by intense erosion processes .

The orographic conditions, combined with their characteristic soils, predetermine the limited species composition of agricultural crops. The specific nature of the relief in the different parts of the area and its combination with other components of the natural environment (climate, water, soils), have a strong impact on the scale of development and directions for formation of the sectoral and territorial structure of agriculture, its production specialization and complex development.

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The diversity of relief is enhanced by the erosion of the rivers, wich has formed a labyrinth of hills and a complex valley network. The terrain of the municipality is crossed bythe middle course of the river Arda, along with its tributaries.

The ***Kardzhali District*** occupies 3,209.1 km^2in the southeastern part of the Republic of Bulgaria, which represents 2.9 per cent of the country's territory. It is located in the South Central region. Kardzhali district occupies the greater part of the Eastern Rhodopes. The relief is predominantly mountainous and semi-mountainous.The highest points in the area are peak *Veikata* (1463 m) in the south and the west side - peak *Alada* (1241 m) and the peak *Chilyaka* (1450 m). The terrain is crossed bythe upper and middle course of the Arda River, along with its tributaries *Varbitsa river*, *Krumovitsa river*and *Perperek river*. In the valleys of these rivers are the most fertile lands and the largest settlements. Along the Arda river is a town of Kardzhali, on the Varbitsa river –town of Momchilgrad, on the Krumovitsa river – the town of Krumovgrad.

According to the geographic zoning of Bulgaria, the Kardzhali region is located in the Eastern Rhodopes subregion of southern Bulgaria and covers the low mountainous hilly relief, along the middle course of the river Arda. Average altitude is 329 m.

Kirkovo municipality is second in population and third on territory in Kardzhali district. Located in the region of the Eastern Rhodopes over an area of 538 km^2 . Kirkovo borders with the municipalities of Krumovgrad, Zlatograd, Djebel and Momchilgrad. To the south it borders with Republic of Greece.

The relief of Kirkovo municipality is flat-hilly to hilly-foothill. Within the boundaries of the municipality fall the northern slopes of the East Rhodope Mountains - *Maglenik* and *Gyumyurdzhinski Snezhnik*. The average altitude is 523 m. The highest point of the municipality is the peak *Veikata* - 1 463 m. This is the southernmost geographical point of Bulgaria. Vesikata is the highest peak of the East Rhodopies ridge of Gyumyurdzinski sneznik on Bulgarian territory. In the same ridge is the highest peak in the Eastern Rhodopes – peak *Orlitsa*, but it is on the territory of Greece.

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2.2. Soil

The soil is a complex natural system made up of mineral particles, organic matter, water, gases, macro and microorganisms. The soil cover is a particularly important component of the natural environment. Formed for millions of years, it is a mirror of the state of the landscapes and it reflects and breaks the interconnections between the other components of the natural environment (rocks, waters, climate, vegetation, human activity) (*Ivanov*, 2016). Thanks to its fertility soil cover is a very important natural resource, a means and a subject of labor in agriculture. As a result of human activity, the fertility of the soil can change (increase or decrease) or preserve. There are three types of fertility - natural, potential and economic. The first is related to the presence of humus and other nutrients formed during the long period of natural soil development. Potential fertility is associated with the possibility of artificially increasing nutrients in the soil by adding fertilizers of natural or artificial origin. Economic fertility is expressed by the value of agricultural produce per unit area on a given type of soil.

Factors for soil formation are three groups: abiotic, biotic and anthropogenic:

Abiotic factors

The soil-forming rock is the material from which the soil is formed. The mechanical, mineral and chemical composition of the base scale determines the water, physical and chemical properties, and the course of chemical processes in the soil.

The climate determines the horizontal and vertical distribution of soils. It is influenced by the climate elements - air temperature and precipitation. They in turn determine the amount of moisture in the soil. Air temperature determines the direction and speed of physical, chemical and physicochemical processes in the soil. At higher temperatures, processes take place at a higher rate and the activity of soil microorganisms increases. The decomposition of organic matter and weathering of mineral particles occurs in the presence of moisture in the soil. Overheating it leads to a slowdown in these processes.

The relief as a climatic factor determines the vertical distribution of the soils, and by its altitude, slope slope, exposure, determines the distribution of shallow and deep soils. In the larger slopes, the rainwater comes from the rainwater. Therefore, on the slopes the soil cover is thin or almost absent. Back,deep soils are formed in the plains, lowlands and valleys.

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Water is an important factor for all soil-forming processes - weathering and erosion. Their presence determines the formation of some of the soil types.

Biotic factors

Vegetation affects soil formation by providing the main source of biomass that becomes humus. Different types of vegetation affect soil in different ways. And due to this influence, the respective changes occur and different types of soils are formed. Vegetation determines the water and heat regime of the soil, determines its structure and prevents it from erosion.

Micro and macro organisms participate in the mineralization of the organic matter in the soil and enrich it with the nutrients necessary for the development of the plants.

Animals affect the structure of the soil, its porosity, water permeability, etc. Some of them affect the changes in the mineral and chemical composition of the soil. Particularlystrongly affecting microorganisms.

Anthropogenic factors

The human influence on soils is in two directions. Positive influence is expressed in actions to improve the composition and fertility of soils. Negative is the impact of human activity on improper treatment of soils, especially on inclined terrains. This causes an increase in water and wind erosion. Until soil deterioration leads to improper irrigation and fertilizer fields. This leads to soil contamination, swamping and deterioration of their fertility.

Soil-geographic zoning

The diverse conditions of soil formation in Bulgaria (from transient mediterranean to subalpine climate, over 3000 species of vegetation, different soil forming rocks, relief) have determined the formation of diverse soils with different fertility and agrotechnical qualities. Of the 25 main soil types in the world, 16 of them are found in Bulgaria. The most common are the cinnamon forest soils (29% of the country's territory), followed by the soils (23% of the country's area). Gray forest soils occupy about 17%, brown forest - 15%, alluvial-meadow soils - 7%, reeds - 6% of the country's territory (*Ivanov*, 2016). The cultivation fund in Bulgaria is composed mainly of black earth soils and black earth troughs (30 million decares), cinnamon forest soils (7 million decares), and other soils occupy about 5 million decares of the total fund (*Alexandrov*, 2006).

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On the territory of Bulgaria three soil zones are separated:

North-Bulgarian forest-stepped soil zone - covers the Danube plain and the Fore-Balkan (up to 600-700 m above sea level). From north to south, the change in the formation of rocks, the climate and the vegetation cover also determine the change of the soil types and their combinations. The main types of soils in this area are the chernozems, of which there are 5 varieties (carbonate, typical, deluged, degraded and heavy clayey chernozems) and gray forest soils.

South-Bulgarian xerothermal soil area - covers the territory of Southern Bulgaria (up to 700-800 m above sea level). Due to the more varied and warmer transient continental climate and xerophytic vegetation, specific soil types have been formed. The main soil type in this area is the cinnamon forest soils, which are the largest soil-borne soil type in Bulgaria and the reedbeds. They are located in southern Bulgaria; to the lowlands and valley fields border with the reeds, and to the foothills - with the pseudo-subsoil soils. Cinnamon forest soils are divided into: typical and leached.

Mountain soil area - covers the mountainous areas (over 700-800 m) covered with deciduous and coniferous forests, as well as extensive pastures and meadows with different variations of the mountain climate.

The two areas of research (Haskovo and Kardzhali) included in the Dionysos project are located in the Southern Balkan Xerothermal Soil Zone. The main and most widespread bioclimatic soil types in these areas are cinnamon forest soils, reedbeds and alluvial-meadow soils.

The cinnamon forest soils are the most widespread soils in Bulgaria and occur only in southern Bulgaria - on the southern slopes of Stara Planina and the main slopes of the other mountains south of it and the associated valleys, the hilly lands of the Srednogorie, Tundzha region, Strandzha, Eastern Rhodopes, Osogovo, Rila, Pirin, Rhodopes (up to 800 m above sea level). In total, they account for about 22.0% of the total area of the country. Of these, 9.8 million dca or 41% are processed (*Ivanov*, 2016). Their formation takes place in the transition-continental and transitional Mediterranean climate and with the participation of warm-hearted broad-leaved, forest vegetation, varied soil substrate (heavily crushed and leached

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granites, granite, gneiss, mica shale, etc.). Cinnamon forest soils are divided into typical, leaned and decanted cinnamon forest soils (*Koinov et al*., 1980).

Typical forest cinnamon soils have limited distribution in hilly and deeply dissected areas. They are developed on a carbonate basis and are characterized by shallow profile, low power, dense construction. Mechanical compositions are mild to heavy loam with humus content (3-5%).

The leaned cinnamon soils are the most widespread soil type in Bulgaria. They are distributed in the main agricultural areas. They are characterized by a 75-120 cm soil profile, humid horizon power (up to 35 cm). Mechanical compositions are more clayey than typical cinnamon soils but are less humus (2-3%).

The resin are predominantly distributed in the valleys to the south of the Balkan Mountains, the Upper Thracian Lowland and the Bourgas Lowlands, Sofiyska, Pernishka, Radomirska, Kyustendil and other valleys. They occupy about 5.4% of the country's area and are almost entirely cultivated. They are formed on waterproof Pliocene lake sediments and andesite tufts and tufts, Mediterranean climate influence, insignificant slope. They are distinguished by heavy mechanical composition (clay content 50-75%), specific physico-mechanical water properties. When wetting the soil, it swells, increases its volume, gains great plasticity and stickyness. Conversely, it wrinkles, hardens and forms wrinkles when it dries. The smells also have a low water-repellency and a great water-holding capacity. They are divided into carbonate, typical, leached and degraded.

Carbonate and typical resins are distributed in the Upper Thracian Lowland. They are characterized by a lower soil horizon (45-60 cm), a less compacted humus horizon and a higher humus content (3.5-4%) compared to leeches (45-60 cm).

Listed resins are characterized by a powerful humus horizon, which together with the transitional one reaches 50-80 cm, with heavy mechanical composition, tight construction and high humidity.

Degraded resins are characterized by a lack of carbonates, a light mechanical composition, a small amount of humus.

Haskovo region

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The soil fertility is extremely rich and is represented by all soil types typical of the area: chernozem-resins, leached cinnamon forest and alluvial-meadow soils (*Sapundjiev and Mitreva,* 2016).

Chernozems

Characteristic of these soils is the heavy mechanical composition - the content of physical clay in the ornitha and the subornitus (50 to 75%), the powerful humus horizon (25-50 cm), the powerful profiles (80-130 cm), the humus content of the 2,5- 4.5%, deep groundwater level and poor erosion. These areas occupy a relatively small area of the area, but are highly fertile in the clever application of scientifically grounded agrotechnology. Due to their rich colloidal clay composition, the rocks often have unfavorable physico-chemical and water-air properties, which are a limiting factor for their use in perennial crops.

Leaded cinnamon forest soils

The main soil characteristics of these soils are that the content of physical clay in the ornithine is between 20 and 60%, in the suborbit - 30-65%, the humus horizons average between 25 and 55 cm, the humus content is between 1.0 and 4.0%, deep groundwater level, average erosion rate and up to 10% stony ground (stones and gravel from ornate). The range of natural fertility of this type of soils is quite extensive, but with cleverly selected and managed land use, these areas can be relied on at a relatively high production potential. In most of this type of soil, especially in the more leafy and less leeway, it is appropriate to cultivate a number of arable crops - corn, sunflower, wheat, beans, cotton and others. In soils with a mild mechanical composition (higher degree of sandiness) are extremely suitable for growing vineyards of dessert and wine grape varieties.

Alluvial-meadow soils

Their area is over 600km², or about 9.0% of the territory of Bulgaria (*Ivanov*, 2016). The soils of this group have various characteristics. The mechanical composition is from bonded sand to slightly clay (physical clay content 5-70%), the humus horizons are between 20 and 60 cm, and the soil profiles - 60-140 cm, the wide variation of the soil response - pH of 5 , 5 to 8.5, humus content 1.5 to 6.0%, average groundwater level, no erosion. Frequent accumulated to poorly salted, slightly swampy and moderately stony alluvial meadow soils often occur. The mild mechanical composition and its associated water, air and heat

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properties make these soils one of the most preferred agricultural areas. The most intensive agriculture in the Thracian Lowland, along the valley of the Maritsa River and its tributaries, is concentrated on them. They are suitable for a wide range of agricultural crops, viticulture and fruit growing. According to their characteristics, this type of soil is characterized by a relatively lower fertility, but in many cases with the nasal soils, it is possible to rely on successful planting practices. Their lower humus content and light mechanical composition place the issues of increasing the organic matter in them, improving their nitrogen-phosphorus regime and the recommended use of irrigation as methods for increasing the soil fertility of the alluvial-meadow soils.

In the land of the villages of Susam, Haskovo Mineral Baths, Shishmanovo, Kolarovo, Lozen, Dimitrovche, and near to town Lyubimets the following soil differences were found:

-Carbonatechernozems, slightly potent, slightly clayey

- Chernozems resinous, slightly potent, slightly loamy

- Chernozems resinous, medium eroded, heavy-sandy clayey

- Cinnamon forest soils, shallow medium, sandy clay

- Strongly leached to slightly podzolized cinnamon forest soils, slightly sandy clay

- Cinnamon-podzolist (pseudopodzolists) forest soils medium sandy-clayey

- Cinnamon forest soils medium eroded

+ clay-sandy and slightly sandy-clayey

+ medium sandy-clayey

+ heavy sandy-clayey

+ slightly loamy

- Cinnamon forest soils, medium and heavily eroded, shallow, low and medium stony, clay-sandy and slightly sandy-clayey

- Undeveloped cinnamon forest soils, strongly stony, slightly sandy-clayey

- Rendzinas (humus-carbonate soils) medium and heavy sandy clay

- Deluvial-meadow soils, medium sandy-clayey

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- Delluvial soils, medium sandy-clayey

- Alluvial soils.

Soil formation process is relatively young as a result of which their profile is visible elements typical of alluvial soils. Issue soils have a solid structure, a large-bore structure and the ability to stock with large amounts of water. An unfavorable property is poor watertightness and weak aeration, particularly by moistening them to the limit but the field moisture capacity.

A large part of the farmland's occupied by areas which are not suitable for agricultural production - highly eroded soils, have a certain production value but are seriously threatened by erosion, and if conservation measures are not taken in a timely manner, there is a danger that part of them, which is still in the arable fund to drop out of it.

Cinnamon forest soils represent the main farm production base.

Rendzinas are the second most important soils. The remaining soil differences have an island distribution in the land.

The soil fertility is extremely rich and is represented by all soil types typical of the area: chernozemsresinous, leached cinnamon forest and alluvial-meadow soils (Sapundjiev and Mitreva, 2016).

Kardzhali region

The predominant soil type in the area is cinnamon forest soils. They are also found in smaller sizes of brown forest soils, rendzins (humus-carbonate), alluvial, cinnamon-subzolasts, delluvial and, in insignificant size, other soil types. According to the Soil Register in Bulgaria, a large share of the most unfavorable agricultural land in the country is concentrated in this area. In agricultural categories, according to the classification category, soils with average productivity are predominant to poor and unfit for agricultural use. The most fertile soils are in the valleys of the Arda River and its tributaries and in the northern parts of the municipality on the border with Haskovo municipality. These characteristics determine the poorly covered viticulture and wine production in the region of Kardzhali.

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2.3. Bioclimatic characteristics

2.3.1. Climate conditions of the area

It is generally known that the vineyard culture reacts very strongly to the climatic conditions.Meteorological conditions in a given year and in a given area have a major impact on the quality of the grape harvest. According *Davitaya* (1959), Katerov et al. (1990) and Roychev (2012) in the wine as a mirror reflected the vine variety and location of its cultivation.

Haskovo region

Southern geographical location of Haskovo and proximity to the Aegean Sea, which separate it from relatively lower slopes of the Eastern Rhodopes, as well as the easy penetration of warmer air in the valley of the Maritsa River, determine a transitional climate between the continental influence from the north and the Mediterranean from the south.Compared to the neighboring regions, the Mediterranean climate impact is more pronounced here. It is expressed mainly by higher annual average temperatures and the significant shifting of the main precipitation minimums and maximums. Winter is mild and short, summer - long and hot. The absolute value of the maximum temperatures is considered to be one of the most favorable in the country.

The average annual air temperature of the plain and lowland regions ranged from 12,2 to 12,8°C, while the Eastern Rhodopes and Sakar Mountain from 12,6 to 13,5°C at an average temperature in January plus 0,5°C and in July 23,2°C. The thermal potential of the region with its territorial differentiation reflects the species structure of the cultivated crops, among which there are highly thermophilic - cotton, tobacco, grapes, etc.

The data indicate the presence of a mild and warm winter. In the high summer heat temperatures are measured to 39-40^{o}C. Typical of the region is the sunny, warm and relatively long autumn. Climate conditions and water resources are a very important prerequisite for the implementation of the economic activity in the municipality. The regional climate, assessed as one of the most favorable in the country, provides opportunities for economic initiatives in the municipality and agricultural participation of the local population.

The area is relatively windy. The windless days are about 80 in the year. With the greatest speed are southern winds. Maximum number of days with a stormy wind (speed greater than 20 m/sec) is at least once a year. When comparing the individual seasons to a

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percentage of quiet weather, it is clear that the autumn is the quietest - 25.5%, while winter is 19.9% the most windy. The annual rose of winds shows the highest frequency from the north at an average speed of 1.8 m / sec.

The region is characterized by moderate precipitation - an average of about 600 mm, with the snow cover from low to moderate.The main rainy maximum is differenfor the different parts: along the Maritsa River it is October. Then fall 11-12% of precipitation and in the Eastern Rhodopes is December (11 - 13% of precipitation). The main rainy minimum is during the summer months from June to August, which is indicative of the fact that during the vegetation period there are significant, prolonged droughts. Because of this, as well as due to the open horizon, the duration of the sunshine is too high - over 2100 hours per year.

Relative air humidity shows values significantly higher than other parts of the country and ranges from 57 to 84%, with a minimum in September and a maximum in December. Combined with other natural conditions and resources - relief, water, flora and fauna, *the climate has a significant impact on the development of tourism in the Haskovo region*. *There are very favorable soil and climate conditions for the establishment of vineyards as potential for development of viticulture and winemaking.*

The following images6-10 show the climate charts of the Haskovo region.

Average Rainfall

The "daily average maximum" (solid red line) shows the maximum average daily temperature for each month. Similarly, "daily average minimum" (solid blue line) indicates the average minimum temperature. Warm days and cold nights (dotted with red and blue lines) show the average of the warmest day and the coldest night for each month for the past 30 years (Img. 6).

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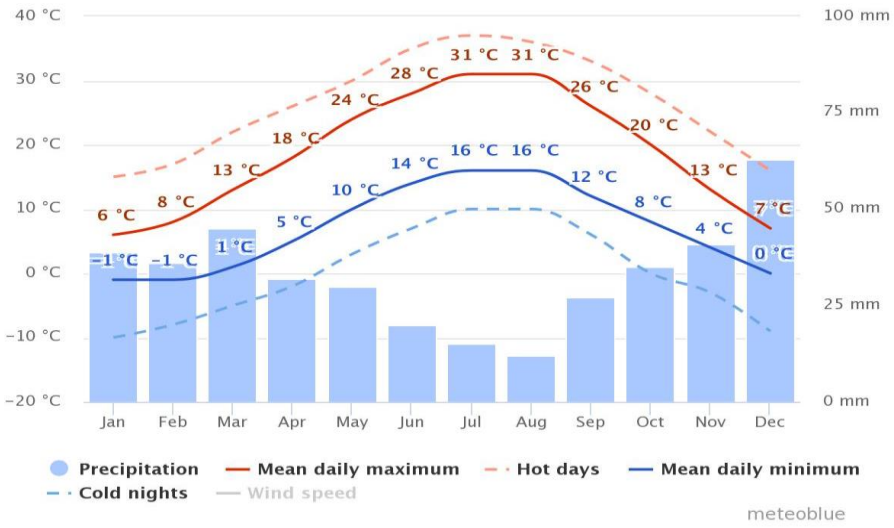

Image 6. Average temperatures and rainfall in Haskovo

Cloudy, clear and rainfall days

The chart shows the number of days per month with sunny, partial cloudy, overcast and rain days. The days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as cloudy and those with more than 80% as overcast(Img. 7).

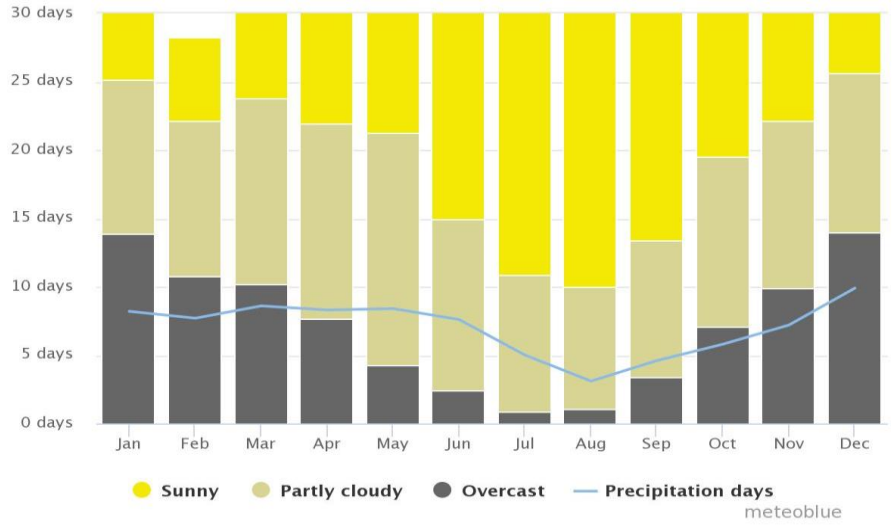

Image 7. Cloudy, sunny and rainfall days in Haskovo

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Maximum Temperatures

The Maximum Temperature chart displays the number of days per month, the specific temperatures are reached (Img. 8).

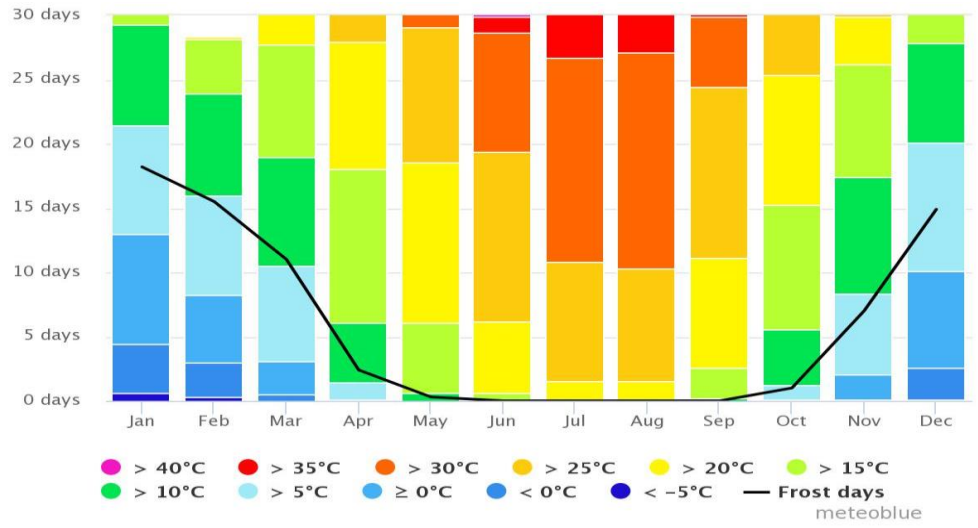

Image 8. Maximum temperatures in Haskovo

Precipitation figures

The Precipitation figures chart shows how many days per month, certain sums of precipitation are reached(Img. 9).

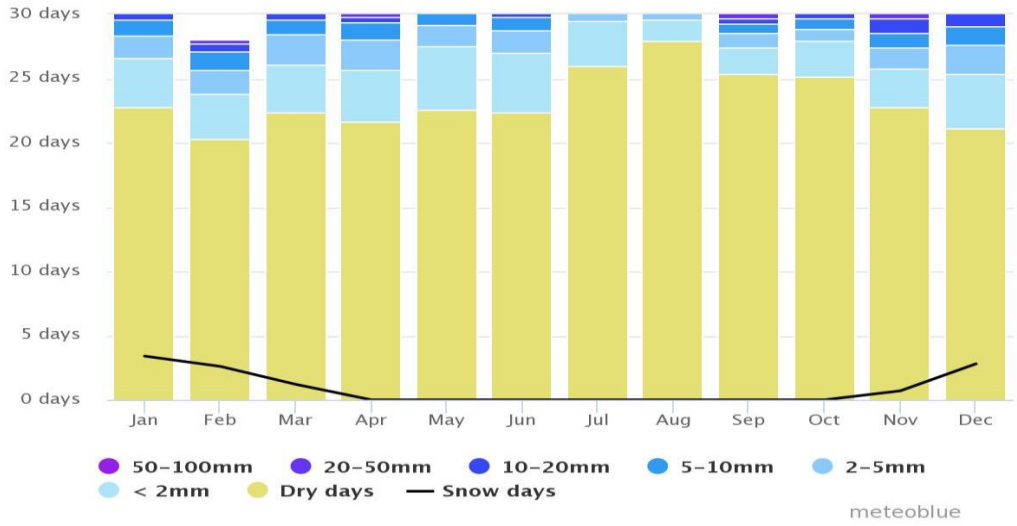

Image 9. Precipitation figures in Haskovo

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Wind Speed

The chart shows the days per month, when the wind reaches a certain speed (Img. 10).

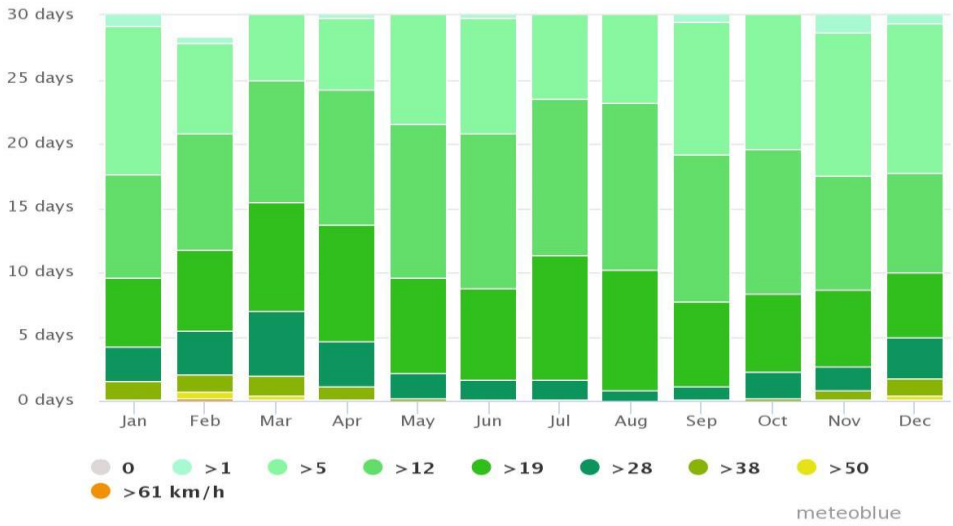

Image 10. Wind speed in Haskovo

Climatically, the territory of the ***Svilengrad Municipality*** falls into the Continental Mediterranean climatic region, the South-Bulgarian climatic suburb, a climatic region of the Eastern Rhodope river valleys, with a noticeable influence on the temperate sea coastal region of the Aegean Sea. Svilengrad Municipality is located in the Continental-Mediterranean climate area, which determines the continental-Mediterranean climate of the municipality.The most characteristic features of this type of climate are the warm summer and the mild winter (January temperatures above 0°C), the relatively small annual temperature amplitude, the autumn-winter peak of maximum precipitationand the lack of an annual sustainable snow cover. According to data of the meteorological station Svilengrad, the region of the municipality is characterized by a long duration of sunshine - 2240 - 2249 hours, with maximum for the months of July and August. The average annual air temperature in the municipality varies between 12.6°C and 13.6°C. Average July temperatures are between 22 - 24°C and average January temperatures for the municipality fluctuate from 0 to 1 - 2°C above 0°C. Prevailing winds are northwest and northeast. During the cold half-year period, southwestern and southern winds with a Foehn wind-effect. Average monthly values of the wind speed varies around– 1.6 m/sec. According to the data of the meteorological station Svilengrad, average annual days with fog are 30.9. The region of Svilengrad municipality is

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characterized by average annual precipitation 696 mm with a minimum during the summer months. The snow cover is weak and short-lasting with a number of days with snow 16 - 30.

Lyubimets Municipality is located in the Continental-Mediterranean climate area, which determines the continental-Mediterranean climate of the municipality. The most characteristic features of this type of climate are the warm summer and mild winters (January temperatures above 0°C), the relatively small annual temperature amplitude, the autumn-winter peak of precipitation and the lack of an annual sustainable snow cover. The average annual air temperature in the municipality varies between 12.6°C and 13.6°C. The average July temperatures are between 22 - 24°C and the average January temperatures in the municipality fluctuate from 0 to 1-2°C. The sum of temperatures during the active vegetative season reaches 4000°C and is one of the largest in the country. Inner-year atmospheric pressure is characterized by a maximum in December or January, and a minimum in July it is the opposite of that of the air temperature. Its values for January and December are respectively 1020.78 hPa and 1020.22 hPa and for July 1011.41 hPa. Average annual for the country is 0° C and atmospheric pressure 1013 hPa.

The number of dry (with relative humidity below 30%) and wet (with relative humidity over 80%) days is an important indicator of atmospheric humidity. Lyubimets municipality falls within the group of areas with the driest days of the year and respectively the least wet days. This determines an average annual air humidity of about 69%. The annual precipitation in the municipality is about 500 mm. The maximum precipitation is winter (November - January), and the minimum is summer - autumn (July - September). There is a secondary May-June maximum precipitation. Very frequent are the intense and torrential precipitation in May and June, with the rainfall from May to August being 1 to 2 times.

Ivaylovgrad Municipality is located in the Continental-Mediterranean climate area, which determines the continental-Mediterranean climate of the municipality. The most characteristic features of this type of climate are: warm summer and mild winters (January temperatures are above 0°C). Relatively small annual temperature amplitude,autumn-winter maximum precipitationand lack of sustainable snow cover. The average annual air temperature is 12.8°C. Absolute minimum temperature is -19.5°C, and absolute maximum is 40.5°C. The average temperature for the coldest months is about 3-4 degrees higher than the average for the country.Summer is relatively hot and dry. Averages in July temperatures are

between 21-23°C. The number of sunny days in the year is the highest for the country. The ratio of winter and summer precipitation is typical for the Mediterranean region. The driest is August, when the average rainfall is 20 mm/m^2. The average January temperatures for the municipality fluctuate from 0 to 1-2°C above zero. The sum of temperatures during the active vegetative season reaches 4000°C and is one of the largest in the country. This climate suggests the need for artificial irrigation, but is suitable for growing tobacco, grapes, almonds, perennials, etc.

The relative humidity of the atmospheric air is one of the main indicators of the processes of evaporation, transpiration of atmospheric impurities, etc. Ivailovgrad municipality falls into the group of areas with the most dry days during the year and respectively the least wet days. The average annual humidity is about 70%. The prevailing winds are northwest and northeast. During the cold season often blowing southwest and south winds.

The area is characterized by an average annual rainfall of 711 mm. Most precipitation falls in winter - an average of 230 mm and at least in summer - 118 mm. The rate of precipitation of snow is relatively low (5-6% of the annual amount) and is the lowest compared to all other regions of the country. High temperatures do not allow to forming a continuous snow cover. The seasonal and territorial distribution of precipitation compared to the requirements of individual crops, indicates the need for ubiquitousartificial irrigation.

Stambolovo Municipality in terms of climate falls in Southern Bulgarian climatic region and especially in the climate of the Eastern region, which is influenced by the warm Mediterranean influence.The climate of the territory is continental-Mediterranean, determined by the nature of the atmospheric transfer and the transformation of the air masses on the surface of the relief.

Winter is relatively soft.The minimum temperatures during the winter months are relatively high. Summer is sunny and hot, with maximum temperatures reaching 40°C. The average winter temperature is around 0°C and in the summer is 24°C. The average annual temperature ranges from 11 to 13°C. The annual temperature sum is about 4000°C. In the autumn-winter period under the influence of Mediterranean cyclones, accounted for some of the greatest rainfall.There are two maximums: winter - November, December, January; spring - May, June, July; and a minimum - August, September. Due to the southern location of the

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area, most of the winter precipitation falls as rain or rain and snow. The thermal potential of the region with its territorial differentiation has an impact on the species structure of the cultivated crops, among which there are also highly heat-treated such as tobacco, grapes, etc. The main precipitation maximum is different for different parts: along the river Arda it is December. Then, 11-13% of the precipitations fall. The main precipitation minimum is during the summer months - from June to August, which is indicative of the fact that during the vegetation period is significant, prolonged droughts. The seasonal and territorial distribution of precipitation compared to the requirements of individual crops, indicates the need for ubiquitous artificial irrigation in lowland areas of the municipality.

The climatic potential favors the development of various economic sectors.Combined with other natural conditions and resources - relief, soils, waters, flora and fauna, the climate has a significant impact on the agricultural specialization and profile of the different parts of the municipality.

Because of the listed geographical features, there are small climatic differences on the territory of *Harmanli Municipality*. Dominant moderate continental climate, characterized by mild and warm winters and relatively hot summers. Significant is the number of sunny days in the year and the annual temperature amplitude is relatively small. The maximum of precipitation is autumn - winter, and the minimum is summer. In winter there is no sustainable snow cover.

Kardzhali region

Kardzhalifalls into the South-Bulgarian climatic region and more precisely in the East-Rhodopian climate region with warm Mediterranean influence.From the nature of atmospheric transferand transformation of air masses on the surface of the relief, is determined by the formation of trans-Continental and trans-Mediterranean climate. The average annual temperature is about 12 - 13°C, with annual precipitation ranging from 700 - 800 mm. Winters are relatively mild.The minimum temperatures during the winter months are relatively high - the average is around 0°C. Days with retention of snow cover are 39. Summer is long and hot, with maximum temperatures reaching 39-40°C and average of 24°C. In the autumn-winter period, under the influence of Mediterranean cyclones drop some of

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the greatest rainfall. There are two maximums: winter - November, December, January; spring - May, June, July, and a minimum - August, September. Due to the southern location of the area, most of thewinter precipitation falls as rain or rain and snow. Precipitation (one of the weakest in the country) at the end of summer and spring is very poor. These periods coincide with critical periods of development of spring crops and climatic conditions make less suitable and unsuitable for most of them. The wind in the area is oriented from north-northwest and south-southwest. The average annual wind speed is 1.66 m/ sec, which defines it as weak.

The following pictures 11-15 show the climate charts of the Kardzhali region.

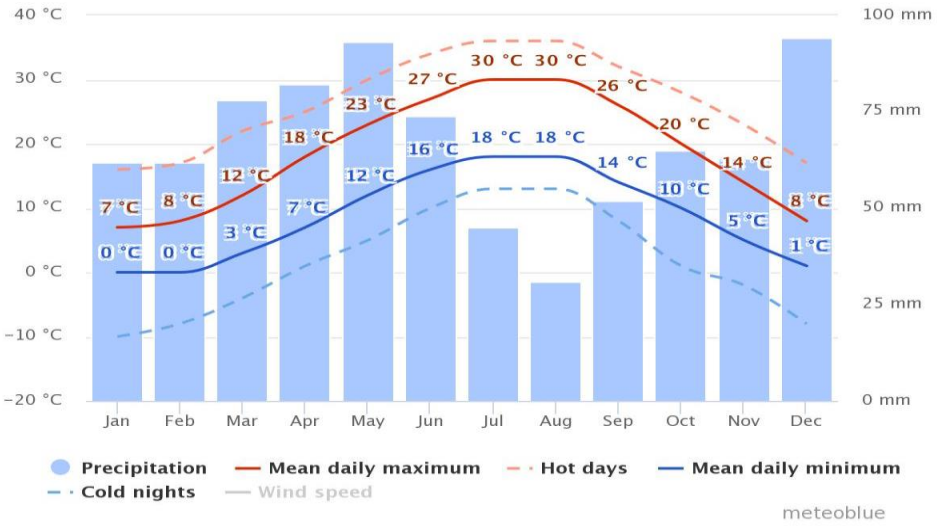

Image 11. Average temperatures and rainfall in Kardzhali

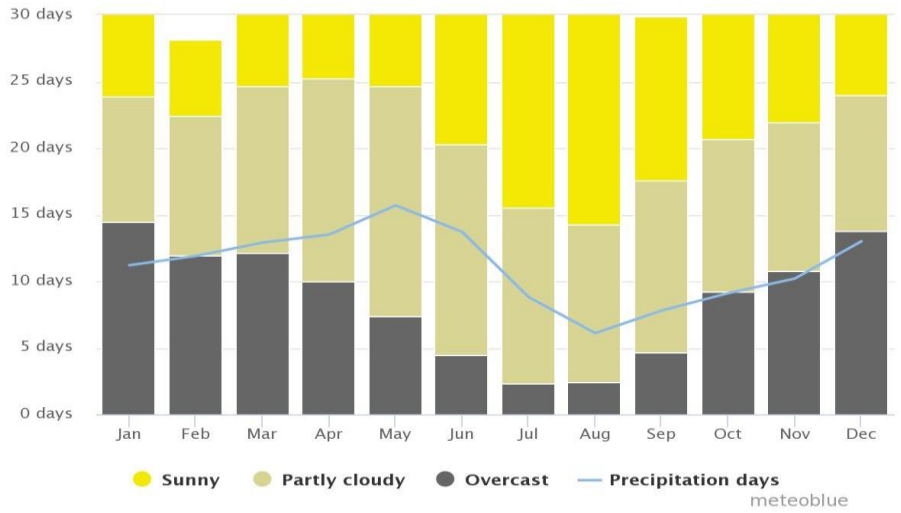

Image 12. Cloudy, sunny and rainfall days in Kardzhali

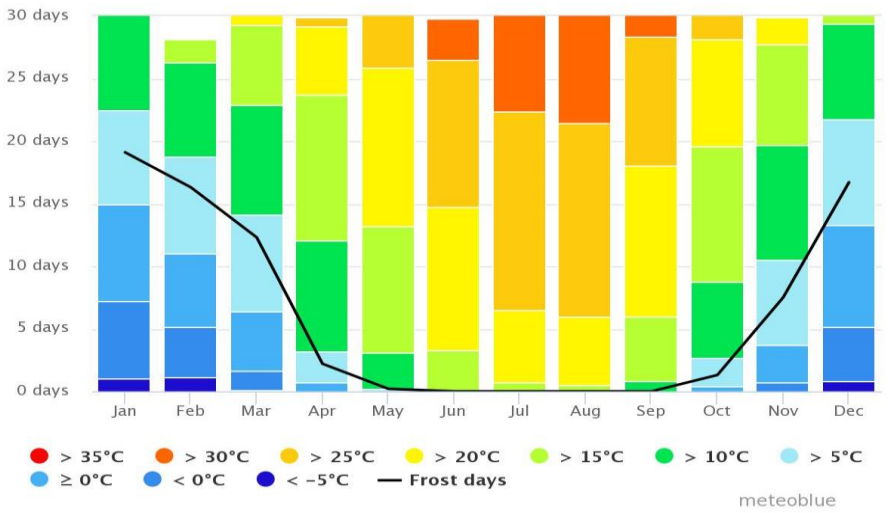

Image 13. Maximum temperatures in Kardzhali

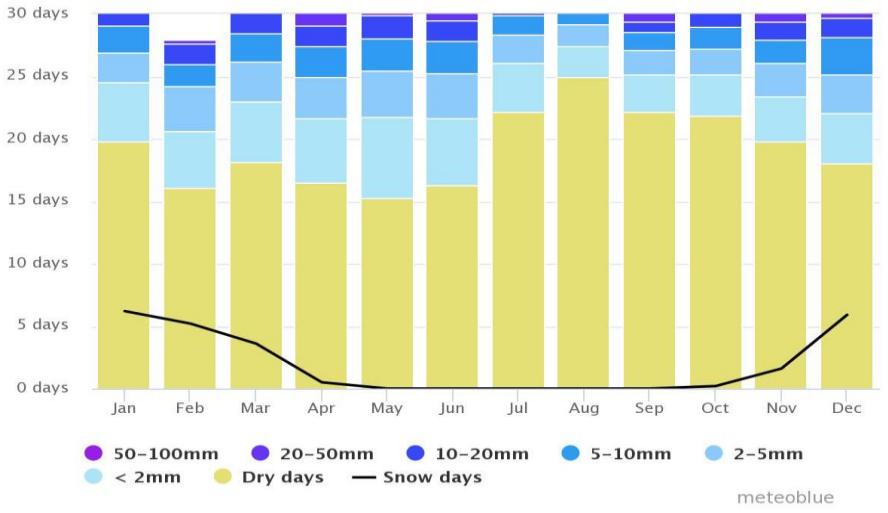

Image 14. Precipitation figures in Kardzhali

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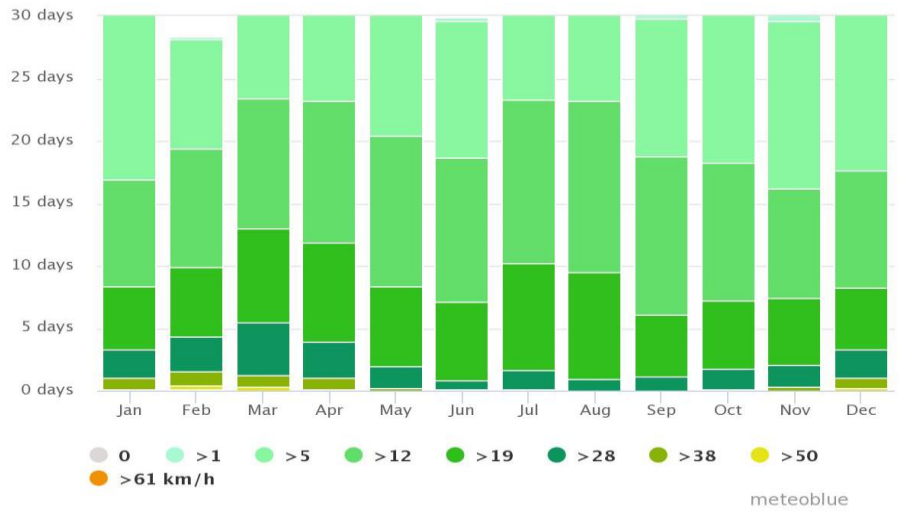

Image 15. Wind speed in Kardzhali

Kirkovo Municipality in climatic terms, its territory belongs to the East Rhodope hilly-mountain climatic region of the South-Bulgarian climatic sub-region with Mediterranean influence. The low-mountain relief and the warm air currents coming from the Aegean Sea are the main factors shaping the climate. The winter is relatively mild, summer is long and hot.The average annual precipitation is 521 mm.The duration of sunshine is 224 hours per year, and the average annual air temperature is between 11 and 13.2°C. On average, around 216 days a year, from the beginning of April to the beginning of November, observed stably maintaintemperature over 10°C. Relative air humidity is lowest in the summer months from 57 to 67%, and the highest in the winter months is 78-83%. Average annual humidity is 72%.

The climatic characteristics of Haskovo and Kardzhali districts show that there are very good conditions for the establishment of vineyards as potential for development of viticulture and winemaking.In addition, a prerequisite for offering tourism for four seasons.

2.3.2. Biotic factors determining the risk for the successful realization of a quality grape and wine harvest

The bioclimatic characteristics of the Haskovo and Kardzhali region are not significantly different from the average for the country, which determines the influence of the biotic factors on the risk for the successful realization of a quality grape and wine harvest. Amongthese factors, determining the yield and quality of grape production, a major share has

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grapevine diseases. Obtaining high and sustainable yields from the vineyards is unthinkable without their protection from diseases and pests. Different methods and means of prevention and control are used for this purpose. In general, there are two groups of infectious diseases of grapevine, depending on the characteristics of the pathogens, the damage caused and the methods for their prevention and control.

The first group includes systemic diseases that affect the entire plant. The causes of these diseases can be viruses, bacteria or fungi, and their etiology is chronic and most often continues until the plant completely dies. Usually their treatment is impossible and, in addition to affecting the quantity and quality of the yield obtained, they reduce the longevity of the vineyards. Often, the diseases of this group occur latently (without symptoms), which favor their rapid spread, including the vine propagation material. For this reason, the most effective method of control is the prevention, beginning before establishment of the new vine plantation, and involves planting of sanitary healthy (certified) vines (Directive 68/193/EEC, Directive 2002/11/EC, Directive 2005/43/EC, Ordinance No. 95 of 04.08.2006 on trading of vine planting material) The object of this legislation are *Grapevine fanleaf virus* (*GFLV*), *Arabis mosaic virus* (*ArMV*); *Grapevine leafroll virus* (*GLRaV*), complex of rugose wood (GVA and GVB); *Grapevine fleck virus* (*GFkV*).

Other members of the group of systemic diseases are Grapevine yellows, caused by phytoplasmas. They are associated with genetically different phytoplasmas and the most important are *Flavescence dorée* and *Bois noir*. *Flavescence dorée* (FD) is a quarantine disease in the European Community, associated to FD phytoplasma. It is specifically transmitted by *Scaphoideus titanus* Ball. The disease shows an epidemical behaviour, and when the vector is not controlled, the number of infected vines can reach 80-100% for several years (Smith et al., 1997). The causative agent of *Bois noir* (BN) belongs to group of stolbur. Phytoplasmas from this group attack a wide range of hosts, such as vegetables, tomatoes, potatoes, carrots; field crops and some weeds. Bindweed (*Convolvulus arvensis* L.) and nettle (*Urtica dioica* L.) are considered the main reservoir of infection in vineyards. BN is transmitted by the cicada *Hyalesthes obsoletus*. Since the vector feeds incidentally on vine, BN spreads more slowly than FD.

In Bulgaria, so far only BN has been found (Avramov *et al.*, 2008; EPPO, 2006; Genov, 2017; Sakalieva *et al.*, 2007). *H. obsoletus* and *Reptalus* spp. are found in Bulgaria as vectors

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of BN on vine (Avramov *et al.*, 2011). So far FD has not been established, but the presence of its vector - the cicada *S. titanus* was registered (Avramov *et al.*, 2011). Furthermore, FD and its vector are available in close proximity to Bulgaria, in Serbia at least since 2003 (Duduk *et al.*, 2003; Duduk et al., 2004; Magud and Tosevski, 2004), where it caused serious damage to wine producers. There is real risk of FD incidence in Bulgaria, causing epidemics in vineyards. An annual monitoring of grapevine yellows should be made to prevent penetration and spread of the quarantine phytoplasma in the target area.

Crown gall (*Agrobacterium vitis*) causes huge damages to viticulture worldwide, as its incidence is the greatest in areas characterized by severe climatic conditions for vine in the winter-spring period (Burr et al, 1998). In Bulgaria, the disease is spread in all viticulture regions (Genov, 2012) and target area is not exclusion. The low negative temperatures during the months of February, March and April are the most important for the crown gall development. The amount of rainfall, temperature and relative humidity, have the strongest effect in May and June (Genov, 2007). There are no officially registered chemicals for control as the systemic survival of the causal agent in the vascular system of the vine limits their application. In this connection, for the control of systemic diseases, the methods and means for diagnosing and identifying the causative agents, including visual, microbiological and molecular, as well as the time of their application are essential (Genov et al., 2009).

The second group of diseases has a seasonal nature and develops only during the vegetation of the vine. The most common causative agents are fungi and mainly affect the green parts of the grapevine. Diseases in this group can be severely damaging and destroy up to 100% grape harvest. The control of these diseases is also a preventive, and after 2014, compliance with the general principles of integrated pest management for crops (Directive 2009/128 / EC and Regulation (EC) No 1107/2009) is mandatory. The General Principles of Integrated Pest Management and the National Action Plan for Sustainable Use of Pesticides are regulated by the Law on Plant Protection. It was foreseen to result in a more targeted use of all available pest control measures, including pesticides, and to contribute to reducing the risks to human health and the environment and dependence on pesticide use. This group includes **mildew** (*Plasmopara viticola*), **powdery mildew** (*Erhysiphe necator*c. f.*Oidiumtuckery*), **gray mould** (*Botrytis cinerea*), **black rot** (*Guignardia bidwellii* (Ellis) Viala & Ravaz with anamorphic *Phyllosticta ampelicida* Englem).

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Vine pests, depending on the degree of infestation, can cause serious damage to the foliage and the grape harvest, which in most cases affect adversely vines resistance to low temperatures and some diseases. The most important economically insects are controlled annually, but together with them there are less familiar pests, that require researches on their phenological development and working out a system for their control (Lyubenova et al., 2016).

Among the **abiotic factors**, late spring frosts, summer droughts combined with high temperatures and hailstorms are the greatest threat to the grape harvest.

2.4. Land use

The total area of the territory of two districts - Haskovo and Kardzhali - amounts to 878 738 ha and represents 39.4% of the area of the South Central Region and 8.0% of the territory of Bulgaria (Table 1).

Within the territory of Haskovo district with the largest territorial area is the municipality of Ivailovgrad - 81 468 ha (14,7% of the total area), followed by the municipalities of Haskovo - 74 480 ha (13,4%), Topolovgrad - 71077 ha 12.8%), Svilengrad and Harmanli with 70 0032 ha (each one with a relative share of 12.6%).

Within the Kardzhali district the largest area is the Krumovgrad municipality - 84 370 ha (26.1% of the total area), followed by the municipalities of Kurdzhali - 58 793 ha (18.2%) and Kirkovo - 53 912 ha (16.7%).

In the structure of the land resources available to both areas, the agricultural territories occupy the leading position - 53.0% of their total area, compared to 47.6% for the South Central Region and to 58.2% for the country. This circumstance determines the resource availability and potential for development of agricultural production in the separate region.

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Table 1. Territorial balance of Haskovo and Kardzhali districts, hectars (ha)

Statistical region Districts Municipalities	Total	Territory by kind					
		Agricultural land	Forest	Urbanized	Water flows and territory	Mining and digging raw materials	Transport and infrastructure
Bulgaria	**11037178**	**6423476**	**3828372**	**495279**	**197561**	**25905**	**66585**
South central region	**2230596**	**1062549**	**1021289**	**84014**	**48599**	**1135**	**13010**
Haskovo district	**555984**	**336629**	**180070**	**23784**	**11977**	**405**	**3119**
Dimitrovgrad	58320	43267	6867	5959	1561	217	449
Ivaylovgrad	81468	30566	48649	775	1113	22	343
Lyubimets	34427	20724	11106	1113	1255	19	210
Madzharovo	24717	6790	16229	398	1203	7	90
Mineralni bani	21467	11393	8902	712	383	8	69
Svilengrad	70032	52848	12677	2285	1764	12	446
Simeonovgrad	22294	16248	4372	989	560	1	124
Stambolovo	27670	14244	11897	967	406	0,1	156
Topolovgrad	71077	44118	23905	2090	655	81	228
Harmanli	70032	46242	19543	2836	1073	0	338
Haskovo	74480	50191	15924	5661	2004	37	663
Kardzhali district	**322754**	**128888**	**174150**	**11067**	**7242**	**28**	**1379**
Ardino	33974	13192	18940	967	785	7	83
Dzhebel	22964	7657	14375	693	152	0	87
Kirkovo	53912	18925	32488	1758	567	0	174
Krumovgrad	84370	38378	43036	1611	1016	7	322
Kardzhali	58793	22703	27954	4133	3648	13	342
Momchilgrad	36030	15974	17899	1149	784	1	223
Chernoochen	32710	12059	19458	756	289	0	148

Source: National Statistical Institute, 2018.

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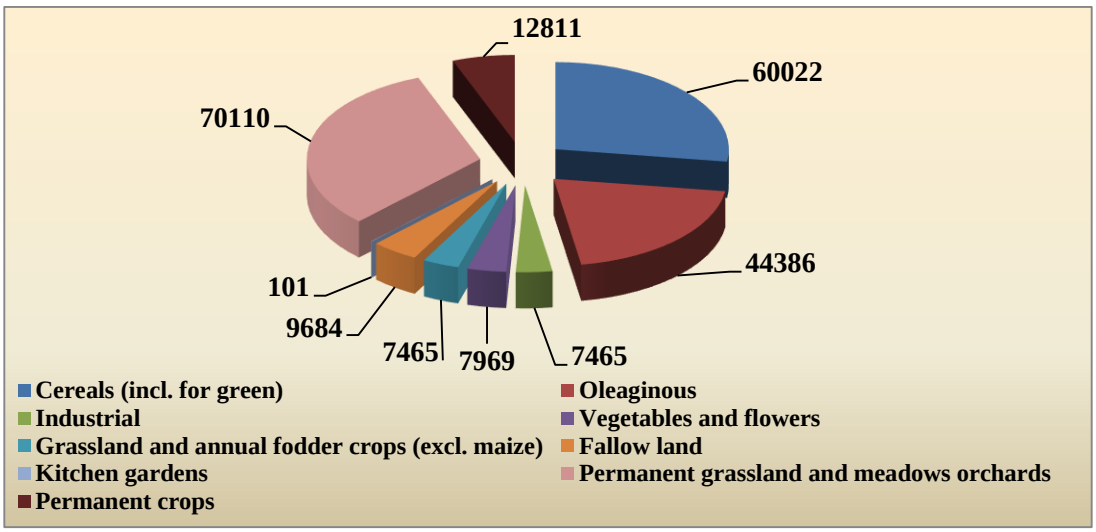
The forest areas occupy 40.3% of the area covered within the districts of Haskovo and Kardzhali, situated mainly in the municipalities of Ivailovgrad and Krumovgrad, respectively 48 649 ha and 43 036 ha.

Water currents and water areas account for 2.2% of the total area of both territories, exceeding the country's average structural level of 1.8%.

For mining used only 433 hectares of the total area covered by the districts of Haskovo and Kardzhali, concentrated mainly within the municipality of Dimitrovgrad- 217 ha. Of minerals with the greatest importance for the economic development of Haskovo are the sources of industrial minerals - mainly limestoneq used for the needs of the cement industry and also marbles limestone, andesite, dolomite, rhyolite, stone materials, which are used in general and road construction.

Urbanized areas account for about 4.0% of the Haskovo and Kardzhali districts territories and 0.5% of the total area are intended for transport and infrastructure.

The structure of the used agricultural area within Haskovo district is shown in figure4. Permanent grassland and orchard gardens account for the greatest share - 31.9%, followed by cereals (wheat, barley, maize, etc.) and oilseeds (mainly sunflower and rapeseed), respectively 27.3% and 20.2%. The share of permanent crops is 5.8%.In terms of area of permanent crops in 2017 Haskovo ranks fourth in the country with a size of 12 811 ha, following the districts of Plovdiv-19754 ha, Stara Zagora -14303 ha and Burgas -13855 ha.



Source: MAAF, Agrostatistics Department, 2017

Figure 4. Utilized agricultural area in Haskovo by group of crops in 2017, ha

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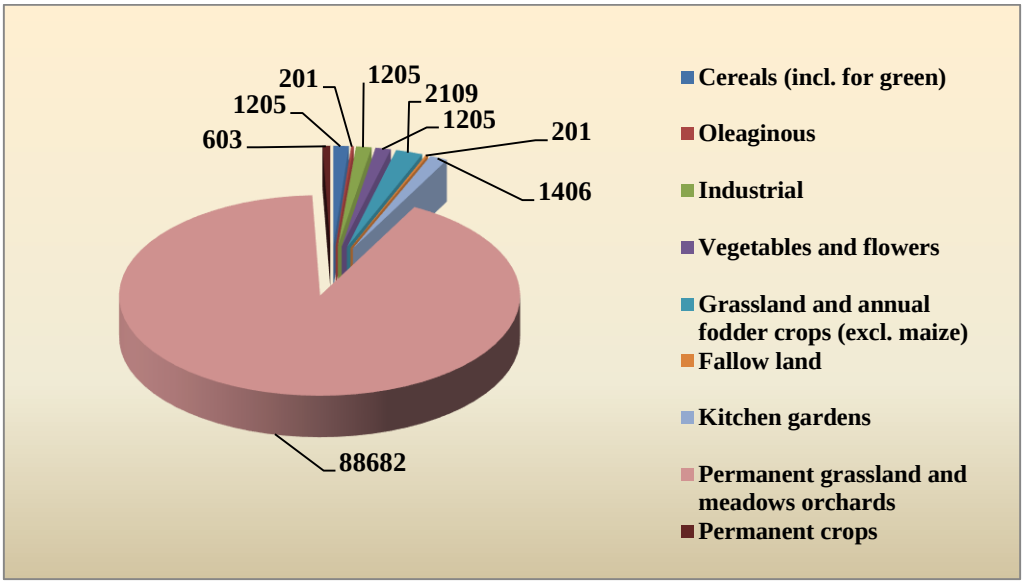
The permanent plantations in the area represented mainly by the vineyards with wine grapes varieties - 6998 ha, according to the EAVW data for 2017, and the fruit plantations - cherries, peaches, apples, plums.The regions with well-developed viticulture and wine-making comprise the municipalities of Lyubimets, Ivailovgrad, Svilengrad, Harmanli and Stambolovo.

The permanent grassland and meadows orchards dominate again in the structure of the utilized agricultural area (UAA) in Kardzhali region with the share of 91.6%. Grassland and annual fodder crops have a relative share of 2.2%, and kitchen gardens, industrial crops, vegetables and greenhouses accounts respectively for 1.5%, 1.2% and 1.2% of the UAA in 2017(Fig. 5).



Source: MAFF, Agrostatistics Department, 2017

Figure 5. Utilized agricultural area in Kardzhali by group of crops in 2017, ha

Traditional for the Kardzhali region is the production of oriental tobacco.According to the official data published in the updated version of the Kardjali Development Strategy 2014-2020, the 2016 tobacco areas are 670 ha compared to 2427 ha in 2013, representing a decrease of 72.4%. In line with the European and global policy to curb smoking, respectively shrinking tobacco production, the trend is likely to continue in the long term. Preserving the vitality of the region in the social sphere implies the search for alternative livelihood, such as fruit and vine growing. At present, the area of permanent crops in the district is only 603 ha

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(of which 135 ha are vineyards) or 0.6% share of the utilized agricultural area. Compared to 2013, the area under permanent crops decreased by 301 ha (by 33.3%). One of the reasons for the low prevalence and the limited interest in fruit growing and viticulture is the specific cultivation of crops, whose proper application requires specialized knowledge and skills. In this aspect there is potential for development of the social capital in the area through conducting trainings of farmers. The development of viticulture as an alternative means of livelihood can contribute to the achievement of sustainability in the region, both economically, socially and ecologically.

CHAPTER 3. Viticulture and wine making in the Haskovo and Kardzhali districts

3.1. Varietal potential of the territory

Because of its ecological plasticity and high quality of the fruit, the vine is the most widespread culture in the world. For thousands of years, a man has been conscious of the plants that have provided him with food for his livelihood, thus choosing thousands of forms and varieties distinguished by morphological or economic qualities. As a result of the development of humanity, the team of vine grape varieties from their natural habitats and their propagation and distribution, a large number of varieties are grown today, the main set of which is country-specific. Most of these varieties have a limited distribution, but there are also those which, due to their valuable economic qualities and high adaptability, are widely distributed and are grown in many areas of the country.

The variety in modern viticulture is one of the most important factors determining the quality of grapes and wine (*Simeonov*, 2014). The main grapevine varieties in Bulgaria have high technological indicators, which do not appear in all wine-growing regions. The quality of the produce of each variety strongly depends on the soil-climatic conditions in the micro-region of its cultivation. Local varieties must also be propagated in the most appropriate terrains, corresponding to their specific ampelographic features.

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On the basis of the multi-year studies of the complex of natural conditions, agrobiological properties and technological qualities of varieties of vines and the accumulated experience in grape production and its processing in wine, four wine regions are outlined: North Bulgarian, East Bulgarian, South Bulgaria and Southwest (*Stoev etc*. 1960, *Katerov et al.*, 1990, *Roychev*, 2012).

All areas of the Dionysos project are located in the South-Bulgarian wine-growing region.

The South-Bulgarian wine-growing region to the north is limited by the Balkan Mountains, to the west and southwest of the Rhodopes, to the south of Sakar and to the east of the Strandzha and Bakadzhik hills, covering the Thracian Lowlands and the Sub-Balkan Valley. Here the climate is continental. The natural conditions in the southern region determine the specialization of viticulture in the wine production line, designed for quality and table red dry wines, as well as for the production of table grapes. In individual micro-regions there are conditions for the production of quality white wines and wines with a protected designation of origin.

On the basis of the temperature conditions, each of the wine-growing regions is divided into three sub-regions, on which the characteristics of the climatic and soil conditions and the directions of the viticulture with the respective variety composition have been prepared.

The first subregion covers the warmest places with a total temperature sum in the vegetation period from 3700° C to over 4000° C. In southern Bulgaria the subregion covers the hilly, sloping terrain of almost the entire Thracian valley from the valley of the Tundja to the west to the slopes of Sredna Gora - Septemvri and Karabunar and to the south of the slopes of Sredna Gora along the Brezovo line, the village of Bratya Daskalovi, Stara Zagora, Sliven, Straldzha to the northern slopes of the Rhodopes (including) along the line of Patalenitsa, Perushtitsa, Kuklen, Asenovgrad and Harmanliyka River to Svilengrad. This includes the valley of Arda from Kardzhali to Ivaylovgrad.

There are five wine-growing areas in this sub-region: dessert grape production with early, mid-ripe and late dessert varieties and wine varieties for red table wines. The main

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varieties for red wines are Cabernet Sauvignon and Merlot. From local varieties for red wines are grown Pamid, Mavrud (around Asenovgrad) and Petrich region - Shiroka melnishka loza.

A second subregion has a total temperature sum of 3500 ° C to 3700 ° C, which in some places drops to 3400°C. In southern Bulgaria, the second sub-region covers the Karnobat microregion - the slopes of the Bakadjik hills - Straldzha, Sungurlar Valley, the Balkan valley (to Kazanlak), the Karlovo region, the southern slopes of Sredna Gora - Brezovsko- Zelenikov Mikroraion and the region of Hissar, Starosel, Krasnovo. The main direction of winemaking is the cultivation of grapevine varieties for quality and table white wines and sparkling wines. In the warmer micro-regions of this sub-region, relatively more early red grapevine varieties and medium ripening dessert varieties can be grown for later dessert grape production - mainly Bolgar. Mainly the local varieties are Misket red, Dimyat and Tamyanka. To this sub-region belongs the micro-region of the villages of Kalugerovo, Vinogradets and Tserovo (with the main variety Pamid) and the northern slopes of the Rhodopes - Radilovo, Bratsigovo, Peshtera, Iskra and Topolovo (Plovdiv region).

A third subregion with a total temperature of 3100°C to 3500°C covers narrow stripes and half-mountainous places on the southern and northern slopes of Stara Planina and Sredna Gora, the northern slopes of the Rhodope Mountains, the slopes of Iskar Gorge, Mesta River valley, Kyustendil Plain, Dobrudja and Ludogorie. The main direction of this sub-region is the cultivation of varieties to satisfy local needs. In the warmer places, a larger vineyard with varieties for the production of quality white table wines and sparkling wines from western European and our newly established varieties of vines with a shorter vegetation period can be developed.

In the past, a limited range of dessert and grapevine varieties of varieties with a different production line have been grown and cultivated in the South Bohemian wine-growing region. Of the local varieties, the most popular are the white varieties Dimyat, Misket red, Tamyanka, Vinenka, Kokorko, Misket vrachanski and Marash white; the red grapevine varieties Gamza, Mavrud, Pamid, Shevka, Zarchin, Marash red and Shiroka melnishka loza and the dessert Chauş and Bolgar. Among the introduced varieties are mainly the varieties of Cabernet Sauvignon, Syrah, Gamay noir, Grand Noir, Pinot Gris, Alicante Bouschet, Muskat Ottonel, Aligote, Rkatsiteli and table grapes varieties Italy, Muscat de Hamburg, Queen of the vineyards, Chasselas, Hars Levelue and Pearl de Csaba.

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In the last 10-15 years there has been a trend of certain changes in the structure of the dessert and wine vine varieties covered in the South Bohemian wine region. The extremely favorable soil and climatic conditions of this region on the one hand, the access to European pre-accession and then structural and thematic funds from the second country and the desire of the wine-producing companies in Bulgaria to change and diversify their production as a style, organoleptic characteristics and third- to the creation of many new plantings with varied varieties of origin and destination. The valuable local varieties of Misket red, Dimyat, Tamyanka, Mavrud, Pamid and Shiroka Melnishka loza are preserved and a number of reputed foreign high quality varieties of Cabernet Sauvignon, Merlot, Syrah, Cabernet Franc, Pinot Noir, Kot, Sangiovese, Marcelan, Carmen, Murveder , Dornfelder, Grenache, Riesling italian, Chardonnay, Viognier, Sémillon, Traminer and the varieties of Victoria, Cardinal, Palieri 5 and others. Many valuable varieties - Bulgarian selection - Rubin, Bouquet, Melnik 55 (Early Melnishka loza), Drujba, Naslada, Misket kailashki, Velika etc. have been planted in many micro-regions and the quality of the grapes and the wine is closely approximated to the standards in the respective direction of production.

3.2. Local grapevine varieties distributed in the regions of Haskovo and Kardzhali

To register the local varieties of varieties distributed in these areas official data from the Executive Agency on Vine and Wine, own data and information from Bulgarian Ampelography, items 1, 2, 3 and 4 (Katerov et al 1990, Katerov et al., 2010, Katerov et al., 2015; Katerov et al., 2019 - in print) and Ampelography, publishing house of Agricultural University, Plovdiv (Roychev, 2012).

3.2.1. White grapevine varieties

Misket red (Turkish ruby, Blue Pendulum, Sungurlar Misket)

Misket red is an old bulgarian variety that has been cultivated since time immemorial in our lands. It is hardly found in other countries, and its foreign names and synonyms are unknown. It belongs to the Black Sea ecological-geographic group. It is found in all the wine-growing regions of the country. Misket red is a late ripening grapevine variety. Its grapes ripen at the end of September or early October. The vines are characterized by moderate to strong

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growth and the frogs mature well until the end of the vegetation and are characteristic of growing right. It is characterized by medium large, cylindrical-conical, sometimes with one or two wings, half-grained to a concise cluster and medium-sized, almost spherical berries. The generosity of the variety is very good. In modern crops, the Misket red variety is grown successfully in stem formations with the use of a short pruning of knots, and if necessary, arrows are left. The vine should be left 20-30 winter eyes, avoiding overloading to get quality grapes. It produces the famous original quality white dry wines "Karlovski Misket", "Sungurlarski Misket", "Brezovski Misket" and "Straldzhanski Misket", which are characterized by pleasant straw-yellow color, harmonious and fine musky aroma. The first gold medal for Misket red wine was awarded in 1898 in the town of Anvers - Belgium. When it is cut with the varieties Dimyat and Riesling Italian, the famous Euxinograd dry wines are prepared.

Dimyat (Smederevka, Damiat)

The Dimyat variety is most likely transported from Egypt to Thrace along the Black Sea coast by Greeks and has been grown since ancient times on our lands. It belongs to the Black Sea ecological-geographic group. In our country until 1960 is the most common wine grape variety, which is also used as a dessert for fresh consumption and export. Dimyat is a late ripening variety that reaches technological maturity at the end of September or early October. It has a medium to big large, conical, often winged, semi-dormant to loamy cluster and

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medium-sized or large oval berries. Its vines are moderately strong, and the variety has a very good fertility. It is recommended to be grown on stem formations and short pruning on 2 eyes. The white dry wines produced by it are characterized by a pleasant straw-yellow color, a slight harsh hue, a fresh and harmonious taste, a fine aroma and are suitable for some maturation and aging. Grapes with less sugars and higher acidity serve to produce quality distilled wine products. It is also used for the production of coupled wines.

Tamyanka (White Charlotte, Izmir Misket, Muscat White, Damianka, Vanilla, Temenuga)

Tamyanka is a very old local grapevine variety. It is supposed to originate in the Middle East - Syria, Iraq, Iran, Egypt and others. In the regions around the Mediterranean sea, it was grown thousands of years ago and is known for its various names. The Romans called the Anathelicon moschaton, because their grapes were very attacked by bees and wasps. The variety refers to the Oriental ecological-geographic group. Growing in larger areas in France, Italy, Portugal, Russia, Ukraine, Moldova, Armenia, Azerbaijan, Turkey and others. In the world this grape variety occupies an area of about 450,000 da. It has been known in our country since ancient times, but it was not widespread. Tamyanka is a medium ripening wine variety. Its grapes ripen in the middle of September. It has a medium large, cylindrical-conical, half-grained to a concise cluster and medium to small, spherical, topped berries, with a strong muscat aroma. Vines are characterized by medium growth. Suitable for this variety are the

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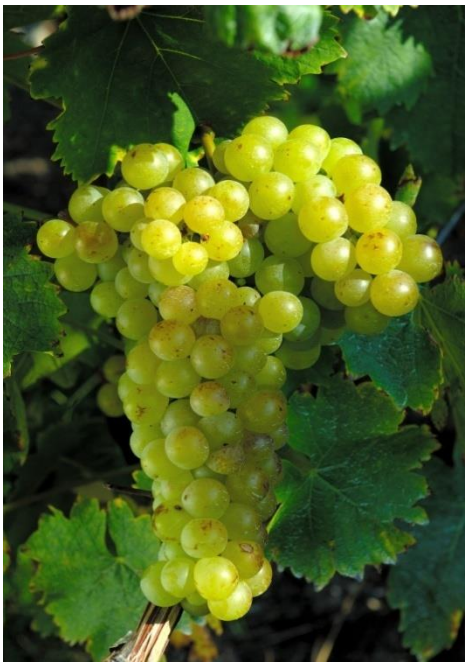
stem formations with the application of a mixed pruning system. To produce quality liqueur wines, the vines should not be overloaded with winter eyes and apply summer pruning. The strong micket taste and aroma is also preserved in wine. On the Crimean Peninsula - Ukraine of this variety is produced the quality wines "Magarach", "Masandra", "Castel", Gurzuuf". In Italy he receives the famous "Asti spumante" sparkling wines. In a coupage with the varieties of Shiroka Melnishka Loza (Broad Melnik Vine), Gamza and others are also produced red liqueur wines.



3.2.2. Red grapevine varieties

Mavrud (Kachivella, Mavrudi)

Mavrud is an old local grapevine variety grown in our lands from ancient times. It belongs to the Black Sea ecological-geographic group. It is spread mainly in Plovdiv, Haskovo other areas. This is the grape variety, which is mostly associated with Bulgaria, and it is with this country that we present ourselves to the world wine scene. Mavrud is late to a very late ripening grapevine variety. In the region of Plovdiv and Asenovgrad ripens at the end of September or early October. Vines are characterized by strong growth and good fertility. In stem breeding, shorter pruning and a small number of short fruit rods (arrows) should be preferred under moderate vines. When the vines are overloaded with winter eyes during pruning, the quality of the grapes is greatly reduced. The grapes are used to produce high-

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quality red table and dessert wines that develop their aging qualities. Mavrud wine is characterized by dark red to garnet color, good density, rich in phenolic substances, and aging has a wonderful harmonious taste. In addition to enough acids, the grapes contain a lot of dyed matter and a high extract.

Pamid (Pamit, Plovdina, Coplic, Pamidi, Eskishka, Felibelik)

Pamid is a very old local grapevine variety, a typical representative of the Black Sea ecological-geographical group. It is believed that the ancient Thracians have been cultivating it on our lands. In the past, it was the most popular grapevine variety in Bulgaria. In the South Bulgarian wine-growing region, it occupies the first place from the wine grape varieties, and in the North Bulgarian one - second place after the Gamza variety. Pamid is an average to late ripening grapevine variety. Its grapes ripen in the second half of September. Vines are characterized by strong growth and right-sighted growers. Its generosity is very good. In the past, the vines of this variety are grown on Cup, and in modern viticulture- the Mozer form, with pruning and arrows, or with a mid-stemmed cordon with knots. It is mainly light red and rosé dry light wines. They have a low acidity and low extract and are therefore not suitable for aging. The dyestuff and wine quality can be increased by adding before fermenting 5-10% grapes from the coloring varieties or a blend of ready-made wines.

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Gamza (Kadarka, Vodnashka vine, Mecic, Black giraffe and Vratsa black)

Gamza is an old local grapevine variety cultivated in the past in large areas in Northern Bulgaria. It is also spread in a many areas of Southern Bulgaria. Its exact origin is not established. It falls to the Black Sea ecological-geographic group.

Gamza is late to a very late ripening grapevine variety. Its grapes ripen at the end of September and the early days of October. The vines feature medium to strong growth and the fertility of the vines is very good with short pruning. When the vines are overloaded, sugars, dyestuff and grape extract are significantly reduced and wine quality deteriorates. A big disadvantage of the variety is the thin and fragile skin of the grains, which in a humid autumn cracked massively and rotted. In order to reduce the risk of gray rot, the vines should be planted in airy, hilly terrain, and in rainy autumn the grapes should be picked up in a short time. The red dry wines of this variety are characterized by bright red ruby color, delicate fruity aroma and a typical resinous taste. They are harmonious, soft, with pleasing freshness. They mature and form relatively fast for 1-2 years but are suitable for consumption and as younger wines.

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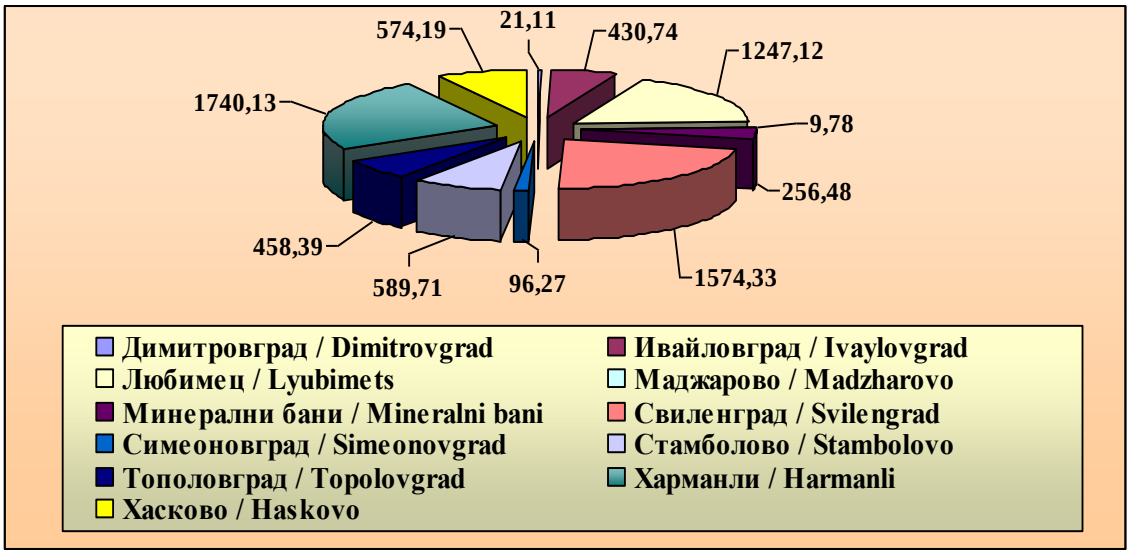
According to the official data of the Executive Agency on Vine and Wine, the total area of vines with grapevine varieties in the territory of Haskovo and Kardzhali districts in 2016 amounts to 7,134 ha (Fig. 6).



Source: Executive Agency on Vine and Wine, 2016

Figure 6. Area of vineyards with grapevine varieties in Haskovo district by municipalities in 2016, ha

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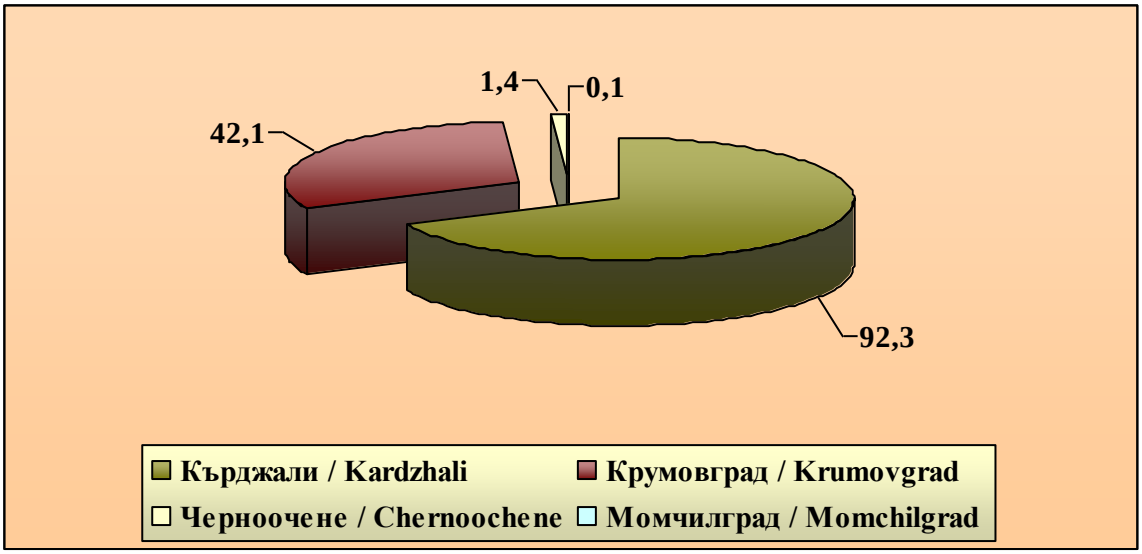
The predominant part of the vineyards is concentrated in Haskovo region - 6,998.24 ha. There is an increase of the area compared to 2015 with 112.24 ha, which is indicative of the presence of investment activity in the sector.

From the data illustrated in figure 6 it is evident that the share of vineyard areas in the municipality of Harmanli is the largest – 24,9% of the total area of the plantations in Haskovo district, followed by Svilengrad municipality – 22,5% and the municipality of Lyubimets - 17.8%. On the other municipalities with a significant amount of area under vines are Municipality Stambolovo – 589,7 ha; Haskovo district – 574,2 ha; Municipality Topolovgrad – 458,4 ha; Ivaylovgrad Municipality – 430,7 ha; and Municipality of Haskovski Mineralni Bani – 256,5 ha.

The size of the areas planted with wine vineyards in the territory of Kardzhali region is considerably smaller – 135,8 ha,which stems both from the specifics of the soil and climatic conditions of the region, as well as from the traditions of tobacco production - a major occupation for a large part of the population in the region. The vineyards with grapevine varieties are located mainly in two municipalities - Kardzhali (92,3 ha or 68,0% of the area of the vineyards in the area) and Krumovgrad (42,1 ha wich representing 31,0% of the total area). Very small is the size of the vineyard areas in the municipalities of Chernoochene and Momchilgrad, respectively 1,4 ha and 0,05 ha (Fig. 7).



Source: Executive Agency on Vine and Wine, 2016

Figure 7. Area of grapevine varieties in the municipality of Kardzhali by municipality in 2016, ha

According to information submitted by declarations in EAVW of produced grapes in 2016, in the Haskovo district produced 18513,4 tons of wine grapes.In the structure of production predominant share occupies the grapes of red grapevine varieties - 11 648,7 tons (62,9% of the total production). Produced grapes of white grapevine varieties amounted to 6 864,7 tonnes (37,1%).

In the structure of production of white grapevine largest share belonged to the introduced varieties Chardonnay and Sauvignon Blanc, respectively 43,0% and 17,2% of the total production (Table 2).

Table 2. White and red grape varieties produced in Haskovo and Kardzhali districts in 2016

Variety	Produced quantity, tons	% of total production
White grapevine varieties	***6864,7***	***100,0***
Chardonnay	2951,4	*43,0*
Sauvignon Blanc	1178,8	*17,2*
Muscat Ottonel	541,2	*7,9*
Rkatziteli	499,4	*7,3*
Misket red	410,7	*6,0*
Traminer	334,6	*4,9*
Dimyat	292,1	*4,3*
Viognier	167,8	*2,4*
Tamyanka	102,3	*1,5*
Semillon	57,6	*0,8*
Aligote	45,7	*0,7*
Riesling bulgarski	45,2	*0,7*
Pinot gris	20,5	*0,3*
Grenache Blanc	15,9	*0,2*
Müller turgao	8,9	*0,1*
Petit manceng	8,3	*0,1*
Muskadel	6,2	*0,1*
Riesling	5,8	*0,1*
Sauvignon gris	4,8	*0,1*
Other white varieties	167,5	*2,4*
Red grapevine varieties	***11648,7***	***100,0***
Merlot	4163,2	*35,7*
Cabernet Sauvignon	3800,7	*32,6*
Syrah	1395,9	*12,0*

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Mavrud	635,4	*5,5*
Cabernet Franc	477,5	*4,1*
Cot	286,9	*2,5*
Verdot Petit	157,3	*1,4*
Tempranillo	119,2	*1,0*
Pinot noir	92,6	*0,8*
Rubin	67,6	*0,6*
Alicante Bouschet	65,7	*0,6*
Pamid	48,9	*0,4*
Sangiovese	41,9	*0,4*
Carmenere	17,0	*0,1*
Grenache	16,8	*0,1*
Ancellota	15,0	*0,1*
Gamza	15,0	*0,1*
Regent	11,7	*0,1*
Murvedr	11,7	*0,1*
Marselan	4,0	*0,0*
Other red varieties	204,7	*1,8*
Total produced grapes:	**18513,4**	*x*

Source: Executive Agency on Vine and Wine, 2016

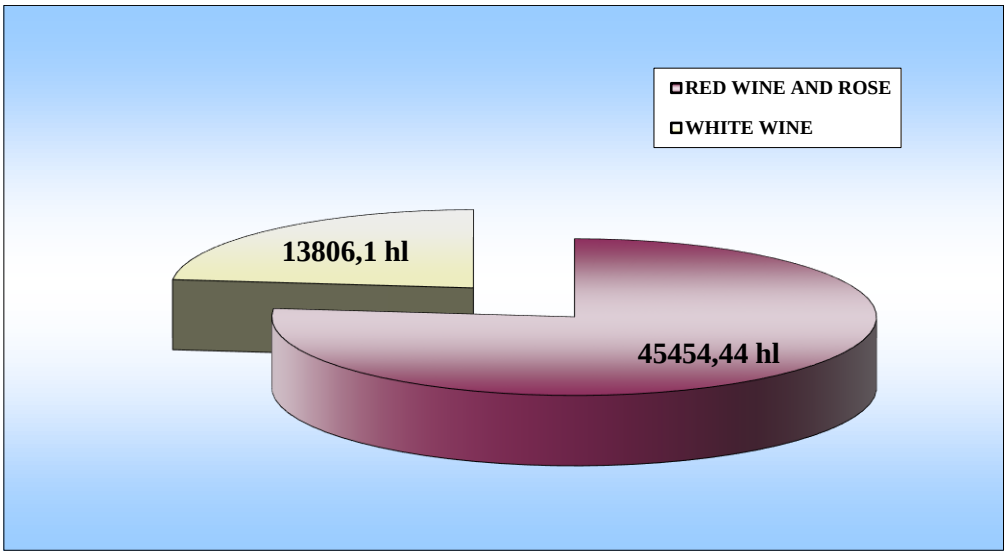
The grapes produced by local varieties - Misket red, Dimyat and Tamyanka are 805.1 tons in total and represent 11.7% of the total white grapevine. The greatest amount of variety Muscat red - 410.7 tons, at least Tamyanka variety - 102.3 tons.

In structural terms, the production of red grapevine is also dominated by the introduced varieties. The largest share in quantity produced in 2016 is Merlot variety - 35.7%, followed by Cabernet Sauvignon - 32.6% and Syrah - 12.0%.

Produced grapes of red local varieties – **Mavrud**, **Pamid** and **Gamza** amounted to 699,3 tons and represented 6,0% of total production of red grapes in Haskovo and Kardzhali. Leading position in the production of grapes from local varieties occupies variety Mavrud – 635,4 tons, which largely characterized the product portfolio of wineries in the region in the context of the production of wines from local varieties. An interesting fact is that the traditional for North Bulgaria a local red wine variety Gumza, is located in the variety structure of production in Haskovo district, although in a small quantity - 15 tons.

The total quantity of wine produced in 2016 within the research area is 59 260,5 hl. The red and rosé wines have a predominant share in the total structure of production – 76,7%,

which is logical consideringin view of the typical terroir for both areas,suitable especially for the production of red wines (Fig. 8). White wines occupy 23.3% of total production.



Source: Executive Agency on Vine and Wine, 2016

Figure 8. Produced wine in the districts of Haskovo and Kardzhali in 2016, hl

The data, presented in table 3, illustrate the varietal structure of vineyards with white grapevine varieties, located on the territories of Haskovo and Kardzhali districts. The presence of foreign varieties dominated over 50% of the total area occupied by white grapevine varieties in the both territories. The most widespread were the popular varieties Chardonnay Blanc (18.0% of the total area of white grapevine varieties in the district of Haskovo), Rkatsiteli (11,4%), Sauvignon blanc (7,4%), Muscat Ottonel (6,1%).

Table 3. Varietal structure of vineyards with white grapevine varieties in Haskovo and Kardzhali region in 2016, ha

Haskovo district			
Variety	**Municipality**	**ha**	**% of the area**
1	**2**	**2**	**4**
Misketcherven (local variety) *(24,2% of total area with vineyards with withe grapevine varieties)*	Lyubimets	15,9	*4,4*
	Mineralni bani	1,1	*0,3*
	Svilengrad	29,8	*8,3*
	Topolovgrad	100,5	*28,0*
	Harmanli	97,5	*27,2*
	Haskovo	113,9	*31,8*
	Total:	**358,7**	**100,0**

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Chardonnay Blanc *(18,0%)*	Ivaylovgrad	5,2	*2,0*
	Lyubimets	118,2	*44,4*
	Mineralni bani	8,1	*3,0*
	Svilengrad	72,1	*27,1*
	Simeonovgrad	8,1	*3,0*
	Topolovgrad	4,7	*1,8*
	Harmanli	38,2	*14,3*
	Haskovo	11,9	4,5
	Total:	**266,5**	**100,0**
Dimyat (local variety) *(17,3%)*	Dimitrovgrad	0,1	*0,0*
	Ivaylovgrad	8,7	*3,4*
	Lyubimets	16,6	*6,5*
	Mineralni bani	5,5	*2,1*
	Svilengrad	199,1	*77,8*
	Stambolovo	23,1	*9,0*
	Harmanli	0,1	*0,0*
	Haskovo	2,8	*1,1*
	Total:	**256,0**	**100,0**
Rkatsiteli *(11,4%)*	Dimitrovgrad	0,1	*0,1*
	Lyubimets	0,3	*0,2*
	Svilengrad	21,8	*12,9*
	Stambolovo	19,2	*11,4*
	Topolovgrad	117,7	*69,7*
	Harmanli	8,8	*5,2*
	Haskovo	1,0	*0,6*
	Total:	**168,9**	**100,0**
Sauvignon blanc *(7,4%)*	Lyubimets	56,9	*51,6*
	Svilengrad	11,2	*10,2*
	Simeonovgrad	1,8	*1,6*
	Topolovgrad	2,2	*2,0*
	Harmanli	34,9	*31,6*
	Haskovo	3,3	*3,0*
	Total:	**110,3**	**100,0**
Muscat Ottonel *(6,1%)*	Dimitrovgrad	0,1	*0,1*
	Lyubimets	31,0	*34,4*
	Svilengrad	9,1	*10,1*
	Simeonovgrad	16,8	*18,7*
	Stambolovo	1,9	*2,1*
	Topolovgrad	18,2	*20,2*
	Harmanli	3,2	*3,6*
	Haskovo	9,7	*10,8*
	Total:	**90,0**	**100,0**
Muscat A Petits Grains Blancs (Tamyanka) (local variety) *(3,9%)*	Ivaylovgrad	2,4	*4,2*
	Lyubimets	8,3	*14,4*
	Mineralni bani	6,0	*10,4*
	Simeonovgrad	12,5	*21,7*

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	Stambolovo	20,1	*34,9*
	Harmanli	2,4	*4,2*
	Haskovo	5,9	*10,2*
	Total:	**57,6**	**100,0**
Viognier *(3,6%)*	Ivaylovgrad	4,1	*7,6*
	Lyubimets	9,6	*17,8*
	Mineralni bani	7,0	*13,0*
	Svilengrad	10,1	*18,7*
	Harmanli	23,1	*42,9*
	Total:	**53,9**	**100,0**
Traminer Rot *(2,1%)*	Lyubimets	21,1	*67,8*
	Svilengrad	0,8	*2,6*
	Topolovgrad	1,0	*3,2*
	Harmanli	8,2	*26,4*
	Total:	**31,1**	**100,0**
Semillon *(1,2%)*	Lyubimets	3,9	*21,4*
	Harmanli	14,3	*78,6*
	Total:	**18,2**	**100,0**
Other white wine-grape varieties *(4,8%)*	Lyubimets	26,5	*37,9*
	Svilengrad	19,9	*28,4*
	Simeonovgrad	1,8	*2,6*
	Stambolovo	0,3	*0,4*
	Topolovgrad	4,4	*6,3*
	Harmanli	10,1	*14,4*
	Haskovo	7,0	*10,0*
	Total:	**70,0**	**100,0**
Total area of white grapevine varieties in Haskovo district: 1481,2 ha			
Kardzhali district			
Aligote *(74,6% of total area with vineyards with withe grapevine varieties)*	Krumovgrad	41,9	**100,0**
Dimyat (local variety) *(19,2%)*	Kardzhali	10,8	**100,0**
Muscat Ottonel (6,2%)	Kardzhali	3,5	**100,0**
Total area of white grapevine varieties in Kardzhali district: 56,2 ha			

Source: Executive Agency on Vine and Wine (EAVW), Vineyard register, 2016

In order to diversify the assortment structure and strive to cover the greater part of the consumer preferences on the domestic as well as the international market in recent years the investment interest was directed towards not very familiar in Bulgaria but finding a place

on the international market varieties such as Viognier (3.6% of the total area of vines with white grapevine varieties in Haskovo district), Traminer Rot (2,1%) and Semillon (1,2%). On the territory of the municipality of Lyubimets were located the largest part of the vineyards with introduced white varieties - Chardonnay (118,2 ha), Sauvignon blanc (59,6 ha), Muscat Ottonel (31,0 ha), Traminer (21,1 ha). One of the most widespread varieties for the industrial production of wine from white grapevine varieties in the years when Bulgaria occupied a significant place in the world wine trade - Rkatsiteli was spread mostly in the region of Topolovgrad Municipality (117.7 ha). The investment interest in the Viognier and Semillon varieties was the largest in the Harmanli municipality, respectively 23.1 ha and 14.3 ha.

Of local Bulgarian white grapevine varieties, the most common were Misket cherven, Dimyat and Tamyanka (***Muscat A Petits Grains Blancs).*** The Misket cherven variety occupied a dominant share in the structure of the vineyard area with white grapevine varieties within the territory of Haskovo district – 24,2% (358,7 ha). The area of the vineyards of this variety is concentrated mainly in the municipalities of Haskovo – 113,9 ha (31,8% of the total area of the vineyards with Misket cherven variety), Topolovgrad – 100,5 ha (28,0%) and Harmanli – 97,5 ha (27,2%).

Variety Dimyat occupied an area of 256,0 ha, which represented 17,3% of the area of vines with white grapevine varieties in the district. The area of the vineyards was concentrated mainly on the territory of the municipality of Svilengrad - 199,1 ha (77,8% of the total area of the varieties). Larger areas for the production of grapevinefrom varieties of Dimyat are in the municipalities of Stambolovo - 23,1 ha and Lyubimets - 16,6 ha.

Permited for the production of wines with a protected designation of origin, white local variety Tamyanka covered an area of 57,6 ha, which is only 3,9% of the total area of the vineyards with white grapevinevarieties in Haskovo region. Potential for the production of white wines of Tamyanka variety was predominantly in the municipalities of Stambolovo – 20,1 ha (34,9% of the total vineyard area occupied by the variety), Simeonovgrad – 12,5 ha (21,7%), Lyubimets – 8,3 ha (14,4%), Mineralni bani – 6,0 ha (10,4%) and Haskovo – 5,9 ha (10,2%). In the territory of Kardzhali district the most widely spread was the introduced grapevine variety Aligote – 41,9 ha (74,6% of the total area of vineyards with white grapevine varieties in the area). Areas concentrated entirely on the territory of the municipality of Krumovgrad. The production of white winegrape was represented only by the local variety

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Dimyat, which occupied an area of 10,8 ha (19,2%), located in the region of Kardzhali municipality. There was a small area of plantations of the foreign variety Muscat Ottonel - 3,5 ha, which is in the same municipality.

The data shown in table 4 illustrated the varietal structure of vines with red grapevine varieties within the two areas considered.

Table 4. Varietal structure of vineyards with red grapevine varieties in Haskovo and Kardzhali region in 2016, ha

Haskovo district			
Variety	**Municipality**	**ha**	**% of the area**
1	**2**	**2**	**4**
Merlot *(61,6% of total area with vineyards with red grapevine)*	Dimitrovgrad	17,4	*0,5*
	Ivaylovgrad	209,0	*6,2*
	Lyubimets	439,9	*13,0*
	Madzharovo	6,2	*0,2*
	Mineralni bani	173,4	*5,1*
	Svilengrad	800,8	*23,6*
	Simeonovgrad	24,6	*0,7*
	Stambolovo	447,9	*13,2*
	Topolovgrad	39,7	*1,2*
	Harmanli	912,1	*26,9*
	Haskovo	325,7	*9,6*
	Total:	**3396,7**	**100,0**
Cabernet Sauvignon *(17,5%)*	Ivaylovgrad	83,8	*8,7*
	Lyubimets	212,1	*22,0*
	Madzharovo	2,53	*0,3*
	Mineralni bani	13,6	*1,4*
	Svilengrad	143,9	*14,9*
	Simeonovgrad	10,3	*1,1*
	Stambolovo	35,3	*3,7*
	Topolovgrad	141,6	*14,7*
	Harmanli	273,3	*28,3*
	Haskovo	49,5	*5,1*
	Total:	**965,9**	**100,0**
Syra, Syrah *(6,0%)*	Dimitrovgrad	0,1	*0,0*
	Ivaylovgrad	19,5	*5,9*
	Lyubimets	108,5	*32,7*
	Mineralni bani	9,9	*3,0*

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	Svilengrad	90,4	*27,2*
	Simeonovgrad	4,4	*1,3*
	Stambolovo	0,3	*0,1*
	Topolovgrad	3,5	*1,1*
	Harmanli	93,5	*28,1*
	Haskovo	2,1	*0,6*
	Total:	**332,2**	**100,0**
Pamid (local variety) *(4,7%)*	Dimitrovgrad	2,7	*1,0*
	Ivaylovgrad	58,7	*22,4*
	Lyubimets	25,1	*9,6*
	Madzharovf	1,0	*0,4*
	Mineralni bani	16,3	*6,2*
	Svilengrad	35,7	*13,6*
	Stambolovo	28,5	*10,9*
	Topolovgrad	22,4	*8,6*
	Harmanli	36,6	*14,0*
	Haskovo	34,6	*13,2*
	Total:	**261,6**	**100,0**
Mavrud (local variety) *(2,5%)*	Lyubimets	44,1	*31,8*
	Mineralni bani	8,5	*6,1*
	Svilengrad	44,2	*31,9*
	Simeonovgrad	2,8	*2,0*
	Stambolovo	1,2	*0,9*
	Topolovgrad	0,6	*0,4*
	Harmanli	35,3	*25,5*
	Haskovo	1,8	*1,3*
	Total:	**138,5**	**100,0**
Cabernet Franc *(2,6%)*	Lyubimets	55,7	*39,1*
	Mineralni bani	7,2	*5,1*
	Svilengrad	17,2	*12,1*
	Simeonovgrad	5,3	*3,7*
	Stambolovo	8,6	*6,0*
	Harmanli	47,0	*33,0*
	Haskovo	1,5	*1,1*
	Total:	**142,5**	**100,0**
Cot *(1,1%)*	Lyubimets	18,8	*30,7*
	Svilengrad	17,6	*28,8*
	Simeonovgrad	0,5	*0,8*
	Harmanli	24,3	*39,7*
	Total:	**61,2**	**100,0**

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Rubin (selected in Bulgaria) *(0,8%)*	Ivaylovgrad	7,1	*15,3*
	Lyubimets	4,7	*10,2*
	Svilengrad	1,8	*3,9*
	Simeonovgrad	4,7	*10,2*
	Stambolovo	3,3	*7,1*
	Harmanli	24,7	*53,3*
	Total:	**46,3**	**100,0**
Pinot Noir *(0,6%)*	Ivaylovgrad	10,6	*34,3*
	Lyubimets	4,5	*14,6*
	Simeonovgrad	1,4	*4,5*
	Topolovgrad	1,9	*6,1*
	Harmanli	10,2	*33,1*
	Haskovo	2,3	*7,4*
	Total:	**30,9**	**100,0**
Evmolpiya (selected in Bulgaria) *(0,5%)*	Lyubimets	0,4	*1,5*
	Svilengrad	25,1	*94,7*
	Harmanli	1,0	*3,8*
	Total:	**26,5**	**100,0**
Verdot Petit *(0,3%)*	Lyubimets	3,2	*16,8*
	Svilengrad	2,2	*11,6*
	Simeonovgrad	1,9	*10,0*
	Harmanli	11,7	*61,6*
	Total:	**19,0**	**100,0**
Other red wine-grape varieties *(1,8%)*	Dimitrovgrad	0,2	*0,2*
	Ivaylovgrad	19,3	*20,1*
	Lyubimets	26,2	*27,3*
	Svilengrad	19,4	*20,3*
	Harmanli	29,4	*30,7*
	Haskovo	1,3	*1,4*
	Total:	**95,8**	**100,0**
Total area of red grapevinevarieties in Haskovo district: 5517,1 ha			
Kardzhali district			
Pamid (local variety) *(58,2%)*	Krumovgrad	0,1	*0,2*
	Kardzhali	46,1	*99,6*
	Momchilgrad	0,1	*0,2*
	Total:	**46,3**	**100,0**
Merlot *(18,2%)*	Kardzhali	13,1	*90,3*
	Chernoochene	1,4	*9,7*
	Total:	**14,5**	**100,0**

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Mavrud (local variety) *(12,8%)*	Kardzhali	**10,2**	**100,0**
Cabernet Sauvignon *(10,8%)*	Kardzhali	**8,5**	**100,0**
Total area of red grapevinevarieties in Kardzhali district: 79,5 ha			

Source: Executive Agency on Vine and Wine (EAVW), Vineyard register, 2016

In the Haskovo region, the imported grapevine varieties (almost 90,0% of the total area of red grapevine varieties) were a major predominance. The most important for the development of red wine production in the region is Merlot – 3396,7 ha (61,6% of the total area of red grapevine varieties), which means that the specifics of the wine are well known and sought after, both domestically and internationally. The variety was grown in all 11 municipalities covered by Haskovo district. The largest was the size of the areas in the municipalities of Harmanli – 911,1 hectares (26,9% of the total area of Merlot vineyards in the area), Svilengrad – 800,8 ha (23,6%), Stambolovo – 447,9 ha (13,2 ha), Lyubimets – 439,9 ha (13,0 ha), Haskovo – 325,7 ha (9,6%), Ivaylovgrad – 209,0 ha (6,2%) and Mineralni bani – 173,4 hectares (5,1%).

Cabernet Sauvignon plantations covered an area of 965,9 ha (17,5% of the area of red grapevine varieties in the Haskovo district), which are spread mainly on the lands of the municipalities of Harmanli – 273,3 ha (28,3% of the area of the varieties), Lyubimets - 212,1 ha (22,0%), Svilengrad - 143, 9 ha (14,9%) and Topolovgrad - 141,6 ha (14,7%).

The third introduced variety, with a significant share in the structure of the vineyards of red grapevine varieties - the variety Syra covered an area of 322,2 ha (6,0% of the total vineyard area with red grapevine varieties). The production of Syra grapes is mainly concentrated in the municipalities of Lyubimets - 108,5 ha (32,7% of the total area of the vineyards with this variety), Harmanli - 93,5 ha (28,1%) and Svilengrad - 90, 4 ha (27.2%).In recent years, the subject of investment interest were varieties Cabernet Franc – 142,5 ha (2,6%), Cot – 61,2 ha (1.1%), Pinot Noir – 30,9 ha (0,6%) and Verdot Petit – 19,0 ha (0,3 ha). They were mostly distributed in the municipality of Harmanli.

The area of the main local varieties - ***Pamid and Mavrud*** represented overall of 7.2% of the total vineyards area with red grapevine varieties in Haskovo region.

Variety Pamid occupied an area of 261,6 ha, which was 4,7% of the overall vineyard area with red wine-grape varieties. The main micro-regions for its production were in the municipalities of Ivaylovgrad – 58,7 ha (22,4% of the total vineyard area), Harmanli – 36,6 ha (14,0%), Svilengrad - 6%), Haskovo – 34,6 ha (13,2%), Stambolovo – 28,5 ha (10,9%) and Lyubimets – 25,1 ha (9,6%).

The local red wine-grape variety Mavrud was grown on an area of 138,5 ha (2,5% of the total area of vineyards with red wine-grape varieties). Plantations of the variety were found in eight municipalities, of which the largest size of the vineyards in the municipalities of Svilengrad - 44,2 ha (31,9% of the area of all the plantations), Lyubimets - 44,1 ha (31,8%) and Harmanli – 35,3 ha (25,5%).

On small areas the Rubin and Evmolpia varieties selected in Bulgaria are distributed, respectively 46,3 ha and 26,5 ha. The Rubin vines are mainly concentrated on the territory of the municipality of Harmanli – 24,7 ha, while the Eumolpia plantations are mainly in the region of Svilengrad municipality – 25,1 ha.

The red grapevine varieties grown in the Kardzhali region are mainly represented by the local wine grape variety Pamid (58.2% of the total area of the vineyards with red wine grape varieties in the area), whose area is 46,3 ha and is located almost entirely on the territory of the Municipality of Kardzhali. The other main local variety grown in the region - Mavrud has occupied 10,2 hectares. Only the Merlot variety and the Cabernet Sauvignon variety are included in the varieties introduced in the area, with an area of 14,5 ha and 8,5 ha respectively.

All these pronounced trends are based on several main guiding principles:

- despite the fact that wine production is quite conservative and jealously guarding its traditions, there are new wine styles on the world wine markets, mostly based on their naturalness, preserved and emphasized fruit aromas, soft and harmonious tastes consumed as young or moderate aged up to 1 year of production. This is a trend imposed by the New World countries - Chile, Argentina, Australia, New Zealand. The new style relies primarily on the characteristics of the raw material and the technology is called upon to preserve and highlight what is the result of the generous nature of the southern hemisphere and the

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specifics of the variety. Old Europe still has a conservative approach, relying heavily on the development of wine, the transformation of grape matter, aging in a barrel and a bottle.

- economic realities tolerate rapid realization, often within a few months, without long aging, under which conditions these varieties have an advantage, which mostly concerns most Bulgarian local varieties.

- the wine market in Bulgaria under international agreements is open to foreign wines and already feels pressure from them.

The new times and the changing demands of the market have radically changed the attitude of producers and consumers towards Bulgarian varieties. More and more wine practitioners are aware of exactly what the feeling is that the wine originates and has fully revealed the potential of Bulgarian varieties. The struggle of wineries to validate the wine map and to dominate the market has led many world critics to show what we lack as Bulgarians and as winemakers - self-esteem, self-esteem and respect for local varieties. Every foreigner who has come to our country wants to touch the Bulgarian, to everything that distinguishes us from other peoples - cuisine, folklore, history, traditions, wines. It is very difficult, however, to respect the varieties that are not nearly grown in the wineries of the wineries and those that they do not process. Aliens openly show their respect for Bulgarian varieties, considering their huge potential before the Bulgarians themselves.

Bulgaria has exceptionally good wines, enough capable and knowledgeable oenologists, wonderful vineyards and cellars and a wonderful attitude to wine. Bulgarian wineries need less self-confidence and more respect for Bulgarian varieties, because they are a national value. In the context of these trends and guidelines, the production of local varieties of wine will allow Bulgaria to be competitive on the market by offering products with specific and unique organoleptic potential.

In the ecological aspect of the guidelines for future development of viticulture in the districts of Haskovo and Kardzhali, the issue of the conservation and sustainable use of genetic resources as a basis of production activity is of particular importance. The gene pool of the vine, as a component of biodiversity, is a vehicle of adaptive and innovative potential for sustainable development of production systems under the conditions of the dynamically changing natural and economic environment.Globally, the threat to the conservation of

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genetic resources arises because of the concentration of production of several wine grape varieties - Cabernet Sauvignon, Merlot, Chardonnay, Syra and others, driven by the economic interests of the producers. This, in turn, limits the distribution of local varieties with unique organoleptic and economic qualities, bearers of traditions and cultural identity. There is a need to increase the entrepreneurial interest in the field of creating and growing vineyards of local varieties suitable for the region, which will expand the possibilities for the production of wines with specific and unique quality characteristics. The successful combination of viticulture, wine making and wine tourism is a way to create an attractive image of the destination, generating synergy in the three main aspects of sustainable regional development - ecological, social and economic.

3.3. Potential for the production of wines with geographical indications - Protected Geographical Indications (PGI) and Protected Designations of Origin (PDO). Review of the regulatory framework

According to the normative regulation in force at present in our country, the wines produced are classified as (Law on Wine and Spirits, Art 35-40):

1. PDO (Protected Designation of Origin) wines - produced in a defined geographical area, micro-region or locality and whose quality characteristics are mainly determined by the specific geographical environment and the inherent natural and human factors.The grapes originate entirely from the production area.

2. PGI (Protected Geographical Indication) wines - the name of the area of production is used to indicate the wine, with at least 85% of the grapes from which the wine is produced originates in the specified region.

3. Varietal wines without PDO / PGI - shall be based on the name of the vine variety and / or the vintage year. Offering them on the market requires registration of the producers and obtaining a production certificate.

4. Wines without PDO / PGI - All other wines other than those listed above.

A) Wine with a protected geographical indication (PGI)

The Bulgarian wine names with a protected geographical indication registered in the European Union are two: **PGI "Danube Plain"** and **PGI "Thracian Valley"**. The areas covered by this study fall within the second geographical indication. According to the approved specification,suitable for the production of wine with PGI "Thracian Valley" are the areas of the municipalities of Dimitrovgrad, Harmanli, Haskovo, Ivaylovgrad, Lyubimets, Madjarovo, Mineralni bani, Simeonovgrad, Stambolovo, Svilengrad, Topolovgrad from Haskovo district and the municipalities Ardino (without the territories of the villages of Ahryansko, Byal izvor, Gurbishte, Dyadovtsi, Enyovche, Jultushha, Kroyachevo, Lenishte, Mak, Mlechino, Padina, Pravdolyub, Rhodopsko, Svetulka, Sedlartsi, Sinchets, Sarnsko, Temenuga, Turnoslivka, Chubrika, Yabulkovets), Dzhebel (without the territories of villages Kontil, Lebed and Pripek), Kirkovo (without the territories of the villages Lozengradci, Strijba and Tihomir), Krumovgrad (excluding the territory of the village of Chernichevo), Kardzhali, Momchilgrad and Chernoochene.

The grapevine varieties which are allowed to produce wine with PGI "Thracian Valley" are:

- for production of white wine – ***introduced varieties*** **-** Muscat Ottonel, Chardonnay Blanc, Sauvignon blanc, Traminer Rot, Riesling Weiss, Pinot gris, Ugni blanc (Trebbiano), Riesling, Rkatsiteli, Aligote, Viognier, Semillon, Sylvaner, Furmint, Harsh Lavelius, Gewürztraminer, Colombard;

- ***local grapevine varieties*** – Dimyat, Misket cherven, Misket vrachanski, Kerazuda, Kokorko;

- ***varieties, selected in Bulgaria*** – Kamchia, Misket varnenski, Riesling bulgarski, Misket markovski, Misket sandanski, Misket sungurlarski, Chernomorski brilyant, Chernomorski eleksir, Aheloy, Orpheus, Sungurlarski biser, Pomoriyski biser.

- for red and rosé wine - introduced: Cabernet Sauvignon, Cabernet franc, Merlot, Pinot noir, Gamme noir, Syrah, Grenache, Gamelo fréo, Alicante bouschet, Petit verdot, Caladoc, Carmenere, Marcellan, Murveder, Malbec, Tempranillo, Dornfelder and Regent;

- local grapevine varieties: Gamza, Mavrud, Shiroka Melnishka vine (Broad Melnik Vine), Pamid, Shevka;

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- varieties selected in Bulgaria: Bouquet, Rubin, Evmolpia, Trakiiska slava (Thracian glory), Septemvriiski rubin (September ruby), Early Melnishka vine (Melnik 55), Melnishki rubin, Melnik Jubileen 1300, Melnik 82, Plovdivska Malaga, Hebros, Kuklenski Mavrud.

The maximum allowable yield is set at 13 000 kg / ha and the maximum yield of 100 kg of grapes is 70 liters.

The wine characteristics described in the specification are as follows:

- *White wines* - rich golden color with greenish tones; intense and multi-layered aroma; volumen, balanced, harmonious rich taste with a pronounced fruity character.
- *Rosé* wine - strong fruity aroma with accents of forest strawberry and cherry.
- *Red wines* - dark ruby shining color with garnet glow; aroma with characteristic strong fruity notes with discrete accents of red peppers, spices and chocolate; solid taste with well-balanced tannins.

Wines are produced using traditional white and red wine technology and can be labeled with the following traditional names, indicating the way of production, aging and quality: “Novo”, “Premium”, “Premium Reserve”, “Reserve”.

B) Wine with a protected designation of origin (PDO)

Bulgaria maintains a total of 52 designations of origin for wine protected in the EU in accordance with Regulation (EC) №1308 / 2013, five of which fall within the territory of Haskovo District.

PDO wines produced in outlined five micro-region located on the territory of Haskovo region, can be marked with the following traditional names indicating ways of winemaking, aging and quality: “New”, “Premium oak” or “First boot in Barrel”, “Reserve”, “Special Reserve”, “Collectible”, “Rosenthaler”.

- *Wine with protected designation of origin “Haskovo” (PDO “Haskovo”)*

The production area covers the lands of the settlements: Orlovo village, Polyanovo village, Dolno Voyvodino village, Tsareva poliana village, Tankovo village, Susam village, Bolyarovo

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village, Vaglarovo village, Mandra village, Kozlets village, Krivo pole, Elena, Uzundzha village, Harmanli village, Chernodub village, Sva reka village, Matochina village, Mladinovo village, Shtip village, town of Svilengrad.

Authorized wine grape varieties for production of PDO “Haskovo” are:

- for white wines - the local varieties Dimyat and Tamyanka;

- for red wines and rosé - the introduced varieties Cabernet Sauvignon, Merlot and Syrah and the local variety Pamid. The maximum allowable grape yield fixed in the specification for the production of wine with PDO "Haskovo" is 9000 kg / ha. The maximum yield of wine of 100 kg of grape is 65 liters for red wines and 60 liters for white wines, rosé and wines of the Pamid variety.

The specific agrotechnicsof vineyards includes:

- formation - Ombrela, Moser, middle-length two-armed cordon;

- pruning - mixed and short with a load of 54 eyes per vine;

- planting distances - from 2.0 m to 3.4 m between line spacing and from 1.0 to 1.5 m in the inter-row distance - up to 4500 vines per hectare.

➢ *Wine with protected designation of origin “Sakar”(PDO “Sakar”)*

The outlined area of production covers the territory of the settlements Dimitrovche, Momkovo, Mustrak, Svilengrad and Mezek.

The authorized grapevine varieties for the production of PDO "Sakar" PDO are:

- white wines - the introduced Sauvignon Blanc, Chardonnay and Viognier;

- red wines and rosé - the introduced Merlot, Cabernet Sauvignon, Cabernet Franc, Syrah and Malbec and the ***local variety Mavrud***.

The maximum allowable yield of grapes is 9000 kg / ha, and the maximum yield of wine from grapes 100 kg of 65 l for red wine and 60 l for white wines and rosé wines.

The specific agrotechnicsof vineyards includes:

- formation - Ombrela, Moser, middle-length two-armed cordon;

- pruning - mixed and short with a load of 54 eyes per vine;

- planting distances - from 2.0 m to 3.4 m between line spacing and from 1.0 to 1.5 m in the inter-row distance - up to 4500 vines per hectare.

The wine from a local variety Mavrud "Sakar PDO" produced in the region, have a rich dark garnet flavor of smoky skin, toasted bread and black fruit, flavor with notes of pepper, meat and sweet spices, soft tannins with a chocolate flavor.

- *Wine with protected designation of origin "Lyubimets" (PDO "Lyubimets")*

The area for wine production with PDO "Lyubimets" covers the territory of the settlements Belitsa, Georgi Dobrevo, Kolarovo, Levka, Lozen, Malko gradishte, Mustrak, Oreshets, Lozenets, Oryahovo, Branitsa, Bulgarin, Dositeevo, Shishmanovo, Kapitan Petko voyvoda, Ovcharovo.

Permitted grapevine varieties are:

- for the production of white wines - Chardonnay, Traminer, Sauvignon Blanc, Muscat Ottonel and the ***local variety Tamyanka***;

- for the production of red wines and rosé - the introduced varieties Cabernet Sauvignon, Merlot, Syrah, Cabernet Franc, Pinot Noir, and Petit Verdot and ***local varieties, incl. varieties of Bulgarian selection Pamid, Mavrud, Shiroka Melnishka loza, Evmolpia, Thracian glory, Rubin, Ranna Melnishka loza, Melnishki Rubin.***

The maximum allowable grape yield fixed in the PDO "Lyubimets" PDO is 9000 kg / ha. The maximum yield of wine from grapes 100 kg of 65 l for red wine and 60 l for white wine, rosé wines and the variety Pamid.

Applicable agrotechnics of vineyards includes:

- Formation - Ombrela, Moser, Gyuyo, middle-length two-armed cordon;

- Pruning - mixed and short with a load of 54 eyes per vine;

- Planting distances - from 2.0 m to 3.4 m between line spacing and from 1.0 to 1.5 m in the inter-row distance - up to 5000 vines per hectare.

Distinctive for the region are the wines produced from local and selected varieties, which have the following organoleptic characteristics:

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- white wines of the local Tamyanka variety - straw-yellow color with a greenish tint; aroma of ripe white fruits; fresh, full-bodied and balanced flavor with a pleasant aftertaste.

- red wines of *local varieties*:

Pamid - light red color; aroma of well-ripened grapes with fruity notes; well-balanced soft and smooth taste.

Mavrud - dark ruby color; fruity aroma of cherry with accents of marzipan and coffee; tender and sweet body with soft freshness, a harmonious and spicy finish of spices.

Shiroka Melnishka loza (Broad Melnik Vine) - ruby-red color with garnet shades; aroma of wild strawberries, mature cherry, spicy spices and notes of tobacco; soft and fruity flavor with spicy spices at the finish.

- red wines from *selected varieties*:

Evmolpia - ruby red color; flavor, which are interwoven notes of tobacco, autumn leaves and nuts; soft taste with pleasant freshness.

Trakiiska slava (Thracian glory) - ruby color; fruity aroma with accents of black berries and plum; dense and mild taste.

Rubin (Ruby) - dark red color; multi-layered aroma with notes of black ripe fruit, vanilla and leather; very well structured body.

Ranna Melnishka loza/ Melnik 55 (Early Melnishka vine) - ruby red color; a specific and rich fruity aroma, dominated by a mature cherry with tobacco notes; soft taste. When aged in oak barrels, are achieved finished and balanced wine, soft tannins and velvety flavor, with notes of vanilla and chocolate.

Melnishki Rubin - dark ruby color; multi-layered aroma dominated by red berries, mulberry, mature cherry with tons of spices and a hint of tobacco; juicy fruity taste with a touch of red fruit and spicy spices.

- *Wine with protected designation of origin "Stambolovo"(PDO "Stambolovo")*

Areas of production are the lands of the villages Gledka, Tsareva poliana, Kralevo, Stambolovo, Malak izvor, Golyam izvor, Tankovo, Zimovina and Lyaskovets.

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Authorized for the production of white wines with PDO "Stambolovo" is only the local wine variety Tamyanka. Red wines are allowed to be produced from the introduced varieties of Cabernet Sauvignon and Merlot and from the local variety Pamid.

The maximum allowable grape yield fixed in the specification for the production of wine with PDO“Stambolovo” is 9000 kg/ha. The maximum yield of wine of 100 kg of grape is 65 liters for red wines and 60 liters for white wines, rosé and wines of the Pamid variety.

Applicable agrotechnics of vineyards includes:

- Formation - Ombrela, Moser, middle-length two-armed cordon;

- Pruning - mixed and short with a load of 54 eyes per vine;

- Planting distances - from 2.0 m to 3.4 m between line spacing and from 1.0 to 1.5 m in the inter-row distance - up to 5000 vines per hectare.

The white wines of the local variety Tamyanka variety are characterized by a straw-yellow color with a greenish tinge, a fine musky aroma with shades of white fruit, citrus and flowers, and the taste of the wine is balanced and dense.

Red wines of variety Pamid with PDO “Stambolovo” are distinguished by a light red color, aroma of ripe red fruits, light and pleasant taste.

- *Wine with protected designation of origin "Ivaylovgrad" (PDO “Ivaylovgrad”)*

Area for the production of wine with PDO “Ivailovgrad” cover the town of Ivaylovgrad, the village of Sviraci, the village of Drabishna, the village of Slaveevo, the village of Belopolyane.

Permitted varieties for the production of wine with PDO “Ivaylovgrad” are:

- for white wines: the local variety Tamyanka variety and the introduced Chardonnay and Traminer.

- for red wines - introduced varieties Cabernet Sauvignon, Merlot, Pinot Noir, Syrah and Alicante Bouschet.

The maximum allowable grape yield fixed in the specification for the production of wine withPDO“Ivailovgrad” is 9000 kg / ha. The maximum yield of wine of 100 kg of grape is 65 liters for red wines and 60 liters for white wines, rosé and wines of the Pamid variety.

Applicable agrotechnics of vineyards includes:

- Formation - Ombrela, Moser, middle-length two-armed cordon;

- Pruning - mixed and short with a load of 54 eyes per vine;

- Planting distances - from 2.0 m to 3.4 m between line spacing and from 1.0 to 1.5 m in the inter-row distance - up to 4500 vines per hectare.

3.4. Magnitude of the viticultural exploitation in the districts of Haskovo and Kardzhali

In accordance with the guidelines of the ongoing European policy in the wine sector, Bulgarian wine sector, part of which is wine production in Haskovo and Kardzhali, faces challenges to increase their competitiveness, preserving traditions and increasing social and environmental role in regional development aspects. The specificity of the production process in the viticulture defines it as one of the most intensive sectors of agriculture, from the point of view of the input of labor resources. In this sense, and also in view of the positive dynamics of international trade in wine, viticulture and wine production, can be defined as activities with potential for generating income and employment (Fig. 9 and Fig. 10).

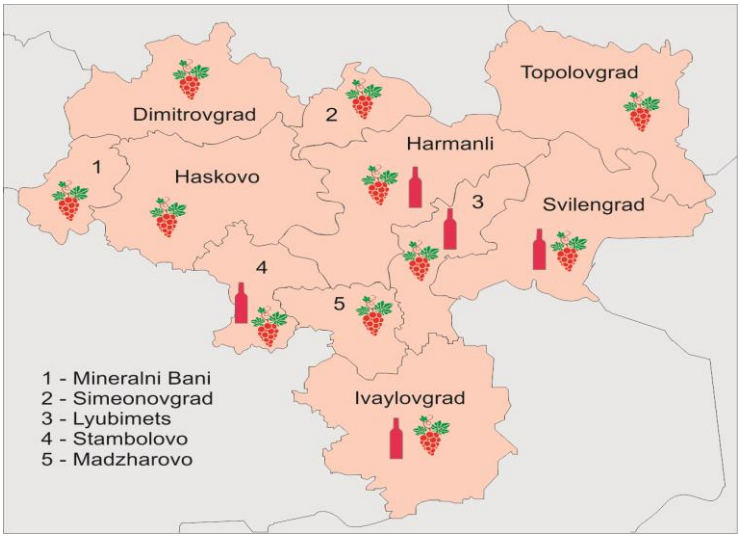

Figure 9. Micro regions of wine production in Haskovo district

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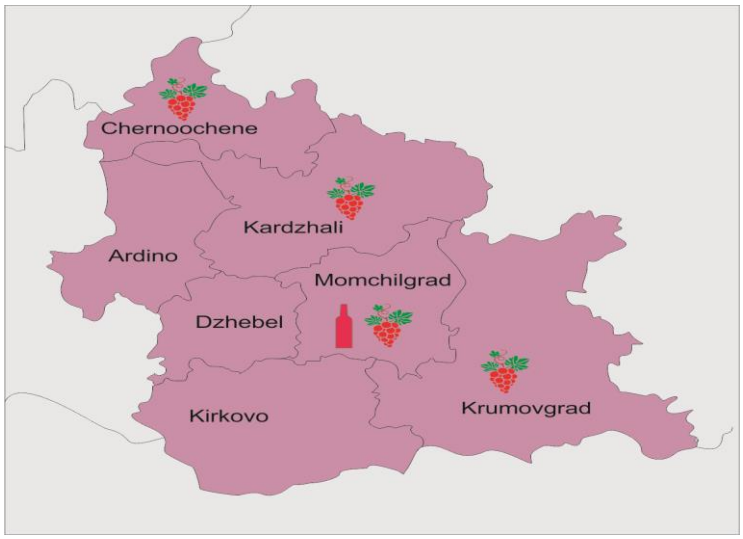

Figure10. Micro regions of wine production in Kardzhali district

Based on the specificity of the combination of factor conditions and organizational and economic relations at regional level, each region can create sustainable competitive advantages that will have a positive effect on the regional economy (Borisov and Radev, 2011, Kanchev et al., 2012, Miteva, 2015, Kirechev, 2012, Dimitrova and Simeonov, 2016).

The South Central Region, which obtained Haskovo and Kardzhali, is the region with the highest percentage of the gross output of grapes in the gross output of plant growing - 3.4% compared to 3.0% in the Southwestregion, 2.9% inthe Southeast and 0,4% in the three regions of Northern Bulgaria, according to NSI official information for 2014 (Dimitrova and Dimitrov, 2017). This is indicative that in regional plan, the traditions in this area are preserved to the greatest extentviticulture and winemaking are important for the livelihood of the local population as well as for regional economic development. There is potential for improving the competitive position of local grape growers and wineries, which should be developed through appropriate economic and marketing approaches, mainly based on the specific nature of local production, resulting from the great diversity of varieties and the unique characteristics of typical local varieties of vines.

According to the National Statistics Institute in 2015 in the South Central region is concentrated 29.3% (17 584.6 ha) of the area of vineyards with grape varieties in the country. Within the boundaries of the region, Haskovo ranks second after the Plovdiv region, according to the relative share of wine vineyard area in the total area of plantations in the South Central

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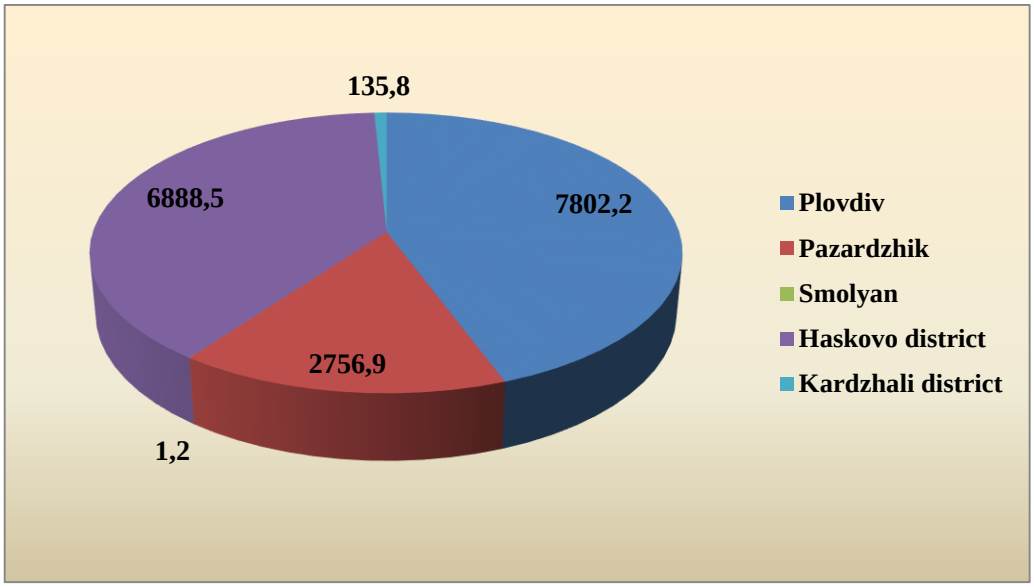
Region - 39.2% (Fig. 11). At the national level, the districts of Haskovo and Kardzhali manage 11.7% of the vineyards for the production of grapevine in the country.



Source: NSI

Figure 11. Structure of the area with grapevine varieties in the Southern Central Region by districts in 2015, ha

In the same year there were 204 wine producing enterprises in the country, of which 18 (8.8%) in the Haskovo district. According to the Executive Agency for the Vine and Wine, in 2016 the number of wineries in the area is 19, with most grape processing enterprises operating in the municipality of Harmanli - 9 and in the municipality of Svilengrad - 5. The municipality of Lyubimets registered two wineries and the same number enterprises in the municipality of Ivaylovgrad. There is one winery in Stambolovo municipality (Fig. 12).

In the Kardzhali district there is a wine-producing enterprise, which is located in the municipality of Momchilgrad.

Respectively, of the high share of the areas managed in the region in the overall picture at national level,the production of grapes also represents a high percentage of the total quantity of the harvested production in that year - 9.3% of the produced grapevine in the countryand 27.9% of the production in the South Central Region.

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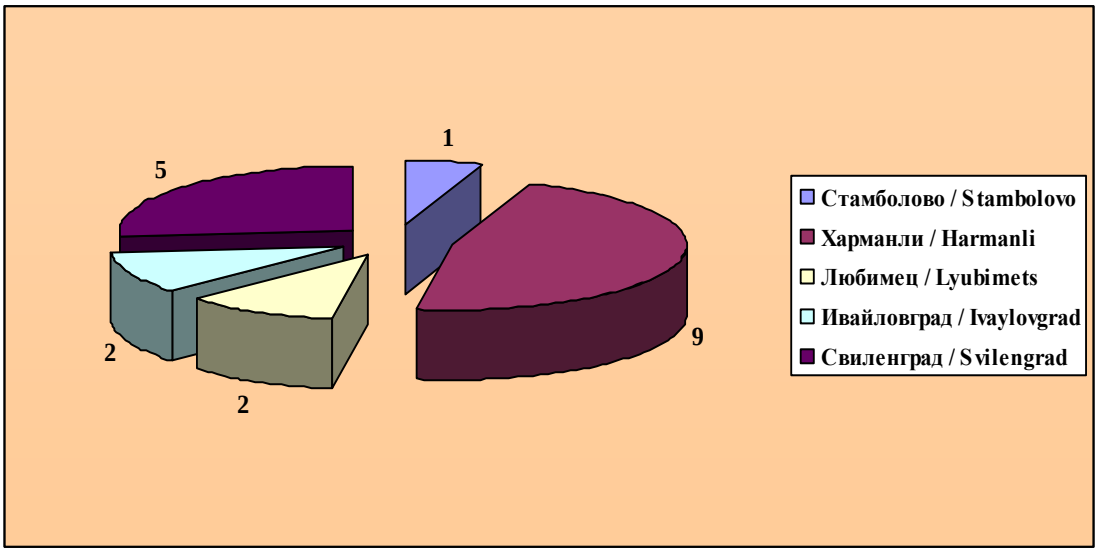

Source: Executive Agency on Vine and Wine (EAVW), Vineyard register, 2016

Figure 12. Number of wineries in Haskovo district in 2016

The participation of Haskovo and Kardzhali districts in wine production at national and regional level is also significant. The amount of wine produced in both areas represents 27.1% of wine production in South Central Region, respectively 4.9% of the wine produced in the country. It is unfortunate fact, that overall production of wine with geographical indication in the country has a small share in the assortment structure of production. According to MAFF (Agrarian Report 2017),in Bulgaria are produced 360 984 hl of wine with a Protected Geographical Indication (PGI), which represent 29.9% of the total wine production. Wines with a protected designation of origin (PDO) amount to 9511 hl, which is only 0.8% of the total production volume. South Central Region, where the districts of Haskovo and Kardzhali are located, is one of the leading regions in the production of wines with geographical indications.In 2016 in the region are produced 110,135 hectoliters of wine with PGI and 1596 hl of wine with PDO, representing respectively 30.5% and 16.8% of the total national production of wines with PGI and PDO. Availability and maintenance of plantations with native varieties in the both areas is a potential for the production of wines with geographical indications,which has to be explored and developed.

Evidence of entrepreneurial interest in viticulture - a basis for maintaining and enhancing the viability of grape and wine production,respectively in the local area, is the increase in areas under grapevine varieties in both areas, which is observed in 2015 compared

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to 2009. Based on the official statistics of the Ministry of Agriculture, Foods and Forestry, the Agrostatistics Department,of the baseline study – "Structure of the Vineyards in Bulgaria - July 2009" and "Structure of the Vineyards in Bulgaria - July 2015" is observed a growth of the area with grapevine varieties:

- in Haskovo District – with 11 ha (+ 0.16%), from 6875 ha to 6886 ha;

- in the Kardzhali region – with 12 ha (+ 9.7%), from 124 ha to 136 ha.

The tendency of vineyard renovation in both areas is also observed, including the expansion of the areas, this reflects the country-wide guideline for an increase in areas with introduced varieties. In this aspect there is a need to explore and promote the benefits of production of grapes and wine from local varieties and to emphasize their role in achieving sustainable development of the area.

3.5. Wineries functioning on the territories of the Haskovo and Kardzhali districts

The wineries in Haskovo district are dominated by family wineries with small and medium production capacity. Only a few cellars are owned by corporations. Wines produced from introducing varieties predominate, because this type of winesare well known on the world markets. But in recent years there has been an interest in local grape vine varieties. Most of them are concentrated in 2 out of 5 micro-regions for the production of quality wines in Lyubimets and Sakar regions. There are 19 cellars in the Haskovo district and only 1 in Kardzhali district. On table 5 are listed the cellars and the municipalities where they are located. Most of the cellars offer wine tourism.

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Table 5. Wine cellers in Haskovo and Karzhali districts

In Haskovo District, By Municipality	**#**	**Name / Company Name**	**HEAD OFFICES**
HASKOVO	1	VINPROM "*HASKOVO*"OOD	HASKOVO
STAMBOLOVO	1	VINARNA STAMBOLOVO EOOD	STAMBOLOVO Village,
SVILENGRAD	1	KATARZYNA ESTATE.	MEZEK Village
	2	WINE HOUSE "LOZEV"	SVILENGRAD
	3	WINE CELLER "DIMITROVCHE"	DIMITROVCHE village
	4	WINERY MEZEK - LTD	MEZEK Village
LYUBIMETTS	1	CONCERTO - LYUBIMETS	LYUBIMETS
	2	VILLA LYUBIMETS	PLOVDIV, 7 Lyuben Karavelov, Str
	3	DOMAIN SAKAR	LYUBIMETS
HARMANLI	**1**	CASTRARUBRA	KOLAROVO village
	2	TERRA TANGRA	HARMANLI
	3	VILLA BASSAREA	HARMANLI
	4	BRATANOV family winery & vineyards	HARMANLI
	5	"CHATEAUKOLAROVO" LTD	KOLAROVO village
	6	MALKATAZVEZDA	KOLAROVO village
	7	DIONYS WINERY	HARMANLI
	8	THRACIAN WINE EOOD	HARMANLI
IVAYLOVGRAD	**1**	YAMANTIEVS WINERY IVAYLOVGRAD	IVAYLOVGRAD
SIMEONOVGRAD	**1**	INTEGRAL WINERY, Svirkovo	SVIRKOVO Village
In Kardzhali District, By Municipality	**#**	**Name / Company Name**	**HEAD OFFICES**
MOMCHILGRAD	**1**	ARIA SATRA	MOMCHILGRAD

CHAPTER 4. Conclusion

4.1. Conclusions for Haskovo district for objectives of the project "Dionysos"

Haskovo district has an important socio-economic and cultural significance not only for the region, but also for the Republic of Bulgaria. The *Strategy for the development of Haskovo District 2014-2020* underlined that wine production is increasing, and two of the major factories for production of machinery and equipment for food industry in the country are based in this area. Part of the specialization of these two companies is in the production of machines and equipment for wine-making industry - fermentors for white and red wines, bottling lines, presses, pumps and a number of others.

The same strategy it highlighted that crucial to the economic development of the region is the presence of large number of small and medium-sized enterprises. Undoubtedly, some of these companies are the wineries, which, apart from being one of the largest employers in this part of the country, are also an important source of income for the municipalities in which they are located.

Agriculture in the region is above the national average, as a large share of it takes viticulture - producing table and especially of wine grapes. This is indicative of the sustainability of wine sector and will continue to develop in near future.

Transport corridors and fully completed in 2015. "Maritsa" highway, the international railway route Belgrade – Sofia - Istanbul, as well as the rehabilitated roads of the Republican Road Network, are also a good prerequisite for future socio-economic development of the area.Good infrastructure has proven to be important not only in the supply and development of tourism, but also in the regional economy of the Haskovo region. On the other hand needs upgrading tourism infrastructure - construction of new and modernization of part of the previously used hotels as well as increasing their categorization.Some of the leading wineries in the area opened their doors to visit, have excellent infrastructure to meet the tourists with medium and high incomes. Expectations are that new wineries will be found in the next 3-4 years. This will undoubtedly increase not only winemaking, but will increase the diversity of

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tourism products related to wine tourism. They will in turn enhance the prestige and establish the image of the area, as a quality destination for wine tourism.

Favorable mild and warm climate, the availability of diverse terrain and beautiful nature, water basins, including mineral springs, are among the most favorable and still underutilized resources available to Haskovo district for offering tourism. The mild climate and easy accessibility in Haskovo are a good prerequisite for offering tourism all year round.This is an a good opportunity for the area to become a **destination for four seasons**.

It marks the importance and opportunity of the area to offer and to specialize in some types of tourism: balneological, cultural cognitive, hunting and rural tourism. Wine tourism is defined as part of the rural, and undoubtedly it is. But considering the analysis here and the presence of wineries in Haskovo region, which have already specialized in offering wine tourism, it should be taken as a separate type of tourism. Therefore, it is important to explore in greater depth its features and competitive advantages. To analyze its material base, to highlight its strengths and weaknesses, as well as to produce new tourism products and services, to develop appropriate marketing approaches and marketing channelsfor realization. This can be done by combining various company products of wine tourism, in the form of "*Wine routes*" or in clusters known in literature as "*Wine Roads*".

The initiation of some well-established European practices and standards is another future, goal that must be realized if the area wants to develop as a wine destination. Practice shows that tourist sites with defined quality standards of products and service are more frequented than others where requirements are low. A particular example is the presentation of quality wines, in a good and hygienic environment, by well-trained and courteous staff, its a prerequisite for a well-presented product. And vice versa - if visitors tested wines with low quality, presented incompetent, there is a risk of a bad image not only for the cellar, but also for the whole region.

Organizing of wine festivals and exhibitions in the analyzed municipalities definitely have high interest andattendance. The right direction for promotion and development of wine tourism is organization of such an initiative by some of the cellars in the municipality of Harmanli, such as "Extreme Wine Tour - 4x4". This initiative is relatively new and still underdeveloped product to attract tourists.But following the latest global trends in offering wine tourism, initiatives of this type have enjoyed great success and attendance.

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The diversification between the wine and other types of tourism in Haskovo is a prerequisite for a wider range of products and options for organizing visits and attracting more wealthy tourists. For example, between wine and hunting tourism or wine with culinary tourism.Haskovo region can also offer eco-tourism, which also has a lot to offer – fishing; eco-routes; observations of rare bird species, such as black stork; observations of rare plant and animal species; natural phenomena.

As noted in the analysis, large deficits are in tourism products and their marketing. Therefore, in the near future, companies whose business is related to tourism should focus their efforts on marketing and market demand. The creation and consolidation of networks and routes related to wine tourism will help not only to preserve the existing wine and tourism potential, but will create opportunities for integrating other businesses and initiatives.

4.2. Conclusions for Kardzhali district for objectives of the project "Dionysos"

In some of the specific objectives for achieving sustainability in agriculture, which is laid down in the *Regional Strategy for Development of Kardzhali Region 2014-2020*, are:

- ❑ Creating unique products based on specific local industries, turning them into an attraction and a means of promoting the destination - "brand / trademark";
- ❑ Development of organic farming and offering traditional cuisine;
- ❑ Strategic positioning of the produced products on the Bulgarian market, and at reaching sufficient volume, orientation to foreign markets.

Part of the targets of project"Dionysos" are supporting and turn the region into an attractive tourist destination. In Kardzhali district viticulture and winemaking have existed for millennia. Evidence of this are many foundrocky wineries(sharapani), tools associated with viticulture; amphorae; jugs; cups; coins and many other artifacts, reveal the great material and spiritual heritage bequeathed by the peoples who inhabited these lands. Perperikon and Tatul are visited annually by over 250,000 tourists from Bulgaria and abroad. This shows great potential for future development of the area. However, there are no more detailed socio-demographic data for visitors - sex; age; status; nationality. These data will provide a more accurate picture of which visitors, what interests they have and which countries they come from. It would be better to advertising and positioning the created tourism products and on

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the other hand to create new and better oriented to specific target groups, following their preferences.

Although tourism infrastructure has been renewed, especially in and around Kardzhali, further investment in this direction should be sought.Its important for the development of tourism is the improvement of the infrastructure to tourist sites in all municipalities - roads, car parks, service spaces, signboards, information in several languages, etc. There are many natural and historical monuments in the Kardzhali region. This shows that the area has very high potential and prerequisites for the development of tourism. Tourism will provide more revenue, and this will improve the regional economy. There are excellent conditions for combining different types of tourism or creating thematic routes. For example, eco-tourism; cultural and historical; religious; rural; hunting; bicycle routes.

Vine-growing in the Kardzhali region is small and fragmented.Yet vineyards are relied on as a source of income, especially in the lowland areas to Haskovo.According to EAVW, only one cellar is registered in the whole Kardzhali region. Creating more wineries in the Kardjali district, in addition to providing livelihood for part of the population, will create the basis for attracting more wine lovers to the territory of the region.

There is interest in wine and culinary tourism. Wine tourism combined with local culinary specialties, will open up the “appetite” and interest of tourists to the region.n support of this statement may indicate that there is interest in creating family cellars and offering local specialties at the boutique restaurants. And all this is due to the progress of tourism in Kardzhali region. It is therefore necessary to provide opportunities for:

- ✓ Cooperation and business initiatives;
- ✓ Linking of corporate tourist products and services into common tourism products;
- ✓ Enriching the tourist offer in all municipalities;
- ✓ Diversification and specialization in tourism supply;
- ✓ Training of staff needed for tourism - hotels, restaurants, guides, information;
- ✓ Implementing good practices;
- ✓ Implementing quality standards;

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- ✓ Orientation towards bio tourism and preservation of natural resources;
- ✓ Advertising and promotion in Bulgaria and abroad;
- ✓ Cross-border cooperation in the field of tourism.

The potential of local varieties and quality wines for the development of the region

The area of Haskovo region has a well developed viticulture and wine production, which shows the relatively high share of the area in the total area of vineyards and in the total production of wine, as well as within the South Central regionand at the national level. Overcoming the development challenges of the wine sector in the region in a competitive environment requires improving the competitiveness of the proceedings as an opportunity to increase the added value. The added value can be achieved through diversification of production and markets, ensuring high quality and authenticity, improving marketing through the use of geographical indications.

In this aspect, the conservation of genetic resources from local varieties vines - Mavrud, Pamid, Misket red, Dimyat, Tamyanka and others, which occur in the studied areas, except to a purely breeding value and contribution to the conservation of biodiversity, is also a source of still insufficiently realized potential for the production of traditional wines with unique qualitative characteristics. This potential of wines from local varieties can provide competitive position of small and medium winemaking enterprises both in their direct involvement in the wine market on the one hand, and the development of diversification activities such as wine tourism on the other.

The conservation of local varieties of vines should be taken as a prerequisite for achieving synergy in terms of sustainable development in economic, social and environmental aspect. Against the backdrop of the widespread use of the introduced white and red grapevine varieties - Chardonnay, Aligote, Misket Ottonel, Cabernet Sauvignon, Merlot, Syra, etc., and increased competition on the international market with a stronger emphasis on wine quality, is necessary to prioritize the cultivation of local varieties. The cultivation of local varieties, which are still spread on the territory of Haskovo and Kardzhali districts, creates opportunities for occupying a specific market niche based on the unique characteristics and authenticity of the traditional wines produced in the country.In addition, they have the potential to produce mixed wines between introduced and local varieties, which have received very high marks

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from international experts in recent years. Such wines are most often obtained from the combinations of the varieties Cabernet Sauvignon, Merlot, Mavrud and Rubin.

In social terms - the preservation of genetic diversity by stimulating production of local products is also a mechanism for combating depopulation, that have settled permanentlyin the rural areas of the country. Maintaining this genetic potential also contributes to the preservation of local cultural identity for future generations.

In the ecological aspect of the opportunities for sustainable development at the sectoral level on the one handthe capacity of ecosystem services is increased, and the other hand - are created conditions to maintain the diversity of plant and animal species inhabiting the specific vineyard landscape.

Established from millennia in the country practice in the wine sector, based on the vital importance of local wine grape varieties, both as a valuable genetic resource and a potential source of income and livelihood for the inhabitants of traditional wine-growing area Haskovo district is an established wine-growing micro-region in Bulgaria. The maintenance of varietal diversity in wine viticulture should become a recognized need, contributing to the realization of the three main priorities of European agrarian policy - viable food production, sustainable management of natural resources and activities, related to climate change and balanced territorial development. In this sense, in addition to direct support for the conservation of genetic resources,it must be capitalized upon the opportunities for improving the organization of the supply chain, contributing both to raising the profitability and viability of farms and to satisfying consumer interests in specific market niches. All this provokes the need for integrated interaction between researcher-breeders, wine cellars, consumers and regional and local administrations, to support efforts to minimize the loss of genetic diversity, ecosystem services, traditional knowledge and local identity. Stabilization of the sector as a means of achieving balanced regional economic development and social and environmental synergy, is a function not only of technological innovation, but mainly of the implementation of organizational and marketing strategic decisions, improving the efficiency and competitiveness of production in accordance with current market requirements.

In recent decades, as a leading concept in marketing and organizational aspects, dictated by drive for sustainable development of the wine-growing sector, the combination of traditions and innovations is shaped, as a synthesis of comparative advantages and

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uniqueness of the terroir, concretised within a certain geographic region. The production of quality wines with a *Geographical Indication* (GI) (a *Protected Designation of Origin* (PDO) and a *Protected Geographical Indication* (PGI)), used for years as a marketing tool for positioning wine in a higher price range, acquires a new reading in the context the need to preserve local production with an emphasis on typical Bulgarian varieties of vines. As part of EU quality policy, geographical indications integrate social and economic goals in the aspect of regional development. The effect of the usage of geographical indications, as a mechanism for protection and development of local production, can be searched in the direction of overall improvement of the socio-economic environment, maintenance of the productive activity in the region,consolidation and flexibility of supply chains, with a stronger focus on the quality of output, better satisfaction of local consumer demand, creating employment and profitability for the population. On the territory of Haskovo and Kardzhali districts there is potential for production of wines with a protected geographical indication - PGI “Thracian Lowland”. Most settlements in the region of Haskovo listed as areas for the production of wines with a protected designation of origin - PDO “Ivaylovgrad”, PDO “Haskovo”, PDO “Lubimets”, PDO “Sakar” and the PDO “Stambolovo”.

In response to growing consumer requirements regarding food safety and the application of production methodspreserving the environment - basis for stable development and the organic production of grapes and wine should be provided. This includes assessing the agri-environmental potential, choosing the right product, marketing and organizational-management decisions in the context of the regional development of viticulture.

Viticulture and wine-making should be seen as opportunities for development of a family business, contributing to the viability of local communities within Haskovo and Kardzhali districts, preserving traditions, diversity of genetic resources and specific viticultural landscape for future generations.

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