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WP3: EMS Development & Pilot Application

Deliverable 3.1.1: Current Status Study

Prepared by

Hellenic National Youth Council

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1. About the project

This project is designed by INTERREG V-A Cooperation Program for Greece and Bulgaria for the period of 2014-2020, regarding 7 Regional Units on the Greek side and 4 Districts on the Bulgarian side. Specifically, regarding the Greek side, the areas we will study are the region of eastern Macedonia and Thrace and the region of central Macedona (Evros, Kavala, Xanthi, Rodopi, Drama, Thessaloniki and Serres). The total of the area of intervention is active in agricultural sector. The region of central Macedonia is the second most populated region of Greece, but also one of the most productive in the agricultural field. The landscapes of both Greek and Bulgarian side are a combination of flat fertile areas and mountainous varying environments.

The project aims in developing an eco-friendly business culture and transfuse a philosophy of sustainable development to young professionals. In order to secure strong foundations for a sustainable economic growth, first we must change the outdated approach of a “profit only” business to an “ally” business that will target the enrichment and protection of the environment resources as well as economic growth. To achieve that, both partners have an extensive knowledge of regional characteristics and limitations together with the necessary expertise for managing successful projects. In particular, the problems we aim to tackle are the threat that the human activities are posing, global warming that leads to climate change and the issue of

internal migration towards the urban cities that has a large impact on the young people who are involved with modern open area activities.

Given this, our work is divided into three major phases. The first phase includes the execution of all necessary preparatory actions that will describe and support the actions to follow. This includes the establishment of a detailed work plan, the evaluation of current situation regarding socio-economical structure and reality in the area of interest, discussion of environmental issues and interactions, and finally a detailed cataloging of relative international, regional or national good practices. This phase also includes the initiation of all necessary processes for establishing the network of enterprises that will structure the basis sample for applying EMSs.

2. Study focus and methodology

This study is based on objective facts by a research of valuable information throughout the internet targeted on the areas of Central and Eastern Macedonia and Thrace, regarding the existing situation and problems that the agricultural section is facing in these regions. There are not any personal beliefs expressed or falsified evidence.

We want to focus on specific objectives that show the existing situation in the regions of Central Macedonia and Eastern Macedonia and Thrace. For this, many statistical analyses from Greek and foreign resources have been used, in order to notice the fluctuations and the rates in the field of interest and collect the data and variances between the years. To identify the reasons engendered the changes many case articles from the internet have been used and analyses from experts. Moreover, there has been a research on case studies, which aims to detect more good practices and new management styles in this sector.

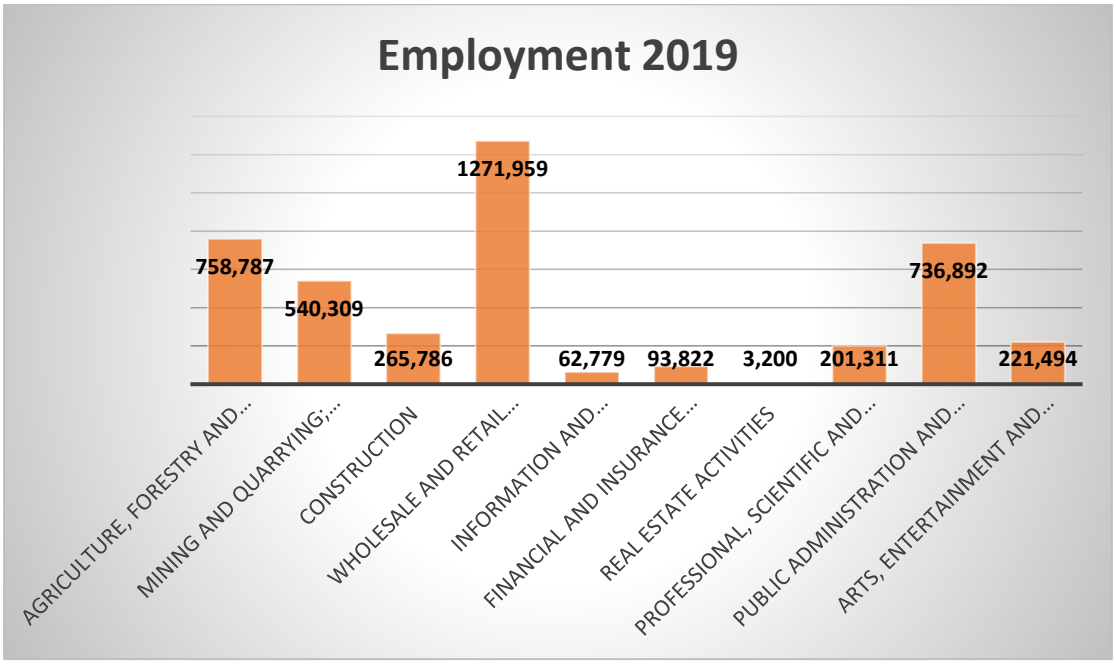
To verify that the collection of data is valid, only reliable sources have need used. For example, the data are taken from the Hellenic Statistical Authority, the National Institute of Labour and Human Resources, and Eurostat. Furthermore, there has been a research through many thesis from Greek Universities, in order to distract relative information that could help with the research. Articles from reliable newspapers were a big help to keep the research up to date and information from articles that carefully confirmed from the internet were taken. The website of the European Commission, (Europa.eu) offered a wide range of details and facts over the matter in which we are interesting and provided easy access in other important issues that are relative.

3. Study area

3.1. Labor force

To describe in detail the people working in the primary sector first we must distinguish three categories of workers. There are the people who are hired and they receive a monthly wage, and there is the "self-employed" category, which includes the employers, the self-employed without any staff, self-employed with staff and the people who help in the family business. There is also the undeclared work and the work of immigrants. Unfortunately there only little information about the situation. From the *Factsheet on Undeclared Work In Greece*[1] we see that the size of the undeclared economy is estimated to be around 25% of GDP.

The chart below visualize the sectors in which Greek workers are involved, irrespective of employment. The agricultural forestry and fishing sector had in 2019, 758.787 persons occupied.



HELLENIC STATISTICAL AUTHORITY

In particular, the agricultural sector in Greece is based on small-sized, family-owned dispersed units, while the extent of cooperative organization stays at low comparative levels. The primary sector in Greece ranks ninth among the EU Member States. Greek

[1] Europa, 2017,*Factsheet on Undeclared Work* – GREECE< file:///C:/Users/User/Downloads/EL%20UDW%20Factsheet%202017-%20Greece%20.pdf>

agriculture employs about 500,000 farmers, corresponding to 12 % of the total workforce.[2](Europa,2019, *Country Report Greece*)

In Central Macedonia, primary sector has a positive deviation compared with other areas in the country, in certain products. The highest deviation is regarding the fruits, with 36.3% share over 19.2% for the rest of the country. As for the secondary industry, of manufacturing, the rates simulates with the rest of the country, since the food industry comes first, with almost 1/3 of the total workforce being occupied in manufacturing. Food industry dominates with the industry of metals coming next and having almost 1/10 employees of the total workforce. Despite that, in Central Macedonia the industries that come first in employing people are the clothing manufacturing, textile industries, industries processing paper products, paper mills, construction of machinery and equipment.

In terms of unemployment, Greece has the highest youth rate in Europe, with 36.1% of the young people not to have a job. This was caused mostly due to the economic crises in 2008 that led to bankruptcy and financial problems to many employers. Other factors that are responsible for the rise of unemployment in the European Union are the industrial automation of processes previously performed by workers and the population growth (Statista, 2020).[3]

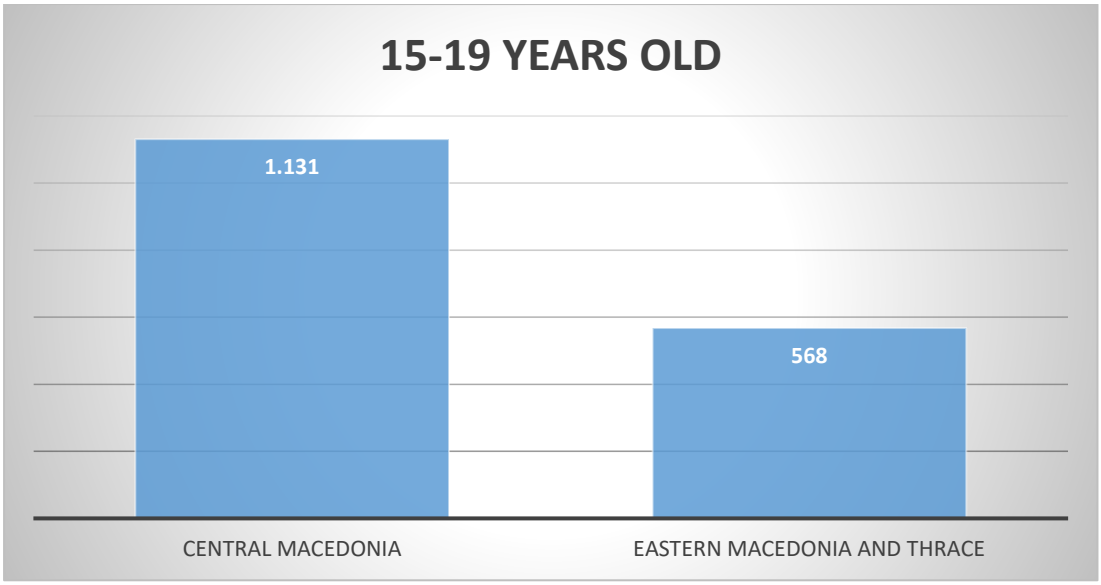
A six months review [4]made by OAED, the Greek Manpower Employment Organization, for the unemployed population in each region during the months of the years 2018 and 2019 showed that the number of the unemployed in the first six months of 2019 had increased steadily from the year before. Moreover, the highest rate in unemployment occurred in the regions of Attica which was 34,88% in 2019 and Central Macedonia which came to 20,24% in the same year.

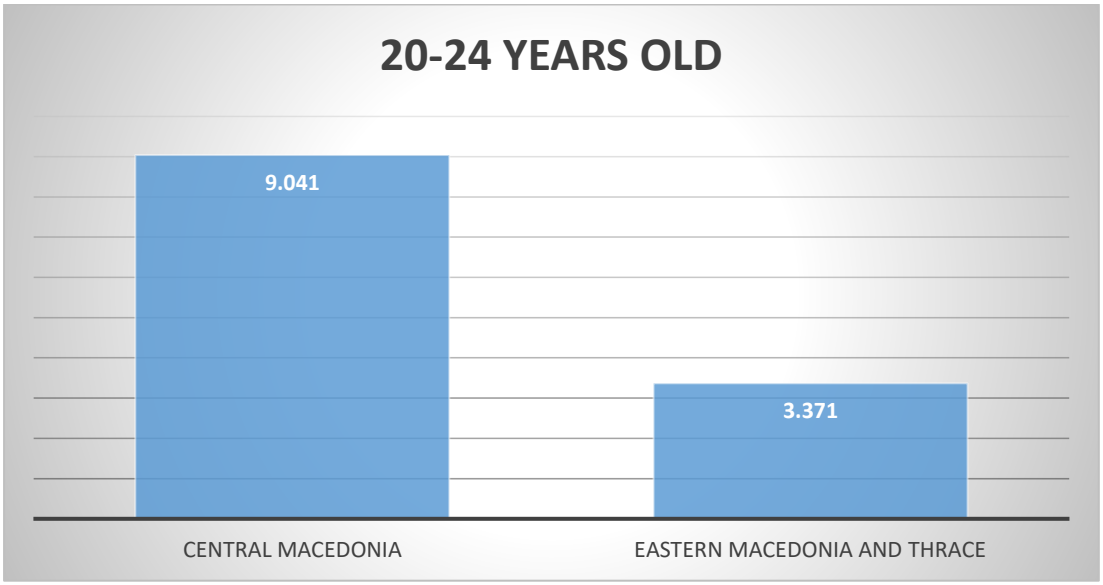
In the charts below it is illustrated the unemployment rate based on the age in the regions of Central Macedonia and Eastern Macedonia and Thrace. In order to be more specific, we only show the rates of the last month mentioned in the review, which was June of 2019.

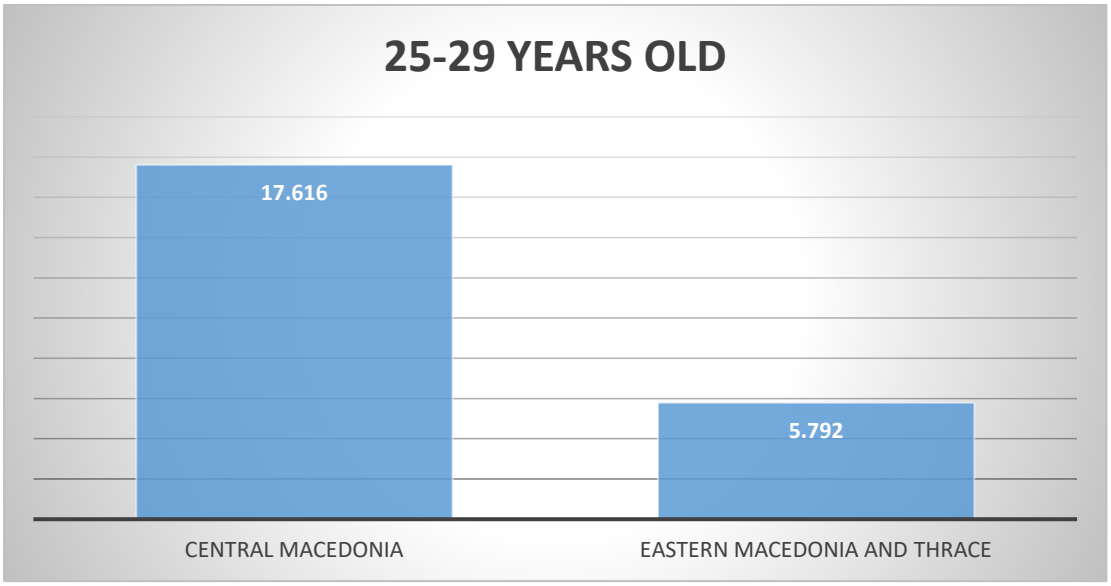
[2] Europa,2019, *Country Report Greece*< *https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-greece_en.pdf*>

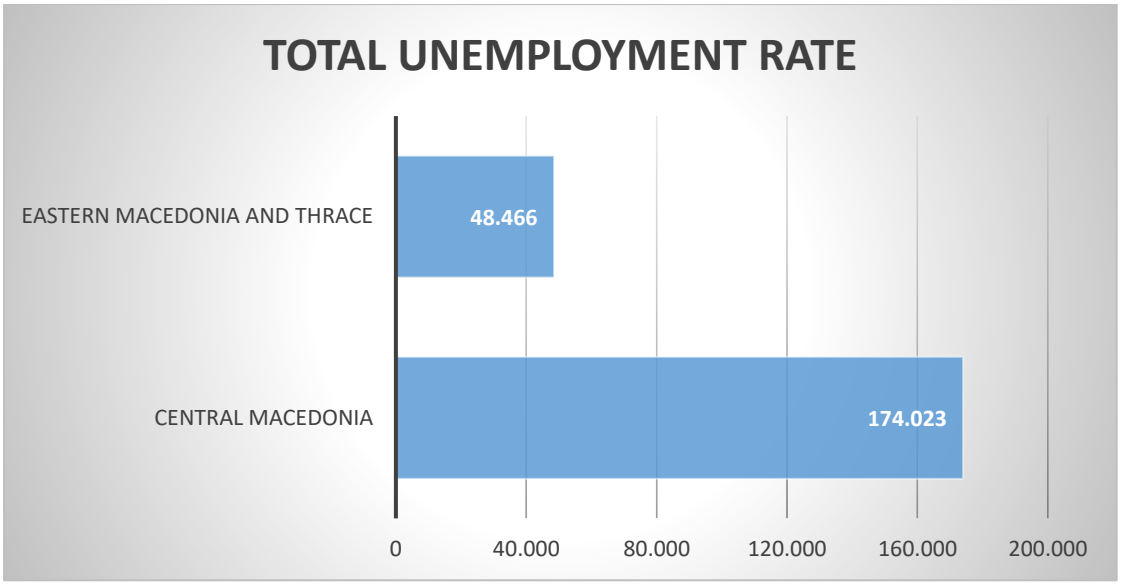
[3] Mar 30, 2020,statista, H. Plecher, viewed 2 August 2020 *Youth unemployment rate in EU member states as of January 2020*<https://www.statista.com/statistics/266228/youth-unemployment-rate-in-eu-countries/>

[4] OAED (2019), Review *of A' six months of 2019, developments in the rates and in the characteristics of the unemployed*


15-19 YEARS OLD
1.131
568
CENTRAL MACEDONIA
EASTERN MACEDONIA AND THRACE


20-24 YEARS OLD
9.041
3.371
CENTRAL MACEDONIA
EASTERN MACEDONIA AND THRACE


25-29 YEARS OLD
17.616
5.792
CENTRAL MACEDONIA
EASTERN MACEDONIA AND THRACE



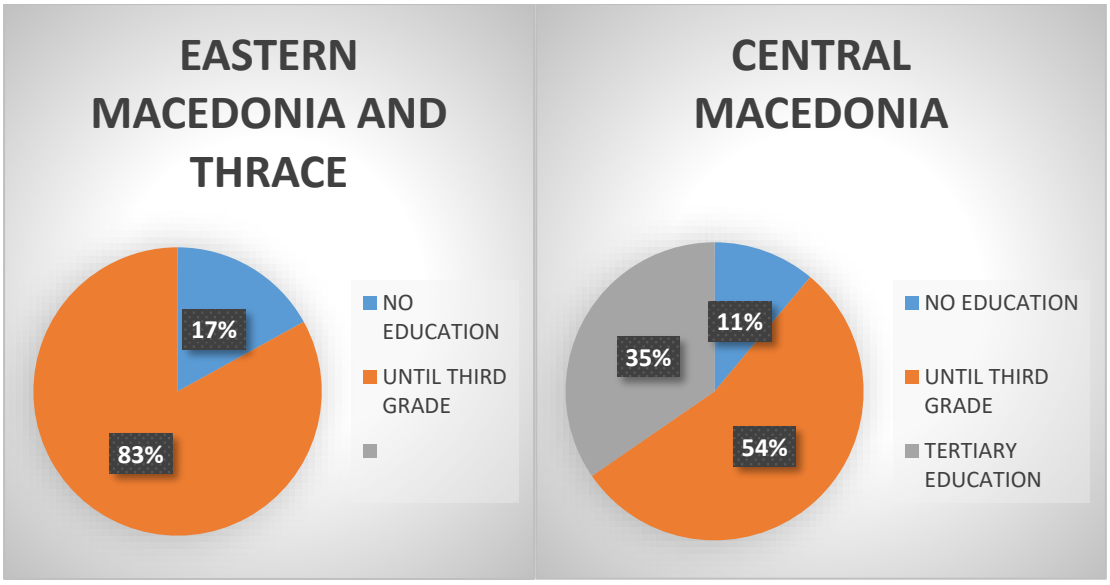
Data from OAED, Review *of A' six months of 2019, developments in the rates and in the characteristics of the unemployed*

The total unemployment rate in Eastern Macedonia and Thrace is 48.466 people, 568 of them being between the age of 15 and 19, 3.371 of them between the age of 20 and 24 and 5.792 between the age of 25 and 29.

In Central Macedonia 174.023 people are unemployed from which 1.131 are between the ages of 15 and 19, 9.041 between the ages of 20 and 24 and 17.616 between the ages 15 and 29.

In the same review[5], it is mentioned the type of education that the unemployed people had. In Eastern Macedonia and Thrace, in June 2019, there were 6.928 unemployed people with no education at all, 15.969 people with the compulsory education (until third grade), 17.966 people with secondary education and 7.603 with tertiary education.

[5] OAED (2019), Review *of A' six months of 2019, developments in the rates and in the characteristics of the unemployed*



Data from Europa,2019, European Commission, *Country Report Greece*

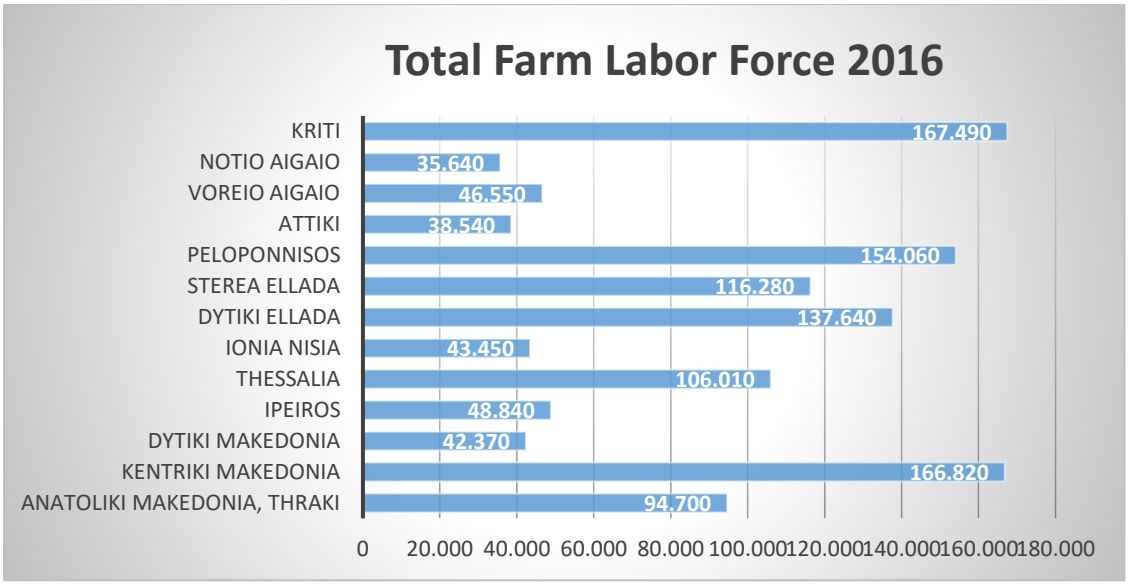
In Central Macedonia there were 10.744 people with no education at all, 52.542 people with the compulsory education, 77.230 people with secondary education and 33.507 people with tertiary education.

The majority of the unemployed people in Greece have Greek nationality, with the rate of unemployment for people from third countries to be 9,82% in February 2019. In addition, women consists the biggest part with a rate of 61,90%-64,86% of the total number of unemployment people.

From a broad point of view, according to the country report of Greece from the European Commission in 2019, although the need for improving workers' skills is very high , participation in adult learning remains very low. At 4.5 % in 2017, participation in adult learning was below the EU average (10.9 %). In 2015, 21.7 % of Greek companies provided vocational training to their employees (EU average: 72.6 %) and only 18.5 % of employees participated in this training (EU average: 40.8 %) which was the lowest rate in the EU. (Europa,2019, European Commission, *Country Report Greece)*[6]

To make a wider analysis for the agricultural sector in all regions of Greece this chart below illustrates the number of the labor force who are involved in the farming sector during the year 2016. Central Macedonia, Crete and Peloponnesus had the higher rates in employing people in the farm industry.

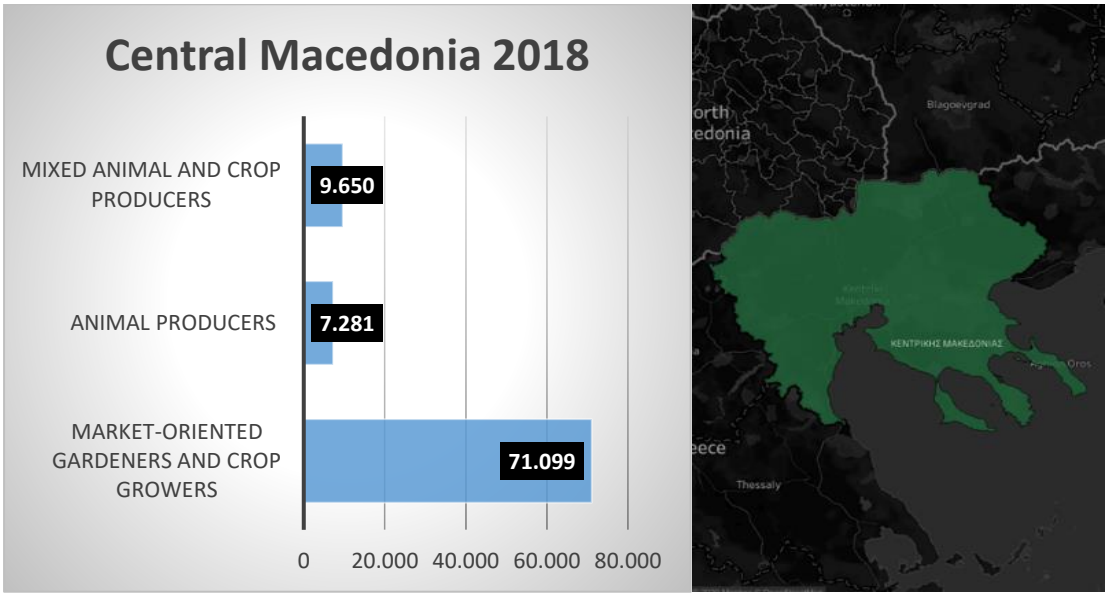
[6] Europa,2019, European Commission, *Country Report Greece*< https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-greece_en.pdf>



Data from Eurostat 2016[7], *Farm Labor Force*

In the charts below it is illustrated the total number of the population in the regions of Central Macedonia, Eastern Macedonia and Thrace, working in the sectors of interest during the years 20011 to 2018. The first column shows the market-oriented gardeners and crop growers, the second the animal producers and the third the mixed crop and animal producers.

The chart below shows that in Central Macedonia in 2018 there were 71.099 market-oriented gardeners and crop growers, 7.281 animal producers and 9.650 mixed animal and crop producers.

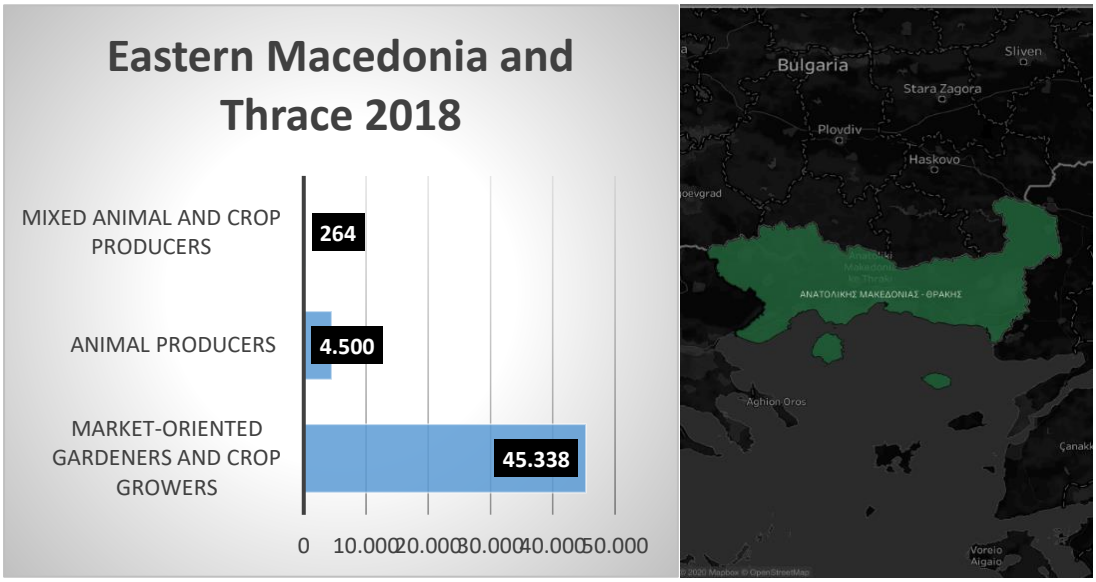


Data from :National Institute of Labor and resources,2011-2018,public.tableau[8]

[7] total number of Greece's farm labor force was 1.198.390 persons (Eurosat,2016)

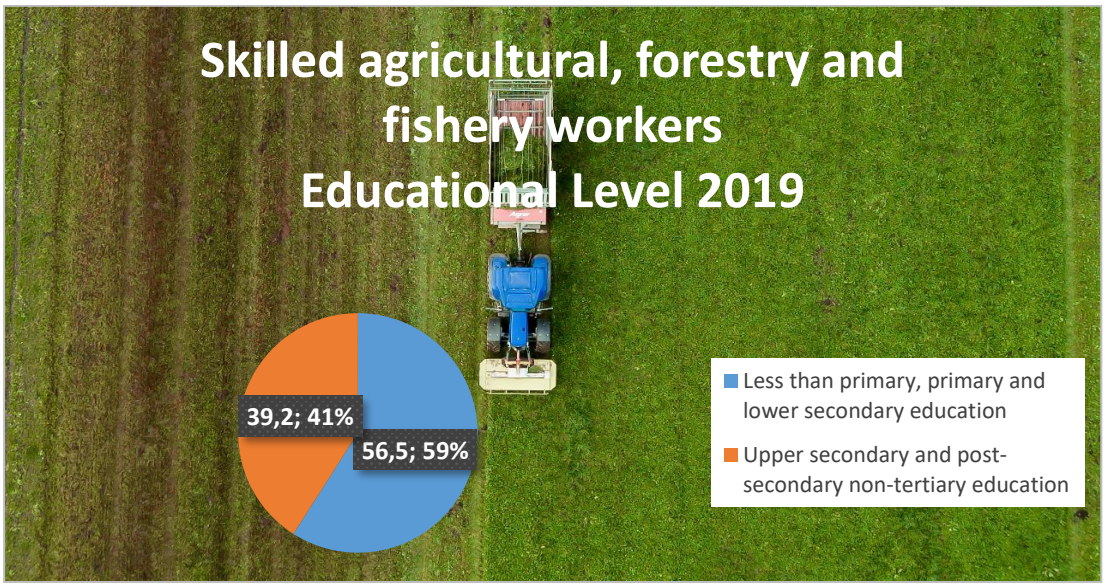
[8] National Institute of Labor and resources,2011-2018, ,Vaios Kotsios, public.tableau,https://public.tableau.com/profile/vaios.kotsios.eiead#!/

In the chart below, we see that in 2018 in Central Macedonia there were 45.338 the market-oriented gardeners and crop growers, 4.500 animal producers and 264 mixed crop and animal producers.



Data from : National Institute of Labor and resources,2011-2018,public.tableau[9]

More information about the educational level of the people working in the agricultural sector, there are in a survey made by Eurostat[10] , regarding the kind of education of the whole population of Greece between the ages of 15-64.



Data from Eurostat,2019

[9] National Institute of Labor and resources,2011-2018, ,Vaios Kotsios, public.tableau,https://public.tableau.com/profile/vaios.kotsios.eiead#!/

[10] Eurostat,2019< https://ec.europa.eu/education/resources-and-tools/document-library/education-and-training-monitor-2019-greece-report_en>

In 2019, 56,5% in the agricultural, forestry and fishery sector had less that primary or primary or lower secondary education. Meanwhile only 39,2% of people working in these sectors, had upper secondary and post-secondary non-tertiary education. We can see that the people that usually involve with agricultural activities are of low education. The reason for that is mainly that agriculture in Greece has not yet embrace technology and is not consider a sector that offers possibilities for people with higher education. The effects of poor education results in low productivity, since the farmers do not have the appropriate technical skills.

3.2 Production

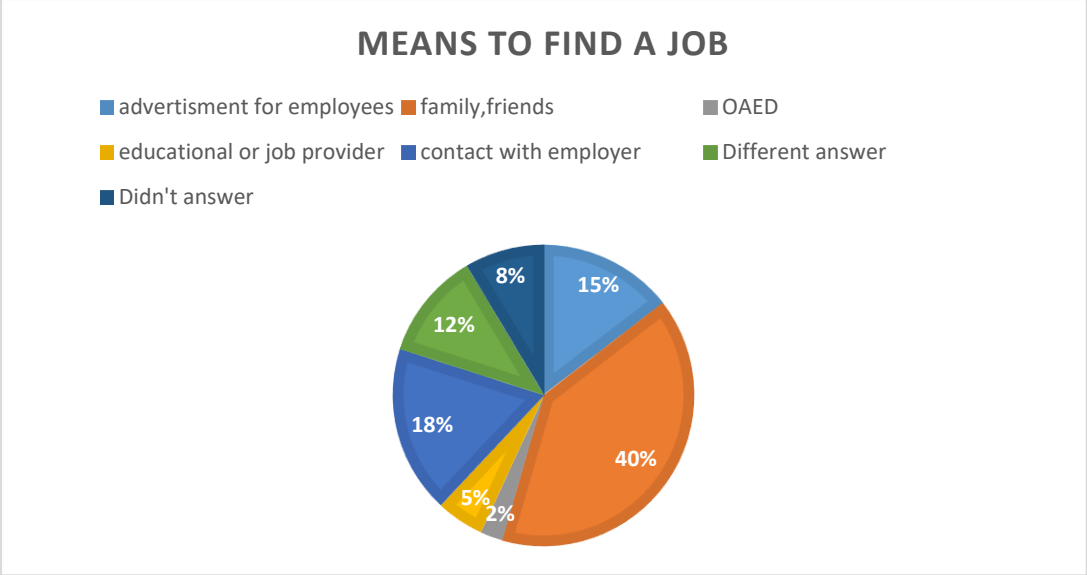
The region of Central Macedonia comes first in producing cereal, tobacco, sugar beet, fruits and second in producing vegetables and cotton. Peloponnesus is at the helm of cultivating olive groves and vineyards and as for West Macedonia, which is not considered a developed agricultural area; it comes first in cultivating lands with pulses. West Greece dominates the field of potatoes and vegetables and finally Crete, is known for the olive groves and vineyards.

Regarding the animal production, Central Macedonia is first in cattle, sheep and bees production, second in goat and chicken farming and third in pork meat. Crete is the main producer of goats and rabbits, Thessaly produces pork and Epirus chickens. Attica is the region with the least developed agricultural activity but still has the first place in producing laying hens.

Concerning the milk production, the region of Eastern Macedonia generates 45,2% of the total production, Thessaly 17,5% and Eastern Macedonia and Thrace 16,5% of the production.

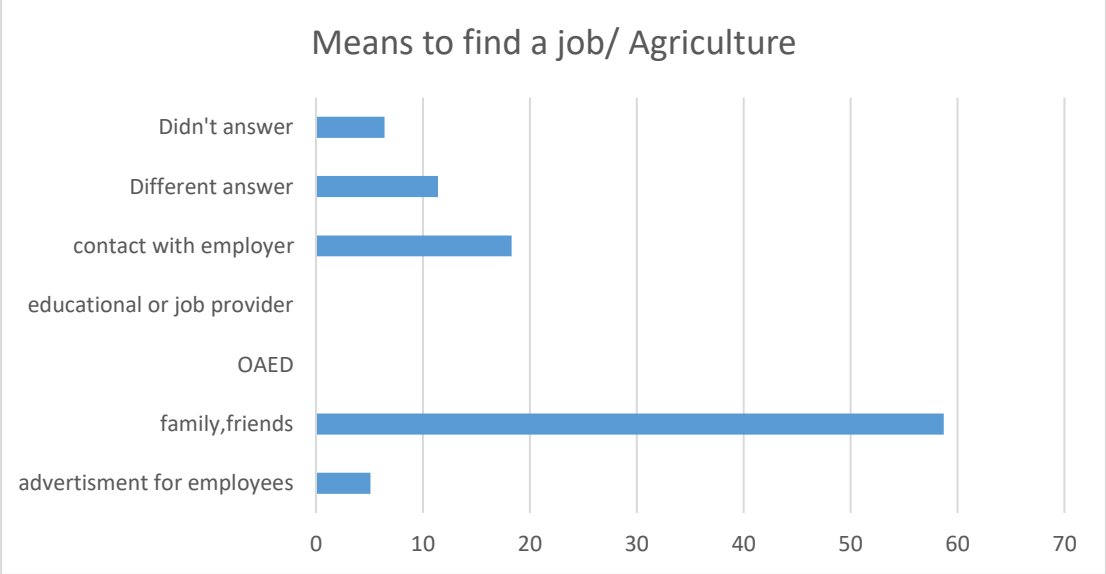
3.3 Job placement

Hellenic Statistical Authority (ELSTAT) made an analysis in 2016 regarding job placement for youth. People between the ages of 15-34 answered about how they did a job search.



Data from ELSTAT

Specifically, 48% of the young people between the age 20 and 24 answered that they found their current job through their family, friends and people they are familiar.



Data from ELSTAT

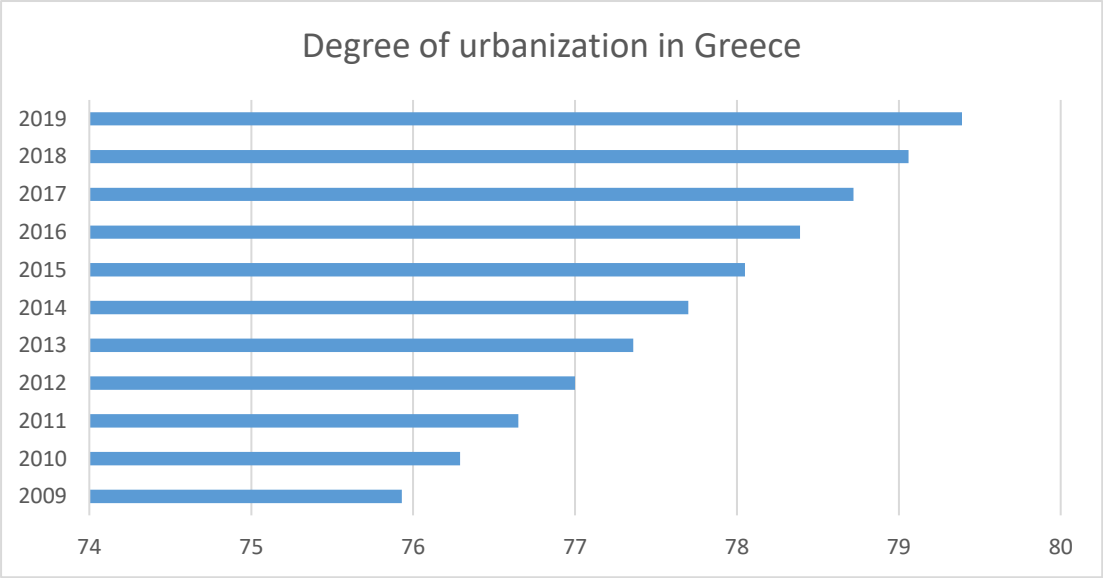
The same situation exists in the primary sector. Getting a job is usually an outcome of personal relationships. As we see in the charter above with 58,7% the people answered that they found a job in this sector through friend and family or people they know. As far as it concerns the role of OAED, which the Greek Manpower Employment Organization, or any other job provider, we can see that they are not a way to find a job.

Straggling with unemployment especially during the years of the economic crises, many young people left the country to work abroad. In 2010, a big number of young scientists and professionals started to leave the country and this went on for the next years. Between the years of 2008 and 2017 more than 467.000 persons between the

ages of 25-45 decided to leave the country. Their criteria was that the markets are bigger and they have a higher chance to be accepted[11]. This situation is what we call "Brain Drain".

Another similar activity is the phenomenon of urbanization, where people from rural areas decide to move in bigger urban cities. The reasons are usually traced in economic factors. In bigger cities, there are more job opportunities and a higher chance to find a start a new job. Many of the young people that did not afford to move abroad choose the alternative to move in urban centers such us Athens and Thessaloniki. Another factor that prompts young people to immigrate to urban cities is education-related, since most of the Universities in Greece are located in central areas.

A statistical analysis made by the World Bank shows the degree of urbanization in Greece between the years of 2009 and 2019. In 2019, the percentage of Greek residents living in cities was 79.39%. The issues that occur from urbanization can be faced by providing higher incomes to the people that move or live in the regional cities, lower taxation and funds for people and start-ups in rural communities and new policies and laws that will not allow new companies to open in over-populated areas and will control the internal migration.



World Bank, 2020, *World Development Indicators, Greece: Degree of urbanization from 2009 to 2019*, Statista [12]

[11] In.gr,2019,Andromaxi Paulou, *Braindrain,* < https://www.in.gr/2019/12/30/economy/brain-drain-profil-ton-ellinon-pou-efygan/>

[12] World Bank, 2020, *World Development Indicators, Greece: Degree of urbanization from 2009 to 2019*, Statista <https://www.statista.com/statistics/276402/urbanization-in-greece/>

A survey [13]made in New Zealand in 2007 collected data regarding the reasons people migrate from one residence to another. A move from a rural to an urban area was mostly driven by economic and employment reasons. Moving for your own or other's education were also important factors. In contrast, when people chose to move from an urban residence to a rural residence, it was also frequently environmental factors prompting the move, such as not being satisfied with previous lifestyle.(Urban and rural dwellers' reasons for moving,2007)

3.4 Small and Medium Enterprises

In Greece, as in Europe small and medium enterprises consists the majority of businesses. Greece continues to perform below the EU average in entrepreneurship. Although the business ownership rate in Greece is the highest in the EU, there has been a weak performance in most other indicators. For this reason, the Greek government had made a priority to promote entrepreneurship for the last decade and support start-ups and scale-ups. For instance, in the agricultural sector a program to invest in the processing, marketing or development of products, is adopted (Small Business Act, Fact sheet).

The agricultural collaboration in Greece is a very strong cooperative movement. There are over 6.900 collaborations with 782 members. Typically, these types of collaborations can help small and medium enterprises to have access to more resources, create economy of scales and to reduce the coordination and transaction costs. However, this is not the case for these enterprises. Many weaknesses hold the agricultural businesses back. Some of them have to do with the high cost of production, bad marketing strategies, not many available funds, small market shares, non-differentiated products compared to larger companies, high levels of accumulated debt and small degree of vertical integration[14]. Therefore the collective action is noticed in high levels but in reality it doesn't seem to offer the benefits it should.

According to the Research of the business structure of ELSTAT[15], in 2016 there were 793.946 enterprises in the fields of industry, construction, trade and services. In terms of employment, the sector of wholesale and retail held the first place occupying 708.428 people, followed by the tourism, restaurants and bar occupying 488.149 people and last came the manufacturing industry with 311.369 people occupied.

[13] STATS NZ,2007, *Dynamics and Motivations for Migration in New Zealand*<*http://archive.stats.govt.nz/browse_for_stats/population/Migration/internal-migration/reason-for-moving-within-between-urban-rural-areas.aspx#gsc.tab=0*>

[14] Vertical integration is a strategy whereby a company owns or controls its suppliers, distributors or retail locations to control its value or supply chain. Vertical integration benefits companies by allowing them to control process, reduce costs and improve efficiencies (Investopedia)

[15] ELSTAT,2016, Research of the business structure <

Below we see in the SBA(Small Business Act for Europe) Fact sheet regarding Greece in 2019 the basic figures about Small and Medium Enterprises.

Class size	Number of enterprises			Number of persons employed			Value added		
	Greece		EU-28	Greece		EU-28	Greece		EU-28
	Number	Share	Share	Number	Share	Share	Billion €	Share	Share
Micro	800,075	97.4%	*93.0%*	1,527,075	62.0%	*29.7%*	9.0	17.6%	*20.8%*
Small	18,958	2.3%	*5.9%*	398,514	16.2%	*20.1%*	11.8	23.1%	*17.6%*
Medium-sized	2,176	0.3%	*0.9%*	239,627	9.7%	*16.8%*	11.7	22.9%	*18.0%*
SMEs	**821,209**	**100.0%**	***99.8%***	**2,165,216**	**87.9%**	***66.6%***	**32.6**	**63.5%**	***56.4%***
Large	331	0.0%	*0.2%*	297,411	12.1%	*33.4%*	18.7	36.5%	*43.6%*
Total	**821,540**	**100 0%**	***100.0%***	**2,462,627**	**100.0%**	***100.0%***	**51.2**	**100.0%**	***100.0%***

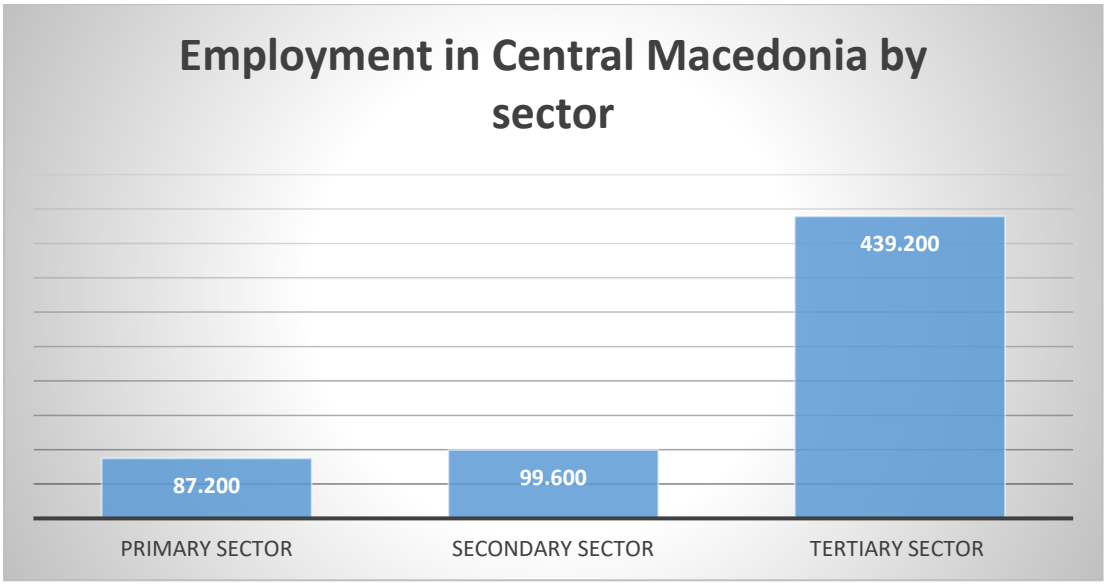
These are estimates for 2018 produced by DIW Econ, based on 2008-2016 figures from the Structural Business Statistics Database (Eurostat). The data cover the 'non-financial business economy', which includes industry, construction, trade, and services (NACE Rev. 2 sections B to J, L, M and N), but not enterprises in agriculture, forestry and fisheries and the largely non-market service sectors such as education and health. The following size-class definitions are applied: micro firms (0-9 persons employed), small firms (10-49 persons employed), medium-sized firms (50-249 persons employed), and large firms (250+ persons employed). The advantage of using Eurostat data is that the statistics are harmonised and comparable across countries. The disadvantage is that for some countries the data may be different from those published by national authorities.

European Commision,*SBA Fact Sheet Greece*,2019

In 2019, there were 821.209 small and medium enterprises in Greece employing 2.165.216 people. This mean that SMEs generate 63.5% of total value added and an employment share of 87.9%. Wholesale, retail trade and manufacturing, together generate nearly half of all Greek SME value added.[16]

In Central Macedonia as we see from the statistical analysis made by ELSTAT most people are employed in the tertiary sector, which is the sector of services. An intensive growth has been noticed during the last years in the areas of trade, shipping and air transport and constructions. Below there is the survey for Central Macedonia regarding the employees working in each sector, in the year 2017.

[16] European Commision,*SBA Fact Sheet Greece*,2019



Data from Hellenic Statistic Authority(ELSTAT), 2018 *a research of human resources*

There were 87.200 people working in the primary sector, 99.600 in the secondary sector and 439.200 in the tertiary sector, in the year 2017.

The most important services sectors in the region are the financial services, transport and communications, recreational, tourism and transport services. There are mostly small and medium firms of non-metallic mineral products, furniture, food industry companies, textiles and clothing. The main exporting sectors are those of textiles, food and drink, chemicals and plastics. [17]

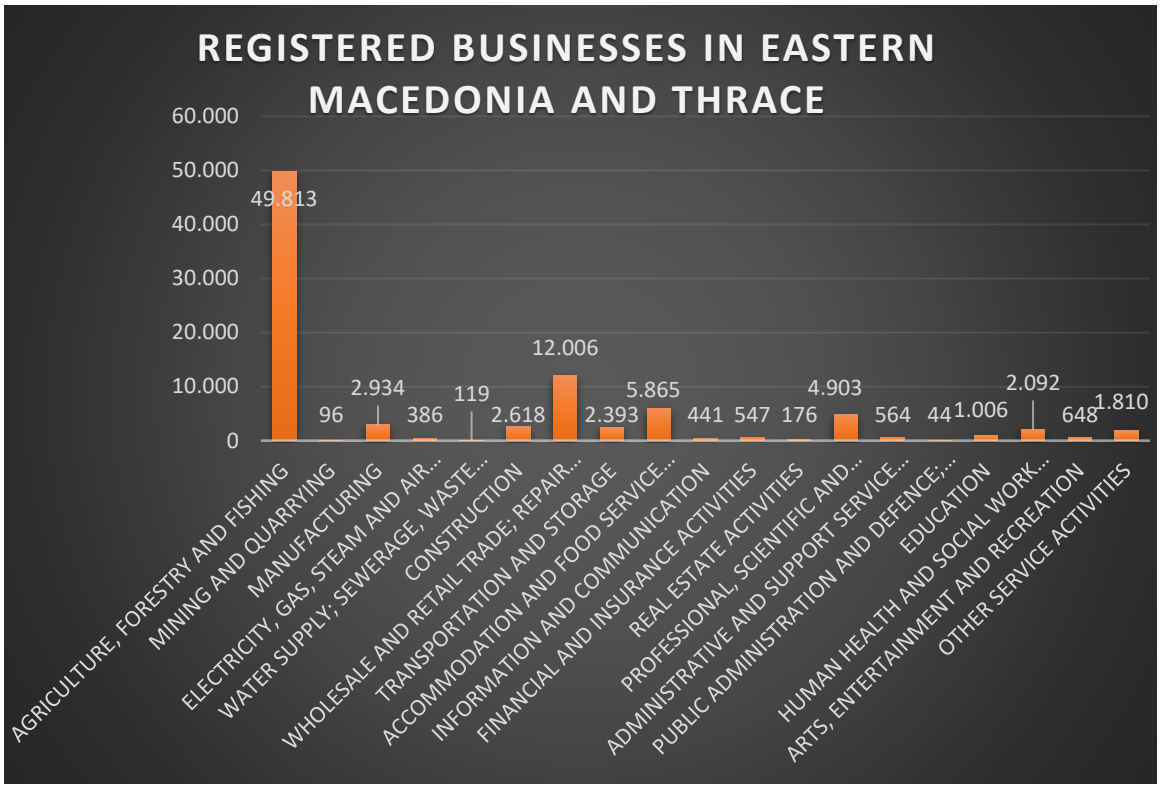
In Eastern Macedonia and Thrace from the other hand, the tertiary sector is directed at satisfying regional needs. There is not competitiveness internationally and there is limited potential to expand to neighboring countries. Mostly existing food industry companies, textiles and clothing, mining and quarrying, manufacture of pulp, paper, paperboard, and manufacture of tobacco products. In addition, in the region are located some larger more technology intensive industries particularly in the sectors of chemicals and the manufacture of machinery and equipment.

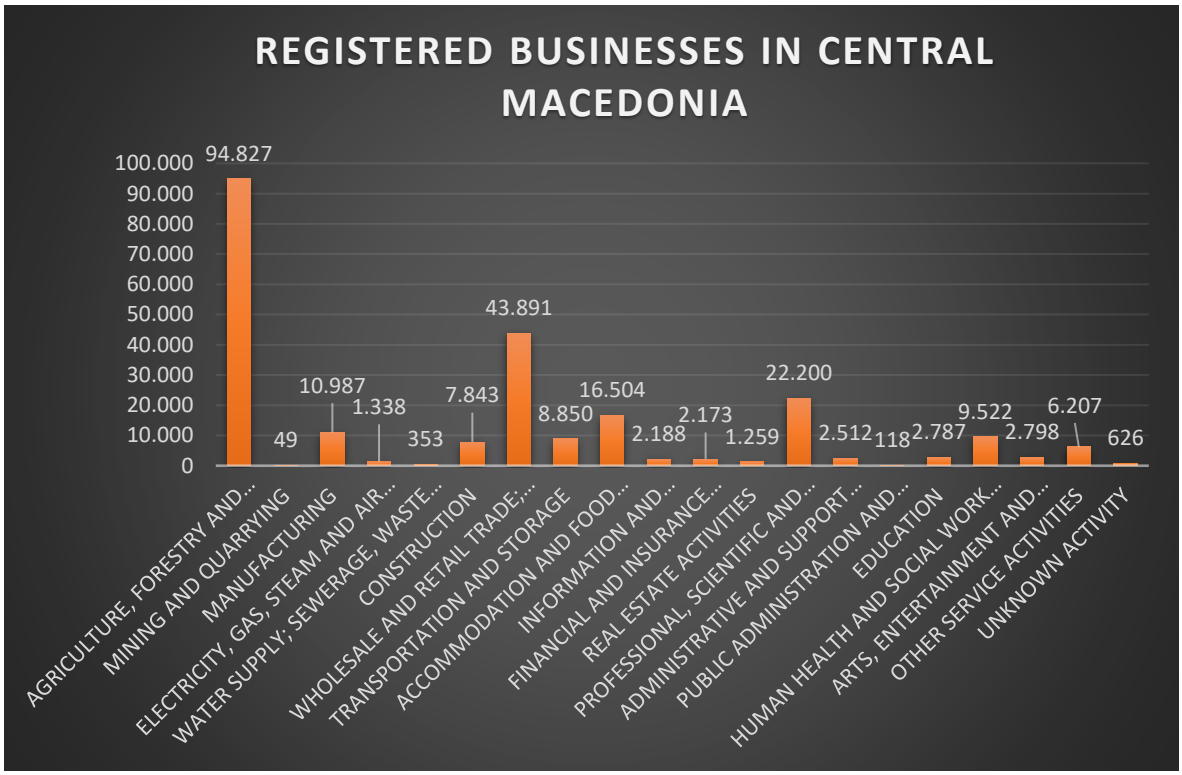
In 2017 from the 205.500 of the region's workforce, 25,3% worked in the primary sector,13,4% in the secondary sector and 61,3% in the tertiary sector. This lead to be the dominate sector in this region too and in 2015 accounted for 73,8% of the regional gross value added, while the secondary sector share was 18.5%, and that of the primary one was 7.7%.(Europa,2020)[18]

To understand the distribution of businesses in the regions the charts below represents the number of legal enterprise units, in 2017, in the region of Central

[17] Europa,2020, *Kentriki Makedonia*, <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/region/ellada/voreia-ellada/kentriki-makedonia>
[18] Europa, *Region of Anatoliki Makedonina,Thraki*,< https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/region-anatoliki-makedonia-thraki>

Macedonia and Eastern Macedonia and Thrace. All the data are taken from the statistical business register, made by the Hellenic Statistical Authority (ELSTAT).





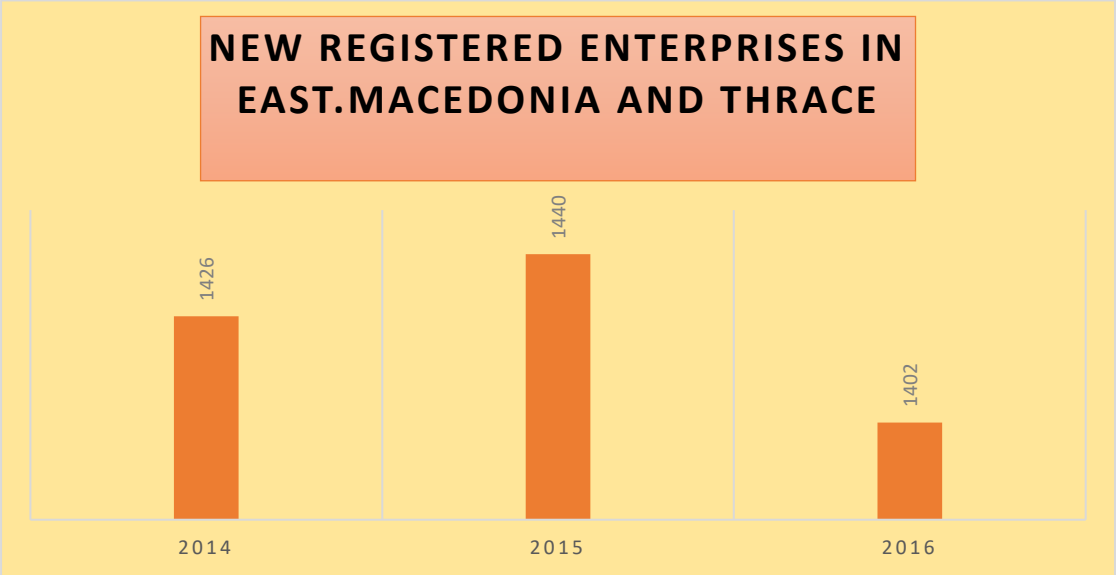
Data from Hellenic Statistical Authority(ELSTAT), *Number of legal units, turnover and employment per one-digit branch of economic activity, Regions and Regional Units* ,2020, *Statistical Business Register*[19],

In the region of Eastern Macedonia and Thrace, the total number 49.813 constitutes the registered businesses existing in agriculture, forestry and fishing sector, employing 54.314 people in total and the turnover was 758.594 euros.

At the same time in the region of Central Macedonia, there were 94.827 legal units employing 100.185 people with 1.596.908 euros turnover. (ELSTAT, 2020)

The importance is clear for both regions as they were the second most profitable sectors with the sectors of wholesale and retail trade-repair of motor vehicles and motorcycles to be first with revenue 15.102.256 euros in Central Macedonia and 2.827.116 euros in Easter Macedonia and Thrace.

From the statistical census of National Institute of Labor and Human Resources in 2016, we see that in the region of Eastern Macedonia and Thrace they were 1.402 new registered enterprises with 55 of them being related with the crop and animal production and 24 of them with the food industry. Meantime,269 new wholesale enterprises (except cars and motorcycles) were registered.

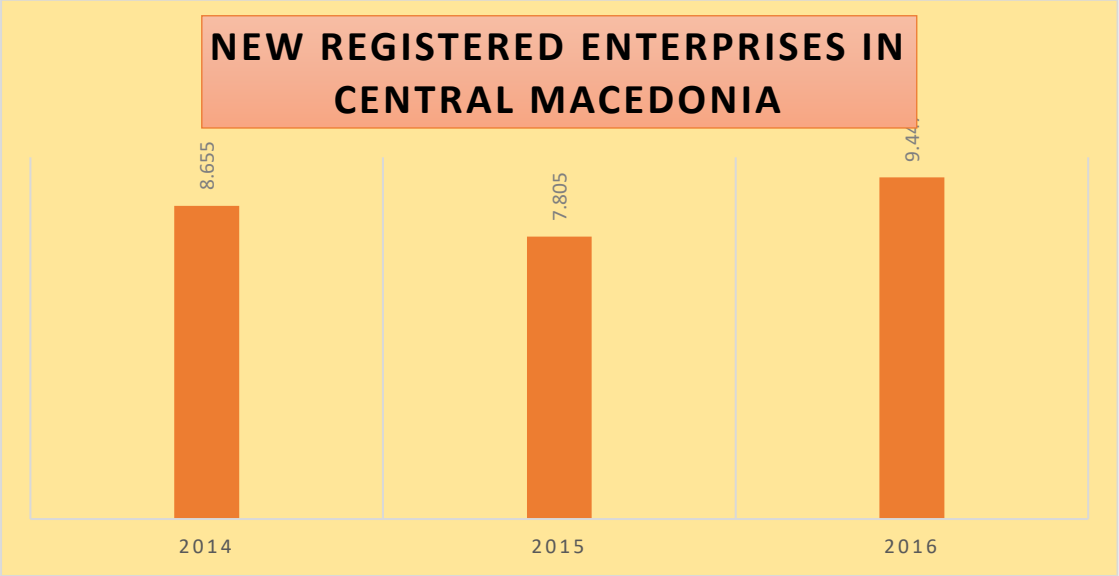


Data from National Institute of Labor and resources, 2011-2018, public tableau.

In the region of Central Macedonia, they were 9.447 new registered enterprises, with 146 of them being related with the crop and animal production and 120 with the food

[19] Hellenic Statistical Authority(ELSTAT), *Number of legal units, turnover and employment per one-digit branch of economic activity, Regions and Regional Units* ,2020, *Statistical Business Register* <https://www.statistics.gr/en/statistics/-/publication/SBR01/2015>

industry. It is worth mentioned that 2.207 new companies related with wholesale (except cars and motorcycles)were registered in the region.



Data from National Institute of Labor and resources,2011-2018,public tableau[20].

According to another analysis made by Endeavor[21] for Greece, in 2016 there were:

- 5.613 new companies related with restaurants/bars/catering/food retail stores,
- 3.200 new retail companies,
- 1.347 tourism related companies,
- 986 construction companies,
- 966 accounting/ consulting services,
- 927 financial services,
- 857 technology services,
- 850 processing related companies
- 418 medical services
- 369 food processing companies
- 233 companies that sell agricultural products
- 110 energy companies

The same source[22] also refers to young entrepreneurs and make their profile. It outlines the fact that they are usually people between the age 25 and 45, who never worked for the public sector, they have substantial working experience and they make

[20]National Institute of Labor and resources,2011-2018,public,Vaios Kotsios, https://public.tableau.com/profile/vaios.kotsios.eiead#!/
[21] Data based on GEMI data from 2012-2016, Analysis by Endeavor,2016, <www.endeavor.org.gr>
[22] Endeavor,2013 *ENTREPRENEURSHOP AND INVESTMENT* < https://endeavor.org.gr/wp-content/uploads/2019/11/Report-Infographic-ENG.jpg>

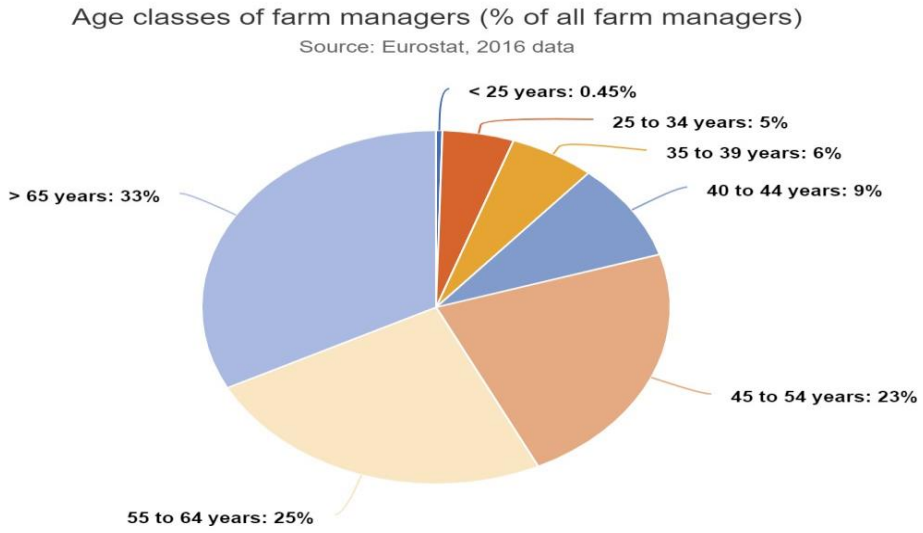
proper use of their network. They are mostly people who studied abroad or traveled a lot and they seize the right opportunities. They seek for new employees especially in the fields of sales and technology.

The need of support for these new entrepreneurs is about beating bureaucracy and the liquidity crisis. These people seek for guidance to understand and explore new markets and for funding opportunities. Another issue that Greece is facing is regarding the tax system. Many entrepreneurs are considering moving their business to another country in order to avoid the high tax rates and the instability that this problem is causing.

3.5 Young farmers

According the European Commission report" Needs of young farmers"[23], the only way to achieve higher levels of production of safe and quality food, while preserving the natural resources, is with a competitive and viable agricultural sector operating within a properly functioning supply chain which contributes to the maintenance of a thriving rural economy.

In the chart below, we see that farmers under 40 run only 11% of all farm holdings in the EU.



Source: Europa.eu, *Report I of the Pilot project: Exchange programmes for young farmers*[24]

Agricultural entrepreneurs are facing many challenges. Many of these have been identified by the Common Agricultural Policy as economic in nature, such as food security and globalization, a declining rate of productivity growth, price volatility,

[23] European Commission,2016, *Needs of young farmers*
Report I of the pilot project : exchange programmes for young farmers

[24] Europa, *Young people in farming,*< https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/income-support/young-farmers_en>

pressures on production costs due to high input prices and the deteriorating position of farmers in the food supply chain. Other challenges are environmental in nature, relating to resource efficiency, soil and water quality, and threats to habitats and biodiversity. Others still are territorial, especially where rural areas are faced with demographic, economic and social developments, including depopulation and relocation of businesses (European Commission, 2013).

Young farmers need to be efficiently trained in order to face these challenges and other related to the high investments needed in the start-up phase, difficulties in accessing finance and low turnover in the first years of business, combined with prolonged generational renewal and diminished access to land

In this survey, the interviewed young farmers in all the EU States answered about their most important general need. Availability of land seems to be less problematic in Sweden, Denmark, Poland, Austria, Bulgaria, Romania, Italy and Greece (43.1%) than in other EU countries which is considered the main concern (60.8% of the young farmers).In Bulgaria, Italy and Greece, the interviewed young farmers grow permanent crops relatively often, an intensive sector for which not much land is needed. In Bulgaria, the need for land is not so significant yet due to the 'Agricultural Land and Ownership and Use Act', which came into force in 1991 and regulates restitution of agricultural land to the persons (or to their inheritors) who were forced to put their land under collective control after 1945. As a result, citizens became owners of parcels of land after 1991 and the availability of land has exceeded demand for many years.

Regarding the development of entrepreneurial skills related to marketing, finance, networking and communication 75.5% of the Greek young farmers perceive it as likely to achieve and 63.9% believe that will develop technological and managerial skills.

The percentage of interviewed young farmers who liked participation in discussions, online training, e-learning through the internet or using social media as sources of obtaining knowledge is 44.2% and 83.2% look and read on the internet as a source of knowledge. In addition, 83% answered that they liked interactive knowledge sources, such as workshops, study groups/networks, agricultural training, field days or excursions and participation in exchange schemes.

Regarding the sources that these young farmers are turning to find valuable information, in Greece the interviewed young farmers can easily obtain information from other sources such as input suppliers. A majority of 78.2% use other farmers, 60.4% use farmers association and only 12.9% using agricultural advisors and consultants.

Greece belongs in the average countries having the possibility to increase its position due to the morphology and the opportunities that it offers to the people who want to give the comparative advantage to their country by making use of its land and innovation and aiming in a sustainable development.

3.6 Starting a business

In order to reduce the unemployment rate, several measures have been taken to simplify the creation of new businesses. Grants were provided to young people and women to create new businesses. Policy efforts and funds have supported the development of start-ups and scale-ups in Greece. In 2018, a fund invested €15 million in different Greek scale-ups and start-ups. One significant new measure was the Centers for the Support of the Social and Solidarity Economy (SSE)' that were established to provide support to social entrepreneurs. [25]

There are many funds and opportunities given by the European Commission [26] depending on the need of the company. The EU encourages through the Small Business Act for Europe, which is an overarching framework for the EU policy on small and medium-sized enterprises (SMEs) all countries to make it easy for new companies to set up with measures including:

- setting up in no more than 3 working days
- costing less than 100 euros
- completing all procedures through a single administrative body
- completing all registration formalities online
- registering a company in another EU country online

However, Greece comes first among 75 countries in the Global Business Complexity Index, a ranking in setting up and running a business, established by the TMF Group. As the report mentions, Greece's existing legislation can be complicated, new measures are continually being introduced and bureaucracy is a huge problem. Sometimes, multiple laws conflict and it can be hard for businesses to know which one to comply with. For example, in some cases, VAT refunds are subject to different treatment depending on the tax office dealt with. On occasion, individuals declaring identical dividends have been taxed at rates varying by more than 10%. The Greek government does not always provide enough guidance, making this a tough jurisdiction for foreign firms to navigate.[27]
The European Union has created a program for the competitiveness of Enterprises and SMEs called COSME. This program also supports the Small Business Act for Europe. It also provides:

- Access to funding (guarantees, loans and equity through local financial institutions in EU countries).

[25] European Commision,*SBA Fact Sheet Greece*,2019
[26] Europa,< https://europa.eu/youreurope/business/running-business/start-ups/starting-business/index_en.htm>
[27] Tmf-group,2019, *THE GLOBAL BUSINESS COMPLEXITY INDEX<* *file:///C:/Users/User/Downloads/20190608-TMF-Group-Global-Business-Complexity-Index-2019-EN.PDF*

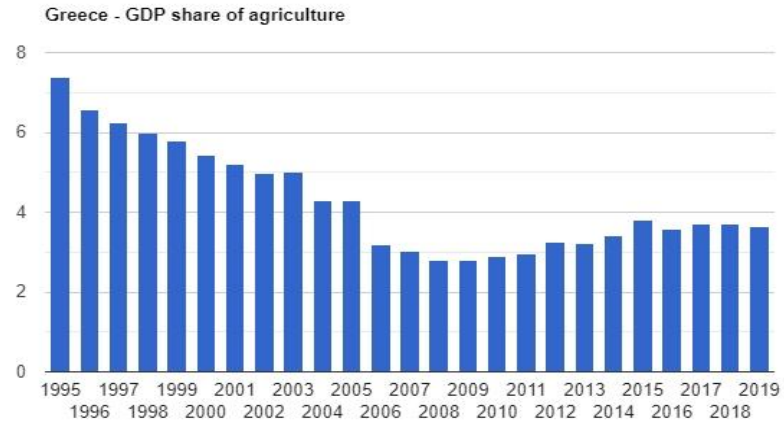
- Internationalization & Market Access (business access to new markets through Enterprise Europe Network and other initiatives, such as: Your Business Portal, the portal for the internationalization of the media, Support Center for issues of intellectual Property, EU-Japan Center for Industrial Cooperation ,etc.)
- Improving business conditions (reducing administrative burden, adopting new business models, setting up clusters, etc.)
- Encouraging Entrepreneurship (Entrepreneurship 2020 Action Plan, Erasmus for Young Entrepreneurs, etc.).[28]

3.7 Challenges

In Greece, there is high aging population rates and people often think of the land as heritage and not as a mean of production. The country's agricultural environment is characterized by small family-owned units losing the advantage of benefiting from economies of scale, as many of their competitors do. That leads to Greece having a very small percentage (7%) of professional training and thus cannot follow the global trend of technological advancement. In addition, due to high production costs, a lack of many natural resources and the internal migration of the youths into urban areas or abroad the agricultural production has decreased. Meanwhile, the economy of agriculture is very dependent of subsidies provided by the EU and many farmers rely on CAP (Common Agricultural Policy) subsidies, instead of finding a way to increase their productivity. People are making use of the European subsidies, with Greece having in 2010, 1.212.720[29] persons working on farms when the GDP share of agriculture the shame year was only 2.88%[30].Greece is facing deep economical and fiscal problems since the economic crises that started in 2009 and led to many companies to bankrupt and many people to stay unemployed.

Below the rates of the GDP share of agriculture in Greece are illustrated from the year 1995 to the year 2019.

[28] EETAA, *COSME*,< https://www.eetaa.gr/eu/programs/Cosme.pdf>
[29] Eurostat, *Table Farm Structure key indicators GR 2000 -2010* https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Table_Farm_Structure_key_indicators_GR_2000_2010.PNG
[30] The global economy,*Greece: GDP share of agriculture*, < https://www.theglobaleconomy.com/Greece/share_of_agriculture/>



Source: TheGlobalEconomy.com, The World Bank

In 1995, agriculture accounted for 7.38 percent of GDP. Since then it started to steadily decrease, reaching its lowest point in 2009, when the crises in Greece started with 2,8% share. There has been many efforts from the European Union to help the country increase its productivity, by granting a number of subsidies and providing investment opportunities. However the current level of agriculture output is low, reported at 3.65% in 2019, according to the World Bank collection of development indicator.[31] Nevertheless, during the crises, many small businesses managed to overcome mainly because they were family companies with strong culture.

Other issues that the country needs to face are regarding the undeclared work, bureaucracy and the old-fashioned management implemented in human recourses.[32]

[31] Trading economics, *Greece, Agriculture, Value Added* <https://tradingeconomics.com/greece/agriculture-value-added-percent-of-gdp-wb-data.html>
[32] Europa, *European Stability Mechanism ,what challenges does Greece still face<* *https://www.esm.europa.eu/content/what-challenges-does-greece-still-face*>

4. Geographical and demographic characteristics

Macedonia is the largest Greek geographical region, with the city of Thessaloniki as its capital. The total surface area is 32,968 km^2.Since, 1987, it has been divided into three administrative regions: Western, Central Macedonia and Eastern Macedonia and Thrace. Both the regions of central and Eastern Macedonia are part of the decentralized Administration of Macedonia, based in Thessaloniki.

The largest part of Macedonia is covered by mountains while 34,7% is flat. 25,6 % consists of gentle slopes and 39,4% is mountainous. Macedonia has many fertile valleys that are crossed by rivers. The longest of the rivers is Nestos with 143 km length expanding along with the Greek land.

Most major urban centers, such as Thessaloniki and Kavala are concentrated on the southern coastline. Thessaloniki, which is known as the co-capital, is a commercial and economic center and the second largest city of Greece. The city has a variety of landscapes with long beaches and mountainous regions. According to World population review[33] the population of the municipality in 2020 is 354.290 residents.

4.1 Central Macedonia

[33] World population review,2020, *Population of cities in Greece*, https://worldpopulationreview.com/countries/cities/greece>

Central Macedonia is a one of the thirteen regions of Greece and the second largest after Attica. The region includes 7 prefectures: Imathia, Thessaloniki,Kilkis,Pella,Pieria Serres, Chalkidiki. Due to the many natural and human recourses, the strategic geographical position, the urban development in the city of Thessaloniki and the agricultural production, it is the most developed region in the north.

Thessaloniki city

The cities of the region are 22 :Serres,Katerini,Veroia, Giannitsa,Kilkis,Naousa,Peraia,Edessa,Thermi,Aleksandria,Diavata,Nea Moudania,Sindos,Epanomi,Nea Mixaniona,Koufalia,Lagadas,Xalastra,Nea Kallikratia,Sidirokastro,Polikastro and Thessaloniki which has the highest population density. On the north, it borders with Former Yugoslav Republic of Macedonia and Bulgaria and inside the country with the Region of Easter Macedonia and Thrace.

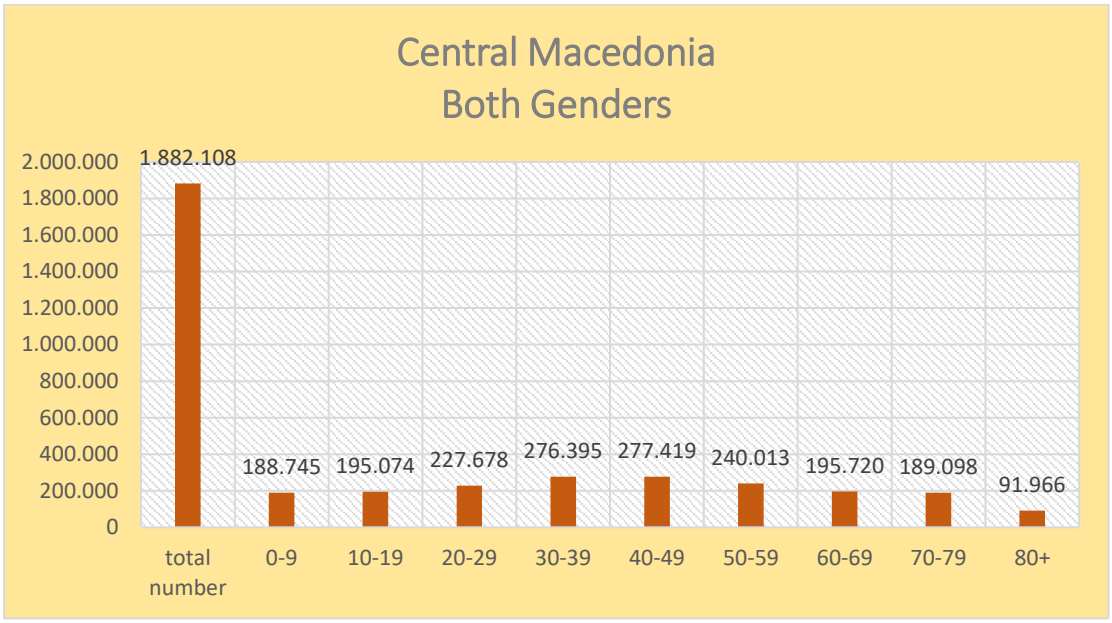
Greek people also refer to the city of Thessaloniki as the co-capital. This is because it use to be the co-capital city of the Byzantine Empire, following Istanbul. Thessaloniki is a big urban center and the governmental and administrative services as well as the commercial and financial treaties and the educational and cultural level is that from a capital city. It is also a bridge between Eastern Europe, the Balkan Peninsula and Northern Greece and the rest of the country, Europe and East.[34]

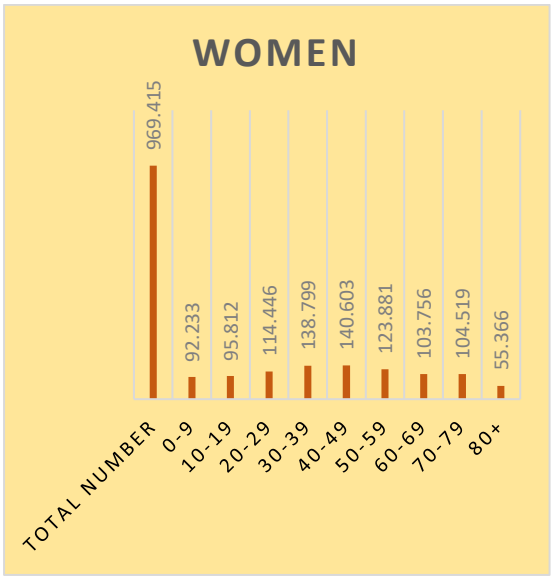
4.1.1 Demographics

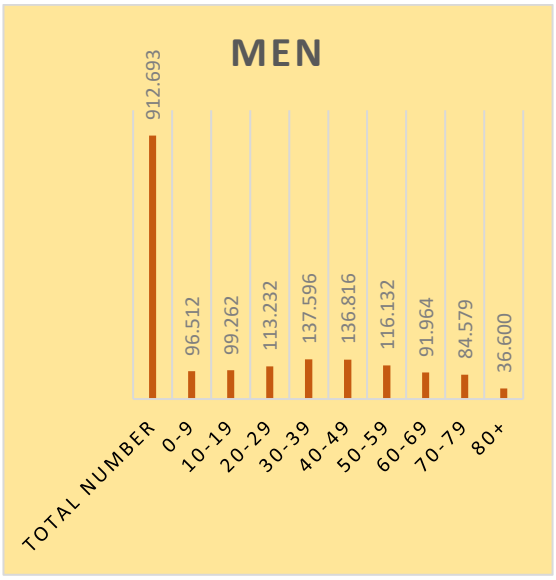
A demographic census made by Hellenic Statistical Authority (ΕΛΣΤΑΤ) in 2011 demonstrated that the population of the region is 1.882.108 residents, which means

[34]Tor hotel group,2013,*Thessaloniki: The only co-capital city in the world* ,< https://www.torhotelgroup.gr/blog/announcements/thessaloniki-the-only-co-capital-city-in-the-world/>

17.4% of the total Greek population. 52% of the total population are women and 48% are men. 15% of the total population are between the ages of 40 and 49, 13% between the ages of 50-59, 12% between 20-29, 20% for people between 60-79 and the same amount for people between 0 -19, and only 5% between 80-89. The average age in the region is 41.7.

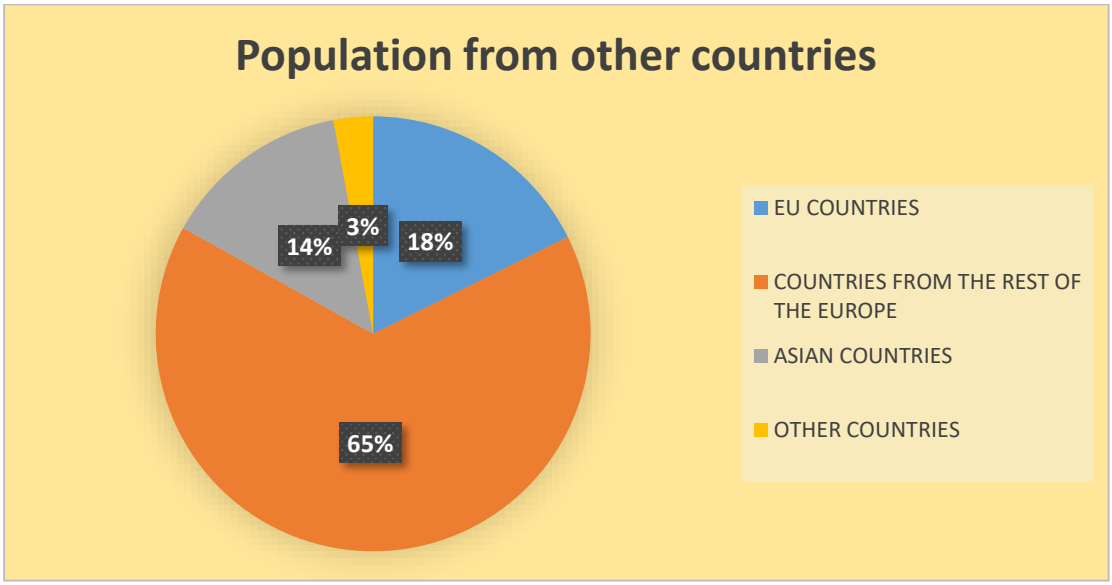






Data from ELSTAT, 2011, *Population census Residents by gender and nationality*

Below there is a graph which shows the percentage of permanent residents in Greece with foreign citizenship. According to the results of the Census 1.765.190 people have Greek citizenship, 20.647 people are citizens of other E.U countries, 76.497 people are citizens of other countries, 16.346 people are from Asian countries and 3.428 people are without citizenship or have no specified citizenship.



Data from ELSTAT, 2011, *Population census Residents by gender and nationality*

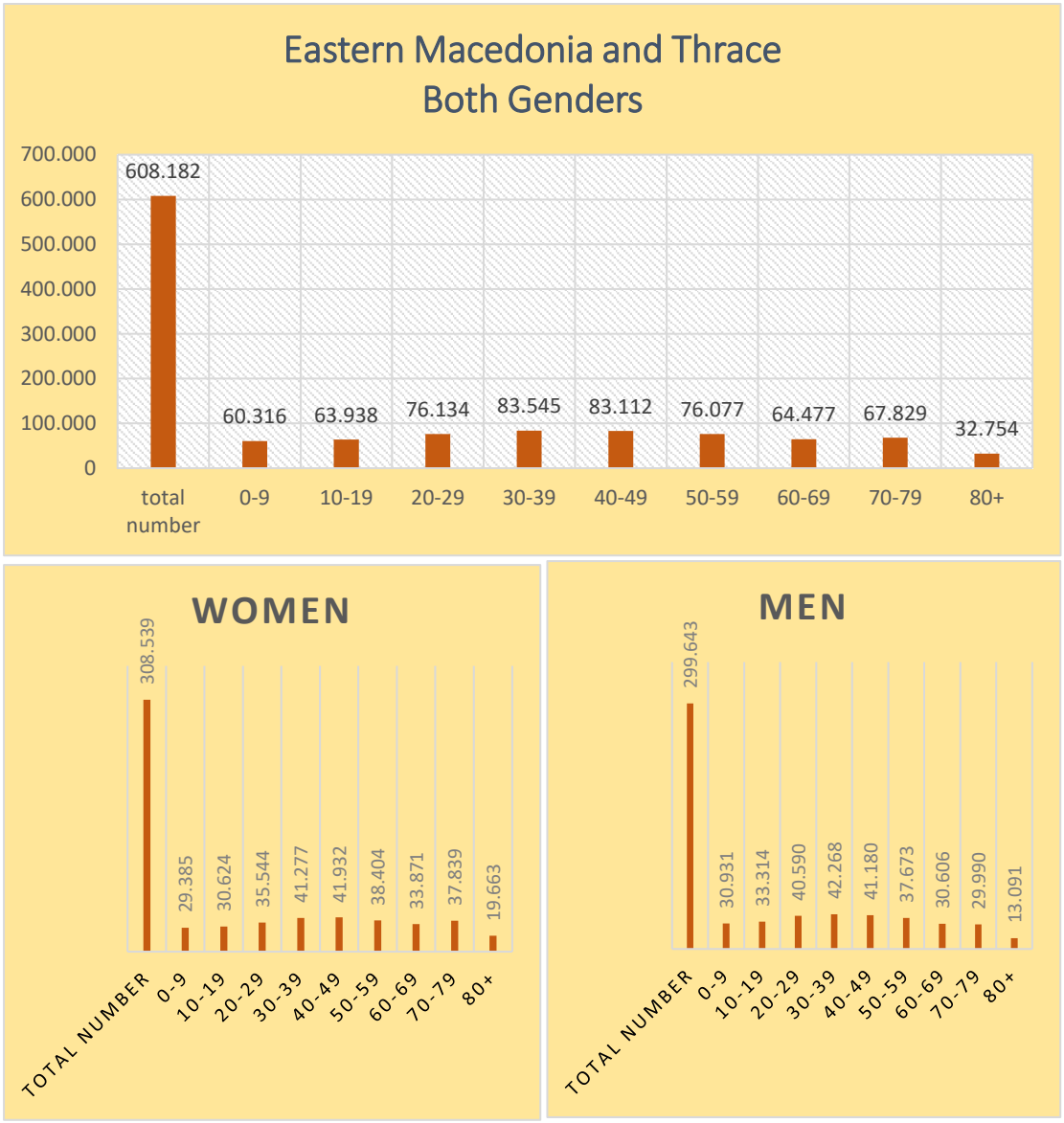
4.2 Eastern Macedonia and Thrace

The region borders with Turkey and Bulgaria and consists from the Regional Units of Drama, Kavala ,Xanthi, Rodopi and Evros and from the cities of Drama, Kavala,Xanthi,Rodopi,Alexandroupoli,Chrysoupoli,Didymoteicho,Drama,Eleftheroupoli,Feres,Kavala,Kimmeria,Nea Orestiada,Prosotsani,Soufli, ,Komotini which is also the region's capital. In the island area, it includes the islands of Thasos and Samothraki. Due to its geographical position and the length of its coastline, most of the inhabited parts of Eastern Macedonia and Thrace have a cool climate. The weather closest to the sea is mild and Mediterranean. In the southwest is washed by the Aegean Sea and and in the southeast by the Thracian Sea.

CITY OF KAVALA

4.2.1 Demographics

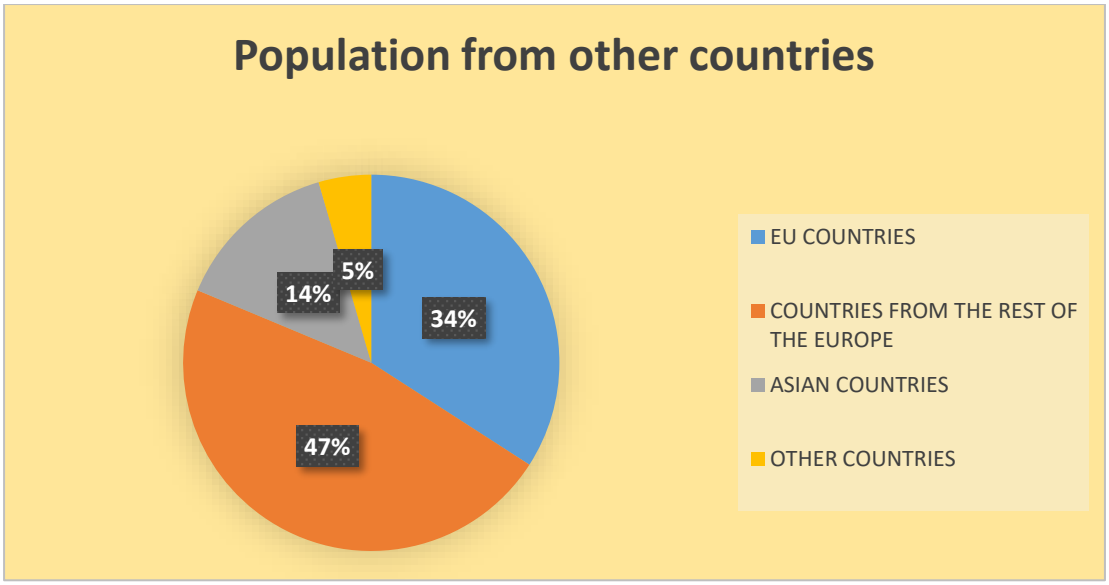
As we see in the chart below the total population of Eastern Macedonia and Thrace in 2011 was 608.182 and 51% of the population were women and 49% men. Regarding their age, 14% was between the age 40-49, 14% between 30-39, 13% 20-29, 11% 60-69, 11% 70-79, 20% 0-19 and only 5% 80-89. In general, the average age in the region is 42.3.



Data from ELSTAT, 2011, *Population census Residents by gender and nationality*[35]

We can also see the percentage of permanent residents in Greece with foreign citizenship below. According to the results of the Census, 586.226 people have Greek citizenship, 7.489 people are citizens of other E.U countries, 10.360 people are citizens of other countries, 3.115 people are from Asian countries and 992 people are without citizenship or have no specified citizenship.

[35] *Population census Residents by gender and nationality,2011,*<https://www.statistics.gr/en/statistics?p_p_id=documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4lN&p_p_lifecycle=2&p_p_state=normal&p_p_mode=view&p_p_cacheability=cacheLevelPage&p_p_col_id=column-2&p_p_col_count=4&p_p_col_pos=1&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4lN_javax.faces.resource=document&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4lN_ln=downloadResources&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4lN_documentID=310596&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4lN_locale=en>



Data from ELSTAT, 2011, *Population census Residents by gender and nationality*[36]

4.3 Land Type

Macedonia accounts for the majority of Greece's agricultural production and is a major contributor to the country's industrial and tourism sectors. Two thirds of the active population of this Region are employed in the primary and secondary sectors (Population Census, 1991), mainly because of the mountainous terrain, the many lakes and the wealth of plants, the land is ideal for cultivation. More specifically, in the plains of Makedonía, and Thráki Corn, wheat, barley, sugar beets, peaches, tomatoes, cotton (of which Greece is the only EU producer), and tobacco are cultivated on a large scale.

From the chart below, we see the structure of crop areas and fallow land in the regions. In the region of Eastern Macedonia and Thrace, there were 3.771.910 stremmas of agricultural and fallow land, with the majority of them in the unity of Evros. In the region of Central Macedonia 6.854.484 stremmas with the majority to be in the unities of Thessaloniki, Kilkis and Serres.

[36]ELSTAT, 2011, *Population census Residents by gender and nationality*
< https://www.statistics.gr/el/statistics/-/publication/SAM03/2011>

Regions and Regional Unities (NUTS 2)	Total cultivated agricultural and fallow land	Καλλιέργειες - Crops				Fallow land (1 - 5 years)	Of which land eligible for the payment of subsidies [2]
		Crops on arable land	Garden area [1]	Areas under trees (compact plantations)	Vines (grapes and raisins)		
Greece Total	**32.216.808**	**17.195.604**	**618.903**	**9.958.590**	**892.459**	**3.551.252**	**1.955.839**
Region of Eastern Macedonia and Thrace	**3.771.910**	**2.955.302**	**67.964**	**289.366**	**52.063**	**407.215**	**239.474**
Rodopi	785.363	676.410	11.914	27.743	3.146	66.150	65.419
Drama	558.453	456.779	6.320	13.545	6.957	74.852	27.649
Evros	1.518.570	1.209.266	25.188	84.230	6.490	193.396	105.359
Thasos	64.274	407	373	62.611	113	770	–
Kavala	404.272	258.712	14.045	69.285	33.933	28.297	19.309
Xanthi	440.978	353.728	10.124	31.952	1.424	43.750	21.738
Region of Central Macedonia	**6.854.484**	**4.852.329**	**106.490**	**1.143.947**	**58.167**	**693.551**	**532.575**
Thessaloniki	1.505.361	1.239.340	26.258	54.412	13.700	171.651	65.757
Imathia	554.898	308.927	13.901	203.592	5.943	22.535	20.403
Kilkis	1.041.454	915.303	12.091	24.024	7.065	82.971	78.013
Pella	886.694	407.016	21.264	384.959	6.340	67.115	56.102
Pieria	565.654	371.701	10.355	93.312	6.904	83.382	59.338
Serres	1.501.317	1.238.226	14.230	93.964	7.184	147.713	147.093
Chalkidiki	799.106	371.816	8.391	289.684	11.031	118.184	105.869

Hellenic Statistical Authority,2018, *Crop areas and fallow land, by category, Region and Regional Unities*[37]

REGIONS AND REGIONAL UNITIES	TOTAL AMOUNT		MIXED		ONLY AGRARIAN		ONLY LIVESTOCK	
	holdings	land	holdings	land	holdings	land	holdings	land
GREECE TOTAL	**723007**	**34779**	**131988**	**13730**	**574812**	**19683**	**16207**	**1366**
Region of Eastern Macedonia and Thrace	**53148**	**3468**	**9943**	**867**	**41674**	**2582**	**1531**	**18**
DRAMA	5841	505	985	139	4393	357	463	8
KAVALA	10994	423	1289	71	9437	352	268	1
EVROS	14311	1469	2829	373	11276	1091	206	5
XANTHI	8296	356	1780	108	6256	247	260	1
RODOPI	13706	715	3060	176	10312	536	334	3
Region of Central Macedonia	**101337**	**6420**	**11563**	**1356**	**87934**	**4953**	**1840**	**110**
IMATHIA	13207	542	1092	84	11873	445	242	13
THESSALONIKI	19342	1410	1880	275	16957	1093	505	42
KILKIS	10700	1134	1418	310	9115	812	167	11
PELLI	16926	727	2131	130	14642	597	153	0
PIERIA	9141	442	1337	93	7719	348	85	0
SERRES	20193	1371	2798	290	16977	1069	418	11
HALKIDIKI	11828	794	907	173	10651	589	270	32

Hellenic Statistical Authority,2016,*Holdings and utilised agricultural area, divided into mixed, agricultural and livestock holdings, by region and regional unit*[38]

The Farm structure survey above, made by ELSTAT in 2016 shows us that in Eastern Macedonia and Thrace there are 53.148 thousand stremmas of holdings with utilized agriculture area and in Central Macedonia 101.337 thousand stremmas.

[37] ELSTAT,2018<https://www.statistics.gr/el/statistics/-/publication/SPG06/->
[38] ELSTAT,2016<https://www.statistics.gr/el/statistics/-/publication/SPG32/->

4.4 Production

Greece is producing cotton, tobacco, olives and olive oil, grapes, melon, tomatoes, peaches, oranges and wine and exporting in the EU. There is also a strong fishing industry but is seriously threatened from the pollution and over-fishing. The country is also known for its animal production especially sheep milk which is used for making the famous feta cheese[39]. The most profitable regions in Greece are Attica with 87.378 million euros to GDP and Central Macedonia with 25.558 million euros to GDP, in the year 2018. The region of Eastern Macedonia and Thrace is the 8th in line most important region with 7.166 million euros to GDP making north Greece contributing to the economy with 40.764 million euros to GDP. (Europa,2020)[40]

Some of the key products in Central Macedonia that are popular in the Greek and the global market are the honey with 6.500 honey workers, the worldwide famous wine, the olives/ virgin olive oil, the goat cheese used for feta cheese, ouzo and tsipouro in Chalkidiki and fish which 95% of it is exported. At the same time, the region of Eastern Macedonia and Thrace has its own dynamic production. Fish is exported throughout Greece and in other countries and in the lake of Porto Lagos there are plenty fish farms. Tobacco, grains, rice, asparagus, pulses, kiwi, cotton, grapes, wheat and vegetables, sugar cane, sunflower, cherries are cultivated. In addition, large quantities of olive oil, vineyards are produced. (Enterprise Greece, *Invest and Trade*, 2018)[41]

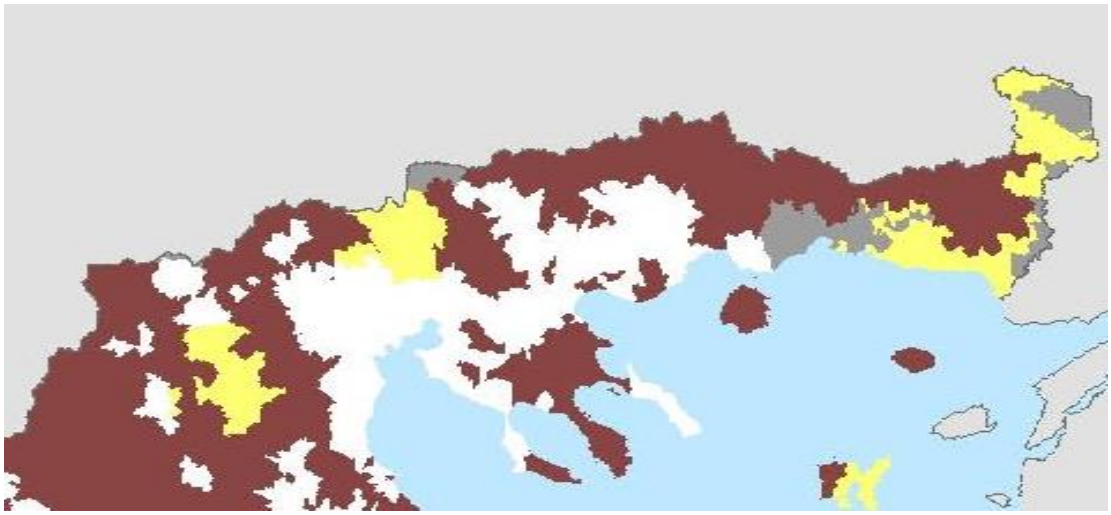
Macedonia accounts for the majority of Greece's agricultural production and is a major contributor to the country's industrial and tourism sectors. Two thirds of the active population of this Region are employed in the primary and secondary sectors. As consumers, the Greek people prefer domestic products considering them safer and of higher quality. Despite that, there is a great competition from imported products from EU countries, which penetrated into the market, crowding out local industrial products. This shows the urgent need for establishing professional organizations that will aim at continuing education, adequate management and will make proper utilization of fields and introduction of new technologies.

[39] Nationsencyclopedia,2010, <https://www.nationsencyclopedia.com/economies/Europe/Greece-AGRICULTURE.html>

[40] Europa,2020,Eurostat, *newsrelease* <https://ec.europa.eu/eurostat/documents/2995521/10474907/1-05032020-AP-EN.pdf/81807e19-e4c8-2e53-c98a-933f5bf30f58

[41] Enterprisegreece,2018<https://www.enterprisegreece.gov.gr/images/public/synergassia/Synergasia_2018_Central-Macedonia.pdf>

4.5 Areas facing natural or specific constraints



Map from flash news, *Demarcation of areas with natural restrictions, except mountainous areas*[42]

In the map above we see in **brown color** all the **mountainous areas**, with **yellow color** all the **new areas with natural constraints** and with **grey color** all the **areas with special dissadvantages**.

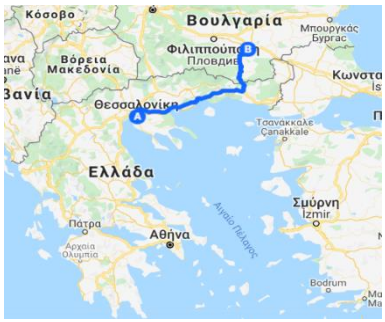
For a farmland to qualify as an mountainous Area with Natural Constraints(ANC), it must be either at an altitude where agriculture is difficult, or to have steep slopes that prevent the use of standard farming equipment or be on the north of the 62nd parallel. Areas that face significant natural constraints are those whose are negatively affected by low temperature, dryness, excess soil moisture, limited soil drainage, unfavourable texture and stoniness, shallow rooting depths, poor chemical properties and steep slopes. Finally, areas affected by specific constraints are those that it is important to maintain the farming community in order to conserve or improve the environment, maintain the countryside, preserve the tourist potential of the area and protect the coastline. In order to prevent these types of land to be abandoned the European Union provides support through rural development pland and income support schemes.[43]

The main activitiy of the people living in mountainous areas is usually the traditional livestock farming of sheep-goat-cattle farming form (pastoral and nomadic). The areas of grass land ensure for animals cheap grazing for 7 to 8 months per year. There are also some crops, such as vineyards, fruit trees, cereals and livestock plants. Forests products(logging, etc.) and their processing in nearby crafts and factories are often an activity in mountainous areas with many forests. A farming activity in a relative limited scale, is utilizing local raw materials for producing specialized local goods, such as various types of wine, cheese, etc. Tourism activities are gradually expanding to places of special interest which are related with history, tradition, art, nature, winter sports

[42] Flash news, *Demarcation of areas with natural restrictions, except mountainous areas*
[43] Europa,< https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/income-support/additional-optional-schemes/anc_en>

etc. In a few places across the country there are some natural national parks which are visited by tourists or hunters (under special rules and control conditions).

4.6 Cross-border area



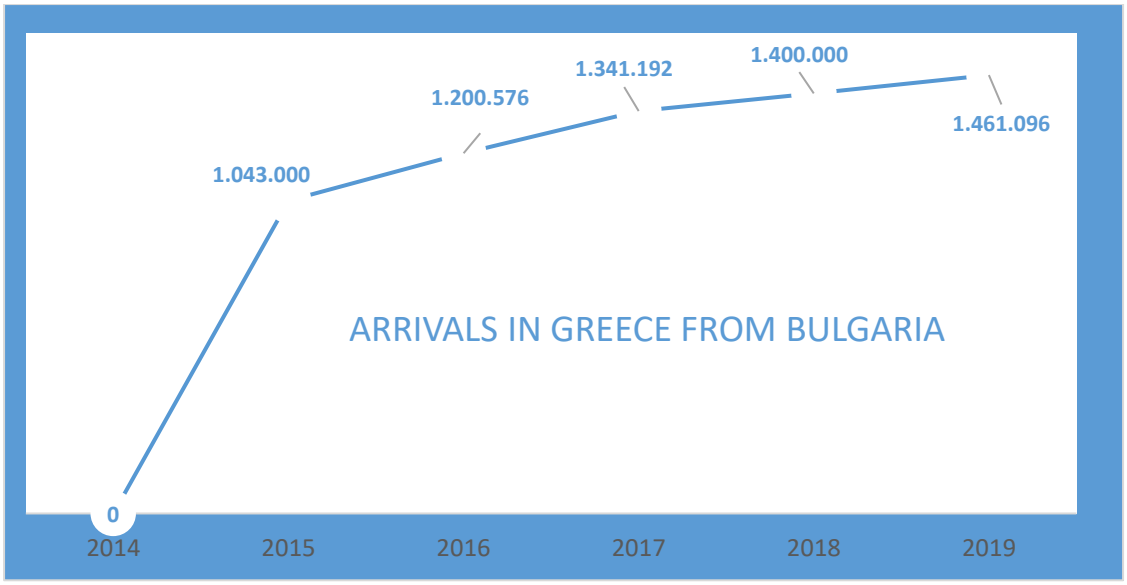
The borders crossing point between Greece and Bulgaria by land are in the areas of Promachonas, Dikea in Evros, Ormenio in Evros, Exohi, Agios Konstantinos in Xanthi, Kyprinos in Evros and Nymfaia. In Promachonas and Dikea, there is also a rail station.[44]

Greece and Bulgaria have signed several agreements of cooperation in the fields of transport. The deal about the cross-border rail traffic aimed to connect the cities of Kavala and Alexandroupoli in Greece with Burgas and Varna in Bulgaria by rail. The two countries also plan to build major road networks, one of which will connect Alexandroupoli with Dimitrovgrad in Serbia, the other will upgrade the Nymfea-Makaza border crossing to allow trucks through. The key Bulgaria-Greece border crossing links the Finnish capital Helsinki with the Greek port of Alexandroupolis via St. Petersburg, Kiev, Bucharest and Dimitrovgrad.[45]

In 27 of July 2020 Nikos Dendias, the Minister of Foreign Affairs met with the Bulgarian Deputy Prime Minister and Minister of Foreign Affairs, Ekaterina Zaharieva, in Athens. They talked about the common values of both countries and their cooperation in energy, economy, infrastructure, education, culture, citizen protection, cross-border and police collaboration.[46]

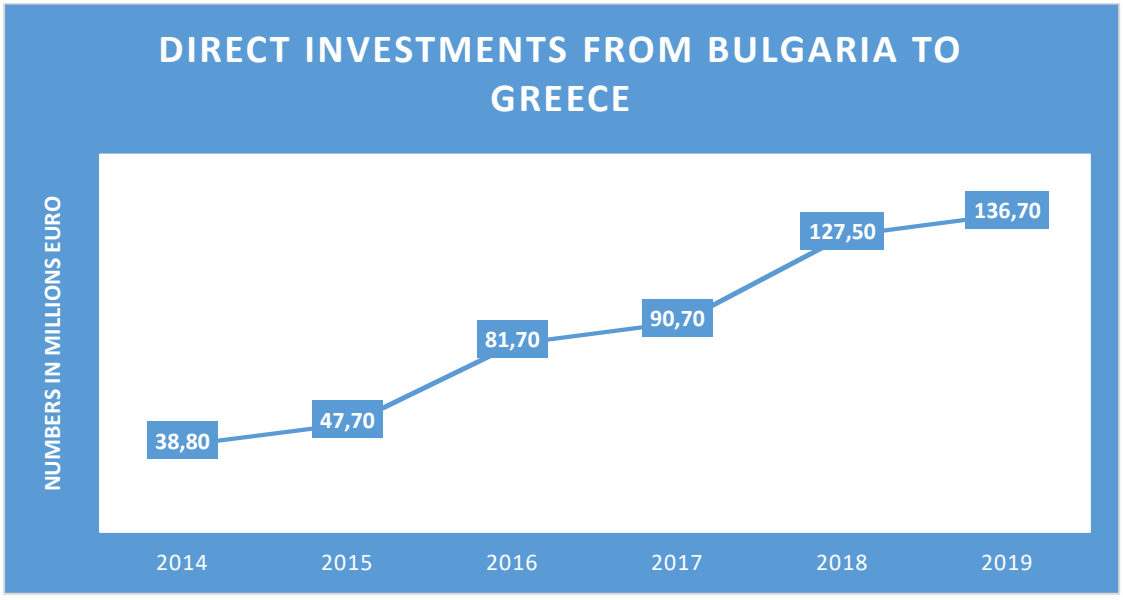
Regarding the people that visit the country from Bulgaria, below we can see the rates of the people arrived in Greece the years 2014 to 2019.The numbers are steadily increasing every year with the year 2019 to have 1.461.096 people arrived from Bulgaria to Greece.

[44]List of border crossing points,2014 < https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC1122(03)&from=EN>
[45] International Transport Journal, 2020, <https://www.transportjournal.com/en/home/news/artikeldetail/better-road-and-rail-links-between-greece-and-bulgaria.html>
[46]Hellenic Republic Ministry of Foreigh Affairs,2020,< https://www.mfa.gr/en/current-affairs/top-story/statements-of-the-minister-of-foreign-affairs-nikos-dendias-following-his-meeting-with-the-bulgarian-deputy-prime-minister-and-minister-of-foreign-affairs-ekaterina-zaharieva-athens-27-july-2020.html>



Data from Hellenic Republic Ministry of Foreign Affairs, *Economic profile of Bulgaria 2020*[47]

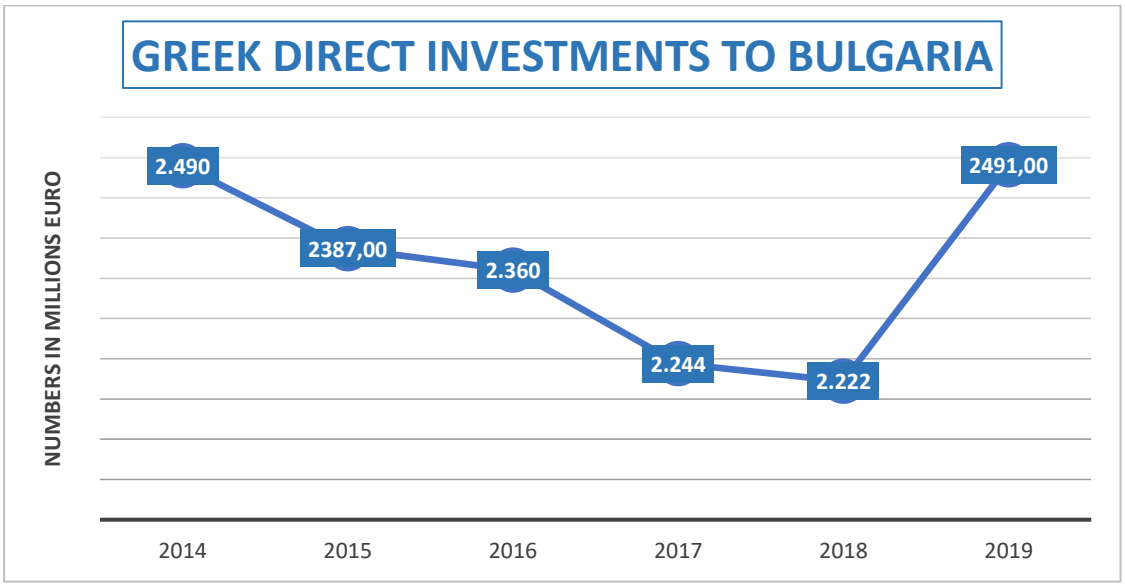
There is also an increase through the years of direct investments from the Bulgaria side to Greece.



Data from Hellenic Republic Ministry of Foreign Affairs, *Economic profile of Bulgaria 2020*

[47] AGORA ,Hellenic Republic Ministry of Foreign Affairs,*Economic profile of Bulgaria 2020*,< http://agora.mfa.gr/infofiles-menu/infofile/71282

Below we see the Greek investments in Bulgaria which in 2019 where 2.491.000 euros.



Data from Hellenic Republic Ministry of Foreign Affairs, *Economic profile of Bulgaria 2020*

In Bulgaria, there are approximately 28.500 persons of Greek origin and citizenship, living there. This includes about 15,000 Sarakatsani, 2,500 former political refugees, 8,000 Greeks that lived from old years, 2,000 university students, 1,000 professionals and their families. There is also a Hellenic Educational Association in Sofia, the Federation of Greek-Bulgarian Black Sea Associations, the Federation of Cultural and Educational Associations of Sarakatsani of Bulgaria and the Association of Neohellenists of Bulgaria. The diplomatic relations of the countries evolved gradually and they now working together in the fields of politics, economy and energy and starting regional initiatives.[48]

Many of Northern Greece's rivers have their origin in other countries. Greece is the downstream country in four out of the five shared rivers. The management of these rivers is of high importance particularly in the area, since around 25% of Greece's renewable resources are coming from neighboring countries. Among the four rivers that flow into northern Greece from neighboring countries, three originate in Bulgaria Nestos/Mesta, Strymonas/Struma and Evros/Maritza. The Greek and the Bulgarian side developed a positive cooperation on this matter. In 2002, a new agreement between Greece and Bulgaria was signed introducing "cooperation on environmental protection". This agreement was the engagement of a broader network of actors including civil society, NGOs, universities, research institutions etc".

The energy project of a construction of an oil pipeline, starting from the greek city Komotini and ending up in the Bulgarian city Stara Zagora, has preoccupied Athens

[48]Hellenic Republic Ministry of Foreign Affairs,2020,< https://www.mfa.gr/en/blog/greece-bilateral-relations/bulgaria/>

and Sofia for most of the two decades since the end of the Cold War. The idea of building a pipeline between the Bulgarian port of Burgas in the Black Sea, and the Greek port of Alexandroupolis in the Aegean Sea, for transporting Russian oil was born as a means of bypassing the congested Turkish straits. On 10 December 2015, Athens and Sofia signed an agreement to build a natural gas pipeline, after a delay that had mobilized American and EU diplomatic pressure. The Interconnector Greece-Bulgaria (IGB), known also as Komotini-Stara Zagora pipeline, was high on Washington's and Brussels' energy diplomacy agenda since 2009 as its construction would reduce the dependency of Bulgaria, and of potentially other Southeastern European countries, from Russian energy giant Gazprom's gas. The IGB will have an initial annual capacity of 3 billion cubic meters per year, with an estimated to cost about €220 million - partially financed by an EU grant of €45 million. Bulgaria's state owned energy holding company BEH has a 50 percent in the joint venture, while Greek state energy firm DEPA and Edison hold 25 percent each. A further agreement on the construction of IGB was signed on 1 August 2016, during the third meeting of the High Level Cooperation Council. In 2018, EU approved the compatibility of the project's financial planning as well as its taxation, In accordance with State aid rules[49]. Thus, in May 22 2019, in Kirkovo in Bulgaria the construction began to took place.

The regions of Central -Eastern Macedonia and Thrace there are in a key spot and have common interests with Bulgaria. Now they aim to make a cross-border cooperation to integrate a sustainable development in the agricultural section and create a brand name for cross-border region bio-products.

4.6 Health Care system

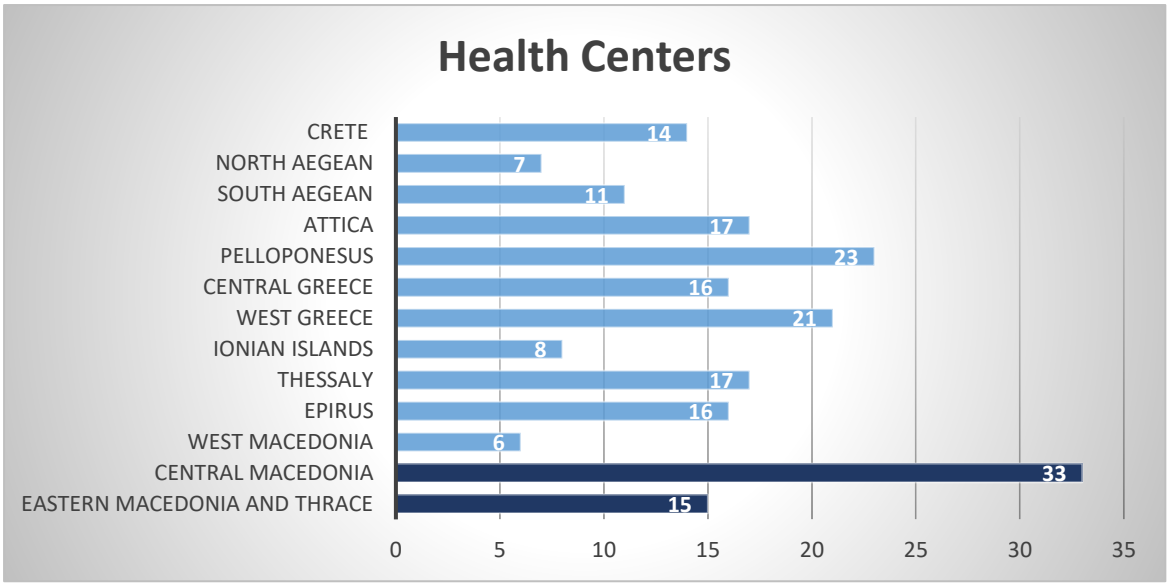
The overall state of health in Greece is good, as it is close to the average of the developed countries of the world. Some worrying facts are the high percentage of smokers, the high rates of deaths from air pollution(77 deaths per 100 thousand people, compared to 40 in the OECD)[50] mainly due to increased concentration of micro particles, particularly harmful to health, from pollutant emissions, with the substitution of energy sources by oil and its derivatives, and from lignite to natural gas and renewable energy sources, to be relatively limited.

Greece has 6.1 doctors and 3.3 nurses per 1000 people, compared to 3.4 and 8.8 respectively in the OECD. In addition, hospitals operate with far fewer nurses per

[49] Eliamep,SE Europe Programme, *Greek-Bulgarian Relations: Present State and Future Challenges,* Yorgos Christidis, Ioannis Armakolas, Panagiotis Paschalidis < *http://www.eliamep.gr/wp-content/uploads/2017/03/Greek-Bulgarian-report-FINAL-24-Feb-2017-1.pdf*>
[50] OECD,2019 HEALTH AT A GLANCE

doctor (1.63) than in the average OECD country (2.7). This situation reflects a serious structural imbalance in the nursing system of the country [51]

Below there is the census made by ELSTAT for the year 2019 regarding the current situation of the provision of primary health care in Greek regions? It illustrates the health care centers in the country and the staff occupied in the regions of Easter Macedonia and Thrace and Central Macedonia.



Region	Medical staff	Nursing staff	Other Staff
EASTERN MACEDONIA AND THRACE	576	753	574
MACEDONIA	517	503	412

Data from ELSTAT,2019

According to the census, there were 33 health centers in the region of Central Macedonia, with 1.564.736 residents, occupying 517 along with the region of Western Macedonia and 15 health centers in the region of Eastern Macedonia and Thrace with 614.352 residents occupying 576 medical personnel.

[51] Sep4u.gr January 24, 2020 by Kalodimos D.< http://sep4u.gr/34876/h-ellada-poly-megalo-pososto-giatron-kai-poly-mikro-pososto-nosokomon/>

5. Environmental conservation and agricultural activities

When we are talking about environmental conservation, we mean the entire actions human do to conserve the natural resources of the environment, aiming in an improved quality of life.

In particular, many practices in everyday life can cause a positive impact and especially in the agricultural section which has an immediate effect on the environment. By conserving the earth, we can help protecting the vital recourses and at the same time go against bad practices that large corporations implement.

Some of the practices we must urgently adopt in the agricultural sector are:

1. The use of renewable energy sources, for example many farmers grow corn to make ethanol and making use of the wind that blows to make electricity. Practices like these, can also benefit the farmers by providing a long-term source of income (ucsusa,2017[52]).
2. Waste recycling that will reduce the use of fertilizers and other chemicals and benefit the whole ecosystem since there would be a reduction in disposed waste in landfills (Europa,2020[53]).
3. The use of soil organic matter that will make the surface structure more stable, improve the ground and surface water, increase water capacity and the health of crops.

[52]Uscusa.org *What is Sustainable Agriculture*,< https://ucsusa.org/resources/what-sustainable-agriculture>
[53] Europa,*Environment*<https://ec.europa.eu/environment/waste/index.htm>

4. Direct seeding or planting that will minimize the disturbance of soil, avoiding the use of mechanical seedbed.
5. Crop rotation, which means growing different types of crops during the years, offering a diverse "diet" to the soil and leading to improvement over soil structure and organic matter. (FAO,2020[54])

The need of environmental protection is getting more crucial as the challenges in today's world are getting more serious with the economic crises, the overpopulation, the climate change, the increased costs of inputs and the necessity of producing good quality products.

The European Union has to supply 500 million consumers and there are 11 million farms and 44 million people employed in the primary sector.

According to FAO, there are 5 key principles of sustainability of food and agriculture: to increase productivity and employment, to protect and enhance natural recourses, to improve the resilience of people, communities and ecosystems and to adapt the governance to new challenges.

FAO, The Food and Agriculture Organization of the United Nations, is already implementing projects and programs to help the developing and the least developed countries around the world. However, the success is relying on the policies, plans and program that each country is adopting. Most of all, we need to raise awareness in everybody involved, especially in the agricultural sector, since they will contribute the most in these actions.

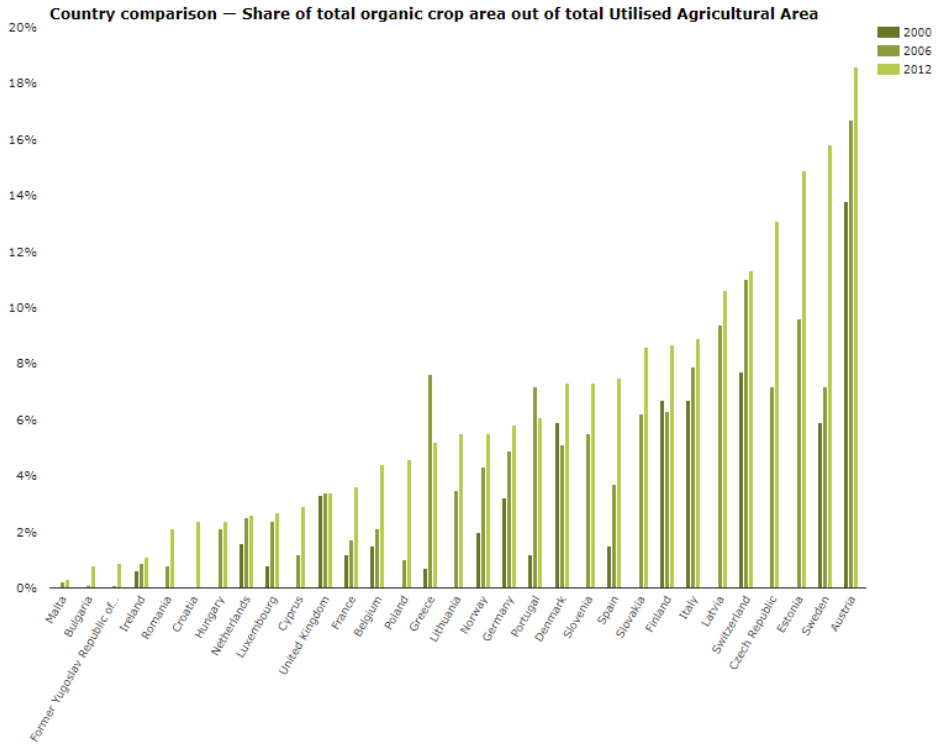
5.1 Organic Farming

Organic production relies on biodiversity and ecological activities that are modified to local conditions. It is a system that creates safe conditions for ecosystems, people and soil. For years, the use of chemicals and synthetic fertilizers in agriculture lead to environmental degradation. Organic production came as an answer with the application of best practices such as the conservation of natural resources and biodiversity, and the good practices applied on animal welfare that was in line with the customers need for products that are healthy and have produced with the use of natural activities. Although the price of organic products is higher sales has increased steadily with the growing of the awareness and the concerns about health issues that are caused by pesticides residues and the consumption of genetically modified crops.(Britannica.com[55])

[54] FAO,2020,<http://www.fao.org/sustainability/en/>
[55] Britannica, *Organic Farming,* <https://www.britannica.com/topic/organic-farming>

In 2012, in Greece there were 462.618 hectares of organic agricultural area with 23.433 organic producers. The domestic market for organic products was estimated to be around EUR 60 million (2010) .About one third of the organic products sold are Greek. Most of the processed products are imported. Key products for the growing export market are olive products, wine and to some extent fresh fruit, vegetables and feta cheese.(organic-europe.net[56])

Below we can see a comparison between the European countries regarding their share of total organic crop area out of total utilized agricultural area.

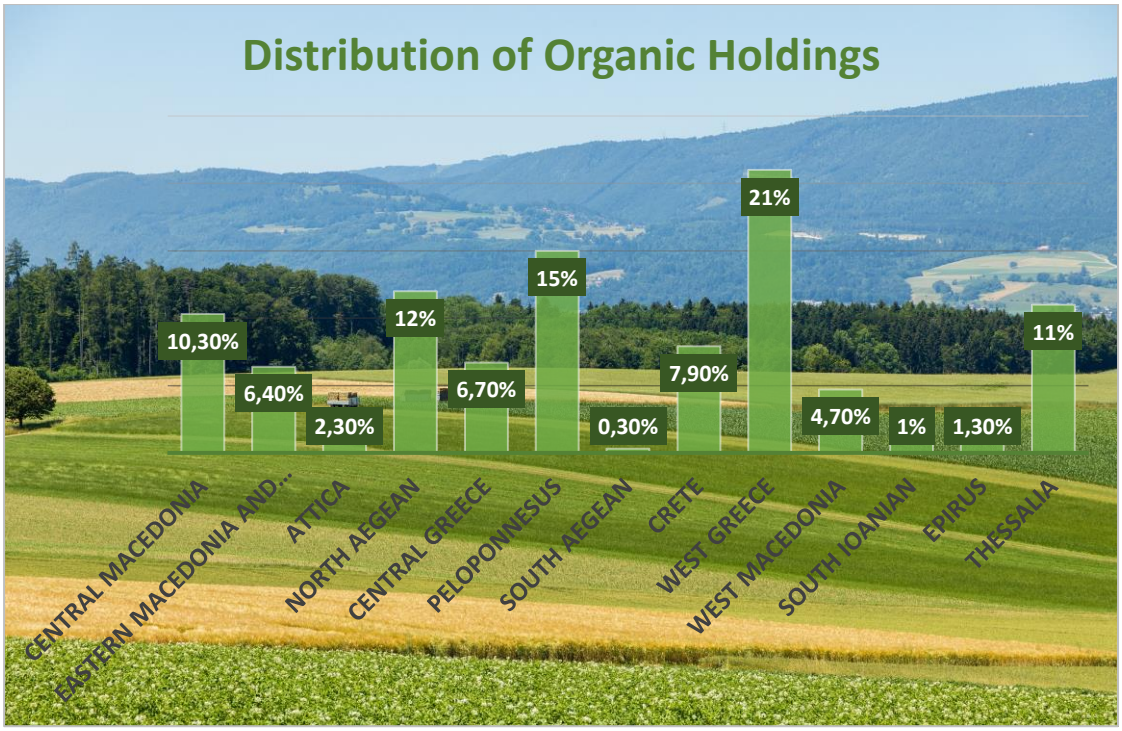


Eurostat,2014 Fig. 1: Share of total organic crop area out of total Utilized Agricultural Area[57]

According to Eurostat, in 2000 Greece had 0.7% share of organic crop, in 2006 7,6% and in 2011, 5.2% of the total agricultural area.

[56] Organic Europe, *country report-Greece*,2014<https://www.organic-europe.net/country-info/greece/country-report.html>

[57] Europa,2014, *Agriculture: area under management practices potentially supporting biodiversity* <https://www.eea.europa.eu/data-and-maps/indicators/agriculture-area-under-management-practices/agriculture-area-under-management-practices-2>



Data from Piraeus Bank[58]

According to a survey from Piraeus Bank in 2019, 10,3% of the total biological holdings where in Central Macedonia and 6,4% where in Eastern Macedonia and Thrace.

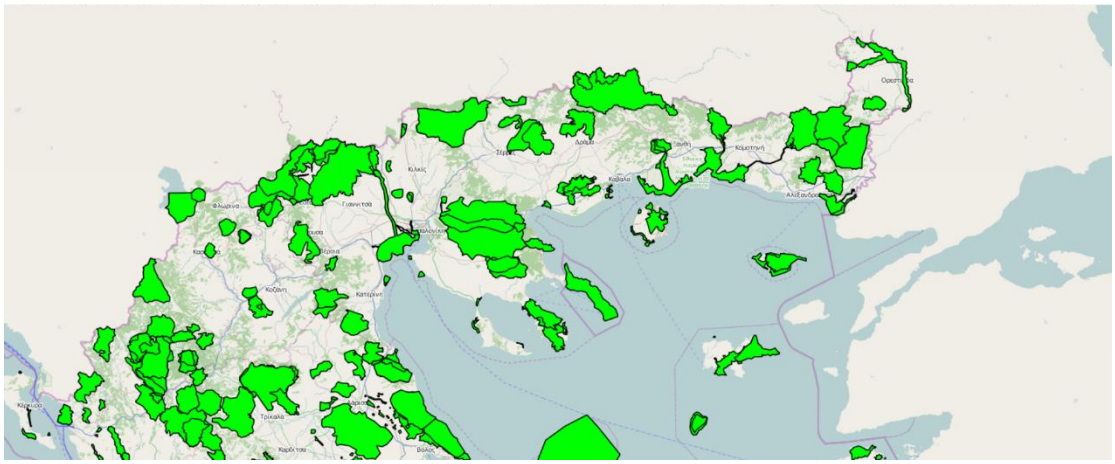
5.2 Natura areas

Natura 2000 designed by the EU to protect threatened habitats and species. It is the largest coordinated network of protected areas in the world, while in Greece there are 443 zones protected from Natura that cover 19% of the country (geogreece,2016-2020[59]), 65 of them being a part of central Macedonia and 29 in eastern Macedonia and Thrace.

All the members of Natura 2000 are obligate to respect the environment and make regulations when some activity is disturbing a species or the habitats. This way they ensure a long-term future for the people who live in the areas and rely on agricultural activities too.

In the map below, we can see all the Natura areas existing in Central Macedonia and Eastern Macedonia and Thrace.

[58] Piraeus Bank, *Biological Farming,* 2019,Dr Dagkalidis Athanasios
[59] Geogreece, 2016-2020, Manolis Papathanassiou,*Natura list*<https://www.geogreece.gr/natura-list.php>



Map from GEODATA[60]

In Eastern Macedonia and Thrace, there are several valuable areas for the whole European ecosystem that are Natura 2000 sites. In Eastern Macedonia there is Xanthi, ,Mount Chaidou-Koula and its surrounding peaks, the straits of the Nestos River and its forest. This forest contains a high importance aquatic ecosystem. The top of Mount Falakro, which is close to Drama is a Natura area and is being protected for its botanical and climatic conditions. There are many rare species such as herbaceous plants, invertebrates and birds..The Dadia Forest,which is close to the Evros Mountain owns 36 of Europe's 38 species of predatory bird.[61]

In Central Macedonia, some of the protected areas among many others are the lagoon of Angelochori, Delta Axiou river, Lake Koronia in Thessaloniki, mountain Cholomontas and Akrotirio Pyrgos in Halkidiki.[62]

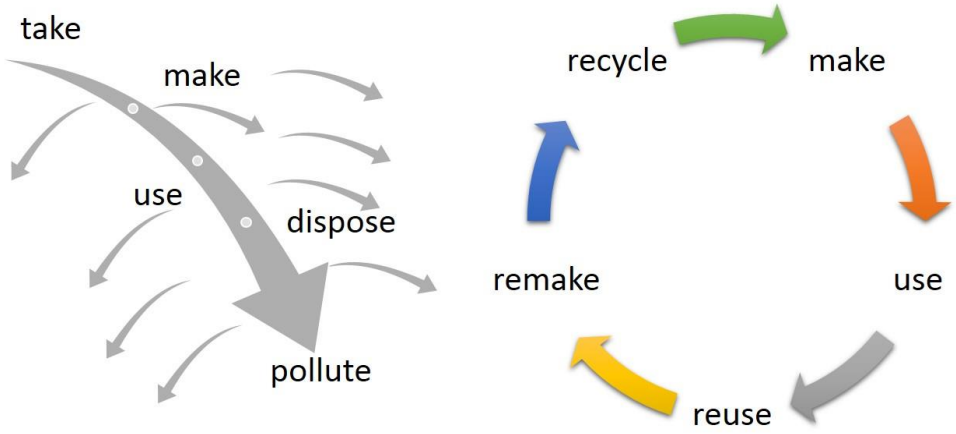
5.3 Circular Economy

In the communication form from the European Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions, we can see an action plan towards a new circular economy.

The steps of "take-make-dispose" describe a Linear Economy. After the transformation of raw materials into products, the waste materials are discarded. This has proven to be unsustainable for both the recourses and the environmental impact. (IGI Global[63],2020)

[60] GEODATA,< http://geodata.gov.gr/maps/?locale=el>
[61] Greece.ru, *Eastern Macedonia and Thrace*
https://www.greece.ru/en/region/eastern-macedonia-and-thrace/
[62] geogreece, Manolis Papathanassiou ,*natura list*,<https://www.geogreece.gr/natura-list_en.php>
[63] IGI GLOBAL,2020 <https://www.igi-global.com/dictionary/linear-economy/75076>

On the other hand, in a Circular Economy the products and services manufactured in ways that can be reused or destroyed naturally. The materials used are non-toxic so the value will maintained and the products can be recycled.



CC 3.0 Catherine Weetman 2016

Linear versus Circular economy

The EU commission aiming in making products for a circular economy is inviting all EU institutions and bodies to follow its initiative for a sustainable action plan.

The action plan covers several environmental aspects and opens the way of regulation. The parts that concern us are:

Sustainable products:

- Making product's ability to last, be reused and upgraded and fighting the hazardous chemicals that are used in products, increasing the energy and resource efficiency.
- Increasing recycled content in products, while ensuring their performance and safety
- Enabling remanufacturing and high-quality recycling
- Reducing carbon and environmental footprints
- Restricting single-use and countering premature obsolescence
- Introducing a ban on the destruction of unsold durable goods
- Incentivizing product-as-a-service or other models where producers keep the ownership of the product or the responsibility for its performance throughout its lifecycle
- Mobilizing the potential of digitalization of product information, including solutions such as digital passports, tagging and watermarks

- Rewarding products based on their different sustainability performance, including by linking high performance levels to incentives

Circularity in production processes:

- Create opportunities for circularity promotion in industrial activities according with the review of the Industrial Emissions Directive, including the integration of circular economy practices in upcoming Best Available Techniques reference documents
- Creating a system of reports and certification that will be led by the industry and will promote industrial symbiosis
- Implementing the Bioeconomy Action Plan that promotes the circular sector and sustainability
- Establishing the proper technology that will trace, map and track the resource
- Encourage the use of green technology by adopting a system of solid verification by registering the EU Environmental Technology Verification scheme as an EU certification mark
- The new SME Strategy will promote circular cooperation in the SMEs building on training, advice under the Enterprise Europe Network on cluster collaboration, and on knowledge transfer via the European Resource Efficiency Knowledge Centre

Plastics:

- According to the European Chemicals Agency the intentionally added micro plastics and tackling pellets should be restricted
- Create the right standards, labels and certificates to take legal measures in order to identify the micro plastics at every stage of the products life
- Creating new methods for measuring unwanted released micro plastics, especially from tires and textiles, and bring compatible data on micro plastics concentrations in seawater
- Create more scientific knowledge related to the risk and occurrence of micro plastics in drinking water, eating and the environment

Food, water and nutrients:

- reduction of food waste
- making sustainable food consumption and distribution
- Using recycling products in food services

Enhancing circularity in a toxic-free environment:

- Create a friendly environment for new solutions for high-quality activities and eliminate contaminants from waste, including those that came from accidents
- Create new methods that will reduce the dangerous substances for the environment or humans in recycled materials
- Work closely with the industry to create new systems that will identify and manage information regarding hazardous substances, especially those creating chronic effects , and substances posing technical problems for recovery operations present along supply chains, and identify those substances in waste, along with measures matching the sustainable products policy framework and with the ECHA Database on articles containing substances of very high concern
- Suggest the revise of the annexes to the Regulation on Persistent Organic Pollutants, in order to be consistent with scientific and technical progress and the international policies under the Stockholm Convention
- Create better organization systems for hazardous waste in order to preserve clean recycling streams, including lining with the classification of chemical substances and mixtures if it is necessary

Create a well-functioning EU market for secondary raw materials:

- Develop EU criteria for waste materials that will create after monitoring the countries adaptation to the existing and new rules and funding more cross-border initiatives for cooperation to harmonize national end-of-waste and by-product criteria
- strengthen the standardization based on the valuation of existing standardization at national, European and international levels
- shape the appropriate timing for the restrictions on the use of substances of very high concern in articles for cases where the use of the substance is subject to an authorization requirement, while continuing to improve implementation at borders
- Create a market observatory for key secondary materials[64]

In Greece, a National Action plan on Circular Economy started in 2018. The Governmental Economic Policy Council created a strategy towards a circular economy, focusing in the areas of production, consumption, waste management, secondary raw materials, innovation and investments. The first convention for the circular economy took place in 2019 in Athens, organized by the Ministry of Environment and Energy along with the Economic and Social Council of Greece (OKE) where they discussed about the Good Practices that must be implemented. Their

[64]Europa,2020, *A new Circular Economy Action Plan,* European Commission < https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN>

priorities where to lift the barriers through more than 10 regulatory and legislative interventions, to fund demonstration projects and improve the governance structure by setting up an executive to monitor the progress.[65]

The National Documentation Centre, as the coordinator of Enterprise Europe Network-Hellas (EEN-Hellas), is supporting the Greek companies to turn to solutions that are circular, inform them about relevant funds and carrying out European projects such as Beshared[66] and Empowa[67] [68]

5.4 Agenda 2030

In June 2012, during the Conference on Sustainable Development, governments decided to develop global Sustainable Development Goals, adding to the Millennium Development Goals issues such as natural resources management, sustainable consumption and production, effective institutions, good governance, the rule of law and peaceful societies. [69]

The 2030 Agenda consists of 4 parts:

- A political Declaration
- a set of 17 sustainable Development Goals and 169 targets
- Means of Implementation

[65] Europa, 2018, *Circular economy*<https://circulareconomy.europa.eu/platform/en/strategies/national-action-plan-circular-economy>
[66] https://beshared.eu
[67] (http://empowa.zenit.de)
[68] Ekt.gr, 2019, Circular economy: a new economic model for sustainable development<https://www.ekt.gr/el/magazines/features/23377>
[69] Un.org, *The Sustainable Development Agenda*<https://www.un.org/sustainabledevelopment/development-agenda/>

- A framework for follow up and review of the Agenda.

It is clear that the agricultural sector has a key role to play in the implementation of these goals for sustainable development.

The 17 goals are:

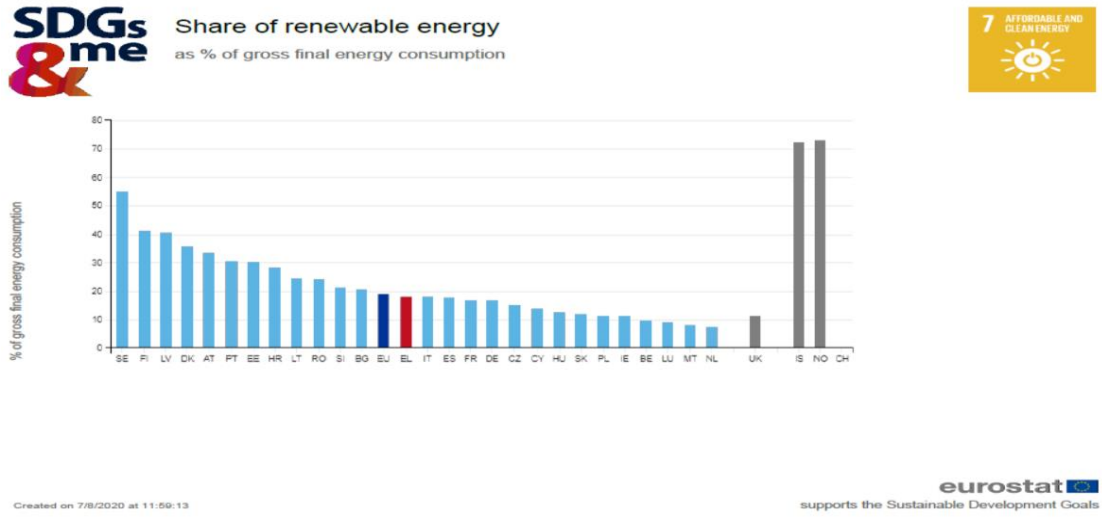
1. No poverty- Almost 80% of poor people live in rural areas
2. Zero hunger- We produce food for everyone, yet almost 800 million go hungry
3. Good health and well-being- Good health starts with nutrition
4. Quality education- Nutritious food is critical to learning
5. Gender equality- Women produce 1/2 the world's food but have much less access to land
6. Clean water and sanitation- Sustainable agriculture has the potential to address water scarcity
7. Affordable and clean energy- Modern food systems are heavily dependent on fossil fuels
8. Decent work and economic growth- Agricultural growth in low-income economies can reduce poverty by half
9. Industry, innovation and infrastructure- in developing countries Agriculture accounts for 1/4 of GDP
10. Reduced inequalities- Land reforms can give fairer access to rural land
11. Sustainable cities and communities- Rural investment can deter unmanageable urbanization
12. Responsible consumption and production- 1/3 of the food we produce is lost or wasted
13. Climate action- Agriculture is key in responding to climate change
14. Life below water- Fish gives 3 billion people 20% of daily animal protein
15. Life on land- Forests contain over 80% of the world's terrestrial biodiversity
16. Peace, justice and strong institutions- Ending hunger can contribute greatly to peace and stability

17. Partnership for the goals- Partnerships help raise the voice of the hungry

There are 5 key principles for these targets:

1. Improving efficiency in the use of resources
2. Conserving, protecting and enhancing natural ecosystems
3. Protecting and improving rural livelihoods and social well-being
4. Enhancing the resilience of people, communities and ecosystems
5. Promoting good governance of both natural and human systems[70]

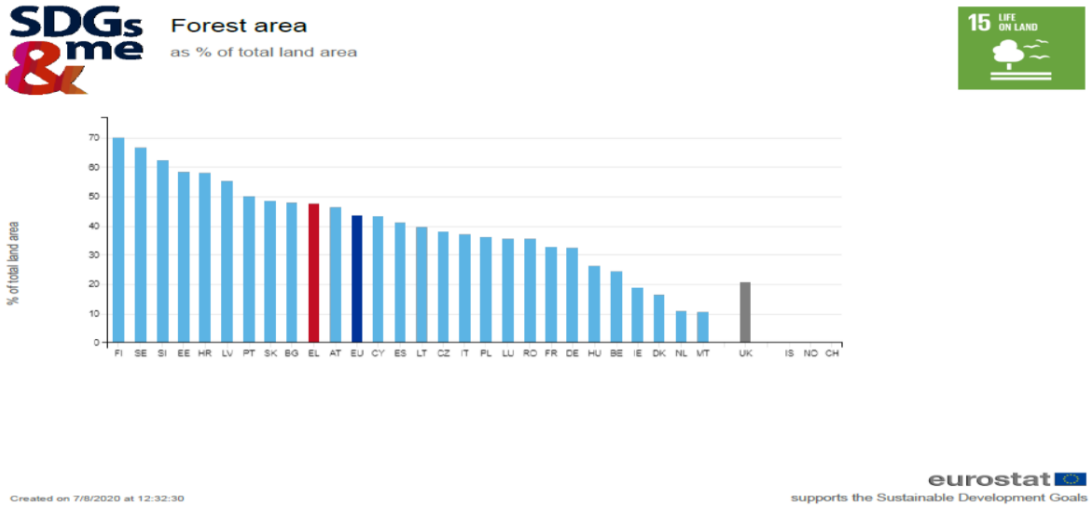
A monitor report made to overview the progress that each country in the EU is making towards these goals. Below there the statistical analysis made regarding the fields that are affected more by agricultural activities. The analysis show the comparison between the countries of EU and we can see Greece's performance in the red line.[71]



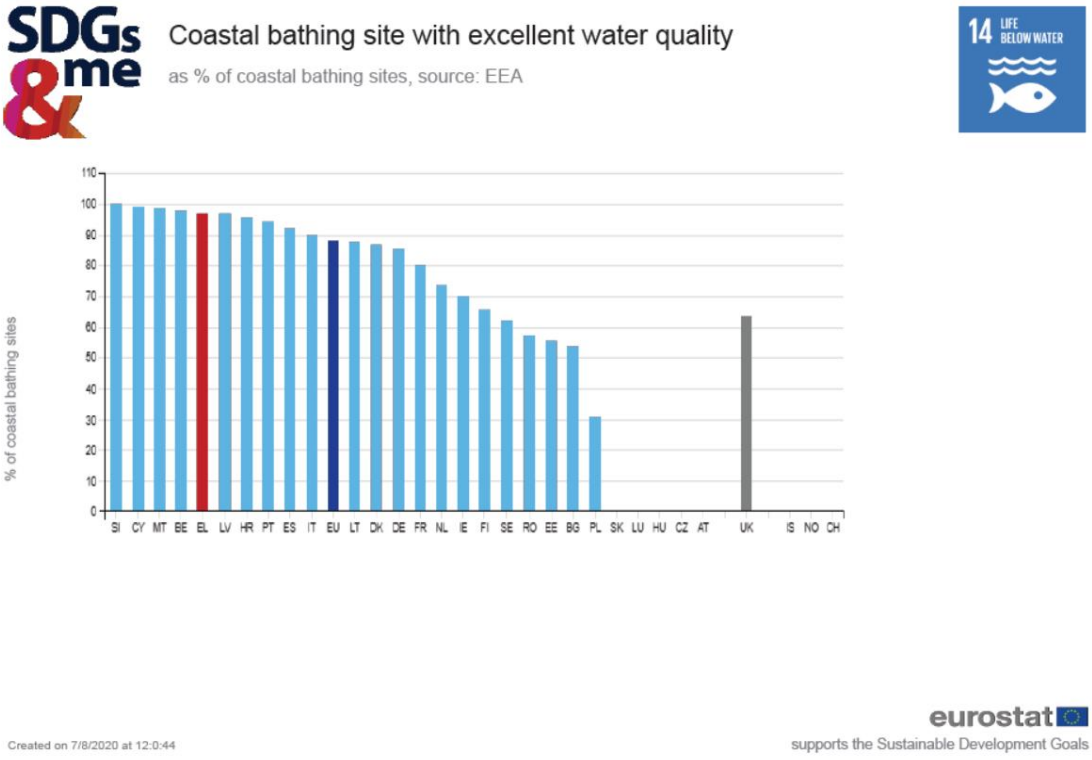
In Greece in 2018, the final energy consumption in households per capita was 365 kg of oil equivalent.

[70] Fao,2020,*Key to achieving the 2030 Agenda for Sustainable Development,* <https://sustainabledevelopment.un.org/content/documents/2313foodandagriculture.pdf>

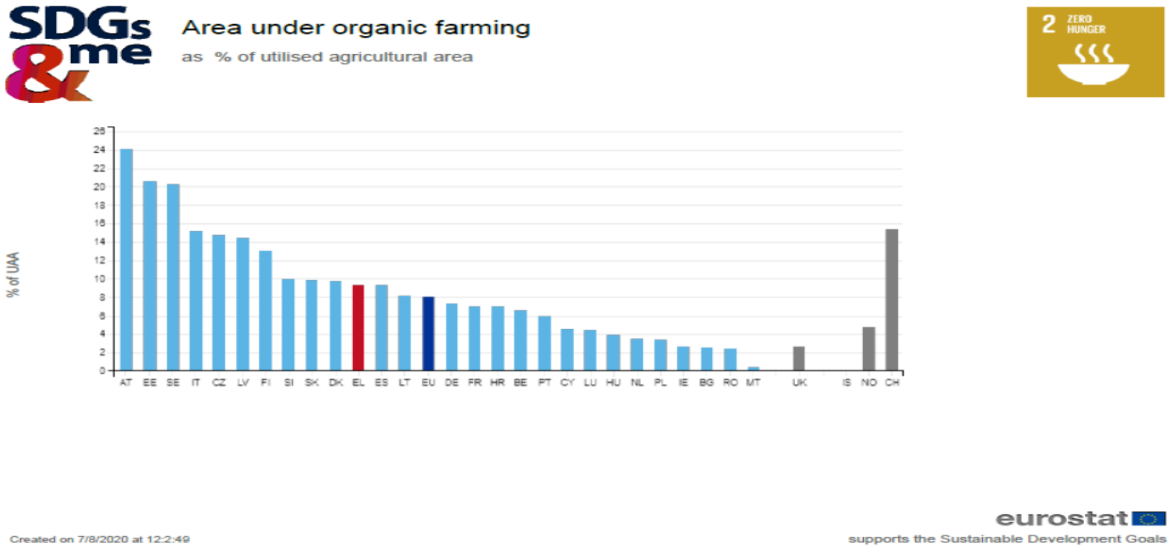
[71] Europa,<https://ec.europa.eu/eurostat/cache/digpub/sdgs/index.html?country=EL&goal=SDG9&ind=1&chart=bar>



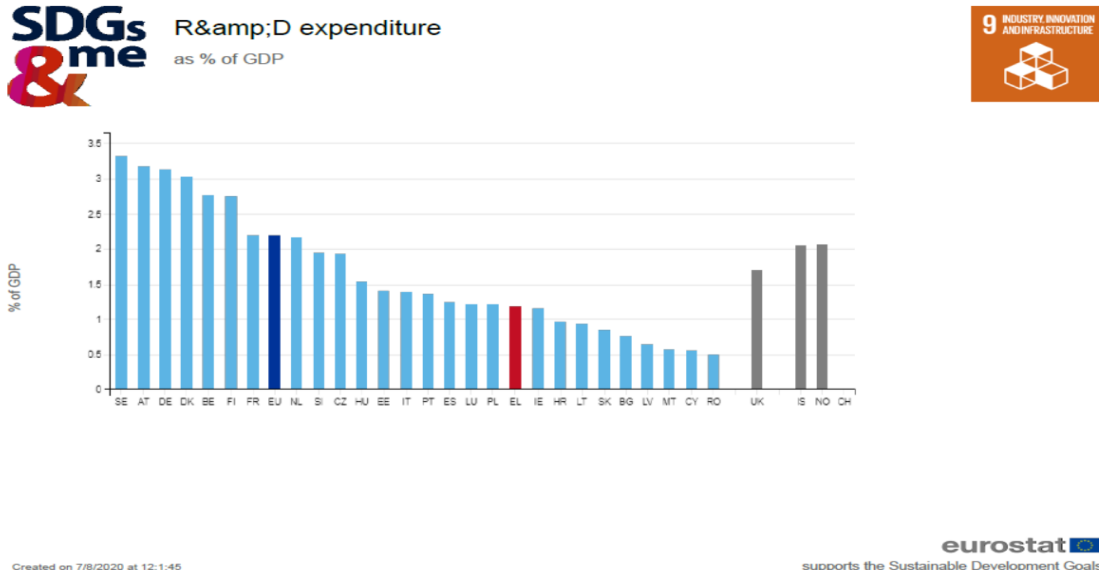
Life on land refers to all sustainably manage forests and halt deforestation, combat desertification, restore degraded land and soil, halt biodiversity loss and protect threatened species. 47.4% of the total land area in Greece is considered safe and sustainable.



In the chart above we see that Greece's oceans are in a very good level with 97.12% of coastal bathing sites being well protected and sustainable.

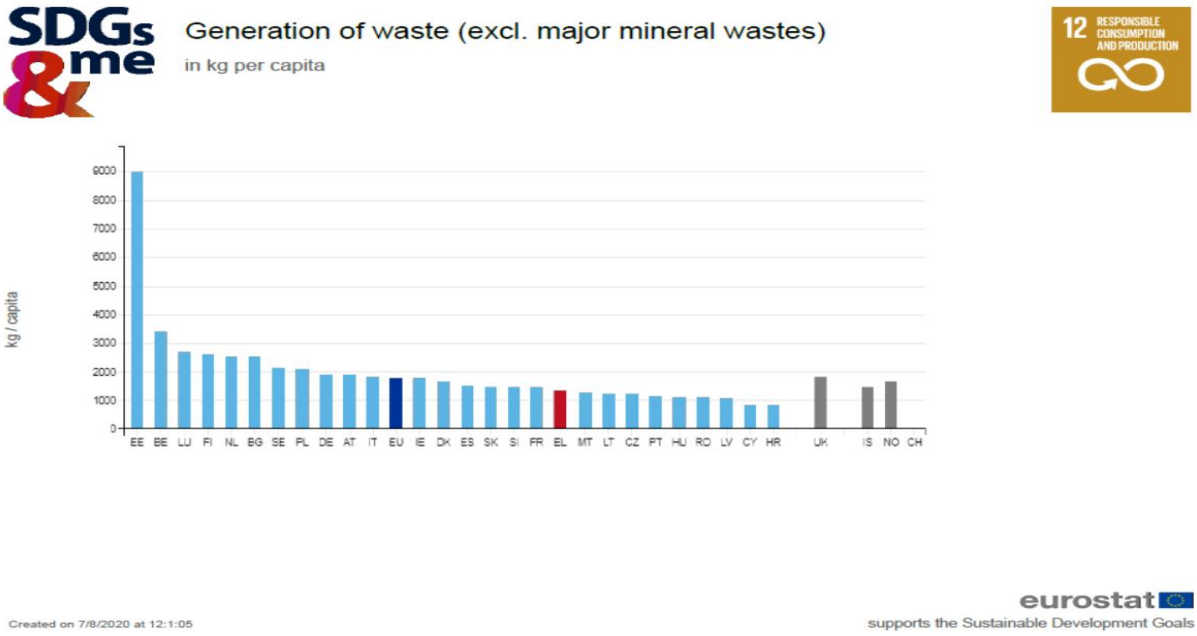


Only the 9.32% of the utilized agricultural area is under organic farming. Besides being an average country in the graph, we see that Greece's performance needs to improve since there is a big gap between the countries that came first.

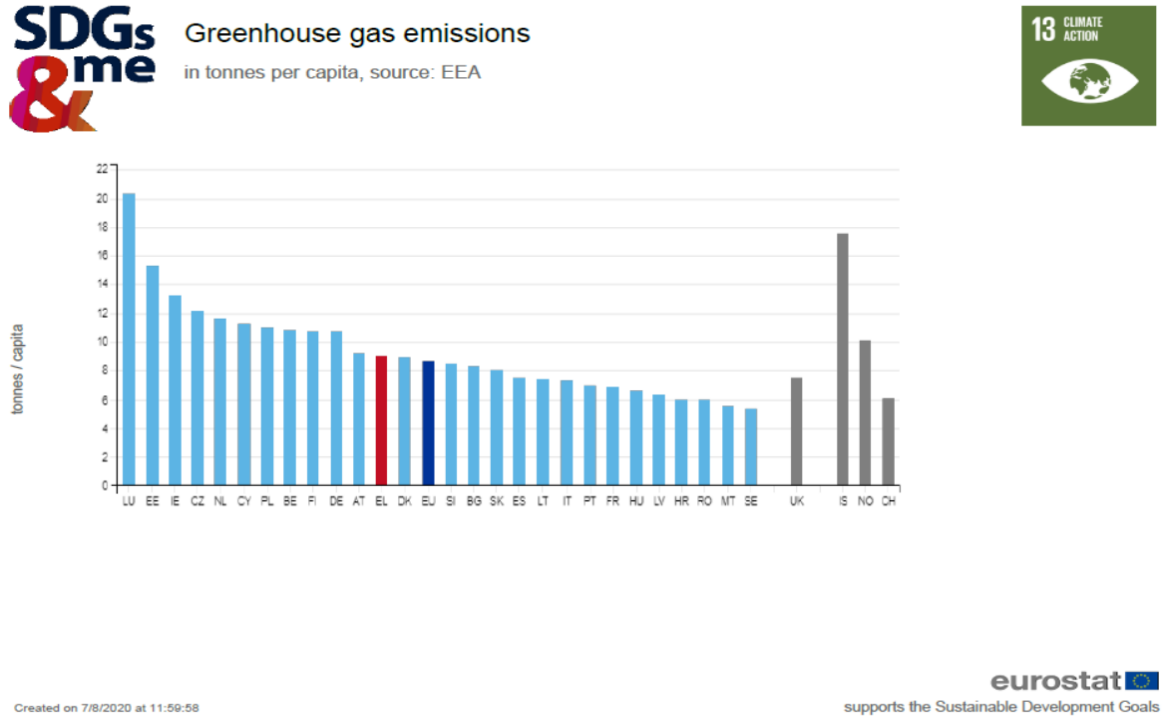


Measuring the science and thechnology personnel and other factors Greece's expenditures in Research and Development in 2018, was only 1.18% of the total GDP, making the industries some of the least developed and innovative among other EU countries.[72]

[72] Europa,2020, *Sustainable development in the European Union Overview of progress towards the SDGs in an EU context,* <https://ec.europa.eu/eurostat/documents/4031688/11010788/KS-01-20-192-EN-N.pdf/ae63aff0-a6f3-1d47-da83-c6886b9daaab>



Based on advanced technological capacity, resource efficiency and reduced global waste, Greece's performance in generating waste is low, with only 1328 kg per capita.



Measuring the intensity of energy consumption and other factors that influence climate change, Greece produced in 2018, 9 tonnes of Greenhouse gas emissions per capita, having an average performance among European countries.

5.5 Vegan Agriculture

Veganism has become extremely mainstream in the last decade and is expected to grow more in the future. It is the practice of abstinence from meat and any animal product. Several categories distinguish the vegans, such as vegetarians and ethical vegan.

Vegan agriculture means plant-based organic farming with no use of animal products. It emphasizes on the promotion of biodiversity (systematic mixed cultivation, wide crop rotations) healthy soil life, the closure of organic cycles, on systematic humus build-up and targets on sustainable development.

The many benefits that has to offer are about the major contribution to climate change, the preservation of natural soil fertility and improvement in groundwater quality by avoiding all use of chemicals. In addition, no animal has to go through slaughter or any other exploitation, and a friendly environment is cultivated for billions of microorganisms in the soil and other wild animals on land. Moreover, with the absence of meat the risk of any contamination by drug residues and by pathogenic germs is reduced. Thus, a massive contribution to global food security is implemented, by making better use of the land through the production of food only for human consumption and establishing a natural ecological balance. Finally yet importantly, vegan agriculture can give the opportunity to developing countries and smallholders to become economically independent as it provides farming methods though the use of locally available resources.

In Greece, there is the Panhellenic Biocyclic-Vegan Network that consists of about 80 certified small-scale family driven organic operations. They receive the technical support by the Biocyclic Park in Kalamata. These operations are committed to organic farming according to IFOAM Biocyclic-Vegan Standard, an internationally applicable standard that can be used for certification.[73]

5.6 Water Management

By 2030, the demand for water will exceed by 40% the available quantity.By 2050, our planet will host more than 9 billion people. The majority of them will live in large urban centers and during that time, farmers should double their food production using half of the water they use today. In order to achieve that, the limited water resourced should be exploited in a sustainable way.

The "water footprint" of the country is the second largest internationally and twice as it is the global average. In Greece, on a total of 38.54 million acres of cultivated area, they are currently irrigated 14.22 million acres.

[73]Biocyclin-network,2020,*organic/biocyclic-vegan fruits & vegetables from Greece and Cyprus* < http://httpwww.biocyclic-network.net/>

In Greece the main consumer of water is agriculture. For irrigation purposes, 87% of the total water consumption is used (Papazafiriou et al., 2000). The cultivated land covers 3,470,000 ha from which 1,430,000 ha are irrigated (National Statistical Service of Greece).

Moreover, the largest consumer of the used water, agriculture, consumes it in the dry season creating an uneven distribution of demand, since at the same time and especially in July and August, the water consumption doubles due to tourism.

In order to make better use of water recourses it is required a good planning and better infrastructures, such as:

- Development of improved varieties of crops suitable for dry crops, drought tolerant and disease resistant.
- Water-related aspects of improving the viability of irrigated crops.
- Crop development with more efficient water use and economic optimization efficiency of water used in irrigation.
- Priority in the development of new irrigation projects and in maintenance and upgrading.
- Existing networks, in combination with the improvement of irrigation methods, which leads to a reduction in water losses.
- Education and continuous training of farmers in new technologies, in the correct use and in dealing with emergencies, so that they become aware of the long-term effects of the reckless and wasteful use of water resources, but also from pollution, which is largely due to agriculture.

Moreover, the government should adopt the following methods:

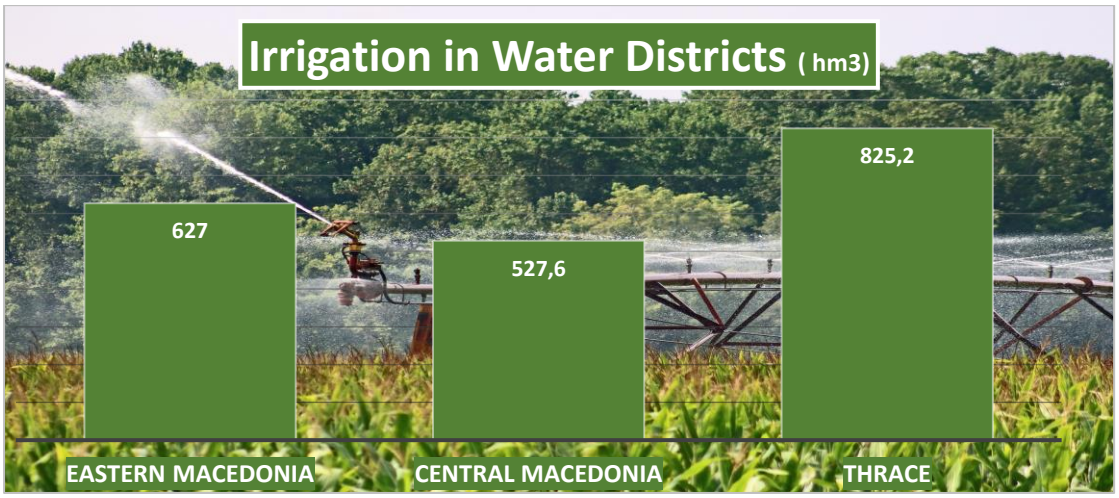
- Water pricing
- Restriction of use
- Reduction of irrigation
- Obligation of water per plot
- Violation control
- Connection of water footprint with the new CAP
- Reduction of subsidies

In order to increase the water sources we could create dams, artificial enrichment of aquifers, better water transport through river diversion and desalination processes.

According to the research made by the Committee of the study about the impact of the climate change [74], in the water district of Central Macedonia there was no shortage of water for irrigation purposes. On the other hand, in the districts of Eastern

[74]Bank of Greece, 2011,The Economic Impact Assesment of Climate Change in the Water Reserves, Michael S, Skourtos, Athanasios Maxleras, Areti Kontogianni Bank of Greece, 2011,Michael Skourtos, Athanasios Maxleras, Areti Kontogianni

Macedonia there are deficiencies with the irrigation needs in some areas, especially in the irrigation networks of areas in Drama and Tenagi of Philippi in Kavala, where it reaches 25% of demand. In addition, in the water district of Thrace there are also shortages of irrigation needs found in the networks of Chrysoupoli, Arda and Niochori.



Data from Ministry of Environment and Energy (2008)

It is critical therefore that the agricultural sector will seek for more efficient and sustainable ways in order to save water. Some practices that could be adopted are:

- Application of more efficient irrigation systems, such as drip irrigation or underground irrigation. Water savings can reach even 65% .At the same time, energy is saved since they operate with pressure ranging from 1.02 atm to 3.4 atm.
- Reduce weed growth and therefore reduce weed control costs.
- Make use of organic fertilizer. Organic matter in the soil improves the structure soil and increases its water capacity.
- The use of additional components in the electric motors of the pumps.

5.7 Tourism

A different sector that has a great power to contribute in the environmental conservation and protection, if incorporating with the principles and practices of sustainable consumption, is tourism.

Tourism gives the opportunity to raise the profile and promote the area visited. Many alternative forms of tourism benefit and regenerate the environment and at the same time provide the incentive for a place to preserve. Because of the attractive sites that considered valuable and the need to maintain the nature-loving tourists, people are more motivated to preserve and protect the wildlife and the landscape. On the other hand, over-tourism leads to a number of serious problems, such as waste disposal,

deforestation for land clearing and several activities, that cause a physical impact to the ecosystems.

There are some types of tourism we can promote and benefit from the outcome. They lay the foundation for sustainable development and combine with agriculture:

5.7.1 Agrotourism

A niche form of tourism, which relates with small communities and active participation in farm-work or staying in farms. It provides educational experience, recreation and raises awareness and the visitor has the opportunity to engage with farm-life. Besides that, agrotourism may include garden tours, hayrides, agricultural museums, living history farms, demonstration farms, petting and feeding zoos, etc.[75]

5.7.2 Ecotourism

With a socially responsible character and the purpose to educate the traveler, ecotourism will provide the community with funds and bring closer different cultures always with the element of respect. Some examples of eco-touristic activities are sailing, rappelling, cycling, swimming, bird watching, rock climbing, health tourism, etc.

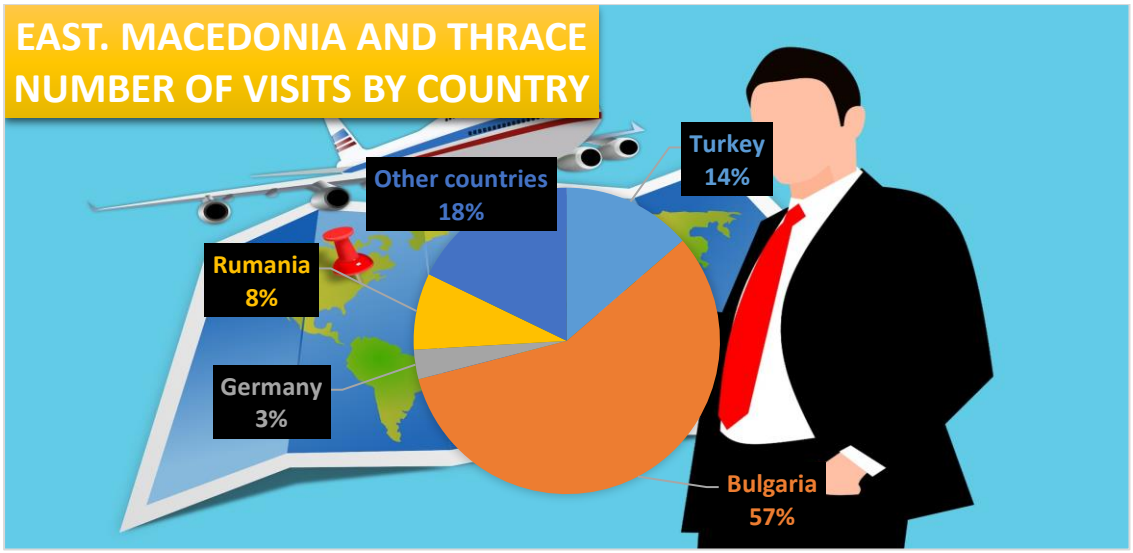
5.7.3 Enotourism/ Wine tourism

A new form of tourism that refers to tasting and purchasing wine and can combine with visits on archeological sites and local gastronomy. In Macedonia, wine tourism is well organized with many wineries open to visitors' every day.

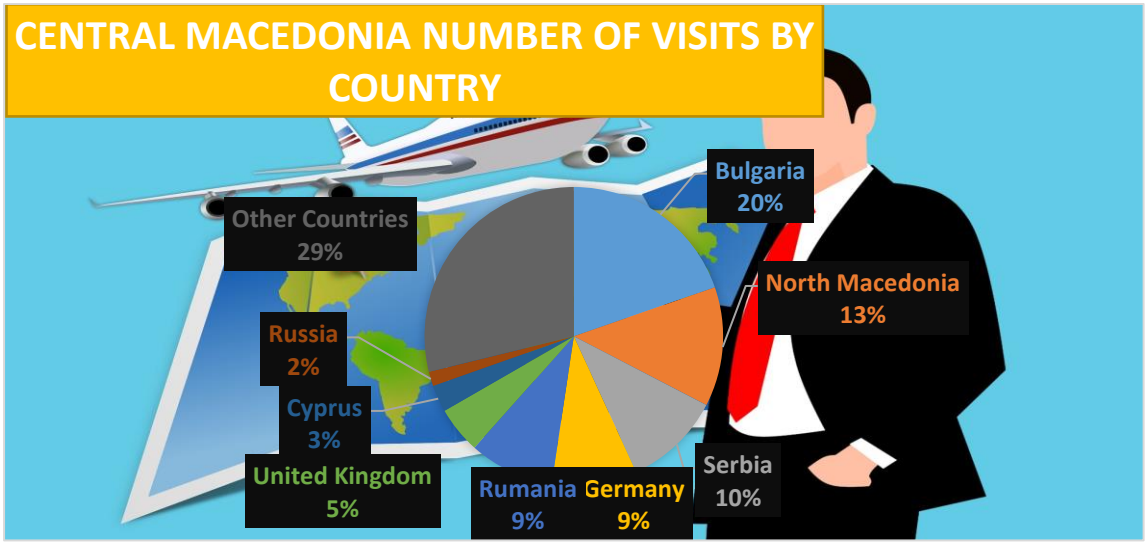
Macedonia and Thrace have a lot to offer in this area and more practices need to be implemented in order to exploit fully the advantages of the regions. The geomorphological characteristics create a differing environment of high mountains, rivers and sea. Lake Kerkini, Nestos, the natural springs, the beautiful island of Thasos, are only a few of the reasons why the tourists respect the environment and enjoy the vacations in the regions[76] .

Due to their close location, the travel between Greece and Bulgaria is easy and there are many means of transport that are convenient and economic, like plane, bus, train or car. In the charts below, we see the importance for the regional economy of the Bulgarian tourists and their preference in the area due to the close location.

[75] Nationallaglawcenter, *Agritourism-an Overview*<https://nationalaglawcenter.org/overview/agritourism/>
[76]Ecotourism-greece< https://ecotourism-greece.com/home/>



Data from INSETE,2019, *regional statistics*



Data from INSETE,2019, *regional statistics*[77]

In both regions, the majority of the tourists are Bulgarian, with 57% of the total in Eastern Macedonia and Thrace, and 20% of the total for Central Macedonia. The data underline the importance of the cross-border area for the economy in the regions and the possibility to develop a plan to sustain and increase the tourism flow between the two countries. To create a strategy we need a strategic market plan[78] that would promote these aspects of both counties and advertise them in the right audience that would boost the economy of the local communities and help to sustain development goals.

[77] INSETE,2019, regional statistics< https://insete.gr/statistika-stoixeia-perifereion/>
[78] Nothern Territory Tourism NT, 2020, *Develop your Marketing Plan*<https://www.tourismnt.com.au/industry-toolkit/start-your-business/develop-your-marketing-plan>

5.7.4 Destination-marketing plan:

STEP 1

At first, we need to evaluate the strong and the weak spots of the areas. Doing so, we will be able to detect the opportunities and the threats that are facing. To achieve this we will perform a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis that is associated with the agricultural industry.[79]

STRENGTHS

- Strong brand name
- Transport infrastructure
- Quality tourism experiences
- Hospitality
- Excellent quality of local products
- Traditional cuisine
- A variety of hotels
- Historical and archaeological sites
- Natural areas
- Low rates of coronavirus cases

WEAKNESSES

- Package tours(all inclusive)
- Weak management in the agricultural communities
- Weak marketing and advertising in the agricultural communities
- Dependence upon tour operators
- Seasonality
- High cost of living

OPPORTUNITIES

- A developing investment-friendly environment
- A common target for Greece to become an all-year-round destination
- Sustainable development through quality tourism experiences
- Proper use of the social media to promote local agriculture
- Exploiting alternative forms of energy (wind farms etc.)
- EU support
- Low cost transportation

[79]SCRIBD,2009,*SWOT Greece Tourism Report*< https://www.scribd.com/document/256985306/SWOT-Greece-Tourism-Report-pdf>

Threats

- Environmental degradation
- Political crises
- The pandemic of Coronavirus
- Climate threat
- Lack of land workers

Step 2

The second step is to set the objectives and achievable goals by using the SMART [80](Specific, Measurable, Achievable, Relevant, Timely) method.

Specific

Our goal is to develop a network that will bring young tourists from Bulgaria to Thrace and central and eastern Macedonia, introduce them to several aspects of the agricultural life, educate them about the environment and the best practices to protect it. During these trips, the travelers will have the chance to acknowledge the fascinating aspects of the agricultural life and the business opportunities.

Measurable

The target is 15% increase in-group travels in the agricultural sector, for the next 5 years.

Achievable

To succeed we need to cooperate and negotiate with several bodies that will organize these trips. We will also make a campaign to draw attention and raise awareness.

Relevant

Our long-term objective is sustainable development and all our actions will align with our values. We will make sure that all the accommodations and the relevant adventures are using eco-friendly policies.

Timely

The deadline of our project will be in 2026. We may need to adjust but we must keep in mind the timeframe.

Step 3

[80]Hoteltechreport,2020, *3 example of smart goals*< https://hoteltechreport.com/news/smart-goals>

Define the action plans, the budget, and assign a person in charge to monitor the expenses.
For example, how we are going to approach young costumers and in what social media we will make a campaign. Facebook, Instagram and Twitter are extremely popular among young people and have a user-friendly platform for creating campaigns. To come up with the budget we need to find the appropriate investors and companies that we will negotiate and work towards a mutual goal.

STEP 4

Set an evaluation system to monitor the effectiveness of your plan. All the parties involved needs to communicate once a month and the team that is responsible for the project needs to make the right adjustments when necessary.

STEP 5

Make a summary of the plan that will remind the key-points and keep the goals on track.

6. Environmental Degradation

Environmental degradation comes in many ways and have a massive effect in the ecosystem. Agriculture's importance for the environment needs to be recognized and supported, as it can be the cause, through pollution, overgrazing, and release of greenhouse gases, and the victim at the same time, leading to many disasters such as floods and climate change.

During the past 10 years, growing awareness of how environmental degradation affect human health and the environment, a huge controversy has led to calls for increased government regulation of the agricultural industry.

Some of the human activities in the primary sector that have a bad impact in the ecosystem and we should address immediately are[81]:

1. Deforestation- More than 40% of earth's surface now supports agriculture, and a big part of these lands was formerly covered by forests (Food and Agriculture Organization). This causes the global temperature to increase and has a serious effect to the degradation of wildlife areas, which are made harsh for the survival of animal and plant species.
2. Plastic materials that lasts for a short duration and can be easily replaced by Bio-based plastics.
3. Black carbon, which is responsible for many diseases and contributes to climate change.
4. Polluted water- The extensive use of fertilizer and the injection of phosphorous and nitrogen nutrients into natural soil and water systems changed the natural balance and rapidly expanded aquatic dead zones.
5. Soil contamination, where all the fertilizers and pesticides applied in ground, are later transported into local streams rives, and groundwater.

According to a case study for Greece[82] some typical problems met all over Greece causing soil degradation are:

- Soil erosion, which leads to increased pollution and sedimentation in streams and rivers, clogging these waterways and causing declines in fish and other

[81] Nations Encyclopedia 2009, *Greece-environment*, <https://www.nationsencyclopedia.com/Europe/Greece-ENVIRONMENT.html>
[82] European Commission, *Case Study – Greece,Sustainable Agriculture and Soil Conservation(SoCo Project),* 2009,Nick Barbayiannis, Kyriakos Panagiotopoulos,Demetris Psaltopoulos, Dimitris Skuras

species. Degraded lands are also often less able to hold onto water, which can worsen flooding.

- Decline in soil organic matter, which is caused by the reduced presence of decaying organisms, or an increased rate of decay, because of changes in natural or anthropogenic factors.
- Soil compaction, which occurs when soil particles are pressed together, reducing pore space between them causing an increase in the likelihood of aeration-related problems.
- Water salinization, which is accompanied by salinization of soils. This makes very hard to grow any crops because to irrigate with salt water often destroys crops and fertility of soils.

6.1 Soil erosion

Soil erosion presents a medium risk due to the hilly landscape and the minimum or totally absent soil cover in spring and autumn during storm events. Soil loss is estimated to 1-2 t/ha/year and to 2-5 t/ha/year for the hilly areas. Decline in soil organic matter presents also a soil threat since farmers do not implement practices that preserve soil organic matter (until recently straw burning was a common practice because incorporation in the dry soil in July was very difficult). Furthermore, soil compaction may become a major problem due to improper selection of heavy agricultural machinery and increasing use of heavy machinery at harvest. Soil erosion is due to the hilly landscape in combination with the lack or minimum soil cover in spring and autumn, the major soil threat and possibly the most difficult to combat due to the small acreage of the holdings in the area since farmers follow different and sometimes contrasting cultivation practices. Soil organic matter is the second major soil threat since farmers do not implement practices that preserve soil organic matter. Until recently, straw burning was a common practice because incorporation of crop residues in the dry soil in July was considered very difficult. Soil compaction will probably emerge as a serious problem due to the increasing use of heavy machinery (most farmers use far larger tractors than required for the size of their holdings and the soil type they have to cultivate). (JRC European Commission, Case Study Greece, 2009)

6.2 Energy

In the field of energy, Greece is facing high dependence issues and high environmental pollution. We consume more energy as the time passes and we keep importing more and more energy products to cover our need because our energy production in not enough to cover regional needs, thus becoming even more dependent. Moreover, as the country's energy production is characterized by high dependence in the energy

mix of the conventional forms of energy (lignite, gas oil, natural gas, environmental degradation is of high importance. The energy sector is the main cause for the greenhouse gases, with the sector of electricity production to be first, cause of the leading position of the lignite in the energy mix. Burning lignite for electricity generation has a devastating effect on the environment and public health. It consumes huge amounts of water, emits pollutants such as sulfur dioxide, nitrogen oxides, microparticles, heavy metals, large amounts of carbon dioxide, while the economic cost of exceeding European limits is estimated at many millions of euros.

6.3 Water consumption

Agriculture in Greece consume extremely large portion of water, about (86% according with studies of IGME), contributing to the rise of new issues. An example of the causes is the lake Koronia, in Thessaloniki, which during the 50s, was among the lakes of Greece with the biggest fish production. The lake used to extend over 45 km² and in 30 years, the depth dropped from five meters to only one. Since then, it has shrunk to about one third of its original area, and its depth has decreased to less than 1 meter. In spite of being a wetland of international importance, the lake suffers from pollution and intensive agriculture. From the 80's the lake has received a major hit of degradation from humanity, mostly from farmers that until today they use the water for their fields. Besides that, many factories emptied wastewater into the lake along with the neighboring town Lagadas that drops the wastewater there. The uncontrolled exploitation of the lake led its ecosystem to disappear[83].

Giannis Cholidis[84]

Thus a new policy must be implemented, concerning the pricing and the licenses, aiming in lower the over consumption of water. The absence of a water pricing policy

[83] The Guardian, *Lake Koroneia in northern Greece is dying,*2011
Alain Salles,<https://www.theguardian.com/environment/2011/feb/22/greece-lake-koroneia-shrinking-salles>

[84]Lake Koronia,2017.Giannis Cholidis<https://commons.wikimedia.org/wiki/File:%CE%9E%CE%B5%CF%81%CE%B1%CE%BC%CE%AD%CE%BD%CE%B7_%CE%9B%CE%AF%CE%BC%CE%BD%CE%B7_%CE%9A%CE%BF%CF%81%CF%8E%CE%BD%CE%B5%CE%B9%CE%B1.jpg>

is responsible for the creation of social costs. Beside the problems in the ecosystem, it will soon lead to agricultural effects, cause of quality degradation and lack of sources.

6.4 Urbanization

As mentioned in the third chapter, urbanization in Greece is a major issue and people prefer big urban cities to live, in order to find a job, have better education and entertainment or ever have better health care. The same goes for companies, which prefer to have their head offices in central areas to lower their expenses in transport, storage and communication. This rise in population leads to a rise in productivity potential in an economy (through the labor force) and in higher consumption and production levels. These new variables leave their impact to the environment, where the demand for natural sources is bigger and the levels of waste are beyond the environment's ability to absorb. Natural procedures are being disturbed with issues such as the road traffic, the lack of green and the structure density leading to environmental degradation. [85]

6.5 Genetic matter banks

Another issue for Greece is that of the lack of genetic matter banks that could contribute to food safety and production conservation. These type of banks preserve the genetic material, in this case the plant genetic resources, to ensure biodiversity and food safety. Beside the wealth in genetic matter, there are not enough funding for Greek banks although it has be proven that the economic gain is much higher than that of the conservation of genetic matter (Xepapadeas et al. 2012)

[85] TEI Kritis, 2013, *Regional development and the environment*, Andreas Anastasakis

7. The EMS application in the agricultural sector

The Environmental management system can help in making better use of agricultural science, knowledge and technology in order to reduce hunger and poverty, improve rural livelihoods and encourage sustainable development.

EMS is a set of processes and policies that every business should follow by tailoring them to their needs in order to be in line with the sustainable development.

The target is to reduce the environmental impact and thus gain a bigger market share, since the environmental awareness has increased in the latest years and will grow even more. Therefore, a framework is created for organizations to manage their environmental impact in a systematic way.

An EMS has the follow objectives:

1. Review the organization's environmental goals
2. Analyze its environmental impacts and legal requirements
3. Set environmental objectives and targets to reduce environmental impacts and comply with legal requirements
4. Establish programs to meet these objectives and targets
5. Monitor and measure the progress in achieving the objectives
6. Ensure employees' environmental awareness and competence
7. Review the progress of the EMS and make improvements

The advantages of adopting an EMS are:

- ✓ Cost savings by reducing the use of raw materials, energy and the production of waste.
- ✓ Ensuring legislative compliance by avoiding the possibility of being fine and publicly criticized.
- ✓ Anticipating future legislation and make appropriate planning and investment decisions.
- ✓ Reduced environmental risk, by adopting eco-friendly policies.
- ✓ Meeting supply chain demands, by using a variety of supply chain tools to collect data.
- ✓ Improved relations with regulators with less frequent site visits or reduced fees from environmental regulators.
- ✓ Improved public image, that will bring more market opportunities through advertising an environmentally aware operation

- ✓ Gaining certification of your EMS through ISO 14001, BS 8555 or EMAS can show credibility with customers and stakeholders.
- ✓ Employee enthusiasm by creating a culture and a common goal.

A basic EMS starts with identifying in which way the business interact with the environment. The people, the equipment and all the procedures and activities inside the company, needs to be analyzed and change if they have a negative impact on the environment. Thus, the company needs to set new objective targets and comply with legal requirements. The next step is to establish new programs in order to fulfil the objectives and then measure the progress made. The last step is to monitor these new procedures with a method of auditing the system, helping the management to review that requirements are met and make improvements if needed.

In all of these stages, the manager must ensure employees' environmental awareness and change the staff behavior in order to comply with the targets. Employees must be aware of the environmental legislation and laws that affect the business and realize the relation between the environment and financial sustainability. To achieve that, managers may organize environmental lectures, set up a "Sustainability Corner" on the company, environmental contribution awards and contests, or just have a talk about sustainability progress.

7.1 Quality Management

TQM stands for Total Quality Management. The first word(total) is used to show that all parties of interest, such as customers, employees and suppliers are a part of the management process. The second word (Quality) is used to underline the need for quality in all the processes of the organization, which are the basis for the quality of products. At last, the word Management shows the need to face quality improvement as a management task.[86]

Quality management Principles can be used in any organization to guide its improvement. The International Organization for Standardization(ISO) provide 7 principles[87], set as rules and beliefs, that show the right way of acting and can be used as basis to quality management. There is not a priority order and each organization must value its possibilities and the importance of each principle from time to time. The 7 principles are:

1. Customer focus
   In other words, to make use of this principle means to understand the customer's need and connect them with the organization's objective. Then

[86]Job Wizards ,2020<https://job-wizards.com/en/total-quality-management-for-excellent-companies/>
[87]iso.org,2015 <https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100080.pdf>

these new targets need to be communicated throughout the organization. Customer satisfaction needs to be measures and new actions to be implemented if needed.

This principle is underline the need to meet the customer's need and expectation in order to increase the customer value, the revenue and thus the market share, and grow the reputation of the organization.

2. Leadership

   In order to inspire people to create and sustain shared values, establish a culture of integrity, a true leader needs to communicate the organization's strategy in an encouraging way, to provide the appropriate training and authority and ensure that all leaders inside the organization are positive examples. That will help the organization to meet its goals and the people to deliver the desired results.

3. Engagement of people

   In order to help the people working in an organization to better understand the objectives and increase their motivation measures must be taken, such as proper communication and open discussions, recognition of people's contribution and right research of people's satisfaction.

4. Process approach

   The capabilities of the organization need to be understand and appropriate resource constraints must be determined prior to action. All the processes must be managed as a system that will achieve the objectives effectively and all risks that could have an impact to the outcome must be managed.

5. Improvement

   All workers need to be educated on how to apply basic tools and methodologies in order to increase the results. Improvement projects must be implemented throughout the organization and monitored. When improvement is achieved it needs to be recognized.

6. Evidence-based decision-making

   Data and information must be accurate and provided to the relevant people. Decisions must be taken based on evidence and experience.

7. Relationship management

   Among many benefits, to achieve a common understanding of the organization's goals all interested parties must be recognized and prioritized and relationships must be established. Information must be open for share and feedback should be provided to all parties.

7.2 Software modules for the environmental management system

Document control software: this software controls and manage the information in order to be viewed by the right person. All types of documents are distributed in an organized way.

Equipment maintenance softwareto: this is a formal method to organize and manage the way the equipment is used, maintained and replaced and ensure there is a person responsible that has the right knowledge to control them.

Accident & incident management software: The software records all the accidents and incidents and their causes and helps you prevent it from happening again.

Risk management software: Risk Manager is a framework for making risk-based thinking, quality improvement and right first time part of your business culture. Environmental Management Software by EHS Insight allows ensuring compliance with various government regulations, reducing environmental impact, and monitoring all aspects of your operations for carbon and energy usage and impacts to the environment, without the hassle of manual systems.

Sustainability Metrics: Gather, track, measure, and improve upon energy and resource consumption, waste production, recycling, carbon emissions, and other pollution and sustainability factors. Ensure the highest quality sustainability indicators using data validation and an automated review process.

Air, Water, and Waste: Regardless of where in the world the organization is working, EHS Insight can help ensure local requirements are achieved. The solution includes configurable, embedded, support for a variety of metrics and units of measure making data collection a breeze.

Compliance Tasks: Ensure compliance with regulatory, company and other requirements by planning work and using automation to get it done. Make sure all requirements are met, and that nothing slips through the cracks.

Permits: Depend on automated workflow to ensure compliance with permit obligations and use reminders to better manage expiration and renewal dates. Produce regulatory reports with a single click and impress auditors with instant access to all records.

Environmental Spills: Report, track, monitor, and improve all aspects of your environmental consequences, including spills, discharges, and releases as well as damage to the environment. Ensure all obligations and requirements are met, and rest assured compliance has been achieved. Learn more.

Audit Management: Complete the audits and inspections in half the time and effortlessly report and track findings. Use standard checklists for common inspections or build your own. Make sure all the obligations are being met.

Chemical Inventory: It captures and tracks chemicals and materials to assist in completing EPA Tier II Inventory reports. Store material details such as phase, mixture, hazardous properties, and composition along with the Safety Data Sheet (SDS).

Training Management: Improve employee-training programs. Tracking and improving training while ensuring compliance with regulatory requirements. Eliminate wasted time and money by using an integrated training management system to replace the outdated spreadsheets and manual processes.

ECO- MANAGEMENT AND CERTIFICATION

ISO

International Organization for Standardization (ISO) is a non-governmental organization with 165 members worldwide, which creates the standards and make a formula of what is the best way to do something for products, services and a range of activities.

To enhance the environmental performance of every organization regardless the size, ISO created ISO 14001 that is the most commonly used guideline for environmental management system and its processes.

ECO WARRANTY

We use it as an alternative to ISO 14001 to small and medium organizations. The advantages over ISO14001 are that is more cost effective, the logo can be used on products and has more user-friendly format.

BS 8555

It provides guidance through 5 stages and is more suitable for small and medium sized enterprises. It includes EMS (ISO 14001) and Environmental Performance Evaluation (ISO 14031) tools 8555. Its goal is to provide the business with an innovative system, manage resources, achieve regulatory requirements and enhance corporate reputation among investors.

EMAS

A 6 level approach developed by the European Commission for every type of organization. It offers companies a wider geographical scope since is applicable worldwide. The main objective is to encourage organizations to demonstrate that they are proactive in their approach to the environmental management and reduce the impact of the activities, products and services. If an organization already complies with an environmental management system such as ISO 14001 it is easier to step up to EMAS.

For this project, we will use the **EMAS** approach. Therefore, below there is a detailed report.

7.2 EMAS

The EU Eco-Management and Audit Scheme (EMAS) is designed by the European Commission to help organizations manage their businesses and improve their environmental impact by evaluating and reporting. EMAS fits to all types of companies, regardless their sector in service and economy and can be implement worldwide to help companies to improve their performance in environmental activities.

EMAS objective target is to promote a continuous improvement to the environmental performance of organizations by committing them to evaluating and reducing their negative environmental impacts. It is a voluntary framework, that provides the basis for a published environmental report and it aims to recognize and reward those organizations that go beyond minimum legal compliance and continuously improve their environmental performance. EMAS incorporates ISO14001 (see ISO9000 Series) and is externally evaluated. Once accredited, participants can publicize their participation in the scheme through use of the EMAS logo.

These are the four key stages that an organization using EMAS will follow:

- Make an environmental report of all the activities in order to compare them with the environmental laws.
- Create a management system with the relevant objectives and the means to achieve the goals to environmental protection.
- Carry out an internal environmental audit assessing the management system in place and compliance with relevant environmental regulatory requirements.
- Provide a statement outlining its environmental policy, program and management system, and summarizing its environmental performance with the results achieved and the steps necessary for future improvements.

An environmental management system is built upon a set of environmental actions and management tools. Those actions depend on each other to achieve a clearly defined goal: improving environmental performance. An EMS establishes a continual cycle of planning, implementing, reviewing and improving the environmental performance of an organization. In practice, the role of an EMS is to ensure the successful implementation of the environmental policy and program. As such, an essential part of developing an EMS is to define its scope.

The environmental policy is a public document prepared by the organization, which describes the commitments to the environment and specifies your organization's overall intentions and direction in terms of environmental performance. It also provides a framework for setting objectives and targets. An environmental policy should be adopted at the highest managerial level, be revised periodically and specify compliance with legal requirements and beyond, commitment to continuous improvement in environmental performance and engagement in preventing pollution.

The environmental program is an action plan that translates the organization's environmental policy into specific objectives .The SMART (Specific, Measurable, Achievable, Realistic, and Time-bound) criteria can help formulating these objectives and targets. The environmental program should contain concrete measures that designate responsibilities and identify the means to achieve the defined environmental objectives and targets, as well as to meet deadlines. The programs integrate improvements in environmental performance into the day-to-day

operations of the organization and it leads to activities that promote better environmental performance. To help identifying relevant environmental aspects, best practices and indicators that should be part of your environmental program.

As part of EMAS, the organization's top management also needs to demonstrate leadership and commitment to the EMS. For example, the top management has to take accountability for the effectiveness of the environmental management system, ensure that the environmental policy and environmental objectives are established and see that the requirements of the EMS are integrated into the organization's business processes.[88] [89]

7.3 Quality Enterprises

1. Kronos SA, is a company located in Central Macedonia close to Thessaloniki and is operating since 1971. It is considered a leading business in the Greek canning fruit industry and is oriented on exports. The company is controlling all its environmental activities and respects the eco-system. It has several policies concerning the wastewater treatment, renewable energy and other aspects of sustainability. Kronos is certified by TUV CERT under the ISO 22000:2005, and HACCP 9001:2008. The company has been certified under the BRC certificate of Higher level (British Retailer Consortium) and the IFS.

2. ARIVIA S.A. is a strong firm worldwide known that is developing plant-based dairy and dairy-free products. It's central offices are located in Thessaloniki and they produce 2.500 ton per month. ARIVIA S.A. follows a quality assurance system according to the standard ISO 9001:2008 and a food safety assurance system according to the standard ISO 22000:2005. They also work according to the GFSI standards BRC Global Food Standard: Issue 7, with Grade AA and IFS International Food Standard: Issue 6 with grade Higher Level. They certified with the first system ISO 9001:2000 in 2001. The first food safety assurance system as per HACCP 2000 was implemented prior to 2002 but was certified in the year 2004 as per the standard ELOT 1416, and in 2006 as per the standard ISO 22000:2005. ARIVIA S.A. has been certified as per the GFSI standards BRC and IFS since 2004 and 2006 individually.

3. The KRE.KA. S.A. company is located in Kavala and has a strong brand name in vertical organized production and meat trade. They have strict sanitary controls and take many measures to protect the environment.The company

[88] NEF CONSULTING, *EMAS*<https://www.nefconsulting.com/our-services/evaluation-impact-assessment/prove-and-improve-toolkits/emas/>
[89] European Commission, *Eco-Management and Audit Scheme* <https://ec.europa.eu/environment/emas/join_emas/how_does_it_work_step3_en.htm>

has focused on quality products, managing the production and guaranteeing safe products , according to the ISO 9001:2008, ISO22000:2005, Total Quality Management QC100 models, in which it has been certified and continues to implement. In addition, Kreka has implemented environmental management systems for the generated waste of the productive procedure and waste of others and works accordingly to a certified system of environmental handling in accordance with the ISO14001:2004 model.

4. Neogal S.A is a dairy industry and was founded in Drama by the Dairy Cooperative Union of the prefecture Drama and Kavala, in 1964. Neogal follows stringent regulations and production standards starting from the production of the milk in the farm until the final product reaches the shelf of the fridge in order to ensure the quality and the safety of our products. The company has a certified quality management system according to ISO 9001: 2008, a certified food safety management system according to ISO 22000: 2005 and a certified environmental management system according to ISO 14001: 2004. Neogal is also certified according to BRC ISSUE 8.In order to ensure the safety of the workplace and to minimize the hazards in an automated production line Neogal has modified the production machinery and will be soon certified according to OHSAS 18001 that concerns the management of health and safety in the workplace. Through the ISO quality management systems the consumers can enjoy fresh, healthy and safe dairy products only a few hours after the collection of the milk.

8. Regulatory context

8.1 EU Policies

The Green Deal sets the road for future legislation with a vision of holistic approach reaffirming the interconnection of challenges and the need of policy coherence, regarding environmental sustainability.

In 1962, the European Union launched a common agricultural policy (CAP), which combines agricultural procedures with society and partners Europe with its farmers. The aim is to support farmers by safeguarding them to make a reasonable living and improving productivity in order to ensure a stable supply of affordable food. In addition, by promoting jobs in farming and keeping the rural economy alive it helps maintain the rural areas. Its final goal is to preserve the landscapes and help tackle the

climate change with the sustainable management of natural resources. It is worth mentioning that CAP is evolving during the years to meet changing facts and on 1 June of 2018, the Commission presented legislative proposals on CAP beyond 2020. During the next 7 years, the new CAP is going to invest more than EUR 19.5 billion in Greece's farming sector and rural areas. The CAP so far consists of:

- Rules for direct payments to farmers (EU regulation 1307/2013);
- A common organization of the markets in agricultural products (EU regulation 1308/2013);
- Support for rural development (EU regulation 1305/2013);
- Financing, management and monitoring of the common agricultural policy (EU regulation 1306/2013).[90]

The future CAP will focus on ensuring access to high-quality food and strong support and will have the following objectives:

- To ensure a fair income to farmers.
- To increase competitiveness.
- To rebalance the power in the food chain.
- Climate change action.
- Environmental care.
- To preserve landscapes and biodiversity.
- To support generational renewal.
- Vibrant rural areas.
- To protect food and health quality.[91]

Concerning sustainable water management EU has four water directives to ensure the good status of the water.

- the Urban Waste Water Directive (91/271/EEC)

Its objective is to protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors and concerns the collection, treatment and discharge of domestic wastewater, mixture of wastewater and wastewater from certain industrial sectors.

- the Bathing Water Directive (2006/7/EC)

[90] Europa, *The common agricultural policy at a glance* < https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance_en>
[91]Europa, *Future of the common agricultural policy*, < https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap_en>

Its main objectives are to safeguard public health and protect the aquatic environment in coastal and inland areas from pollution. Bathing waters can be coastal waters or inland waters (rivers, lakes).

- the Nitrates Directive (91/676/EEC)

It aims in reducing water pollution caused or induced by nitrate from agricultural sources. The Directive requires Member States to apply agricultural action program measures throughout their whole territory or within discrete nitrate vulnerable zones (NVZ's).

- the Drinking Water Directive (98/83/EC)

Its objective is to protect human health from adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean.

The Water Framework Directive is aiming in cleaning all polluted waters and the "Blueprint" is aiming in a sufficient quantity of good quality water for people's needs, the economy and the environment, through actions that concentrate on better implementation of current water legislation, integration of water policy objectives into other policies, and filling the gaps in particular as regards water quantity and efficiency.

In May 2020 The European Commission has adopted the new EU Biodiversity Strategy for 2030 which is targeting in:

- Transforming at least 30% of Europe's lands and seas into effectively managed protected areas.
- Restoring degraded ecosystems across the EU that are in a poor state, as well as reducing pressures on biodiversity.
- Enabling transformational change.

In addition, an associated Action Plan (annex) was published through the coronavirus pandemic and outlines the need to protect and restore biodiversity in order to protect the ecosystem and our own health as well.

The EU Farm to Fork Strategy , which addresses comprehensively the challenges of sustainable food systems, recognizes the inextricable links between healthy people, healthy societies and a healthy planet, and interlinks with the biodiversity strategy, seeking to rethink the whole food value chain in order to improve its sustainability.

8.2. National Law

As we can see in the "The Environmental Implementation Review 2019, Country Report Greece by the European Commission", Greece is implementing a series of policies that are conforming to the EU environmental law.

In broad terms, as the review is underlying, the main challenges Greece needs to address are:

(i) Waste management issues

Progress was made on waste management as the country adopted national and regional management plans, however it is of great importance a network of facilities that would manage all the hazardous waste produced.

(ii) Nature protection

Greece has expanded its marina Natura 2000 network. The legislation and a comprehensive *LIFE integrated project* [92]implemented to address the challenge.

(iii) To complete the implementation of the Urban Waste Water Treatment Directive[93].

Greece also endorsed a new recycling law (4496/2017) in November 2017, which adjusted existing legislation to circular economy principles. Moreover, the country adopted its National Adaptation Strategy (NAS) by law in 2016(Law 4414/2016). The Greek NAS is an overarching policy document, which defines the goals, principles and priorities for adaptation. The Greek NAS also lists potential adaptation measures and actions for fifteen environmental and socio-economic sectors that are likely to be significantly affected by climate change in Greece. These sectors are: biodiversity and ecosystems, agriculture and food security, forestry, fisheries, aquaculture, water resources, coastal areas, tourism, energy, human health, the built environment, transport, cultural heritage, industry, mining, and the insurance. The NAS provides guidance, insight and priorities, which should be further detailed at regional level and translated into Regional Adaptation Action Plans.

Law 1650/86 for Environmental Protection. This Law provides the basis for the protection of the natural environment. Its provisions aim at the institution of fundamental rules and the establishment of criteria and methods for the protection of the environment, so that man, both as an individual and as a member of the society, can live in a high quality environment. The basic aims of this law are the following: prevention of pollution and degradation of the environment; safety of human health; renewal of natural sources and rationalistic use of the non-renewable or rare natural sources, in a combination with the present or future needs; protection of soil, superficial and subterranean waters, atmosphere as well as preservation of nature and landscape, especially of areas which have an important biological, ecological,

[92] A project designed by the EU to help member States to comply with EU environmental legislation(ec.europa.eu)
[93] The Urban Waste Water Treatment Directive is a European Union directive regarding urban waste water collection, waste water treatment and its discharge, as well as the treatment and discharge of "waste water from certain industrial sectors". It was adopted on 21 May 1991. (Wikipedia)

aesthetic or geomorphological value; determination of permitted waste emissions; environmental impact assessment.(FAO[94])

Law 4685/2020. Modernization of environmental legislation, incorporation into Greek legislation of Directives 2018/844 and 2019/692 of the European Parliament and of the Council and other provisions.

Law 4711/2020 - Utilization of agricultural capital. The Law aims to simplify and expedite the environmental licensing process. It also constitutes the first set of measures adopted by the Greek Government aiming to accelerate and to rationalize the RES (Renewable Energy Sources) licensing process.(ZEYA[95])

Law 3585/2007- Environmental protection, agricultural safety and other provisions. An independent Service entitled "Hellenic Agricultural Guard" is established, with the mission of:

a) Policing the implementation of measures and rules concerning safety, protection and restoration of the rural environment, irrigation water, ensuring the origin and quality of agricultural products intended for use and consumption and ensuring sustainable rural development.
b) The prevention and suppression of agricultural, environmental and other crimes committed on agricultural land and agricultural estates.
c) The Hellenic Agricultural Guard participates in the framework of its responsibilities in dealing with any emergency, resulting from natural disasters and accidents or other disasters in times of peace or war, in cooperation with the competent authorities and Services, as well as in ensuring national defense, in cooperation with the Armed Forces.

[94] FAO, *FAOLEX Database* < http://www.fao.org/faolex/results/details/en/c/LEX-FAOC051736/>
[95] ZEPOS YANNOPOULOS, *Newsletters*,< https://zeya.com/newsletters/law-46852020-modernising-rules-environmental-and-res-licencing-process>

9. Best practices

9.1. National

9.1.1 LIFE

In Greece, during the years 1992-2018 there has been 254 LIFE projects implemented funded by the European Union with total budget of 388,1 million. The aim of the LIFE project to promote the environmental and climate policy through integrated projects. Its targets are strongly connected with the agricultural sector and the Common Agricultural Policy by the European Commission.

The Greek task force for the project Greek LIFE Task Force, GRLTF was created in 2016. The project has many tasks including the creation of a strategy regarding pest management and a sustainable farming practice for fighting the Mediterranean fly (Ceratitiscapitata) without insecticides with the use of BIODELEAR which is safe for the environment and for humans.

Another LIFE project is AgroClimaWater which aims in promoting efficient water use and supporting the transition to an agricultural systems which is resistant to the climate change in the Mediterranean countries, though the development and implementation of water management strategies in three agricultural organizations, two of which are in Crete and one in Basilicata in Italy. The project's objectives include:

- The development and implementation of water management strategies in the agricultural sector
- To determine and implement water-efficient agricultural practices in arboreal crops.
- The creation of farms adapted to the lack of water
- To strengthen the adaptability of farmers and their organization to climate change (information, awareness, education)
- To inform and sensitize all water users about its effects to climate change at the level of pilot sub-basins of the project.
- The dissemination of the proposed strategies, aiming at their implementation by farmers and agricultural cooperatives both in the selected areas and in areas that face similar climate challenges.
- The integration of the project results in the European and National legislation and policies on agriculture, climate change and the environment.

LIFE TERRASCAPE is a project about transforming the abandoned landscapes terraces into green infrastructure, through participatory land surveillance for better adaptation to climate change. To achieve that the following means must be made possible:

- Climates of smart crops and local traditional varieties.
- Utilization of innovative new technologies in agriculture.
- Implementation of cultivation systems with low inputs.
- Use of appropriate mechanical equipment for terraces

As a result, the walking tourism will enhance through the upgrade of the landscape. The project aims in production and disposal of local products and reinvestment in additional areas in cooperation with farmers to create an Agri-Food Partnership. This Partnership is envisaged to cooperate with the secondary and tertiary sector in order to strengthen the circular economy and the local community.

The project SKYROSBIODIVERSITY "Demonstrative Application 'Biodiversity Action Plan' approach to conservation of the biodiversity of Skyros contributed to the quality of life of the locals a lot, though the environmental improvement and the following development of sustainable tourism. To descrive the morphological characteristics of the local varieties of Skyros a rural garden was created where (durum wheat), horse barley and hexagon (barley), kourakatsi (pea), pise (lathouri), Skyros koyki were planted. In addition, in cooperation with farmers of Skyros propagating material of

local varieties were collected and preserved in a cold room of the Genetic Material Bank of Thessaloniki. [96]

9.1.2 Regional Projects

In the municipality of Ilion in Attica there has been a series of agricultural programs funded by the municipality in cooperation with the Greek Agricultural Organization"DIMITRA" which belongs to the Greek Ministry of Rural Development and Food. They were carried out by trained teachers and included theoretical and practical training. The first cycle of agricultural training programs that took place concerned the aromatic and medicinal plants, where 30 participants were evaluated by the teachers and received certificates of attendance from the Municipality.[97]

> The municipality of Grevena made The manual of Good Practices for the project" Agricultural Entrepreneurship in Pindos". It provides advice to several sectors of agriculture and is a guide for models of organization and operation of integrated farms. Special emphasis is given in the field of organic products providing the know-how support though a manual.[98]

9.2.International

9.2.1 Farm management

Farm management is of high importance when it comes on investment. Farmers these days besides producing crops, must address profitability, fertility, conservation and tax issues. Farm management strategies can be used both on large commercial farms and on a small family-owned farm. A professional farm manager is required in order to maximize the income of investment farmland. Each farm has different needs and a management plan needs to be customized accordingly to align the interests of the farmer99. Depending on the size the services of a single farm manager or a group of managers to oversee is required.
Farm management should focus on these aspects:

- Profitability
- Leasing
- Production
- Fertility
- Conservation

[96] EU programs, LIFE 2014-2020< https://www.eetaa.gr/eu/programs/Life/Life_2014-2020.pdf>
[97] OTA practices,< http://www.otapractices.gr/portfolio-items/practice49/>
[98] OTA Practices,< http://www.otapractices.gr/portfolio-items/practice5/>
[99] AG WEB, *Importance of Farm Management* <https://www.agweb.com/Importance-of-Farm-Management>

- Capital Improvements
- Additional Revenue Opportunities
- Insurance
- Taxes
- Communication

9.2.2 Integrated Pest Management

IPM can be used to both agricultural and non-agricultural settings and is a method that combines comprehensive information on the life cycles of pests and their interaction with the environment with pest control methods in order to manage pest damage with economical and sustainable means. Integrated Pest Management programs are a series of steps that one should follow. The 4 steps are[100]:

1. Set Action Thresholds- In this step the point at which pest populations or environmental conditions that require pest control actions must be defined.
2. Monitor and Identify Pests- In order to use pesticides only when needed, all living organisms, insects and weeds must be identified.
3. Prevention- Control methods that can be used to prevent pests from becoming a threat, such as rotating between different crops, selecting pest-resistant varieties, and planting pest-free rootstock.
4. Control- If pest control required, IPM programs evaluate the proper control method for effectiveness and risk starting with less risky methods and moving on to additional methods if needed such as targeted spraying of pesticides.

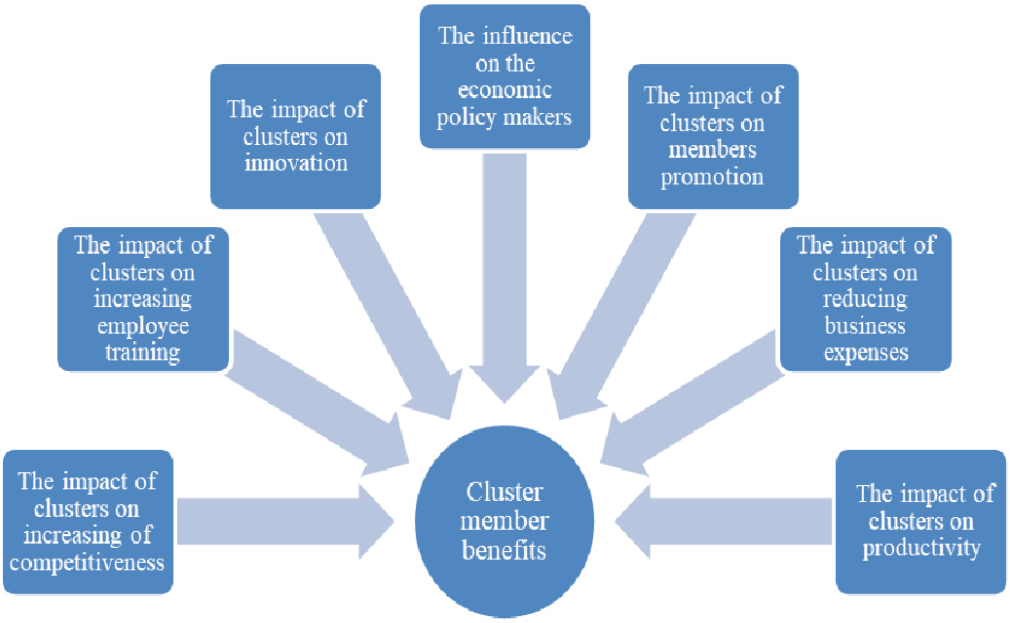
9.2.3 Cluster business

An issue for entrepreneurs with small companies is that they cannot complete with larger ones and achieve economies of scale. A solution for this problem could be a cluster business. This means an interconnected system of companies, which are able to overcome others by engaging the innovation and development. A Cluster business is a system of connected firms/suppliers/service providers that are put together based on their geographic location. These organizations have multiple purposes and they create a symbiotic form that collaborates and competes with each other and with other clusters from other places

[100] EPA, *Integrated Pest Management (IPM) Principles*,< https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles>

Clustering leads to productivity growth, increased competitiveness, innovation boost, and local growth and regional development (Michael, 2003, 2004) According to the definition proposed by Bianci (2005), clusters are resulted by itself. These systems of interconnected businesses have multiple advantages; since they make use of better technology, use quality standards, have more educated personnel, great mobility of investment and lead to internationalization. Their target is to create a form that is more competitive for its members and to make small and medium enterprises to be able to collaborate with large companies. Thus, they can become competitive in the global market. Innovation, Technology, science and knowledge are the four important factors for every national economy to become independent and strong.

This cooperation results in sharing their technical knowledge and experience, access to more supplies, flexibility, access to public good, permutation of an area and of course the privilege of creating economies of scale. [101]. Examples of successful cluster businesses are: Hollywood with a cluster of firms and creative climate, the Pearl River Delta in China, which is a large manufacturing region with suppliers close to each other, with techniques and knowledge easily spread between firms, and Silicon Valley with successful technology related start-ups. The idea behind Clusters is that they through the combination of inter-firm rivalry and collaboration they reinforce their competitiveness.



Source: Authors

Vuk Mirčetić, Svetlana Vukotić, Drago Cvijanović,2019, *Impact of tourism cluster members*

[101] Interreg,*Cluster development guide*<https://www.bmbpages.biz/Tools_for_SMEs_Competitiveness_by_Country/03_Cluster%20Development%20Guides%20GR.pdf>

In developing countries, there are many efforts to create cluster businesses in the agricultural sector in order to strengthen the economy. In India, agro-industrial parks with shared facilities and services are very common in order to help Small and Medium sized Enterprises to benefit from clustering. One more initiative in the same country is the Agri-Export zones. The State governments identify a specific agricultural product whose export is to be promoted in a particular area that is considered the Agri-Export Zone and then the export is promoted with assistance in several areas such as training, research and development and infrastructure development. SME's usually make export consortia of food and agricultural products which is a voluntary alliance of firms with the objective of promoting the goods and services of its members abroad and facilitating the export of agricultural products through joint actions" (adapted from UNIDO, 2003). In Japan an initiative called "One-village-one-product" originated with villages or local areas to concentrate on one value-added and local product, with product development and marketing assistance being provided. The products are then sold nationally and internationally.(FAO[102])

9.2.4 A report of Adaptation of agricultural practices and technologies to climate change in Sub-Saharan Africa

The report of the project "Adaptation of agricultural practices and technologies to climate change in Sub-Saharan Africa" published in Africa by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) refers to Six categories of Good Practices and technologies in Africa. ds. In Africa, 650 million people are currently dependent on rainfed agriculture and, despite progress in the Millennium Development Goals, food and nutrition insecurity remain unacceptably high. The report has outlined six categories of adaptation good practices and technologies that have been identified from empirical research in six case study countries. The categories are[103]:

- Use of improved seeds: use of improved varieties, use of pest and disease tolerant varieties, use of certified varieties, planting different maturity varieties, use of early maturity varieties.
- Soil and water management: Manure, composting, vermicast, biofertiliser, Fertiliser use, planting circle, crop rotation, leaving fields fallow, mulching,

[102] FAO,*Agro-based clusters in developing countries: staying competitive in a globalized economy*, Eva Gálvez-Nogales,2010< http://www.fao.org/3/i1560e/i1560e.pdf>
[103]Reliefweb, *Agricultural adaptation: Six categories of good practices and technologies in Africa,*GIZ,2017< https://reliefweb.int/sites/reliefweb.int/files/resources/Agricultural-Adaptation-Report-Digital-low-res.pdf>

contour soil, stone bunds/bounds/filter bounds, vegetation bands/ grass strips.

- Timing of farming practice: planting of early, medium and long duration varieties, dry sowing/ early sowing/ dry planting/ early dry planting, change in feeding quantities and times, mechanization.
- Changing crop/livestock distribution and densities: reducing stock density, intercropping distribution (row planting/ spaces between rows).
- Tillage and associated practices: reduced/no tillage, repeated tillage.
- Farm crop and livestock diversification: Crop diversification, diversifying to livestock farming, diversifying farming activities/ income.

9.2.5 Scheme and Training Manual on Good Agricultural Practices (GAP) for Fruit and Vegetables, Volume 1 The Scheme-standard and implementation infrastructure by FAO

According to FAO's *(Food and Agriculture Organization of the United Nations) "Scheme and Training Manual on Good Agricultural Practices (GAP) for Fruit and Vegetables, Volume 1 The Scheme-standard and implementation infrastructure*" food production safety needs to be addressed from the primary sector.

This pilot project aims in strengthening Good Agricultural Practices for fruits and vegetables in countries. The producers of fruits and vegetables are going to improve product's safety and quality and meanwhile enhance the environmental conservation and protect the health of their workers.

These kind of farms should implement with respect these 5 modules:

FOOD SAFETY MODULE

Site history and management

- It is critical to be an assessment and documentation of the sites history, to identify the risks of contamination to crops grown.
- If risks are identified, they need to be managed, or else the site is not to be use for production
- Implementation of a monitoring program to verify that contamination has not occur and documentation of the monitoring.

Planting Materials

- Documentation of all the planting material produced, and fertilizers or chemicals used, including dates, trade name, active ingredient, name of operator, method of application, dosages and reason for its use.
- A certificate or record that guarantees seed quality.
- The planting material should not have any signs of pest or disease.

- All the treatments must be approved and must be done as per recommended technologies.
- If there is material obtained from another farm or nursery, there must be a record of the supply.
- Toxic varieties to human must not be grown.

Genetically modified organisms

- Planting of GM crops is only permitted by the country's legislation
- If so, the crops shall be documented
- Clients should be informed accordingly about the status of the product with respect to GMO
- There must be a written plan to handle GM materials that contains strategies to minimize contamination hazards.
- GM crops must be stored separately from other crops.

Fertilizers and soil additives

- Assessment of the chemical and biological risks related to fertilizers and soil additives used for each crop grown shall be carried out and records of any hazards shall be kept.
- In case of hazards, measures shall be taken to minimize contamination to produce.
- Fertilizers and soil additives should be based upon soil analysis and/or recommendations of National Soil Service Centre/technically competent personnel/institution/ authorities or based by own experience.
- Fertilizers and soil additives should be selected and applied, to minimize the risk of heavy metal contamination to produce.
- Fertilizers and soil additives should be applied through recommended application practices at appropriate stages of crop growth.
- Untreated organic materials shall not be applied where significant risk of contaminating produce is identified. If organic materials are treated on-farm, the method of application, fate and duration of treatment shall be recorded. If organic material is obtained from outside the farm and there is a significant risk identified, documents shall be available from the supplier to show that the material has been treated to minimize the risk of contamination to produce.
- Untreated human sewage shall not be used for production of fresh produce.
- The facilities for storage, mixing and loading of fertilizers/soil additives and for composting organic material should be located and constructed and maintained in a manner to minimize the risk of contamination to production sited and water sources.
- Records shall be maintained for fertilizers and soil additives detailing the source, product, name, date and quantity obtained and for the application

detailing the date, name of product, rate and method of application and name of the operators.

- The inorganic and organic fertilizers shall be stored separately from harvested farm produce.

Water

- The water for irrigation/ fertigation should be free from harmful contaminants
- To minimize the risk of chemical and biological contamination, there must be done annually an assessment of the source of water used for irrigation, application of chemicals or handling, washing, treating the produce or cleaning and sanitation.
- Tests shall be conducted at a frequency depending on the conditions affecting the water supply and records shall be kept.
- If any risk is identified, either a safe alternative source shall be used or the water treated before used.
  Untreated sewage water shall not be used during production or for post-harvest activities. Where treated water is permitted, the water quality shall comply with applicable national regulations.
- The farmer should maintain irrigation equipment as per manufacturer's guidelines.
- All measures must be taken to prevent the flow of water into the field from undesirable sources (hospital, industry waste dump areas etc.).

Chemicals

- Only pesticides permitted under a country's regulation shall be used.
- Chemicals should be purchased form registered/ licensed suppliers.
- Mixing of two or more chemicals should not be done, unless recommended by technically competent personnel/institutions/authorities.
- The dosage as recommended by competent authorities shall be applied and excess chemicals shall not be used.
- Surplus chemicals shall be disposed of in a manner to avoid contamination to the produce.
- Withholding periods for the interval between chemical application and harvest shall be maintained as per the pre harvest interval mentioned on the label.
- Equipment for applying chemicals shall be maintained in working condition and checked for effective operation by a technically competent person.
- Equipment shall be washed properly after every use and washing water shall be disposed of in a manner to avoid contamination to produce.
- Chemicals should be stored in a well-lit, sound and secure structure, which is located and constructed to minimize the risk of contaminating produce and equipped with notices and emergency facilities in the event of a chemical spill.
- Liquid chemicals shall not be stored on shelves above powders.

- A record of application for each crop shall be maintained giving details of chemical, reason for application, treatment location, dosage, method, date of application and name of operator.
- A record of chemicals held in storage shall be maintained detailing chemical name, date and quantities procured and date of complete use or disposal.
- If chemical residues in excess of maximum residue limits (MRL) are detected in the market where the product is traded or exported, the marketing of the product shall cease and the cause of contamination shall be investigated. Corrective actions shall be taken to prevent recurrence and a record kept of the incident and the actions taken.
- Non-agrochemicals shall be handled, stored and disposed of in a manner to avoid any risks to food safety.
- Integrated Pest Management (IPM), if implemented, shall require careful consideration of available pest control techniques and the subsequent integration of appropriate measures to discourage the development of pest populations, while keeping the use of plant protection chemicals at minimal level.

Harvesting and handling produce

- Harvested produce shall not be placed directly on the soil, or on the floor of the handling, packing or storage areas

Equipment, containers and materials

- Equipment, containers and materials that come in contact with produce shall be made of material that will not contaminate the produce and is easy to clean.
- The containers used for storage of chemicals, waste, and other dangerous substances shall be clearly identified and not be used to hold or store produce.
- Equipment and containers shall be regularly maintained to minimize contamination of produce and shall be kept in areas separate from chemicals, fertilizers and soil additives to avoid cross contamination.
- Equipment, containers and material shall be checked for soundness and cleanliness before use and cleaned, repaired or discarded as required.
- The producer shall, at least once a year or as per the legal requirements of the country, have his measuring devices calibrated for ensuring correctness of measurement.

Buildings and structures

- Buildings and structures used for growing, packing, handling and storage of produce shall be constructed and maintained to minimize the risk of contaminating produce.

- Grease, oil, fuel and farm machinery should be segregated from handling, packing and storage areas to prevent contamination of produce.
- Sewage, waste disposal and drainage systems shall be constructed so as to minimize the risk of contaminating the production site and the water supply.
- Lights in the packinghouse or store should be shatter proof or protected with a shatterproof cover.
- Where equipment and tools that may be sources of physical hazards are located in the same building as handling, packing and storage areas, these should be isolated by a physical barrier or not used during the handling and packing of produce

Cleaning and sanitation

- Equipment, tools, containers and materials that may be sources of contamination of produce should be identified and regularly cleaned and sanitized.
- Appropriate cleaning and sanitation chemicals should be selected to minimize the risk of these chemicals contaminating produce.

Animal and pest control

- Household and farm animals should be kept out of the production site (especially where crops are grown in or close to the ground. and around handling, packing and storage areas.
- Measures shall be taken to prevent the presence of pests in and around handling, packing and storage areas.
- Baits and traps used for pest control shall be located and maintained to minimize the risk of contaminating produce. The location of bait traps shall be recorded.

Personal hygiene

- Workers shall be trained in personal hygiene practices and training records kept.
- Written instructions on personal hygiene should be provided to workers and displayed in prominent locations.
- Toilets and hand washing facilities shall be available to workers and maintained in a hygienic condition.
- Sewage shall be disposed of in a manner that minimizes of direct or indirect contamination to produce.

Produce treatment

- The quality of the water applied to the edible parts of produce shall be equivalent to that of drinking water.

- Chemicals applied for post-harvest and waxes shall follow the same practices as under the chemical section and shall comply with instructions and recommendations from competent authorities.
- Specific test on produce should be included if required by an importing country.

Storage and transport

- Produce shall be stored and transported separately from goods that are potential sources of chemical, biological or physical contamination.
- Produce should be stored in cool places and overloading should be avoided. Produce should be covered to reduce moisture loss during transportation.
- Containers filled with produce shall not be placed in direct contact with soil, where there is a significant risk of contaminating produce from soil. Pallets, if used, shall be checked for cleanliness, chemical spills, foreign objects and pest infestation and rejected if there is any risk of contaminating produce.
- Vehicles used for transporting produce shall be kept clean and maintained in good condition. These shall be checked before loading for cleanliness, chemical spills, foreign objects and pest infestation.

Traceability and recall

- Production sites shall be identified by a name or code and recorded on a site map.
- Packed produce shall be clearly marked with name and identification to enable traceability of the produce to the farm or site where the produce is grown.
- A record detailing the date of delivery and destination of each produce consignment should be maintained.
- Where produce is identified as contaminated or potentially contaminated, it shall be isolated, but if such identification is made after the produce is sold the buyers or consumers shall be notified immediately.
- The cause of contamination shall be investigated and corrective action taken to prevent its recurrence and a record kept of the incident and the action taken.

Training

- Proper purchase, handling, storage and use of chemicals, including labelling requirements, selection of chemicals or bio-pesticides, which are approved and recommended by the competent authorities for the crops grown.
- Application of suitable Integrated Pest Management and avoidance of use of inorganic chemicals.
- Information and updates on the maximum residue limits (MRL) as specified in the national regulations, Codex standards or the importing country's standards where the produce is to be traded.

- Checking that chemicals are used correctly and before shelf-life/expiry date.
- Importance of testing for chemical residues at a frequency required by customers or the market and the method of drawing of samples for testing.
- The training needs shall be reviewed once a year

Documents and records

- Records of GAP shall be kept for two years or more in accordance with statutory requirements, if any, or business requirements.
- Obsolete (out-of-date) documents shall be discarded and only current versions shall be in use.

Review of practices

- A review to be carried out at least once a year to identify new or emerging risks related to food safety and actions to correct any deficiencies identified and corrective actions taken. (Major)
- A record of the review undertaken and corrective action taken shall be kept.

ENVIRONMENTAL MANAGEMENT MODULE

Site history and management

- Sites used for production shall comply with the country's recommendations to restrict production on steep slopes.
- For new sites, the risk of causing environmental harm on and off the site shall be assessed and a record kept of the hazards assessed. The risk assessment shall take into consideration prior use of a site, the potential impact of crop production and post-harvest handling on and off the site, and the potential impact of adjacent sites on the new site. If there is a significant risk to the environment identified, the new site shall either not be used for crop production and post-harvest handling or measures to prevent or minimize these potential hazards shall be taken before use.
- Highly degraded areas shall be managed to avoid further degradation.
- Management of the site activity shall conform to the country's environmental conditions covering air, water, noise, soil, biodiversity and other environmental issues.
- A farm layout map shall be maintained showing the crop production sites, environmentally sensitive or degraded areas (if any), storage and mixing areas of chemicals, water storage, watercourse and drains, building structures and roads.

Planting material

- Diseases or pest-resistant planting material should be selected to minimize the use of chemicals.
- The planting material should be selected based on compatibility with soil type, soil fertility and so that the use of additional nutrient supplying chemicals is avoided.

Soil and substrates

- The production practices selected shall be suitable for the soil type and not increase the risk of environmental degradation
- The production practices selected shall be suitable for the soil type and not increase the risk of environmental degradation.
- Where possible soil maps should be used to plan for crop rotation or a fallow period to increase soil fertility should be encouraged.
- Production practices to improve and maintain soil structure as well as soil compaction shall be used to avoid erosion.
- If chemicals are used to sterilize soils and substrates, a record shall be kept detailing the site name, name of the product or material, name of the chemicals, the date of application, dosage and method of application and operator's name.

Fertilizers and soil additives

- Fertilizers and soil additives shall be applied according to the recommendation of the National Soil Service Centre or any other competent source and considering the crop and soil type to avoid nutrient run-off or leaching.
- Facilities for storage, mixing or loading of fertilizer and soil additives and for composting of organic matter should be located, constructed and maintained to minimize the risk of environmental pollution on and off the site and of pollution of water sources.
- The equipment used to apply fertilizers and soil additives should be maintained in good condition and annually checked by a technically competent person.
- The application of fertilizers and soil additives shall be recorded detailing the name of the fertilizer or soil additive, location, date, rate and method of application and the operator's name.

Water

- Irrigation shall be based on crop water requirements, availability of water and soil moisture levels. The irrigation system shall be checked and maintained in good condition to ensure its efficiency during irrigation and to minimize wastage of water

- Water collection, storage and use shall be managed in accordance with national regulations and a record shall be kept of irrigation use, detailing crop, date, location and volume of water irrigated or duration of irrigation.
- To minimize the risk to the environment, any water discharge or wastewater shall be treated.
- A water management plan to optimize water usage and reduce waste shall be made available.

Chemicals

- Farmers or workers shall be trained to a level appropriate to their area of responsibility for chemical application.
- Chemicals used for crop protection shall be selected so as to minimize the negative effect on the environment and antagonist organisms of pests and diseases.
- Crop protection measures shall be based on the recommendations of competent authorities or a plant protection organization.
- The use of chemicals shall be minimized by the application of Integrated Pest Management (IPM) and biological control products
- Only chemicals obtained from licensed suppliers and approved by a competent authority for the crop grown shall be used.
- Chemicals shall be applied according to the label directions and guidance from the competent authority.
- A rotation strategy for chemical application and crop protection measures should be used to avoid pests and diseases resistance.
- Appropriate volumes of chemicals shall be mixed to minimize the amount of surplus chemical after application.
- Surplus chemical mixes and tank washings shall be disposed of in a manner that minimizes the risk of environmental harm on and off the site. Empty chemical containers shall be collected and disposed of according to national regulations.
- Obsolete chemicals shall be identified clearly, kept in secure places and disposed of through official collection systems.
- The application of chemicals shall be recorded for each crop, detailing the chemicals' names, the reason for application, date of application, location, dosage and method of application and name of operator and, where applicable, a record of chemicals held in storage shall be kept detailing the chemicals' names, date and quantity of purchase and date when completely used or disposed of.
- Chemicals used for post-harvesting and handling produce shall be stored and disposed of according to national regulations to minimize the risk to the environment.

Waste management

- A waste management procedure shall be documented and followed, including identification of waste products generated during production, harvesting and handling produce, using practices to minimize waste generation, to reuse, recycle waste and dispose of waste.

Energy efficiency

- The use of electricity and fuel shall be reviewed to ensure that efficient operation practices are implemented.
- Machines and equipment should be maintained in good condition to ensure the efficiency of operation and to save energy.

Biodiversity

- The production plan shall comply with national regulations covering protected plant and animal species and to preserve native plant and animal species, including native vegetation areas, wildlife corridors and vegetation areas on or near the banks of waterways.
- Measures should be applied to control/protect feral animals.

Air/Noise

- If an offensive odour, or smoke, dust or noise is generated from production practices, management action shall be taken to minimize the impact on neighbouring property and surrounding areas.

Training

- Farmers and workers shall be trained to have appropriate knowledge in their areas of responsibility related to GAP and training records shall be kept.

Documents and records

- Records of GAP shall be kept for two years or more in accordance with statutory requirements, if any, or business requirements
- Only current versions of documents shall be in use.

Review of practices

- A review shall be carried out at least once a year to identify any new and emerging hazards resulting from inputs, processes or hazards affecting the environment.
- A record of the review undertaken and the corrective actions taken shall be kept.

Chemicals

- Chemicals shall be handled and applied by trained workers with appropriate knowledge and skills.
- Chemicals shall be stored in well lit, sound and secure structures with access permitted to authorized persons only. The storage structures shall be such as to minimize the risk of contaminating workers and they shall be equipped with emergency facilities to deal with any chemical spills.
- Chemicals shall be stored in their original containers with legible labels and instructions from competent authorities. If chemicals are transferred to another container, the new container shall be clearly marked with the brand name, dosage of use, and withholding period.
- Reuse of empty chemical containers for purposes other than containing and transporting identical products shall not be permitted.
- The Material Safety Data Sheets (MSDS) of all chemicals shall be available.
- Safety instructions shall be provided to workers and displayed in appropriate and readily accessible places.
- First-aid measures shall be available and accessible to treat workers having injuries related to chemicals or other accidents.
- Emergency instructions shall be documented and placed in prominent places within the chemical storage area.
- The workers handling and applying chemicals or entering newly sprayed sites shall be equipped with suitable protective clothing and equipment. Clothes and protective equipment shall be cleaned and stored separately from crop protection chemicals.
- People shall not be allowed access to the sites where chemicals are being applied or have just been applied for the appropriate period depending on the type of chemical used, and if chemicals have been applied in public areas or areas to which the public have access, the site shall be marked with warning sign.

Working conditions

- Working conditions shall be suitable for workers but where hazardous conditions cannot be avoided entirely, protective equipment/ clothing shall be provided.
- All farm vehicles, equipment and tools, including electrical and mechanical devices shall be adequately guarded and maintained in good condition to minimize the risk to workers.
- A safety operation manual for operation of equipment, machinery, accessories and their handling practices shall be provided to workers and displayed in prominent places.

Personal hygiene

- Farmers and workers shall be trained on personal hygiene practices for ensuring their own health and well-being. Records of training shall be kept.
- Written instructions on personal hygiene practices shall be provided to workers and displayed in prominent locations.
- Medical check-up of workers should be done at six monthly/ yearly intervals and records kept for five years.
- Toilets, hand, and body washing facilities shall be readily available and maintained in a hygienic condition.
- Sewage shall be disposed of in a manner to minimize the risk of contamination to workers.
- Where employers are to provide health cover to workers, any serious health issue shall be reported to the appropriate authorities.
- Measures shall be applied to minimize the access of domestic and farm animals to production sites and around the handling, packing and storage areas.

Worker welfare

- Workers shall be treated equally in all respects.
- Workers shall not be exploited because of gender, age or other reasons.
- Living quarters shall be suitable for human habitation and contain basic services and facilities –clean food storage areas, designated eating areas, hand washing facilities and drinking water.
- The minimum working conditions including working hours and minimum wages shall comply with national regulations.
- The workplace shall be secured from dangers of wild animals where these are a hazard.

Training

- Workers shall be informed about the risks with respect to health and safety when working at sites.
- Workers shall be trained in safety requirements (safety drill), accident and emergency response measures, first-aid practices, safe use of chemicals and personal hygiene.
- Workers shall be provided with appropriate training in areas of their responsibility such as vehicles, tools and equipment operation, handling and application of chemicals.
- “Environmental Education and Awareness” programmes and “Human – Animal Coexistence Training” should be organized for all personnel working on the farm.
- The training needs should be reviewed once a year.

Documents and records

- Records of GAP shall be kept for two years or more in accordance with statutory requirements, if any, or business requirements.
- Obsolete (out-of-date) documents shall be discarded and only current versions shall be in use.

Review of practices

- All practices affecting occupational health and safety of workers shall be reviewed at least once a year to ensure that they are done correctly and actions shall be taken to correct any deficiencies identified.
- A record of the review undertaken and any corrective actions taken should be kept.
- Actions shall be taken to resolve complaints related to worker health, safety and welfare, and records kept on complaints and action taken.

PRODUCE QUALITY MODULE

Quality plan

- A plan shall be maintained on practices that are critical to manage produce quality during the production, harvesting and post-harvesting stages.

Planting material

- Vegetables and fruits planting material (seeds, rootstock, and scion) should be obtained from farms or nurseries certified or recognized by the competent authority of the country of origin or other reliable sources to ensure the good quality and freedom from diseases to satisfy market requirements. Records of the planting material should be maintained.

Fertilizers and soil additives

- The application of fertilizers and soil additives shall be based on the crop grown and recommendations from the competent authority and shall be properly applied to ensure their effectiveness. The facilities used for composting shall be constructed and maintained to prevent cross contamination of the crop. Records of the application of fertilizers or soil additives shall be maintained giving details of quantity and date of application, the name of the person who applied the fertilizers and additives, and the provider.

Water

- Irrigation should be based on water requirements of the crop grown, water availability and soil moisture levels. Records detailing the date of irrigation, location, duration and volume of water applied shall be kept.

Chemicals

- Farmers or workers shall be trained to a level appropriate to their responsibility for chemicals application.
- Chemicals shall be obtained from licensed suppliers and applied according to label directions or permit issued by a competent authority for the crop grown.
- A chemical rotation strategy and other crop protection measures shall be practiced to avoid pest resistance to chemicals.
- Equipment used to apply chemicals should be maintained in good condition and be working properly.
- Records shall be maintained, giving the name of chemical applied, reason for application, date and dosage of application, method of application, weather condition and the name of person who applied the chemicals.

Harvesting and handling produce

- A maturity index is used to determine the appropriate time to harvest produce. Harvesting shall be carried out at the coolest time of the day, namely early in the morning.
- The equipment, containers, liners used shall be suitable for harvesting and shall be cleaned before using. The container shall not be overfilled. Liners should be used to cover the rough surfaces or other alternate means used to prevent bruising. Containers should be covered to reduce moisture loss. The containers shall not be stacked on top of each other unless these are specially designed to avoid produce damage when stacked.
- Harvested produce shall be placed in the shade and leave the field as early as possible.

Handling and packaging produce

- Clean water shall be used for handling, washing and treatment of produce and the water changed regularly to avoid spoilage organisms damaging the produce.
- Excessive drops and impacts shall be avoided to minimize mechanical damage to the produce.
- Packing and storing should take place in covered and in cool places.
- Produce shall not be placed directly on the soil or floor surfaces.
- Produce shall be graded and packed according to the customer or market requirements.

Storage and transport

- Produce shall be quickly transported to its destination. If there is to be a long wait for transport, produce should be held at the lowest temperature possible.

- Produce shall be covered during transportation and maintained at appropriate temperature to avoid quality loss
- Checking for cleanliness and removing all sources of contamination should be done. Mixing incompatible produce during transport should be avoided.

Traceability and recall system

- Produce from different sites shall be identified by name or code, and the same shall be placed on the containers and suitably recorded.
- A record shall be kept of the date of supply, quantity of produce and destination of each consignment.

Training

- Farmers and workers should be trained in the area of their responsibility relevant to GAP and a record of training kept.

Documents and records

- Records of GAP shall be kept for two years or more in accordance with requirements, if any, or business requirements.
- Obsolete documents shall be discarded and only current versions shall be in use.
-

Review of practices

- All practices shall be reviewed once a year to ensure that they are done correctly and action shall be taken to correct any deficiencies identified. A record shall be kept to show that all practices have been reviewed and any corrective actions taken documented.
- Action shall be taken to resolve complaints related to produce quality and a record kept of the action taken related to the complaint.

GENERAL REQUIREMENTS MODULE

Legal

- Either the applicant shall own the land under certification, or an agreement between the legal owner of land and the applicant shall be in place granting authorization to the applicant to carry out the agricultural operation and certification.

Visitor requirements

- Any visitors to the farm or place where operations are being carried out in relation to GAP shall follow the practices applicable to farm workers to ensure the safety of the produce as well their own safety.

Redressal of complaints

- All complaints shall be adequately registered and addressed. A record of action taken shall be maintained.
- Each farm to address complaints effectively and a record of the same shall be available.

Site details

- Each farm and production unit shall be referenced on a farm plan or map.

Internal inspection

- Internal inspection shall be carried out a minimum of once a year.

Calibration

- The producer shall, where applicable, have his equipment calibrated as per the legal requirements of the country.

Product traceability and segregation

- All GAP certified products shall be traceable to individual registered producers and their farms. Effective systems and procedures shall be in place to reduce the risk of wrong labelling or mixing of GAP with non-GAP products.
- The harvesting area shall be managed for registered produce so that produce are identifiable and traceable from the purchase order through post-harvest handling, storage and distribution.

Withdrawal of certified product

- A system for product recall and withdrawal shall be in place and this shall be reviewed annually.

Common packhouse

- If the group has one or more common packhouse within its farming operation, then every packhouse shall be required to meet the GAP requirements.

Agreement with buyer

- A written agreement shall be entered into between a group and its buyers cautioning against misuse the of GAP certification claims, as applicable.

Subcontracting

- To ensure such external services are in compliance with GAP requirements, in case of subcontractors are used.

- To ensure that subcontractor operates in compliance with the group's quality system.

In the Scheme[104], there is a more detailed plan depending on the needs of each farmer. Moreover, a system is categorizing each requirement as "minor", "major" or "critical" and a checklist that can be used by the produces to verify that all procedures are done correctly.

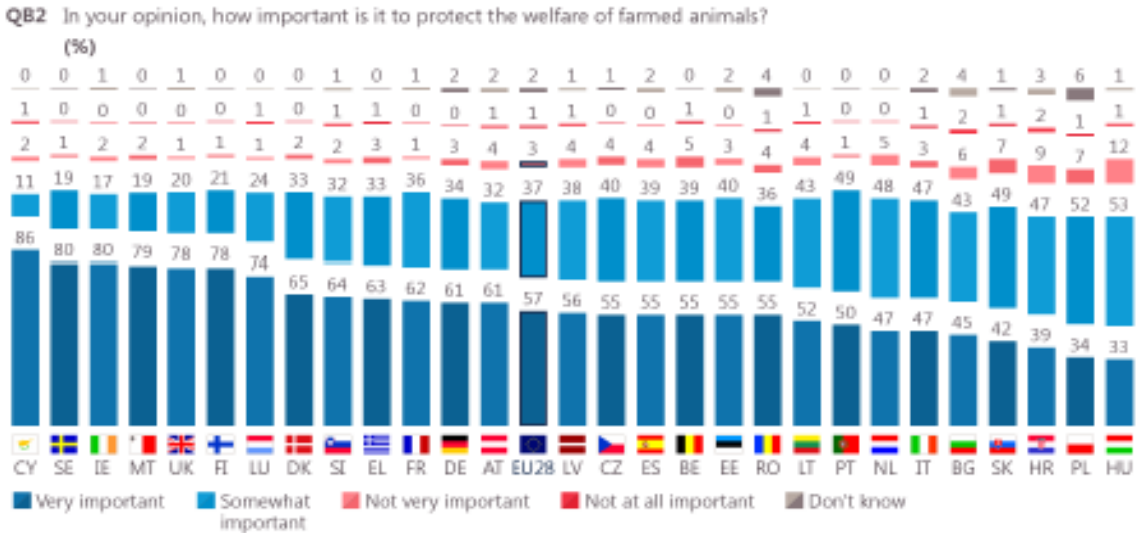
To view the full manual, please visit FAO'S website.(http://www.fao.org/3/a-i5739e.pdf)

9.2.6 Animal welfare

Many farm animal lives do not meet the standards for a decent life and have to live their entire lives in tiny, barren cages. This way of living is both cruel and outdated as it is unhealthy for the animal and thus the human population that will later consume it.

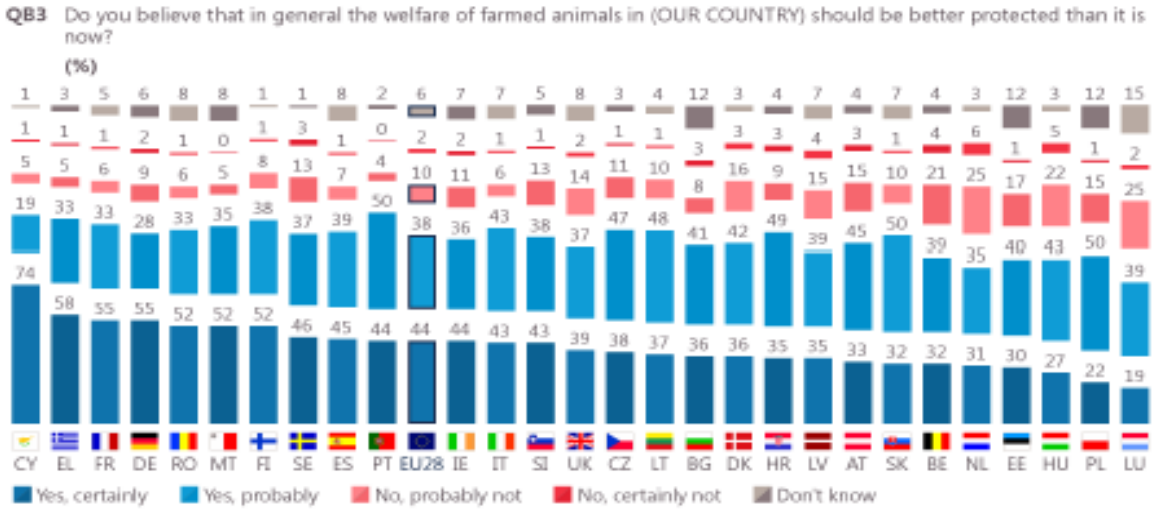
In Greece, farmers highly agreed on the high cost of animal welfare.However they believe that the consumers demand for improved farm animal welfare is high.[105] According to the Eurobarometer report in 2015[106], regarding the attitudes of Europeans towards Animal Welfare, the majority of people are willing to pay more for products that are made from higher animal welfare systems. Of the total EU citizens 94% of them believe it is important to protect the welfare of farmed animals and 64% of them, which is a growing number since the last survey, would like to have more information about the conditions under which farmed animals are treated in their respective countries. In addition 47% of the Europeans do not think there is sufficient choice of animal welfare-friendly food products in shops and supermarkets.

[104] Implementation of this Scheme should be through a multistakeholder committee. The steering committee will internalize it in the respective countries and provide operational guidance.
[105] Institute for Food and Agriculture Research and Technology,*Study on education and information activities on animal welfare,*2013
[106] European Commision, Special Euribarometer 442, *Attitudes of Europeans towards Animal Welfare,*2015



Special Eurobarometer 442, 2015

In the survey, people where asked about the importance in protecting the welfare of farmed animals. With varying degrees of importance, more than four out of five respondents in each of the States consider the welfare to be important with 63% of the Greek population saying that they think that the welfare is very important.



Special Eurobarometer 442, 2015

People where also asked if they believe that farmed animals in their country should be better protected that they currently are. In seven Member States, the absolute majority “certainly” think farmed animals should be better protected and in Greece the rate is 58% which is one of the highest.

In many countries, there are already measures and legislation regarding caged animals. In Luxembourg the cages for hens are banned and so will be in Germany and Austria during the next years. In UK and Sweden sow stalls are banned completely and in the Netherlands they are only permitted for the first four days after insemination.

In Denmark, sow stalls may only be used for 3 days. Farrowing crates are banned in Sweden and Denmark and in Austria cages for meat rabbits have been banned since 2012. Barren cages for rabbits were banned in the Netherlands in 2016 and will be banned in Germany in 2024.[107]

In Greece the total number of laying hens farmed per year is 4,300,313 . From that 3,631,413(84%) are caged.The total number of farmed rabbits per year is 336,801 . From that 323,736 (96%)*of them are caged.The total number of farmed sows per year is 118,000. From that 64,663 (55%)*are in sow stalls and 81,420(69%)* of them are in farrowing crates. Moreover, the total number of caged farmed animals, including quail, ducks and geese per year is 4,036,569 animals.[108]

The World Organization for Animal Health (oie) has published the international standards on animal welfare[109], which is a comprehensive guide that addresses issues like animal transport, the slaughter of animals and killing for disease control purposes. Subsequently, other standards included the use of animals in research and education, stray dog population control and the welfare of working equids.

Among many recommendations regarding the welfare of farm animals before slaughter, some of them are about the areas used to accommodate them:

1. As far as possible, established groups of animals should be kept together and each animal should have enough space to stand up, lie down and turn around. Animals hostile to each other should be separated.
2. Where tethers, ties or individual stalls are used, they should allow animals to stand up and lie down without causing injury or distress.
3. Where bedding is provided, it should be maintained in a condition that minimizes risks to the health and safety of the animals, and sufficient bedding should be used so that animals do not become soiled with manure.
4. Animals should be kept securely in their area, and care should be taken to prevent them from escaping and from predators.

[107]Compassion in world farming, *end the cage age* <https://www.ciwf.org.uk/media/7434596/end-the-cage-age-why-the-eu-must-stop-caging-farm-animals.pdf>

[108] Data on annual animal numbers were taken from the following sources according to the most recent published data: Sows – Eurostat 2017; Laying Hens – CIRCABC 2017; Rabbits – European Commission (DG Santé) 2016; Ducks and Geese - ITAVI 2016 and SSP, Eurofoiegras 2016; Quail – Industry and national government statistics. **Where published figures are not available, estimates of number of animals caged (indicated by *)** have been calculated using generic estimates and data from various credible sources. Compassion in world farming, *end the cage age* <https://www.ciwf.org.uk/media/7434596/end-the-cage-age-why-the-eu-must-stop-caging-farm-animals.pdf>

[109] World Organization for Animal Health (oie) <https://www.oie.int/infographic/StandardsAW/index.html>

5. Suitable drinking water should be available to the animals on their arrival and at all times to animals in the area unless they are to be slaughtered without delay.

6. Waiting time should be minimized and should not exceed 12 hours. If animals are not to be slaughtered within this period, suitable feed should be available to the animals on arrival and at intervals appropriate to the species. Unweaned animals should be slaughtered as soon as possible.

7. In order to prevent heat stress, animals subjected to high temperatures, particularly pigs and poultry, should be cooled by the use of water sprays, fans or other suitable means. However, the potential for water sprays to reduce the ability of animals to thermoregulate (especially poultry) should be considered in any decision to use water sprays. The risk of animals being exposed to very cold temperatures or sudden extreme temperature changes should also be considered.

8. The area should be well lit in order to enable the animals to see clearly without being dazzled. During the night, the lights should be dimmed. Lighting should also be adequate to permit inspection of all animals. Subdued lighting, and for example blue light, may be useful in helping to calm birds.

9. The condition and state of health of the animals in an area should be inspected at least every morning and evening by a well-educated person or, under his responsibility, by another competent, trained person. Animals, which are sick, weak, injured or showing visible signs of distress, should be separated, and veterinary advice should be sought immediately regarding treatment or the animals should be humanely killed immediately if necessary.

10. Lactating dairy animals should be slaughtered as soon as possible. Dairy animals with obvious udder distension should be milked to minimize udder discomfort.

11. Animals, which have given birth during the transport or in the area kept, should be slaughtered as soon as possible or provided with conditions, which are appropriate for suckling for their welfare and the welfare of the newborn. Under normal circumstances, animals, which are expected to give birth during a transport, should not be going.

12. Animals with horns, antlers or tusks capable of injuring other animals, if aggressive, should be penned separately.

13. Poultry awaiting slaughter should be protected from adverse weather conditions and provided with adequate ventilation.

14. Poultry in transport containers should be examined at the time of arrival. Containers should be stacked with sufficient space between the stacks to facilitate inspection of birds and air movement.

15. Forced ventilation or other cooling systems may be necessary under certain conditions to avoid buildup of temperature and humidity. Temperature and humidity should be monitored at appropriate intervals.

10. Case studies

10.1 Cooperative “ΘΕΣγάλα-ΠΙΕς

A young doctor changed the cooperative model in Greece and the producer’s mentality who expected to make a living though the subsidies. He proved that a cooperative can be a healthy business. “THESGALA-PIES” was founded in 2010 and is based in Larissa. With the inspiration of doctor Thanasis Vakalis and thanks to the vision and the continuous efforts of a group of dairy farmers. Soon, and through hard work and the passion of its members, evolved into the first productive model cow's milk cooperative founded in Greece. Having as a moto, “We cooperate differently” the company tries to defend the interests of its members by combining the provision of high quality milk to consumers at fair prices, worthy of the added value of the final product.

The company settled for the first time in Greece innovative milk vending machines starting with the city of Larissa. Daily, fresh, pasteurized and quality milk reaches directly the tanks of the vending machines. The consumer chooses the quantity he wants (1 and 1/2 liters) as well as desired packaging, reusable glass bottle and plastic bottle for one-time use. Andreas Hardaloupas, representative of the cooperative, describes in "MTK", “The vending machines have been installed since October 3. We started with four, which became six, then eight and now ten. The eight are in the city of Larissa, one in 110 Battle Wing at the airport and these days the tenth opens in

Army". The cooperative has 102 members, cow breeders, representing 58 units. The daily production is approaching 130 tones, of which 120 are sold in two large dairies and 7 to 7.5 tones are available from vending machines. “Our business is to expand our network of vending machines throughout Larissa. We also plan to open a veterinary medicine store to procure our members as well as open a portal on our website to make online announcements, for example to get corn. In this way, there will be transparency in procurement and beneficial competition. We installed pilots livestock computer interconnection system in the central computer of the cooperative ", as Mr. Hardaloupa says.

According to the philosophy of the cooperative, sustainable Greek cow breeding means: Ensuring the quality of milk, therefore added value to the final product. Reduction of production costs. Increasing livestock productivity. Improvement of management of the units. Development of synergies in the entire range of the primary sector.[110](*Rural Entrepreneurship- Marketing of Agricultural Products,* Giorgos Spais)

10.2 EMAS Farming: Improving small holdings’ environmental standards

Aragon, a region in Spain is a mountainous area characterized by small scale-farm holdings of mixed livestock and crop production. Over 90% of the small companies are family owned will low innovation techniques. A local NGO, Fundacion San Valero, identified a concern that the small holders had about the cost needed to comply with environmental standards. A LIFE project was launched to address these issues. In this project more than 100 small holder participated. A survey took place in the first step and the outcome was an identification of common issues and a list that classified different farms in terms of their individual needs. The team decided that an EMAS methodology could focus its attention on basic issues. These were a general capacity-building campaign on environmental awareness and improved management of dangerous waste containers carrying phytosanitary and zoosanitary products. The process included tangible outcomes, such as new environmentally sensitive procedures for managing zoosanitary containers being adopted by 11 farms. The EMAS approach was integrated within a large number of agricultural businesses through the establishment of a Rural Foundation and an on-going program of farm training in environmental standards. In order to improve the management of containers they set up central collection and cleaning points and thus created 12 new jobs as a direct result. Cost savings of 21% were generated through cost sharing between 16 small farms at the centralized container cleaning points. Through this project, the risks of pollution episodes from pesticide, fertilizer or manure spillage were significantly reduced. About 1.800 Good Practices and Best Available

[110] Newspaper Macedonia, *Rural Entrepreneurship, the way to success comes from innovation*, 26/2/2014, Koutsamparis F.

Technologies were implemented during the three-year project. The project achieved its goal and made a big difference in farmers' life through improving environmental quality standards and creating new jobs in a rural area.

10.3 HiPP Werk OHG, Germany

HiPP is a leading baby food company and the production sites are situated in Germany, Austria, Croatia, Hungary, Russia, Switzerland and the Ukraine. The company has about 2.000 workers and in 2015 the group sales were €850 million. The name of the company is closely related with ecological agriculture and sustainable values for over 60 years. HiPP introduced an EMAS-based environmental management system from 1995, continuously improving its eco-balance since then and protecting biodiversity. In Germany, agriculture accounts for around 50% of the total land area. HiPP relies on ecological farming, which protects the environment by using natural, pesticide-free methods and enhances soil quality by means of crop rotation and humus creation. For this and other reasons, the company has elevated the protection of biodiversity to a top priority. There is a separate corporate department for biodiversity and their team develop a method to test their own practice-based system and approach. The analysis was based on the Biodiversity Management Manual, the GRI Standards and the impact factors developed in collaboration with NGOs (LBV Bavaria /NABU, Bioland, University of Hanover, TU Munich) in practical projects. The company is committed to protect and promote biodiversity and its long-term goal is to develop key performance indicators, which will recognize products from 'biodiversity-friendly' production operations. HiPP has taken several measures to protect natural resources and the environment. They produce and process organically farmed raw material thus protecting the air, water and soil from synthetic and chemical fertilizers and pesticides. Systematic environmental management in line with EMAS and ISO 14001 improves HiPP's environmental performance at all levels throughout the company, from the procurement of raw materials to waste recycling. In 2015, HiPP celebrated its 20th anniversary as one of the first ten companies to adopt the EMAS scheme.

They use energy from renewable sources and support an international climate protection project. To protect the forests, all office stationery and cardboard packaging is produced from 100% environmentally friendly recycled and FSC paper. To protect the oceans from overfishing, production operations and staff cafeterias use only organic or MSC-certified fish. In order to protect the climate, HiPP makes use of the sun, water and biomass as renewable energy sources and recycles 99.8% of all waste. The company was honored with the German Solar Prize in 2011, for its extensive use of renewable energies. Moreover, Hipp offers tours of the model farm to students and school classes where they allow the next generation to gain hands-on experience of the theme of biodiversity. This model farm also inspired the project "Companies Call for Diversity", where the aim is to develop practical and low-cost

methods of increasing biodiversity in agriculture. This project was a collaboration with AÖL (Association of Ecological Food Producers), other organic food producers and scientists and it has been expanded to include farmed fruit, vegetables and grain. The project receives financial support from the DBU (German Federal Environmental Foundation).

Another project of the same company was launched in Costa Rica regarding banana cultivation. A staff member works locally to oversee the project and there is an environment of mutual trust between HiPP and the farming families. The bananas are cultivated by smallholders who are engaging in organic farming methods. HiPP is conserving the natural habitats of flora EMAS & Biodiversity and fauna and protecting biodiversity. The banana plants stand individually and widely spaced, enabling any spread of disease or fungal infection to be quickly contained by simply removing any plants affected. In contrast to conventional plantation farming, no pesticides or herbicides are used. This maintains the quality of the fruit and conserves the environment as a habitat for a wealth of flora and fauna.

All corporate agreements and contracts include an environmental, social and ethical code, with the aim that suppliers and business partners comply with them and annual staff training courses explore the importance of biodiversity to HiPP staff and allow them to learn more about its background. There are also Environmental Days held at which all members of staff, particularly trainees, plant trees, dig ponds for amphibious animals or create habitats for endangered species of birds. Furthermore, the staff are informed about HiPP biodiversity projects on the Intranet and via other forms of media.

10.4 Small apple growers in Italy's Trentino region benefit greatly from Integrated Fruit Production

Trentino is a mountainous region and an important producer of apples (10,000 hectares) with annual production of about 450,000 tons accounting for about 20% of Italian production. The operations, mostly because of the division of farms between heirs, are very small (about 1.3 hectares). The unemployment levels are high and these farmers are able to earn a living by annually producing large quantities of nearly blemish-free fruit. Apple farming is the main source of income for about 10,000 families in Trentino. In addition, another 6000 families depend on income from the apple sector for packing, transportation and other secondary activities. Due to the small size of apple operations, growers band together into cooperatives to organize marketing and today, about 95% of the apples produced are assigned to the cooperatives. In 1989, the Public Administration of Trento initiate a program for Integrated Production standards, in order to help farmers benefit from a market position with clearly defined quality standards. Growers are obliged to sign

agreements and the cooperatives are responsible for their members' activities. Since 1991, Integrated Fruit Production (IFP) guidelines have covered all aspects of production, including inspection for compliance and fines payable for infractions. The guidelines include choice of varieties, pruning systems, grass cover, nutrition, thinning, irrigation, harvest time, farm records, and pesticide use. Every year, the guidelines are updated. The list of approved chemicals is integrated with new registered compounds judged consistent with Integrated Fruit Production. Impacts on beneficial organisms and resistance management requirements are taken into consideration. The apple crop in Trentino is almost completely managed by IFP standards, which they combine sampling, thresholds and pest forecasts with biological and cultural control methods and the use of selective pesticides. Only a single miticide treatment is applies to biological control mites. To manage apple scab they use 10-24 treatments with preventative and curative fungicides. Codling moth has two generations per year. Mating disruption, combined with insecticides, is used in high-pressure orchards (30%) In low pressure orchards, pheromone applications are not economically feasible. The most common situation includes an application of an insect growth regulator at the first egg-laying period and two more treatments using insecticides with a different mode of action. A spring insecticide treatment against psyllids is mandatory because they are vectors of apple proliferation (AP) disease. AP occurs in all countries of central and southern Europe but its highest incidences are in Trentino and southwestern Germany. The disease causes important economic losses due to small size of fruits and poor taste. Thus, by controlling and preventing the damage from insects and pathogens that could damage the production of the apples they manage to stay profitable and provide a major contribution to the economic and social standards of the province.

10.5 Vertical Farming

By 2050, the world's population is expected to grow by another 2 billion people, and feeding it will be a huge challenge. Vertical farming is the practice of producing food on vertically inclined surfaces. Instead of farming vegetables and other foods on a single level, such as in a field or a greenhouse, this method produces foods in vertically stacked layers commonly integrated into other structures like a skyscraper, shipping container or repurposed warehouse.

The largest vertical farm is Aerofarms, a 14,164 square meter facility in Newark, New Jersey, run by Aerofarms. The farm has won the award of the World's Most Innovative Companies by Fast Company and has the potential to produce 2 million pounds of lettuce every year, without soil or natural sunlight.

AeroFarms was founded in upstate New York but it moved to Newark to be closer to the people it serves. The city is home to four of AeroFarms' nine locations, and many of its residents are employed at the farms.

Photo by AeroFarms

They use aeroponics to mist the roots of our greens with nutrients, water, and oxygen. The aeroponic system is a closed loop system, using 95% less water than field farming and 40% less than hydroponics. In addition, they use LED lights to create a specific light recipe for each plant, giving the greens exactly the spectrum, intensity, and frequency they need for photosynthesis in the most energy-efficient way possible. This engineered lighting allows them to control size, shape, texture, color, flavor, and nutrition with razor-sharp precision and increased productivity. They are constantly monitoring all of the macro- and micronutrients for our plants to provide them with everything that they need to thrive. They are able to take the exact same seed from the field and grow it in half the time as a traditional field farmer, leading to 390 times more productivity per square foot than a commercial field farm. The plant scientists monitor millions of data points every harvest. They are constantly reviewing, testing and improving our growing system using predictive analytics to create a superior and consistent result. They have developed cutting-edge approaches to machine vision; machine learning and integration. They have developed a patented, reusable cloth medium for seeding, germinating, growing, and harvesting. The cloth can be fully sanitized, after harvest and reseeded with no risk of contamination, acting as a barrier between the mist and the plants. Moreover, their growing methods disrupt the normal life cycle of common indoor pests so that they never get started.[111]

Oshima, the co-Founder of AeroFarms said "This is a way of growing that uses 95% less water and no pesticides. But at the same time, because of that faster growing cycle and our ability to grow all year round, there's no competition, no weeds. This is

[111] AeroFarms,<https://aerofarms.com/>

a way of growing that has 390 times more productivity per square foot than a field farm."[112]

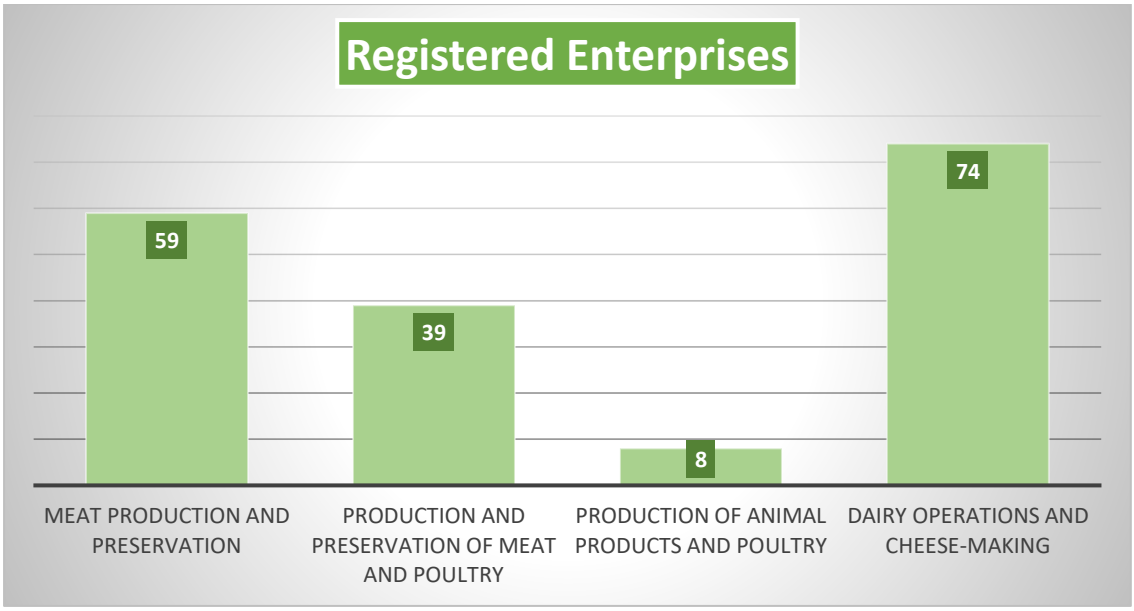
11. Developing a Network of SMEs

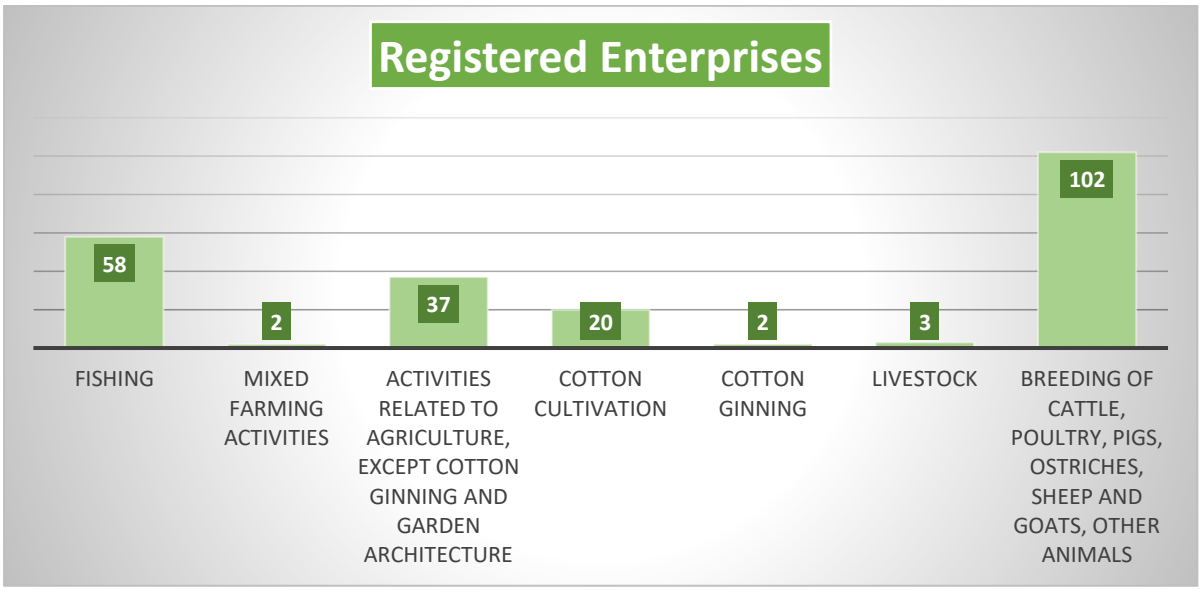
This project aims to enhance the agricultural management practices of the Small and Medium Enterprises in the regions of Central Macedonia and Eastern Macedonia and Thrace and the cross-border area with Bulgaria and its final target is the protection of the environment. To achieve that, a knowledge center will be established in the city of Thessaloniki that will provide guidance and support to new and old entrepreneurs of SMEs. The goal is to promote cross border cooperation and strengthen the development of the regions and their transformation into a center for sustainable development in order to create a system of a brand-name characteristic for cross-border region bio-products.

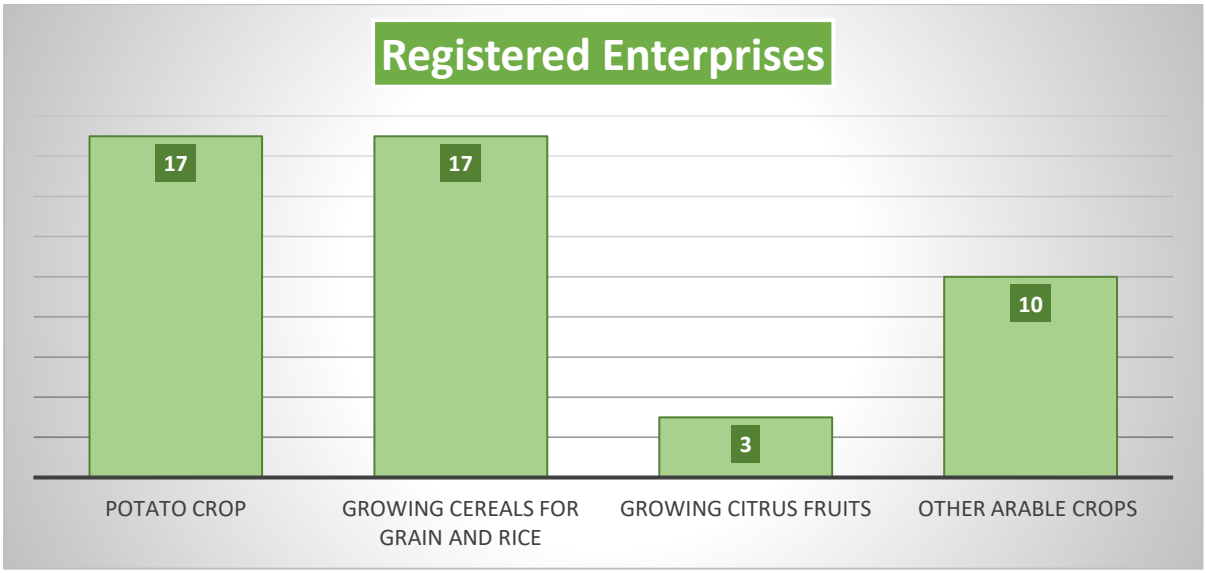
For our search for enterprises that we can cooperate and share our goals with, the Ministry of Finance provided us with the number of registered enterprises in the eligible area.

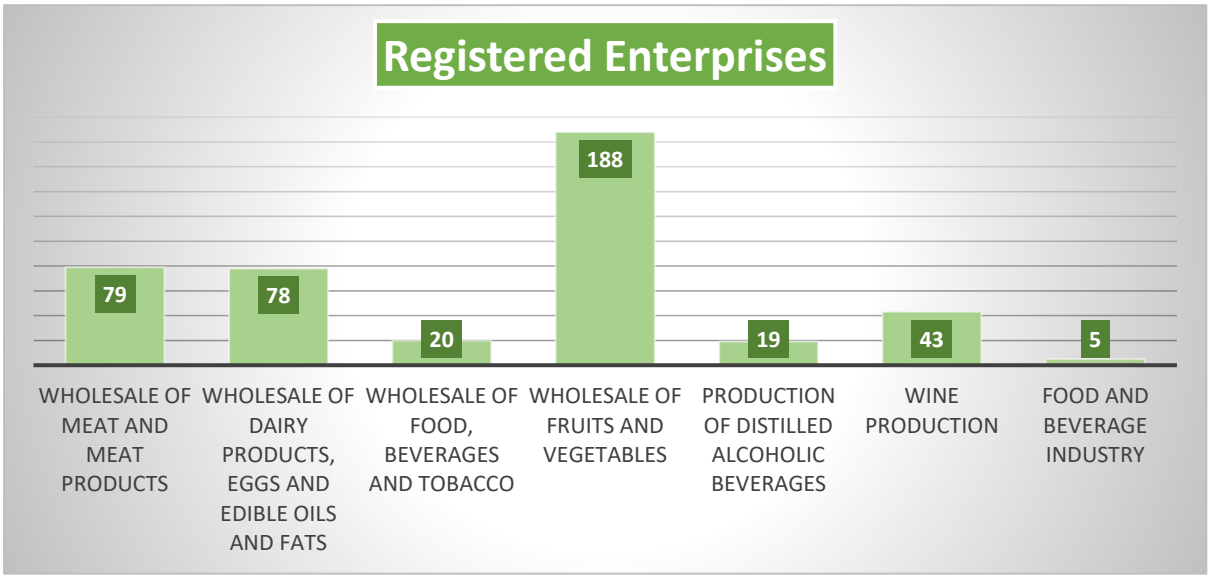
Below there are the rates of the registered enterprises in the prefectures of Drama, Thessaloniki,Evros,Imathia, Kavala, Kilkis,Xanthi, Pella and Halkidiki that are suited for the developing network.

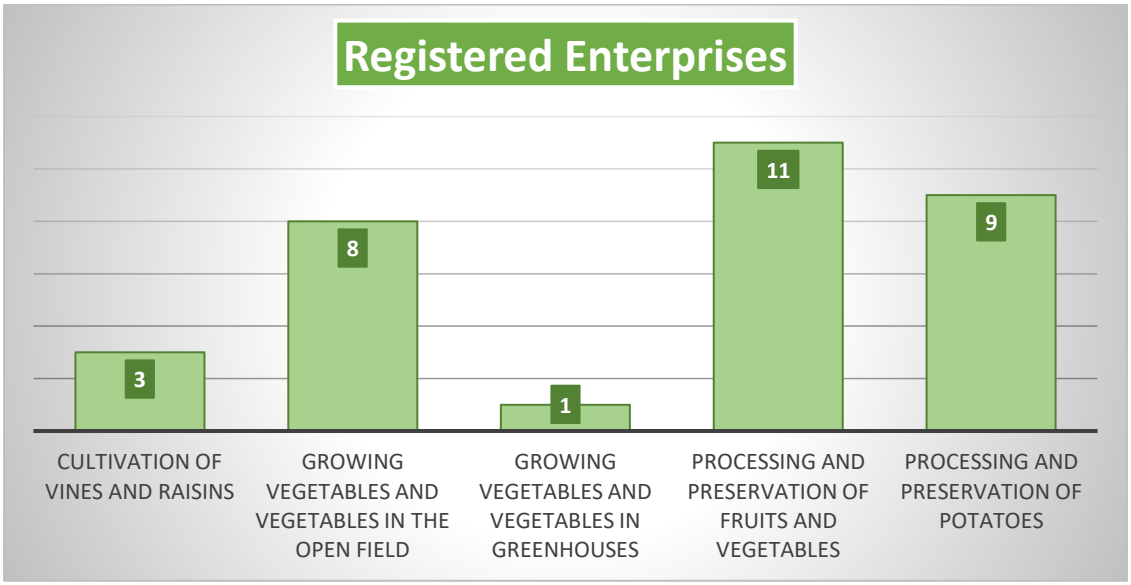
[112] AbcNEWS, 2019<https://abcnews.go.com/Business/vertical-farming-company-aerofarms-making-vegetables-tastier-feeding/story?id=67147957>


Registered Enterprises
59
39
8
74
MEAT PRODUCTION AND PRESERVATION
PRODUCTION AND PRESERVATION OF MEAT AND POULTRY
PRODUCTION OF ANIMAL PRODUCTS AND POULTRY
DAIRY OPERATIONS AND CHEESE-MAKING


Registered Enterprises
58
2
37
20
2
3
102
FISHING
MIXED FARMING ACTIVITIES
ACTIVITIES RELATED TO AGRICULTURE, EXCEPT COTTON GINNING AND GARDEN ARCHITECTURE
COTTON CULTIVATION
COTTON GINNING
LIVESTOCK
BREEDING OF CATTLE, POULTRY, PIGS, OSTRICHES, SHEEP AND GOATS, OTHER ANIMALS







Data from Ministry of Finance

The first step in our work is to make ourselves open to the public through relevant carriers and communicate our goals through every mean. We will be accessible and approachable to the enterprises that want to develop their contribution to the environment and through that, their overall profile. Our network will built in the regions of Central Macedonia and Eastern Macedonia and Thrace and our actions are oriented in these eligible areas. This means that our communication strategy will include among others the people related to agricultural activities in the communities of the regions.

Our next step is to cooperate with the Bulgarian side and to create a strong culture for the cross-border area. In order to achieve that, people in both sides, need to have the proper information and training to understand how they will benefit from this project but also how to implement the methods needed to achieve this. Furthermore, people need to learn to work together and cooperate and to realize the potential of building a strong network of healthy enterprises.

The knowledge center will be located in the city of Thessaloniki, which is a central point and easy accessible. There, people will make contact with trained personnel that will inform them about the EMAS methods and will guide and advise them.

We shall also organize a trip to some of the eligible areas in order to introduce ourselves to the local community and get in touch with local associations.

In order to be more approachable, an online tool will created with an EMS Compliance Assistant Platform that will set up. Every person who wish to visit will have free access. The platform will provide the opportunity of a self-assessment through a questionnaire that will determine the rate of compliance with EMAS for entrepreneurs. After that, the visitor will receive instructions and improvement procedures that his company should follow.

Our team will constantly support the Knowledge center and keep up with the changes that may occur due to coronavirus pandemic. In case of limited access, we will have scheduled appointments in order to avoid gathering and give more ground to the call center. We want to create strong bonds with the people that will approach us and cooperate so we can achieve sustainable goals and mouth-to-mouth reputation.

Finally, after a short period of action we will evaluate our work and progress, measure the outcome so far, and make the right changes if needed.

12. Conclusion & recommendations

Greece's agricultural environment is characterized by small and medium, mostly family owned enterprises. Most farmers in rural areas have low education and many of them are getting involved with agriculture for opportunistic reasons and they don't evolve. Greece's economic crises through the years 2009 -2018 led to many companies to bankrupt and many people were found unemployed. During these years, many young people decide to go abroad in order to have betted job opportunities. Greece performance in innovation is low but in the latest years, there are many companies that start to adopt innovative methods and new management styles. Our main target is to help more companies reach that goal and be competitive and up to date. In the regions of Central Macedonia and Eastern Macedonia there is prosperity in the agricultural sector and Greece and Bulgaria good relationship gives the opportunity to create a network in the cross-border area for a strong agricultural

brand name. Tourism could also help in some of its forms like agrotourism, enotourism and ecotourism where people are motivated and educated in Good Practices.

The European Union is granting many funds to help young entrepreneurs to make their first step and guide them to success. The need for people to be well informed and properly trained has seriously increased, since the population growth and climate change are requiring new innovative methods and higher production. The agricultural sector is going to be a serious contributor to a sustainable development, along with society compliance.

There are many Good Practices that the farming industry needs to adopt, like the use of renewable energy sources, waste recycling that will reduce the use of fertilizers and other chemicals, the use of soil organic matter, direct seeding or planting that will minimize the disturbance of soil and crop rotation. The target is to protect biodiversity and the environment and set up a Circular Economy in order to protect and preserve the environment and thus our health and future generations. Out of date processes like deforestation, use of plastic materials that lasts for a short duration and black carbon, which is responsible for many diseases and contributes to climate change or the pollution of water and contaminating the soil with fertilizers and pesticides, need to be left behind if we want to respect the eco-system.

Technology is helping agro-businesses to stay ahead. There are many cases in Greece and in other countries, that innovation gave a competitive advantage to the enterprise, providing inspiration to other entrepreneurs. That is why business managers need to study other successful cases, adopting, and adjusting the methods in their business.

Moreover, all enterprises need to comply with security measures and have an Environmental Management System to reduce their environmental impact. EMAS is an Eco-Management and Audit Scheme, developed by the European Commissions for every type of organization. Its objective is to encourage organizations to demonstrate that they are proactive in their approach to the environmental management. The companies are able to evaluate, report, and improve their environmental performance. Our target is to work together with companies and provide them all the necessary tools and information to adopt the EMAS and measure the status of the company. We will develop a network in the eligible regions and work closely with the Bulgarian side of the project in order to create an interconnected system of businesses that have more opportunities and a strong brand name.

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