New Agriculture for a New Generation: Recharging Greek Youth to Revitalize the Agriculture and Food Sector of the Greek Economy

Task 2 Deliverable: An overview of the structure of the Agrologistics industry in Greece

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NEW AGRICULTURE FOR A NEW GENERATION

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1. Overview of the Greek economy

Economy covers a wide range of themes that span production, distribution and consumption activities across the three traditional economic sectors according to the three-sector theory [1]. In addition to the agriculture, animal husbandry, fishing and forestry activities of the primary sector, the importance of other economic activities of the secondary sector (e.g. manufacturing and industrial processing of secondary products) and the tertiary sector (e.g. storage, transportation and distribution of the products to the sale points) are of paramount importance for the sustainable growth of the agrologistics chain in Greece. Specifically, Agro-Logistics can be seen as a sub-discipline of Logistics comprising all the necessary activities and organizations engaging in the flow and processing of products and related information from the raw material stage to the end user. It therefore concerns all the actors and processes involved in the production (farmers), manufacturing and processing (industry), storage and distribution (service providers and traders) up to the final consumer [2].

After almost a decade long recession period, the Greek economy appears to be in the recovery process as improvements have been recorded in GDP and unemployment in 2017. The country has officially exited the European Stability Mechanism (ESM) support programme on 21 August 2018 as a result of improvements on its budget and account balances. The economy's new era highlighted by the performance record reached in 2017 where the highest degree of extroversion was recorded, as exports of goods and services reached historically high levels. The increase of growth and employment continued throughout 2018 but the investments (both private and public) which bottomed out in 2015 and slowly increasing they are still less than 13% as a share of GDP which constitutes the lowest number in the EU. The lack of investment favorable conditions undermines the country's growth potential resulting in the loss of human capital in the form of emigration of large numbers of skilled workforce [3]. Worth noting is also the fact that business demography has developed significantly during the past 2 years. According to the general commercial registry, there were 31.271 new business registrations for 2017 recording a 4.1% increase from the previous year while the de-registrations for the same period decreased by 27.1 %. [4].

The following figures give an overview of the share that the three economic sectors of the country's economy hold in terms of gross value added as percentage of the GDP and the percentage of employed persons by section of economic activity. The gross value added is calculated without taking into consideration deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

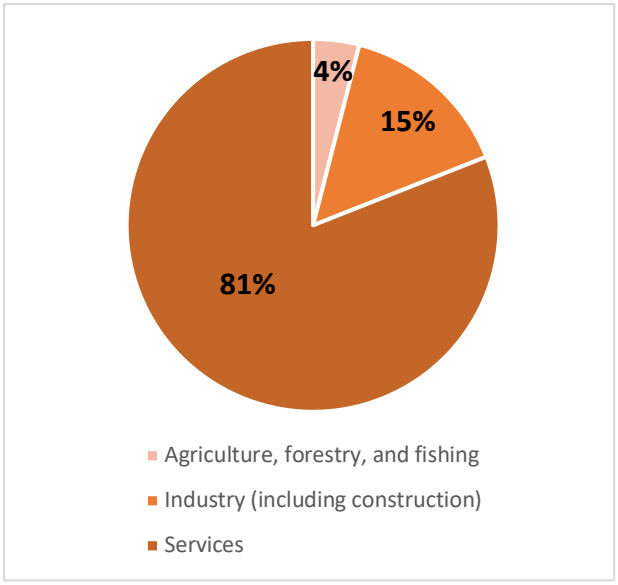

Figure 1: Value added per economic sector as % of GDP (Source: [5])

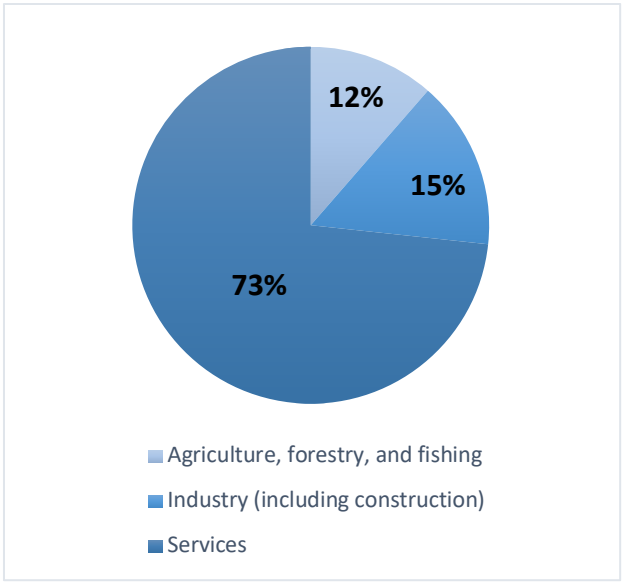

Figure 2: % of employed persons by economic sector (Source: [6])

As depicted above (Figure 1), the primary sector includes the cultivation of crops and livestock production as well as forestry and fishing and represents the 4% of the GDP while also employs the 12% of the total workforce. The secondary sector includes the core of industrial activities like manufacturing and processing industries. It also comprises value added in mining, construction and energy subsectors (electricity, water, and gas) constituting the 15% of the GDP. The secondary sector is providing jobs to the 15% of the workforce with manufacturing employing approximately 380 thousand persons.

Tertiary sector comprises the value of all the intangible economic activities ranging from the storage and freight transport services to those associated with financial and government matters. The tertiary sector is constantly expanding over the years accounting for the 81% of the Greek economy in 2018 and the overwhelming majority of jobs with 73% (Figure 2).

This chapter will focus in the analysis and assessment of the current status of the secondary and tertiary sectors as they relate to Agro- Logistics in Greece and their relative position throughout the Greek industry with emphasis on future development prospects based on their dynamics and emerging trends that affect the sector.

2. Processing of Agricultural products

In an economy that is in the process of recovery, such as the Greek one, the manufacturing industry may contribute greatly to its growth and increase of its international competitiveness. It's a sector that traditionally attracts large volumes of investment and presents increased productivity compared to the primary sector creating a robust and productive base of high added value tradable goods that can promote the extroversion of the economy and help establish a surplus trade balance in Greece.

The European Union acknowledging the importance of manufacturing sector for creating jobs and growth where each additional job in manufacturing creates 0.5-2 jobs in other sectors, have established a set of priorities to support its competitiveness and a European Industrial Renaissance[1]. The Greek manufacturing sector although experienced a decrease the previous years, has shown resilience and accounts for the 9.6% of the country's GDP recording a 0.2% year on year increase from 2016 and onwards indicating that there is significant room for more growth [5].

The contribution of agriculture to the secondary economic sector remains substantial with a significant range of products that in many cases are not suitable for immediate consumption or use. The proper utilization of agricultural production as well as the creation of several products that meet the consumers' needs and satisfy their different preferences are the subject of a specific part of the secondary sector namely the processing of agricultural products. This includes all the processes applied to the primary sector products out of which a new product is derived excluding all the related work done on the farm in order to prepare a plant or animal based product for sale [2].

The processing of agricultural products is considered to be one of the major industrial activities of the secondary economic sector mainly owing to the fact that its activity is related to the production of food and other products that ultimately serve human beings and their immediate needs. It comprises companies that are engaging in activities related to the processing of primary agricultural products from the beginning of the agriculture chain (crop

[1] https://ec.europa.eu/commission/presscorner/detail/en/IP_14_42

and animal products and other raw materials) and sometimes the use of intermediate or semi-processed agricultural products. In other words, the main element that characterizes these companies in relation to the agricultural production is that the raw materials used in the production process are primary sector produce where after the appropriate process provide goods for immediate consumption by humans and animals (e.g. animal feed). These businesses operate throughout the year or for a specific period as production can be highly seasonal due to biological cycles depending on the agricultural product they process [7].

The manufacturing sectors engaging in the processing of agricultural produce is comprised of the following economic activities (Table 1) as described in the second revision of the European Community's statistical classification of economic activities which is abbreviated as NACE[2]. The table also provides information for the turnover of each activity along with the production index which measures changes in value added at factor cost taking 2015 as the reference year (2015=100) [8].

Table 1: Manufacturing sectors related to agriculture in 2018. Turnover (million €) and Industrial production (volume) index at base year 2015 (2015=100) (Source: [9])

Code	Activity	Turnover (million €)	Industrial production index (2015=100)
C10 - C11	Manufacture of food products and beverages	15.500,6	102,1
C12	Manufacture of tobacco products	685	95,1
C13	Manufacture of textiles	746	105,1
C10 - C33	Total of manufacturing sector	58.195,2	109,2

2.1. Food and Beverage industry

Undoubtedly, the Food Sector in Greece is consistently one of the most important segments of the agro-processing business and constitutes the main driving force of the entire Greek manufacturing and processing sector with an increased year on year contribution to the country's external trade balance [10]. The sector covers all the activities relating to the process, standardize, and move of food in either its final form or in a semi-finished form for further treatment and handling by other processing industries.

The food and beverage Industry is among the driving forces of the manufacturing sector in Greece and is fundamental to the Greek economy in terms of turnover, added value and productivity and a major provider of employment. It is a dynamic, competitive and extroverted industry, with significant investments and business activity in Greece, the Balkans and throughout Europe. The sector remains a stable, competitive, resilient and robust economic activity being one of the few domestic industries that has managed to keep its production levels high throughout the recent economic recession period maintaining its fundamental role

[2] https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

and demonstrating the necessary requirements to remain a major growth lever for the economy, open to new challenges and opportunities with a great development capacity [11].

The following table (Table 2) presents the basic structural figures of the food and beverage industry, namely the number of enterprises, turnover, production value and number of employees per subsector and in relation to the total manufacturing sector. The data are taken from the latest published data of the Eurostat database concerning the 2018 year.

Table 2: Number of enterprises, turnover, production value and number of employees of the Food and Beverage industry and the Manufacturing sector (Source: [9])

Sector	Enterprises (n.)	Turnover (million €)	Production value (million €)	Employees (n.)
Manufacture of food products	14.900	13.467,1	11.368,4	111.911
Manufacture of beverages	1.150	2.033,5	1.873,7	8.716
Total of manufacturing sector	58.247	58.195,2	52.016,2	326.751

Based on the above data, some valuable results can be extracted. The Food & Beverage industry is accounting for the 27% of the total manufacturing turnover having a higher contribution compared to other European countries where the average is 10-20%. In addition, the industry employs more than 120 thousand persons, corresponding to the 37% of the total workforce in the manufacturing sector [12].

The majority of companies (14,765) that are active in the food and beverage industry are small, family-owned businesses, employing less than 10 people. However, they account for only 15% of the total industry turnover (€ 2.3 billion). On the other hand, the 325 largest companies of the industry employing more than 50 persons recorded increased revenues showing a strong resilience during the previous period accounting for approximately € 10 billion of turnover in 2017 highlighting the fact that the 2% of the industry's companies are accounting for the 64% of the total sector's turnover. The remaining 21% of the turnover is attributed to the small and medium-sized companies (10-49 employees) of the industry.

In 2017 SMEs engaging in the manufacturing of food products were accounted for one third of the total SME employment and value added in the manufacturing sector making them its largest SME subsector and an important factor to the growth of the non-financial-business economy for the last years. The increase of food products exports by 46%, especially those of dairy products (cheese and yogurt), olives, natural sweets and honey, between the years 2010 and 2016 have contributed greatly to the year on year growth of the sector reaching a 10.8% increase in employment and 15% in value added for the 2015-2017 period [13].

By analysing the structural characteristics of the Greek food and beverage industry, some useful results can be extracted for the business potential of its subsectors. Bakery and

farinaceous products sector proves to account for the highest share in terms of gross value added recording 20% while fruits and vegetables and beverages are in the second place with 16% each and dairy products are third with 14% of the industry's total gross value added. Similar results are also observed regarding the production value of the food and beverage industry as bakery and farinaceous products together with the dairy products account for 16% of the total each, followed closely by beverages and fruits and vegetables with 14% and 13% respectively. When it comes to the number of business that are active to each subsector, the majority of them (59%) correspond to the bakery and farinaceous products, the oils and fats business represent the 12% of the total while the 7% correspond to various other food products and the 5% in dairy products.

Furthermore, businesses that manufacture or processing bakery and farinaceous products recorded the highest turnover of the industry (17%) and those producing dairy products although they make up only 5% of the total food industry businesses, they recorded the 15% of the total turnover. Additionally, companies dealing with fruits and vegetables and oils and fats are following in the list with 14% turnover each. Finally, regarding the employment of the food and beverage industry, the majority of employees are in the bakery and farinaceous products subsector while in the fruits and vegetables are employed the 14% of the total and in the dairy products the 11% [14].

2.1.1. Exports

Regarding the exports of the Greek processed food and beverage products, in 2017 they remain practically the same recording only a slight increase by 0.2% from the previous year amounted to € 3.06 billion. On the other hand, the imports increased by 1.9% amounted to € 4.8 billion compared to the € 4.7 billion in 2016 meaning that the much higher increase in imports compared to the corresponding exports broaden the trade deficit by 5.1% reaching € 1.7 billion. The main products that recorded a positive balance of trade for 2017 were the processed fruits and vegetables and oils and fats with € 274 million and € 224 million respectively although both products had reduced exports compared with last year. All the other product categories had more imports than exports, recording a trade deficit. The country's main trading partner regarding the export of processed foods and beverages for 2017 was Germany with 17% of the total with Italy following 14% which is considerably lower from the 18% of the previous year, USA with 9% and United Kingdom and Cyprus with 8% and 6% respectively [14].

However, regardless of the fact that it is the most productive industrial sector, the country's food industry seems to have not taken full advantage of the agricultural production and its wide range of products. Greece holds approximately only 2% of the core European export markets indicating the need to draft a more holistic and focused product and export strategy. The majority of agricultural products are exported in bulk form without a substantial degree of processing and little added value from manufacturing constitutes a disadvantage for the Greek food industry. A notable example of the aforementioned drawback is the case of the Greek

olive oil were only 27% of the total quantities are branded before being distributed abroad in contrast to the same product being exported from other countries such as Spain and Italy were the branded percentage reaches the 50% and 80% respectively, making olive oil a synonymous with these countries [3], [13].

2.1.2. SWOT Analysis

By taking into account the basic characteristics, the internal and external factors that affect the development and sustainability of the Food and Beverage industry, a SWOT analysis is formulated to determine its growth potential (Table 3). The specifics of the entire agri-food chain are also considered since a number of parameters from the primary to the tertiary sector have a significant impact on its growth potential.

Table 3: SWOT analysis of the food and beverage industry (Source: [10], [15])

STRENGTHS (+)	WEAKNESSES (-)
• The production of high-quality raw materials due to the favoring climatic and soil conditions. • The increase in organic production practices and especially in organic cultivation • The distinct characteristics of specific Greek food products that often have a high nutritional value. • The high level of technological development and infrastructure in certain sectors such as the dairy industry, the meat industry, the production of tomato products, etc. • The development of fish farming.	• The level of fragmentation of the manufacturing sector due to the large number of very small companies (< 10 employees). • The shortage in agricultural produce due to the limited land per unit and the large fragmentation of inhomogeneous products. • The inability of agricultural production to adapt to new market demands. • The limited domestic market and the distance from the countries of Central Europe. • The difficulty in expanding to new markets especially outside the European Union. • Existing weaknesses in distribution networks. • The lack of collaborative actions to promote Greek products compared to other Mediterranean countries. • The absence of a long-term strategy for the Sector. • Frequent legislative and tax changes along with the unfavorable institutional framework for entrepreneurship. • The low standardization of products (e.g. fruits, vegetables and olive oil).
OPPORTUNITIES (+)	**THREATS (-)**
• Consumers' growing interest in healthy and high-quality foods creates prospects for foods linked to the Mediterranean diet model, organic products, the products of Protected Designation of Origin (PDO) or Protected Geographical Indication (PGI), etc. • Conditions favoring the return of population with a high level of education in rural areas and engage in agricultural production. • Promoting the collaboration of research bodies with businesses.	• The low cost of imported products. • The results of the long lasting economic recession. • The increased market share of major food traders introducing many imported products that reduces the bargaining power of Greek food product manufacturers. • The unwillingness of companies for new investments and innovative initiatives. • The lack of collaboration between the industry, research and educational providers. • The degradation of the education system.

• Utilizing innovation and new technologies for improving productivity and meet consumer needs. • The geographical location of the country and especially the possibility of approaching many markets. • The geographic location of the country along with the development of the transportation sector facilitating the distribution to new markets. • The synergies between the agriculture and food sectors with tourism, which can increase direct sales in the short term, and exports in the long run. • The investments of the Greek food industry in domestic production and raw materials. • The increased consumers' trend of supporting domestic products due to the economic crisis. • The developments in the fields of biotechnology and genomics that can support the promotion of health benefits by consuming Greek food products.	• The lack of extroversion that characterizes the businesses. • Large fluctuations in raw material prices worldwide. • Energy costs and the reduction of energy reserves. • Intense competition from other countries.

2.1.3. Future Potential

The agricultural sector has the dynamic and growth potential to act as one of the main driving forces for the recovery and sustainable development of the Greek economy. To survive in the context of the new globalized food environment, where consumers will increasingly impose their personal requirements along with the increased presence of new technologies, food and beverage businesses will have to make radical changes to their productive practices. Taking into account its characteristics, trends and perspectives, the Greek food and beverage industry presents a strong and promising growth potential by making determined efforts to deal with emerging economic and technological challenges derived from the increasing international competition and new consumer trends. As a response, the domestic industry is trying to improve its competitiveness by reorganizing all stages of food production and distribution through the adoption of new technologies and innovative business practices for the purpose of achieving high levels of product diversification and quality and ultimately expanding its market share.

According to a recent report of the National Documentation Center (2019) that examined the strengthening of priority economic sectors of strategic importance for the Greece (e.g. tourism, energy, agri-food, environment, supply chain etc.) by domestic innovative companies as a result of the innovative procedures they apply to entrepreneurship during the period 2014-2016, the agro-nutrition & food industry is the sector that benefited the most from related innovative products and business procedures with 21.7%. Furthermore, it is the top industrial sector when it comes to innovative businesses with 38.3% of the entire secondary sector clearly showing the potential of the food industry to exploit innovative solutions for strengthening its market position [16].

The changes we are observing today require a fundamental transformation in operational and business practices of all actors involved in the agri-food chain along with the drafting of sector related policies and support initiatives to create favorable conditions for the development of innovative efforts that will facilitate the sector's extroversion and business potential.

To this context, Greece has adopted a support programme, under the 2014-2020 rural development programme, in order to promote agribusiness activities by supporting investments in processing, marketing and development of agricultural products. The main objectives of the program are:

- To increase the added value of agricultural products by making them more attractive to the consumer
- The integration of innovation processes and the use of new technologies as well as environmentally friendly processes that reduce the environmental impact of the sector
- The preservation and creating of jobs and as well as the protection of human health.

Some of the focus areas of the support action encourages, among others, the digital transformation in the agrifood sector, construction or improvement of building infrastructure, purchase and installation of laboratory equipment to the extent that it serves the operational activities as well as equipment for the production of energy from renewable sources and equipment for water saving and waste treatment [17].

Creating sectoral links

In addition, to the increase of added value through innovation and technology, the industry focuses on strengthening its collaboration with other economic activities with the support of relevant government bodies for increasing the extroversion of the industry by efficiently promoting the uniqueness and quality of Greek products and choosing the appropriate distribution channels.

To this end, the development of synergies between the manufacturing and processing industry and key activities of the primary and tertiary economic sectors highlights the role of the industry, adding value to its products and increases its export dynamics [14].

Linking sectors with strong comparative advantages like agriculture and food industry with other driving forces of the Greek economy as is tourism, can constitute a key enabler towards the restructuring of the rural life and the local economy and a solid source of jobs in areas with higher levels of unemployment. The Greek government aims to promote the co-operation and the creation of synergies between those sectors taking advantage of the great diversity, high quality and the recognition of the Greek agricultural products in combination with the cultural heritage, the landscape and the environmental conditions of the country.

To this end the coordinating body "Agri-Food - Industry - Tourism Forum" was created holding an advisory role for both the direct and long-term policy making. This instrument aims to

elaborate on the suggestion of policy measures and actions providing also support to the formulation and submission of proposals by businesses in the targeted sectors. The main objective is to support the implementation of the government's strategy for agriculture and rural development in a modern and efficient context highlighting its comparative advantages.

The above points highlight the importance of inter-business synergies and networking, horizontal integration, research and innovation along with the use of information and communication technologies and marketing practices for renewing businesses and the future of the agri-food chain. Especially important for the future potential of the sector is also the collaboration between the industry, research and educational providers (secondary and post-secondary VET and tertiary education) to identify the educational and training needs that will facilitate the engaging of young people in agribusiness and the supply of industry with highly qualified workforce that will be holders of the necessary skillsets enabling the revitalization of the Agriculture and Food Sector. To this end, the role of business services and the services that contribute to the creation of a higher quality workforce trained under new productive and competitive conditions is extremely important [18].

2.2. Tobacco industry

Today there are 9 active tobacco companies in Greece a significant smaller number compared to the 70 companies that operated 10 years ago directly employing approximately 2.000 employees. Out of these, 4 are engaged in the light processing of tobacco products, 2 are engaging in the production of tobacco and other related products holding more than 90% of the industry's value while 3 are importers subsidiaries of multinational companies. Worth noting is the recent acquisition of SEKAP SA from the Japanese JTI who acquired the entire parent organization Donskoy Tabak. Furthermore, there are also several small importers of tobacco products but they hold a small market share and have little impact on the characteristics of the industry [19].

Although the sector recorded a slight sales increase in 2018, overall the tobacco market followed a downward trend which recorded a 43% decrease in sales between 2009 and 2016 (IOBE, 2016). The domestic consumption of tobacco products has been in a decline during the recent years due to the economic crisis and the impact it had on the purchasing power of Greeks. Consumers spend on average 20% less money on cigarette and tobacco consumption the last three years compared to 2008 and pro-crisis levels which is also shown by the 2.7% decrease of the retail turnover index regarding the food, beverages and tobacco products category [20], [21].

Worth noting is also the fact that the increase in taxation of tobacco products through the increase of excise duty has led to a significant upsurge in prices causing a sharp decline in the consumption of legal tobacco products which in addition to the recent legislation that imposes a total ban on all public indoors smoking favors the massive influx of smuggled cigarettes and

tobacco in the market. The decrease in consumption and the level of pre-tax prices has led to a significant reduction in revenue across the entire supply chain of tobacco products affecting more than 28.000 direct and indirect jobs related to the production and trading of such products [14].

3. Packaging industry

The production of packaging materials is of great importance for the majority of the agricultural sector and the associated businesses producing food, beverages, tobacco and other agriculturally based products. The mapping and assessment of the packaging industry in Greece is not a simple task as this sector is not considered a separate business activity with a specific classification and is distributed among others like plastic products, paper products, graphic arts, publishing and printing, metal products, etc. Furthermore, another important factor that makes it difficult to classify these companies in a unique business activity is the fact that many of the Greek companies active in the packaging industry are producing more than one type of packaging material at the same time (e.g. paper and plastic packaging) and in other cases the production of such materials represents only a part of the business activities of these companies (e.g. they combine it with the manufacture of greenhouse covering plastic films, self-adhesive tapes, disposable plastics, insulating materials etc.). In some cases several vertically integrated companies that produce juices, soft drinks and agricultural products, include also the production of packing materials in their industrial operations for use on their own products [22], [23]. To this context a commonly accepted practice used by the Association of the Greek Manufacturers of Packaging & Materials is to classify the targeted companies based on the category of produced material that each one accounting for at least 75% of their sales [24].

During the last years, the Greek packaging industry proved to be more resilient compared to the rest of the manufacturing industry presenting a stable dynamic. According to the structural business statistics (SBS) of Eurostat, more than 600 companies are active in Greece in the manufacture of the 3 major type of packaging products namely the plastic packaging products, corrugated paper and paperboard packages and containers and light metal packaging (Figure 3). In total there are currently 324 active companies manufacturing plastic packing, 210 for paper and 73 for metal packaging. Over the recession years, there has been a decrease of approximately 16% in the number of businesses in the aforementioned sectors with those currently active accounting for 1.04% of the total number of companies in the manufacturing sector (Eurostat, 2020). The total turnover of the plastic packing businesses rose to more than € 883 million in 2017 from € 629 million in 2010 (an increase of 40%), while those of paper and metal packaging reached € 482 million and € 368 million respectively (Figure 2).

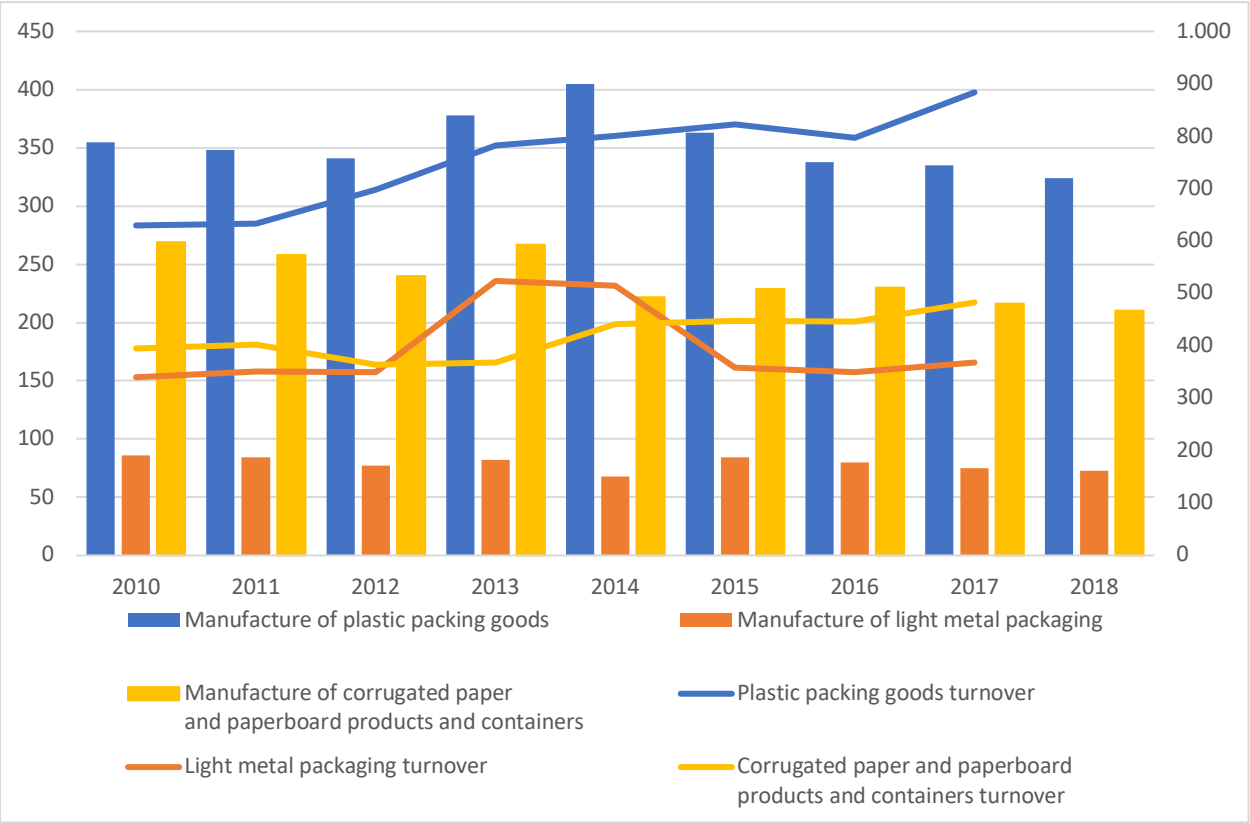

Figure 2: Number of enterprises and turnover per packaging subsector (Source: [9])

Regarding plastic packing the production volume index recorded a cumulative increase of 32% between 2010 and 2019 and is the only sector between the three that recorded a continuous increase since 2013 where the recovery momentum is pronounced in contrast to the rest packaging segments (Figure 4). In contrast, in the cases of paper and metal packing the production volume index recorded a cumulative decrease of approximately 5% for both sectors while they also follow a similar downward trend for the period of 2017-2019. Both sectors have recorded an upward trend at some level though less pronounced compared to the plastic packing but overall they have recorded less production volumes as against those of 2010.

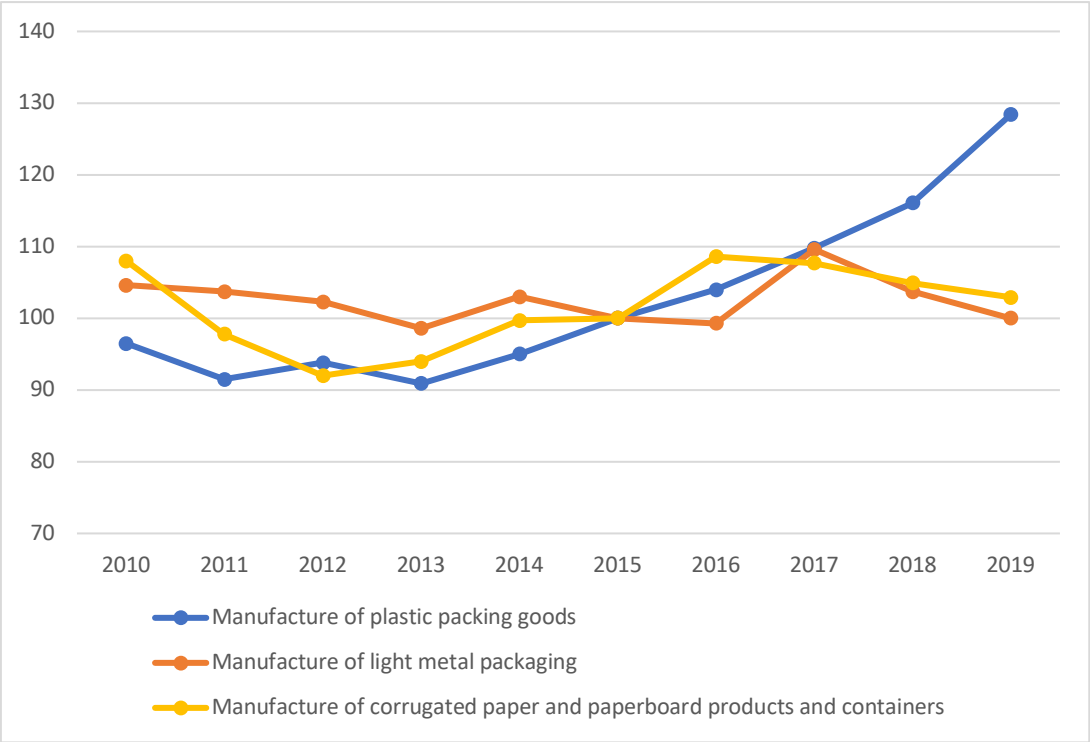

Figure 3: Industrial production (volume) index per Packaging subsector at base year 2015 (2015=100) (Source: [9])

Based on the Association of the Greek Manufacturers of Packaging & Materials' last report published in 2014 the sector is comprised of 165 medium to large industrial businesses and several other not recorded small size companies consisting of general and limited partnerships that is not required by law to publish their balance sheet. These data show an increase from the 143 active medium to large companies in 2012. The packaging manufacturers sector saw a 4% increase in turnover and 22 million of profits in 2013 against a loss of 15 million that was recorded in 2012 contrary to all the other manufacturing sectors (excluding the oil industry). In general, the sector presents approximately a 4% year on year turnover increase over the period 2009 – 2013. It is also worth noting that 80% of corrugated cardboard, carton and industrial packaging production is carried out by only four enterprises [24].

3.1. Future potential

Significant changes and rearrangements expected in the packaging industry as a result of the new Directive (EU) 2018/852 of the European Parliament and of the Council of 30 May 2018 regarding the single use plastics amending the Directive 94/62/EC on packaging and packaging waste[3]. World production of plastics has reached 350 million tonnes in 2017 compared to the 50 million tonnes in 1976 something that highlights the importance of plastics in the world economy. A substantial part of this increase in the growth rate of the plastics demand is due to the flexible plastic packaging products used primarily in the food and beverage industry

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.150.01.0141.01.ENG&toc=OJ:L:2018:150:TOC

which constitutes approximately 40% of the total demand for plastics internationally for 2018 [14].The aim of the new directive is to increase the waste prevention actions by the Member States encouraging the adoption of appropriate measures for the increasing of the share of reusable packaging placed on the market and the reuse of packaging for reducing the environmental impact of waste and improve resource efficiency.

To this end, the Member states should put in place adequate economic incentives and other measures for minimizing of the environmental impacts of packaging and packaging waste, taking also into account the benefits of using bio-based materials and materials suitable for multiple recycling. The appropriate measures should be from a life-cycle perspective aiming to support the competitiveness and sustainability of the packaging industry implementing in that way the long-term strategy of the cyclical economy adopted by Europe setting specific targets for the recycling of plastic packaging and the use of recycled plastics which is projected to reach 55% and 30% by 2030 respectively [13].

4. Supply Chain sector

As mentioned in the previous chapter, the tertiary sector in Greece accounts for the highest employment rates (73%) and GDP (81%) compared to the rest economic sectors and It covers a wide range of economic activities related to the i) market services sector like commerce, transport, accommodation and food service activities, etc. and ii) non-market services like public administration, health and social work, education, etc. In relation to the agribusiness, all the services that are provided in businesses and consumers across the agricultural supply chain and add value to the related products, fall under this sector. The Greek supply chain sector is an ecosystem of economic activities that are a major source of employment with substantial contribution to the country's GDP covering all modes of transport (land, water and air), storage and all the transport related activities [25].

They cover a wide range of activities throughout the agricultural supply chain from raw material procurement, storage and distribution of the final products to consumers. The overall aim of the logistics companies is to adopt an integrated approach of the entire spectrum of their business operations by providing high value added services, minimizing the costs and time and eventually increasing the efficiency across the entire value chain. These services can be provided either in-house by industrial or commercial enterprises or through the outsourcing, either partially or full, of the logistics activities to specialized companies. These companies are called Third Party Logistics (3PL) Providers and can help the manufacturers to take advantage of the economies of scale and lower their transportation and other associated costs [26].

Product-producing companies in Europe typically outsource logistics where in most cases it accounts for the 80 – 90% of the total transport expenses. Therefore, the presence of an efficient and reliable logistics network covering all the necessary storage, transport and ancillary services is crucial for the availability and effective distribution of goods in a market. In

the case of Greece however, the logistics outsourcing is approximately 20% of the total transport expenditures highlighting the need for improvements in the sector and for adoption of modern day logistics practices that will help lowering the costs and contribute to the sustainability of supply chains [27]. According to Eurostat (2017), the Greek supply chain sector consists of 60.143 companies of which 58.566 are very small (0 to 9 people) while there are also 1.316 small companies (10 to 49 people), 204 medium (50 to 249 people) and 57 large companies (> 250 people). It is noted that the 13% of the total number of large companies in Greece employing more than 250 people belong to the logistics sector. The total number of the active companies has been decreased by 14,9% in relation to the pre-crisis levels (2008) highlighting the merging and acquisitions processes, especially in the storage sector, due to the dramatic decline in sales as a result of the economic recession [25]. The domestic supply chain sector manages the entire international import and export trade of the country accounting for approximately the 11% (both 3PL and in-house logistics services) of the country's GDP contributing significantly in the Greek economic activity and employment with more than 175.000 people (4.6% of the total). In relation to the other economic activities, the supply chain sector creates greater gross added value per employee and recovers faster in terms of employment and wages. Lately, attempts are being made towards more efficient operations through the rationalization of costs and overall quality improvement of the provided services towards a more extroverted reorientation of the Greek economy that aims to introduce the Greek products as reliable inputs to international value chains [25], [28].

4.1. Logistics services

Today, a large number of specialized Third Party Logistics companies (3PLs) are providing their services to various businesses, increasing the competition in activities like the management of third party goods (e.g. collecting, storing and dispatching of the products to end customers), order management, packaging, pricing as well as other supplementary activities like customs clearance and vessel and air cargo chartering services (IB.HS, 2018). The existence of large number of 3PL service providers contribute to the expansion, improvement and integration of services but also intensify the fragmentation of the sector which in combination to the excessive regulation prevent the efforts to develop modern warehousing with increased capacity, integrate services and benefitting from the extensive adoption of new technologies [27].

The majority of logistics service providers are based in the Attica region in locations such as the Thriassian Field (Aspropyrgos, Magoula, Mandra, Elefsina), Avlona, Oinofyta along with Paiania and Koropi in close proximity to the Athens International Airport where several 3PL companies are also active offering combined sea - air and air - road transport services. Furthermore, many of the businesses that are engaged in freight forwarding activities maintain facilities and warehouses in northern Greece in the greater Thessaloniki area (Kalochori, Thermi, and Sindos) and other important provincial cities throughout the country [29]. Approximately 40% of these are large sized multinational or domestic companies (that partner with large foreign companies) which cover almost the entire Greek territory offering a full range of services to

their clients which mainly consist of large businesses. For covering the smaller and regional markets, the 3PL providers often form partnerships with local agencies. The majority of the sector is comprised of small and medium sized companies that maintain smaller facilities and offer a limited range of services due to inability to follow technological developments and modern operational procedures. These companies hold the smaller market share and their customers are also small businesses with limited transportation and storage service requirements.

During the 1998 – 2008 period the domestic market for 3PL services was increasing over time, recording 19.7% of average annual growth rate. This constant growth however stopped in 2009 and the sector enter a recession period until 2016 resulting in a cumulative loss of almost 1/4 of its market value for the period between 2008 and 2016 recording a cumulative decrease of 24% for the same period. The recovery of the sector began marginally in 2016 marked with a minor increase of 0.6% compared to the previous year and the upward trend continued also for the following year where the total market value of 3PL service providers increased by an additional 1.8%. Another key point worth mentioning is that in 2016 the top 10 companies of the sector together accounting for more than 50% of the total market value underlining the fact that the largest 3PL companies are constantly gaining market share to the detriment of the smaller ones and in many cases they were bankrupt [28], [29].

Regarding the distribution of the third party logistics companies in the main business categories, the services associated with the storage and handling of goods account for approximately 59% of the total value of the provided 3PL services, out of which the 44% corresponds to the storage and handling of third party dry products and the 15% to the storage and handling of third party refrigerated goods. The distribution services are following next with the 34% of the market and the remaining share is distributed to the unpacking, repackaging and labeling services and other value added services (e.g. monitoring, software support, etc.) with 4% and 3% respectively. It is evident that the 93% of the total provided logistics services corresponds to the storage and distribution sub-sectors (Figure 4).

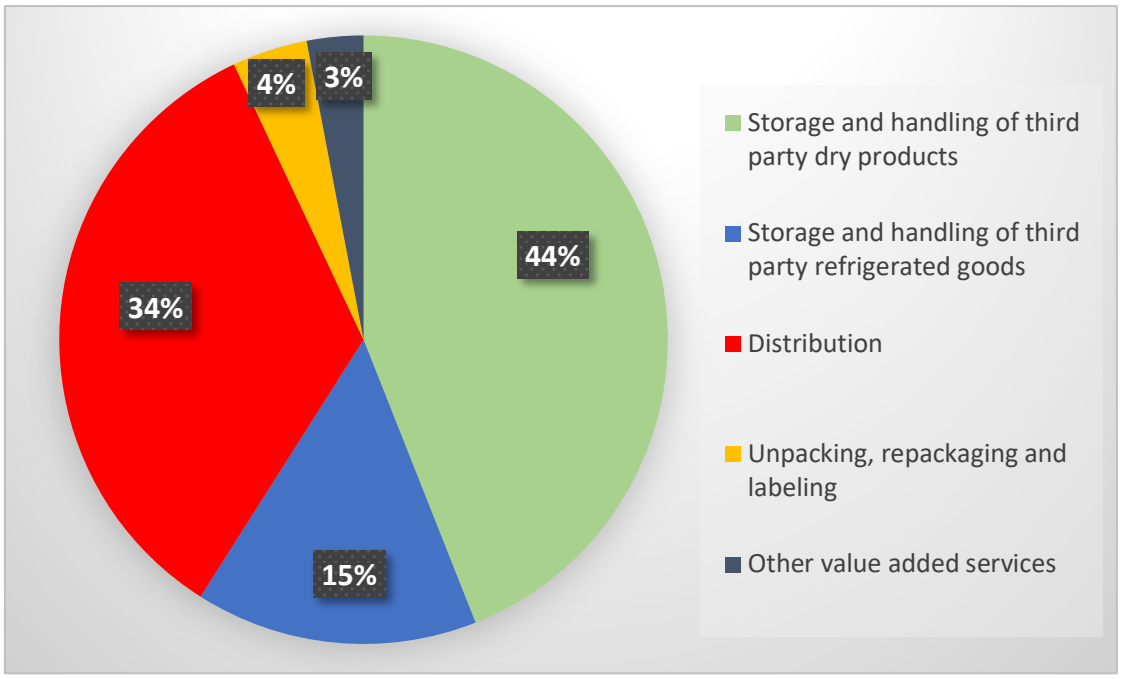

Figure 4: distribution of the 3PL market by type of service (Source: [29])

In relation to the storage and handling of the third-party products, the majority of the 3PL providers (63%) owing warehousing facilities with limited storage capacity of less than 10,000 square meters while only the 14% have facilities larger than 45,000 square meters. The food and beverage industry remains the sector with the largest percentage regarding the outsourcing of logistics procedures per main product category with approximately 23% of the total, following by businesses trading electrical and electronic devices and manufacturers of medicines & medical equipment amongst others [28], [29].

4.2. Land transport

Regarding the land freight transport almost all (98,7%) is transported via the road networks when in the rest of Europe this percentage is smaller (76.4%) mainly due to the country's lack of extensive rail links and the short inland distances [27].

The road transport sector affected from the financial crisis and the ongoing recession of the Greek economy showing a dramatic reduction in total road transport performance. During the 2009-2015 period recorded a sharp decline in both tonnes transported (-35%) and tonne-km (-31%). This performance is attributed to two parameters:

i) The decrease of the national freight transport by more than 38% in terms of tonne-km for the specific period as a result of the downward trend mainly in the food sector's retail sales which constitutes half of the transported freight.

ii) The increase of international freight transport due to the rise in exports and particularly of food products preventing in that way further decline although the share of international transport (25%) in total transport activity is lower compared

with the EU average (35%) and wasn't enough for counterbalancing the decrease of national freight transport.

The recovery of the the international road freight activities was the result of the increased volumes of international trade transshipped via the port of Piraeus which recorded 7.5 times more container traffic between 2011 and 2015. This significant cargo operations expansion of the port turned it into the main driving force of the Greek economy and an important factor for the recovery of almost all the relevant industries [30].

There are approximately 16.700 enterprises in the Greek road freight transportation sector employing more than 34.000 people which represent more than 20 % of those working in the transportation and storage services sector [8]. The majority of companies comprising the road transportation industry, are individual truck-owners and small companies who provide limited traction services to medium or large domestic and international logistics providers [30].

Concerning the cargo truck fleet, the available own-account trucks (used exclusively for serving the owing company's transport needs) have a total carrying capacity of 266.443 tonnes which is decreased by 11.2% from the previous year and traveled 6.5 million ton-km while on the other hand the public-use trucks (used for third parties transport needs) are 7.6% higher compared to 2017 reaching a total cargo carrying capacity of 95.503,4 tonnes with 22.8 million ton-km [21]. The annual tonnekilometres per truck remains significantly lower than the EU average [31].

Important differences are also observed regarding the type and age of trucks where those of 25.5 tonnes and over comprise only the 10% of the fleet when the EU average is 36% and the percentage of old trucks (15 years old or over) is significantly higher than the EU average with 30% against 5% as a result of the economic inability of small companies to renew their own-account truck fleet [32].

The Greek national motorway network consists of more than 1,700 km connecting the largest logistics hubs of Athens and Thessaloniki with the ports of Piraeus, Thessaloniki, Patras and Igoumenitsa and plays an important role to the Orient/East-Med Corridor which connects large parts of Central Europe and its industrial and logistics centers with ports of the North, Baltic, Black and Mediterranean Seas. The largest percentage of the entire corridor's road infrastructure is located in Greece totaling 1.245 km thus requiring a series of development programs during the last years in order to improve its overall condition and comply with the strictest European motorway standards [30].

Regarding the Greek rail freight transport and its dynamics, it is worth noting that the domestic rail transport has historically been oriented towards the passenger transport with limited coverage and to underline this fact it should be emphasized that until 2014 the railway line did not reach the container terminal of Piraeus port. The amount of transported freight reached 408 million ton-kilometers in 2018 through a rail network that remains sparse having one of the lowest percentages in EU in terms of rail network per surface and per population. Railway

freight is the least developed rail market with a total of 20.778 TEUs being transported from 318 trains in 2017 recording € 13.4 million in revenues which constitute approximately 20% of the total market (passenger and freight). The low coverage and carrying capacity of the network limits greatly the rail freight transportation. The available infrastructure poses several important restrictions both on the permissible maximum length of the trains (up to 550 meters) and on the permissible maximum weight of the trains (from 950 to 1.250 tonnes depending on the part of the network) and a particularity found only in the Greek railway system is that the maximum number of axles per train is up to 120. However, the recent privatization of the TRAINOSE SA, operator of the domestic railway transport services (both passenger and freight) from the Italian FS Group along with the recent interest of third parties to involved in the rail freight transportation from different consortiums involving amongst others the Austrian OBB and the Chinese COSCO, showed that there is a significant growth potential for the sector. This potential is due to the fact that the transportation of containers from Asia to Europe, through the Port of Piraeus is shorter by approximately 7 days than the traditional route through the northern ports considered in that way an attractive alternative route for the global supply chains. The completion of the Piraeus port connection with the main railway network and its operational use, enabled the transportation of a significant part of the container throughput to the Central European countries like Hungary, Slovakia and the Czech Republic as well as to the Balkans and vice versa [33], [35].

4.3. Water transport

More than 80% of the global traded volume is carried out by sea and specifically in Europe represents the backbone of trading activities accounting for more than 75% of the EU's external and one third of the intra-EU trade [34].

Maritime transport plays a key role in Greece's international trade contributing substantially to the sustainable economic growth by increasing the country's national product and strengthening its strategic position and competitiveness as a valuable trade partner.

Worth mentioning is the fact that the Greek-owned merchant fleet is the biggest fleet in the world with 4,936 vessels representing almost 21% of the world's total in terms of deadweight tonnage (DWT) while also Greek ship owners account for 53% of all EU-controlled DWT capacity [36], [37].

Due to the unique geographical location between three continents providing an alternative and shorter trade route for the central European markets compared to Northern Europe, Greek ports serve as the main gateways of its entire transport network, and thus represent key engines of economic development and sources of prosperity.

To this end, efficient port infrastructure is a key enabler for accommodating the y-o-y growing maritime freight flows and hence great emphasis has been given on supporting large investments for their improvement and development making them capable to support the country's role as a key gateway to Europe. Thirteen major ports span across the country providing employment to approximately 14.000 persons in activities related to water transportation, cargo handling and storage in 2017 [34].

The developments that have been occurred in the Greek ports and road infrastructure during the recent period have borne fruit as the container transportation recorded more than 700% increase between 2008- 2017 and approximately 46% in the total maritime transport of goods. Specifically, the container transportation traffic increased by 14% during 2017-2018 showing trends of further dynamic acceleration (+ 17% in the last 3 months) [32].

According to the Liner Shipping Connectivity Index (LSCI) which indicates a country's integration level into global liner shipping networks, Greece ranks 21th in the world in maritime connectivity presenting a significant increase since 2016 (Figure 5).

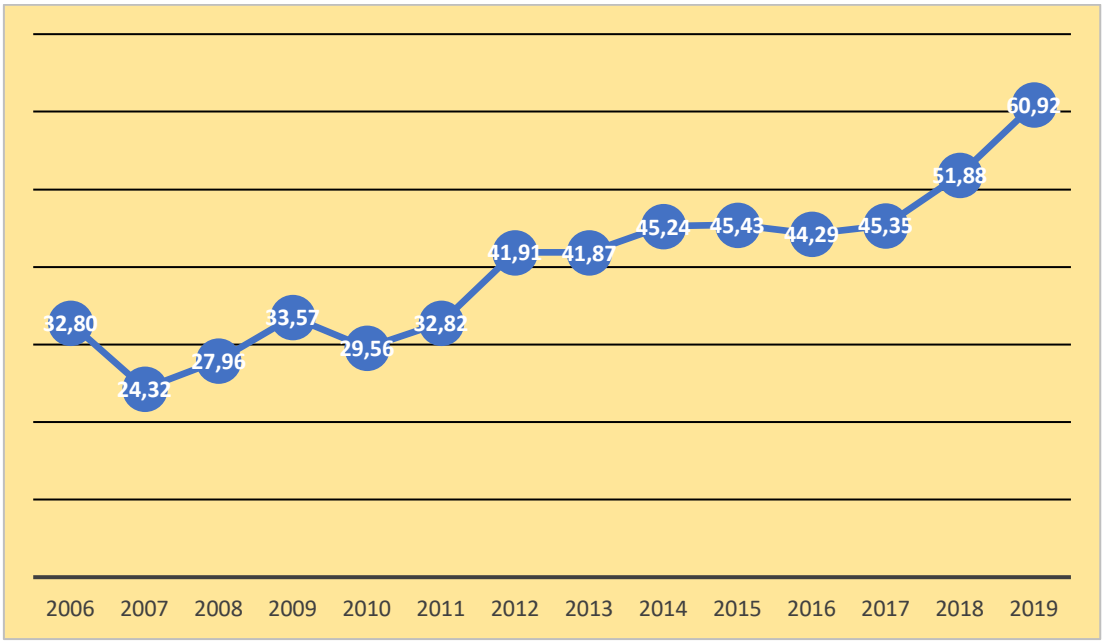

Figure 5: Greece Liner Shipping Connectivity (base=100 in 2006) (Source: [38])

The largest port of the country and one of the largest in the Mediterranean region, Port of Piraeus has shown a remarkable development since its privatisation in 2009 and its acquisition from the Chinese shipping group COSCO which initiated a € 612 million investment plan. This further drove the port's fast development and growth, ranking 4th in Europe in 2019 reaching a 5.6 million TEUs container throughput and 15.6% growth rate from the previous year. This constitutes a significant achievement since port of Piraeus was not even in the top 15 in 2007 and made it the most developing port in the Europe recording a more than threefold increase between 2007 and 2019 [39]. With the completion of Pier III enlarging its capacity to approximately 7.5 million TEUs and plans to construct a fourth pier (Pier IV) with an additional capacity of 2.8 million TEUs aiming to expand the port's capacity to over 10 million TEUs challenging the long standing domination of North European ports [40]. In addition, the city of Piraeus, being a major maritime hub Is home to a large number of shipping, logistics and port-related companies with a profound impact on the local economy.

The second largest port in Greece is the Thessaloniki port which covers the northern part of the country. Due to its geographical location and the essential road and rail connections with many neighbouring countries, it is also an important port for the Balkan region, serving

approximately 15 million people (thpa.gr) in several countries. Recent privatization of the port of Thessaloniki is creating new development opportunities and growth potential for specific sectors of the economy such as transportation and storage, shipbuilding and ship repair activities, cruising and manufacturing.

Additionally, the ports of Piraeus and Thessaloniki are part of the core Trans-European Transport Network along with three other ports that EU have identified as ports of strategic interest ("core ports"), namely the ports of Heraklion, Igoumenitsa and Patras. Specifically, they are part of the Orient/East-Med Corridor that connects large parts of Central Europe with ports of the North, Baltic, Black and Mediterranean Sea.

4.4. Air transport

About 97,000 tonnes of air freight (both nationally and internationally) were carried through Greek airports in 2018 marking a significant increase (+40.3%) from the 69.000 tonnes of the previous year which is expected to be even higher for 2019 since the volume of air freight was already increased by 3.4% until the third quarter of 2019 compared to the same period last year. These statistics highlight the recovery of the sector following the onset of the 2008 financial crisis when the 112.000 tonnes of air freight almost dropped in half by 2014. The share of international air freight transport is by far the largest in terms of volumes of transported goods through the Greek airports with approximately 93% of the total and the overwhelming majority of the total air freight (nationally and internationally) passed through the Athens International Airport (AIA) "Eleftherios Venizelos" [41]. There are several companies active in Greece that provide air logistics services employing about 3.700 people and they are involved in the transportation of perishable cargo such as foodstuff, fruit and vegetables, medicines and pharmaceuticals, clothing, various types of equipment from electrical and electronic to military material and even live animals [9], [30]. AIA proves to be an emerging logistics hub for Southeast Europe due to is geographical location serving as a central connecting node between Europe, Middle and Far East having also immediate access to railway and the core national road network. Athens International airport is the first European airport to launch multi-modal flows in the form of the combination of maritime, road, and air traffic. The project provides an attractive alternative to pure air transport and enables shippers to forward their cargo from the Eastern Mediterranean region via Piraeus seaport and Athens airport to final destinations in Northern Europe and North America. Having signed Cooperation Agreements with both Piraeus seaport operators, AIA and the local cargo community offer same-day connection in Athens and a total transit time of five days at competitive rates. In addition, AIA have established the Airport Cargo Community Committee (ACCC) a communication platform aiming to further develop the supply chain sector by promoting the collaboration and communication between all members of the local cargo community and the State authorities resulting in the formation of synergies and joint solutions [41].

4.5. SWOT Analysis

By taking into account the basic characteristics, the internal and external factors that affect the development and sustainability of the sector, a SWOT analysis for the Supply Chain sector is formulated to determine its growth potential (Table 4).

Table 4: SWOT analysis of the supply chain sector (Source: [10], [15])

STRENGTHS (+)	WEAKNESSES (-)
• The geographical location of Greece which makes it an important transit hub for SE and Central Europe. • The increasing recognition of the importance and benefits of Supply Chain activities. • Commercial and industrial enterprises can perform significant unit cost savings from adopting modern supply chain management techniques. • The growing numbers of commercial and industrial companies outsourcing their supply chain activities to specialized 3PL service providers. • The relatively high levels of value added per employee in the transport and storage sectors, compared to European data. • The flexibility of companies in the industry and the range of services offered.	• The country's spatial plan and the lack of proper infrastructure are obstacles to the development of the industry. • The lack of specialized senior executives in the logistics sector and the relatively low level of training in the middle and lower levels of staff • The delays observed in the elaboration of a clear legal framework for the creation and operation of the Logistics Centers. • The high levels of the industry's fragmentation. • The reluctance of many companies to outsource their activities to 3PL providers, with their share remaining well below the European average. • The lack of a combined transport policy.
OPPORTUNITIES (+)	**THREATS (-)**
• The increases container traffic in the country's central ports will have a positive effect on the operation and development of 3PL companies • Further strengthening of the country's trade balance will also increase the demand for 3PL services • The development of the green supply chain sector • The stabilization and emerging recovery of the industry and the further development of the country's commercial and industrial activity • Opportunities arising from investments in the NE part of the country providing the possibility of linking domestic networks with Black Sea ports and the Central and Western European river transport network.	• The long-term recession of the Greek economy has led to activities decrease of many companies that are customers of 3PL providers. • Liquidity problems in the market and the difficulties in bank financing. • The recent fiscal policy and unfavorable financing conditions challenging the modernization of transport networks and the creation of new and efficient infrastructure in the country.

4.6. Future potential

The country's strategic geographical location is an important factor for the growth of the sector as it provides a gateway to the Balkan region and the central Europe as a whole. To this end, the reformation of the domestic supply chain sector is of paramount importance for the Greek Governments highlighting the necessity of providing efficient, competitive, reliable, fully integrated, sustainable and high quality supply chain services that meet the needs of businesses and consumers.

According to the Logistics Performance Index of the World Bank (LPI), the sector appears to present a qualitative upgrade over the years as the competitiveness of freight handling in Greece has recorded a notable improvement since 2012. Specifically, although recorded a 1.09 % decrease from the all time high 3.24 score of 2016, Greece has ranked 42nd in the world based on the total LPI score as a result of the examined individual parameters underlining the sector's capacity for growth (Table 5).

Table 5: Greece - Logistics performance index (LPI) (Source: [42])

Year	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing	Timelin ess
2012	69	2.83	2.38	2.88	2.69	2.76	2.98	3.32
2014	44	3.20	3.36	3.17	2.97	3.23	3.03	3.50
2016	47	3.24	2.85	3.32	2.97	2.91	3.59	3.85
2018	42	3.20	2.84	3.17	3.30	3.06	3.18	3.66

The National Supply Chain Action Plan aims to support the sustainable development of the sector by promoting the country's strategic objective to become a leader in the supply chain at regional and European level. The plan has an implementation framework of 3 years and focuses on key actions for the development of a competitive and efficient supply chain sector that will establish Greece as a provider of high-end international services. To achieve the strategic objective, 35 Actions have been identified in each of which they are analyzed inter alia the current situation, expected results, and implementation stages for increasing the freight flows through the Greek logistics hubs.

To this end, the ports of the country are vital for achieving this goal and especially the Ports of Piraeus and Thessaloniki where a significant part of the cargo transit is exported via international routes as Greece is a transit country for goods between Europe, Asia and Africa. Ports and storage infrastructure to the Northeast part of Greece will also play a significant role as they are also linked to the Black Sea region.

The transit of goods through the Greek logistics hubs is an important factor for the transformation of the country into a leading force in the field of logistics as it will promote the development of high value added services that can create jobs in Greece. For achieving this goal, the plan aims to simplify the cargo transportation and handling procedures and the provided high value added services, enhance the supply chain information flow, measure and publish the carbon footprint of the supply chain and develop new business practices in the urban supply chain [43].

Undoubtedly the utilization of the country's competitive advantages is progressing at a faster pace with the privatization of key infrastructure like ports, airports and railway services. Nevertheless, the absence of additional organized infrastructure hampers Greece from

capitalizing its central geographical position in the Eastern Mediterranean and claim the opportunity to be regarded as an international logistics node.

To this end, the implementation of other important infrastructure projects is promoted like the expansion of several regional ports and airports, the completion of important arterial road and railway networks along with the construction of several modern logistics centers at key areas nationwide. These plans aim to increase the competitiveness of the Greek supply chain sector and its growth potential in the near future.

Although the necessary procedures have been imitated, tenders have been launched and investments have been planned for the construction of the three largest Logistics Centers in Greece, in Thriasian field (I and II), at the former Gonu camp in Thessaloniki and one in Alexandroupolis, none of them is progressing. Specifically, upon completion of the second phase the Thriasian Logistics Center will become the largest multimodal logistics park and most developed intermodal freight centre in Southeast Europe with an area of 1,758,240 sq.m. Apart from the warehouses and administration buildings It will have multiple railway lines providing direct railway connection with the Container Terminal of the Piraeus Port becoming its physical expansion, road connection with the Greek TEN-T road network and the Athens International Airport.

A similar Logistics Center has been planned for construction at the former Gonu military camp in Thessaloniki, in close proximity to both the port of Thessaloniki and the Sindos logistics and industrial area. The recent privatization of the Thessaloniki port and the potential to become an important hub for the Balkan region makes the implementation of the project imperative although the lack of specific interest along with another plan for the development of a smaller logistics center within the port premises will most likely lead to the final cancellation of the logistics center in Gonou. A recent study [44] indicates that there are significant quantities of agricultural products, food and beverages that could be supported by an Agrologistics center in northern Greece serving the Balkans and Central Europe with a potential market of more than 540.000 FEUs per year. Furthermore, based on the current planning a network of seven large and two smaller Logistics Centers are projected to be developed in several regional areas. The construction of a 200,000 sq.m center in the city of Alexandroupolis in North Eastern Greece is considered more mature due to the high investment interest and assisted by the already initiated procedure for the privatization of the nearby port [45], [30].

A major drawback is that the development rate of the aforementioned infrastructure and facilities for supporting the sustainability and growth of the supply chain sector is particularly slow. The wide gap between the lengthy domestic bureaucratic procedures and the international standards hampers the recovery and development of the country's own economy and underlining the need for fast-track procedures to boost the sector-related investments. The terms for establishing such Centers in Greece remain about 30% less favorable than the European competition. A typical example of such delays is the creation of the first phase of the logistics center in the Thriasian field where in order to be given the 35% of the available space,

it took 11 competition notices, 3 tenders and approximately 12 years when compared to the eightfold in size Zaragoza Plaza logistics park, it only took 5 years [46].

Chapter B: Analysis of key agricultural product supply chains

The objective of this subtask is to analyze procedures and practices relevant to the supply chains of key agricultural products in Greece (i.e. cereals, nuts, spices and stimulants, sugar, roots and tubers, vegetables, and fruits). A survey of the main supply chains of key agricultural products will be performed in an attempt to specify their structure and present a summary of the regular as well as seasonal and touristic demand and supply.

1. Introduction

This study is a component of a Regional Agricultural Infrastructure Plan. The study describes a long-term development strategy with an emphasis on rural economic and environmental sustainability. The contribution of the study is the modelling of activities, the imprinting of the necessary infrastructure, and, crucially, the creation of culture in the productive classes - primary and secondary agricultural sectors - for organized entrepreneurship.

In recent years, the need for an expanded regional 'agricultural infrastructure' has been identified to strengthen the local and regional food system and the rural communities in the region. 'Agricultural infrastructure' is created to cover consolidation, packaging, processing, storage, marketing and distribution as an overall chain of values classified as Agribusiness & Agrologistics.

The design of a Supply Chain for Agribusiness is crucial for the overall operation and efficiency supply in the long-term and incorporates critical strategic decisions affecting the products and information as well as the associated costs. These decisions include business attributes, such as, procurement, purchasing, allocation and capacity of intermediate warehouses – if exist-, allocation of processing facilities, transportation network design or redesign, retailers' network design and target market selection. The objective is to minimize supply chain, direct and indirect costs including harvesting, collection or purchasing costs, facility (storage, handling and fixed) and inventory holding costs, and transportation costs, while assuring an adequate level of flexibility in order to be able to adapt to potential future changes.

Overall, the agricultural infrastructures:

1. Improve the effectiveness and sustainability of the local food system,
2. They increase access to healthy food, especially fresh produce (fruits and vegetables), in communities that are not adequately served;
3. They create momentum and prospects for exports,

4. They create economies of scale and significant clusters of partnerships and synergies in practice,
5. They create a reduction in the opening of consumer and producer prices,
6. Support the sustainability of agriculture,
7. They create new jobs and economic opportunities, and,
8. They are assisting in the conservation of valuable agricultural land.

1.1 Definitions

Agribusiness the production and marketing of agricultural products including industrial processing, until the final consumption.

Agrologistics is called the agribusiness sector which supports the operation of rural business parks for the transportation, storage, certification of agricultural products and secondary products produced using contemporaneous logistics management procedures and functions.

Involved

1. Producers and Agricultural Consultants
2. Standardization Experts
3. Warehouses & Carriers
4. Wholesalers, Retailers, Consumers

1.2 Geographical Location

Defining the location for developing an Agrologistics Center is an essential action. Main key parameters are:

- The category of products produced in the area, such as fresh vegetables, meat, cheese, etc. (demand for purchases).
- The volume of products produced in the wider geographical area by category (purchasing adequacy).
- The connection to main transport axes (roads, railways, ports, airports).
- The connection of the planned production model of the geographical area with the produced products and possible future productions.

1.3 Objectives

The main objective is to provide a business model, analytical tools of prefeasibility for self-sustaining medium-scale concentration and distribution - a center of agri-food chain with

processing functions - to serve regional producers and crops, including small and medium-sized producers, with emphasis on those who lack the ability to access business and institutional markets. At the same time, the study has been developed as a central axis for entrepreneurs, investors and other stakeholders to promote the development of this infrastructure.

The objectives of the study are to create new market channels and support small and medium-sized growers, including young and economically disadvantaged farmers. The Agrologistics centers are also intended to be a central market resource for producers of any scale; competitive prices and reliability of supply, will create a stable basis for local crops and value-added products.

At the same time, it is due to assess the possibility that central or retail networks can stimulate, incubate and create new activities and/or provide services related to Agrologistics.

The study should include - in a second phase - the following elements:

1. Assessment of regional market demand.
2. Identification of target indicative crops, production levels, capital and operating costs for a sustainable model.
3. Assessment of the economic feasibility of the proposed model.
4. To summarize the policy and other obstacles that need to be addressed. And
5. Identification of potential funding resources.

In the long term, an economically viable organization - business, will be the best way to provide market opportunities for small and medium-sized producers, working with a wide range of partners to meet and achieve additional objectives.

The expansion and development of different types of agricultural infrastructure will help each region to take advantage of emerging markets – exports – and opportunities linked to the growing food economy and address important objectives such as:

1. Keep more capital funds for food production in the local economy.
2. Improving food chain security.
3. Reducing food waste.
4. Providing alternative opportunities for young farmers.
5. Conservation of valuable agricultural land in production.

This will begin to rebuild the medium and small-medium agricultural infrastructure that existed in the past but has been lost over time due to markets changes, de-industrialization, economies of scale, regulatory issues, urbanization and the change of country's production model.

Agrologistics centers may come in the form of more focused partnerships with distributors and wholesalers, as it happens in other countries, rather than operating with classic models. This approach will help local producers to connect with businesses such as restaurants, hotels and groceries, shops and institutions (schools, hospitals) that already have contractual relationships with existing distributors and wholesalers and/or food service suppliers, but they

are continuous looking for new market channels for fresh products of local origin and high quality branded that give added value.

Many Agrologistics centers abroad, focus on developing different target customer categories. The opportunity to identify and cultivate a large number of customers (long term) is something that will be part of the study. Some studies at international level suggest building a business base with the highest end customers, because this base is less price sensitive. As with any business, the “ownership” of an expanded variety of customers helps the stability.

1.4 Agrologistics Suppliers

Agrologistics should be able to adequately bind the number of producers at the initial stage and during the escalation process. The problem of the producer’s commitment is common at international level. In the US in a corresponding survey of 2013, it was recorded that the average producers in each hub were 80 individuals of different sizes. But the majority of the Agrologistics centers (61%) were left with 40 producers or even fewer.

Given the international experience, Agrologistics have to activate producers. This activation can and must be done through training and incentives to be offered. The generality of any strategy will create apathy and distancing. Industry trends and growth prospects with a specific targeting will be a first essential step towards identifying and solving chronic problems.

2. General Data on Agricultural Production at territory level

Greece presents a wide range of different agricultural products, which are evenly distributed at the level of territory. This creates important prospects for Agrologistics centers with character and product identity.

The production of fruits and vegetables is a dominant position of total agricultural production as a result of the Mediterranean diet. Even though the "vegetables and horticultural products" section includes products other than vegetables, account for almost 95% of the total production of this category.

2.1 Product categories

1. Cereals for grain
2. Beans / Pulses (Edible)
3. Vegetables
4. Melons, watermelons and potatoes
5. Industrial Plants
6. Trees production (Oranges, Lemons etc.)
7. Grapes

2.2 Agricultural Production Analysis

Table 6: Cereals for grain in tons [Source ELSTAT (2018)]

Regions	Wheat Common	Wheat Durum	Wheat Total	Barley	Oats	Rye	Maize	Rice	Sorghum
Eastern Macedonia and Thrace	79.140,92	112.773,70	**191.914,63**	**32.168,64**	3.189,04	3.149,63	**351.403,73**	16.359,13	132,15
Central Macedonia	133.950,58	277.144,12	**411.094,70**	**88.878,87**	**10.024,40**	3.584,62	**397.323,36**	**225.400,19**	144,35
Western Macedonia	79.894,96	85.550,36	**165.445,31**	**58.593,47**	2.172,94	**17.019,52**	**74.389,96**	0,00	71,63
Epirus	973,21	90,56	1.063,77	564,13	**14.795,00**	4.011,93	2.607,78	**30.491,00**	**29.020,86**
Thessally	49.407,53	342.255,34	**391.662,87**	**112.104,17**	**20.198,01**	1.364,23	**321.902,34**	0,00	30,73
Central Greece	10.057,99	140.646,12	**150.704,11**	**47.711,13**	**15.316,06**	91,62	**62.013,53**	5.924,20	5,30
Ionian Islands	145,81	252,02	397,83	105,06	1.841,63	3,36	715,85	0,00	0,00
Western Greece	3.793,15	8.971,56	12.764,71	8.322,00	**35.506,35**	90,00	**216.771,31**	6.786,20	25,50
Peloponnese	6.023,75	6.843,30	12.867,05	7.079,38	**13.177,47**	28,11	7.183,70	300,00	1,40
Attica	356,68	9.026,18	9.382,86	2.338,05	1.297,47	4,20	312,92	0,00	2,50
Northern Aegean	1.340,30	2.659,81	4.000,11	12.183,73	942,76	45,80	262,60	0,00	0,00
Southern Aegean	1.226,13	2.909,75	4.135,88	4.916,81	941,29	104,35	286,70	0,00	48,84
Crete	629,92	708,75	1.338,66	1.577,64	1.116,13	157,64	143,53	0,00	4,46

Conclusion:

Almost total cereal production in the territory comes from Macedonia, Thessaly and Central Greece. An exception is Oats and Maize also concentrated in Western Greece.

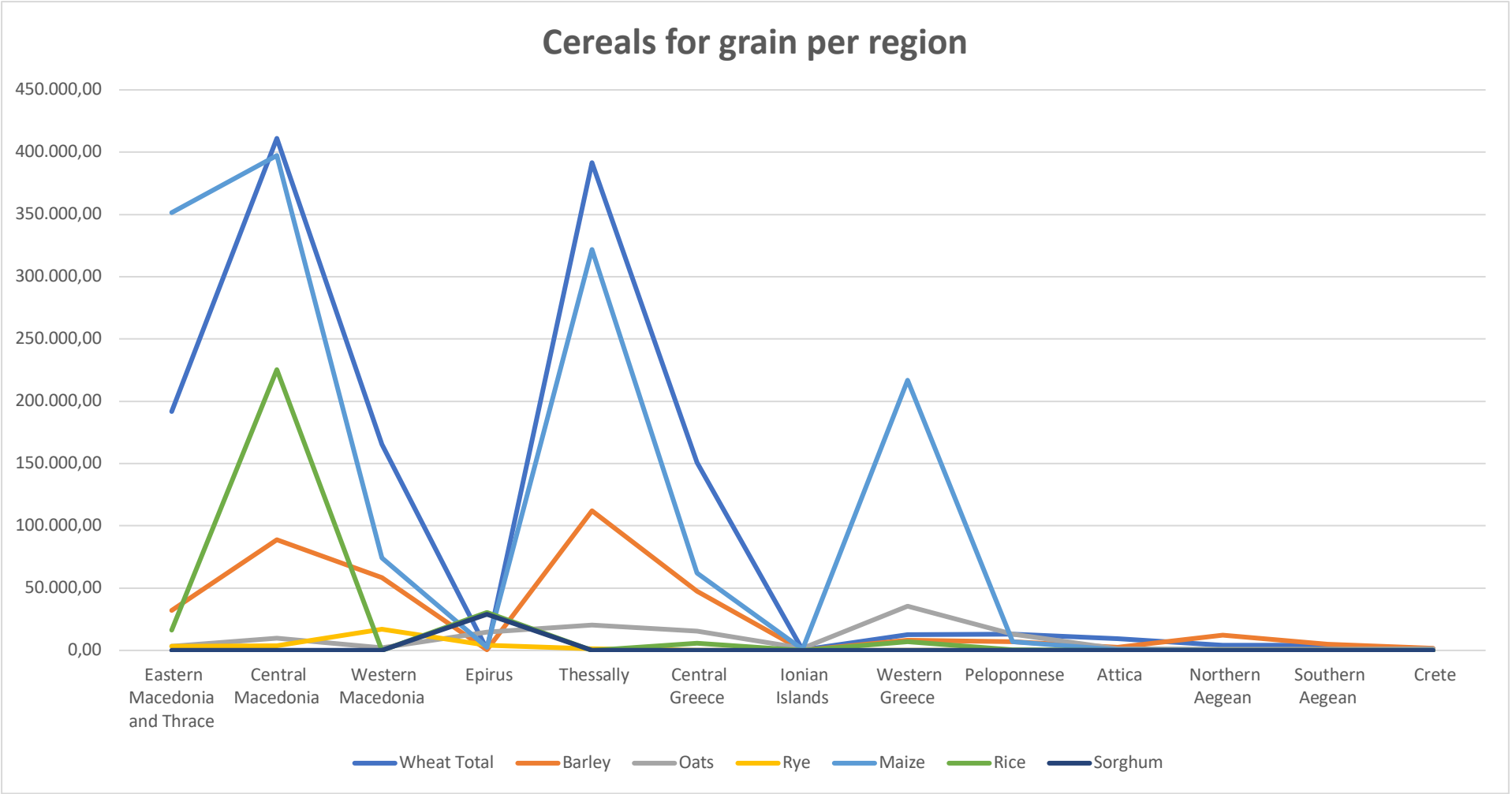

Figure 6: Cereals for grain per region

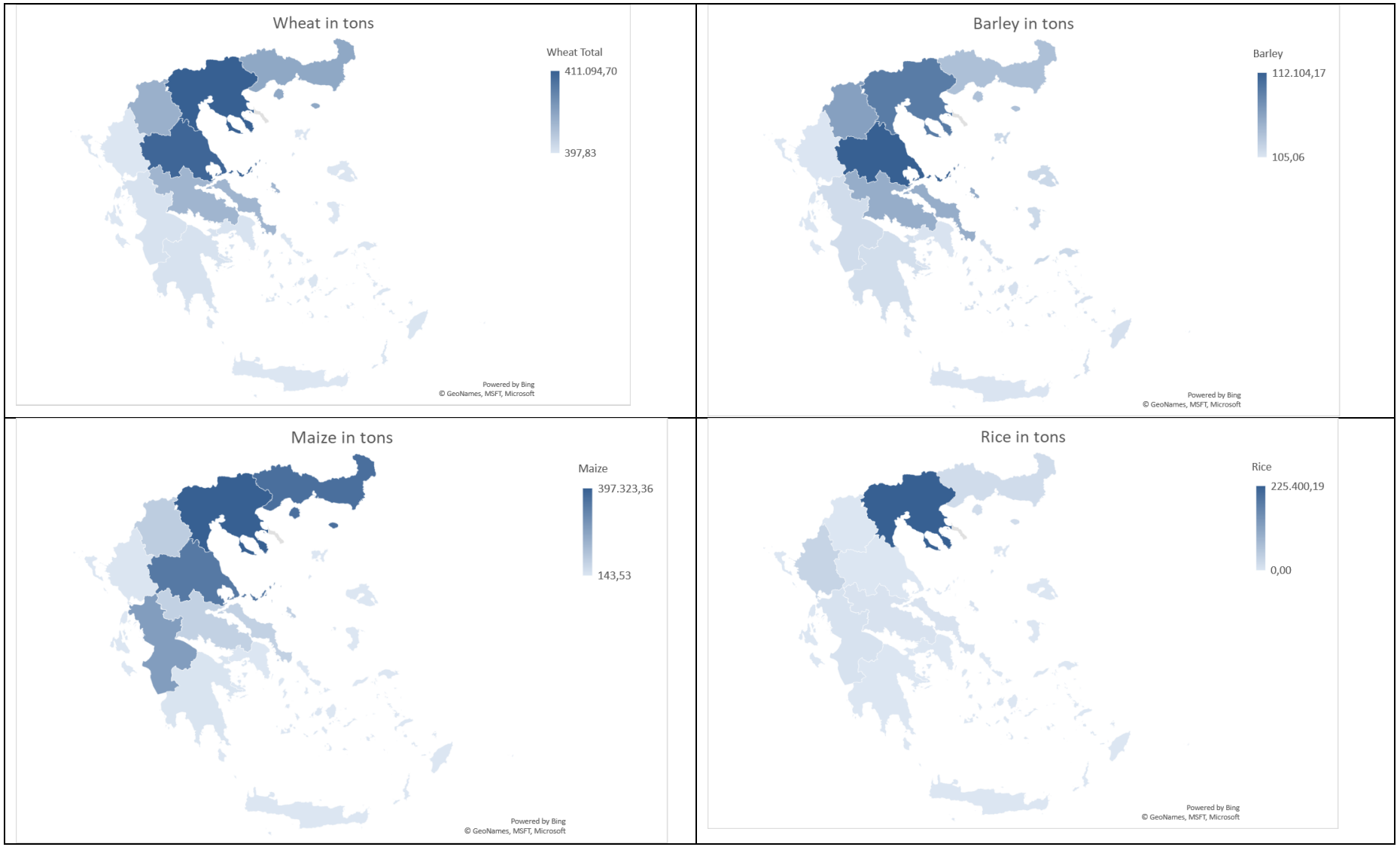

Figure 7: Selected Cereals geographical presentation

Table 7: Beans / Pulses (Edible) in tons[Source ELSTAT (2018)]

	Beans	Broad beans	Lentil	Chick-peas	Lathyrus	Peas
Eastern Macedonia and Thrace	**3158,70**	8,80	436,48	**1440,40**	8,94	0,00
Central Macedonia	**1951,26**	**162,55**	**1035,70**	**2737,72**	12,03	9,34
Western Macedonia	**6464,75**	**356,85**	**4751,15**	**3614,83**	139,30	43,18
Epirus	808,62	14,50	27,08	18,67	25,65	0,10
Thessally	**1673,00**	134,68	**5540,08**	**6540,48**	919,32	118,00
Central Greece	**1027,97**	167,20	**1453,56**	**2358,55**	403,34	5,75
Ionian Islands	99,32	17,10	54,09	19,79	6,81	11,64
Western Greece	581,66	51,33	81,27	68,54	2,20	18,36
Peloponnese	**1114,11**	75,70	293,20	69,46	457,00	7,50
Attica	116,62	52,72	95,24	82,66	72,65	32,60
Northern Aegean	**732,37**	**216,19**	14,50	79,21	44,65	2,74
Southern Aegean	129,51	32,48	6,51	21,54	175,37	1,81
Crete	155,36	**394,97**	9,85	73,07	9,16	8,45

Conclusion:

Almost total edible pulse production in the territory comes from Macedonia, Thessaly and Central Greece. An exception is beans that also have an interesting production quantity in Peloponnese and North Aegean and Broad beans with major production area Crete.

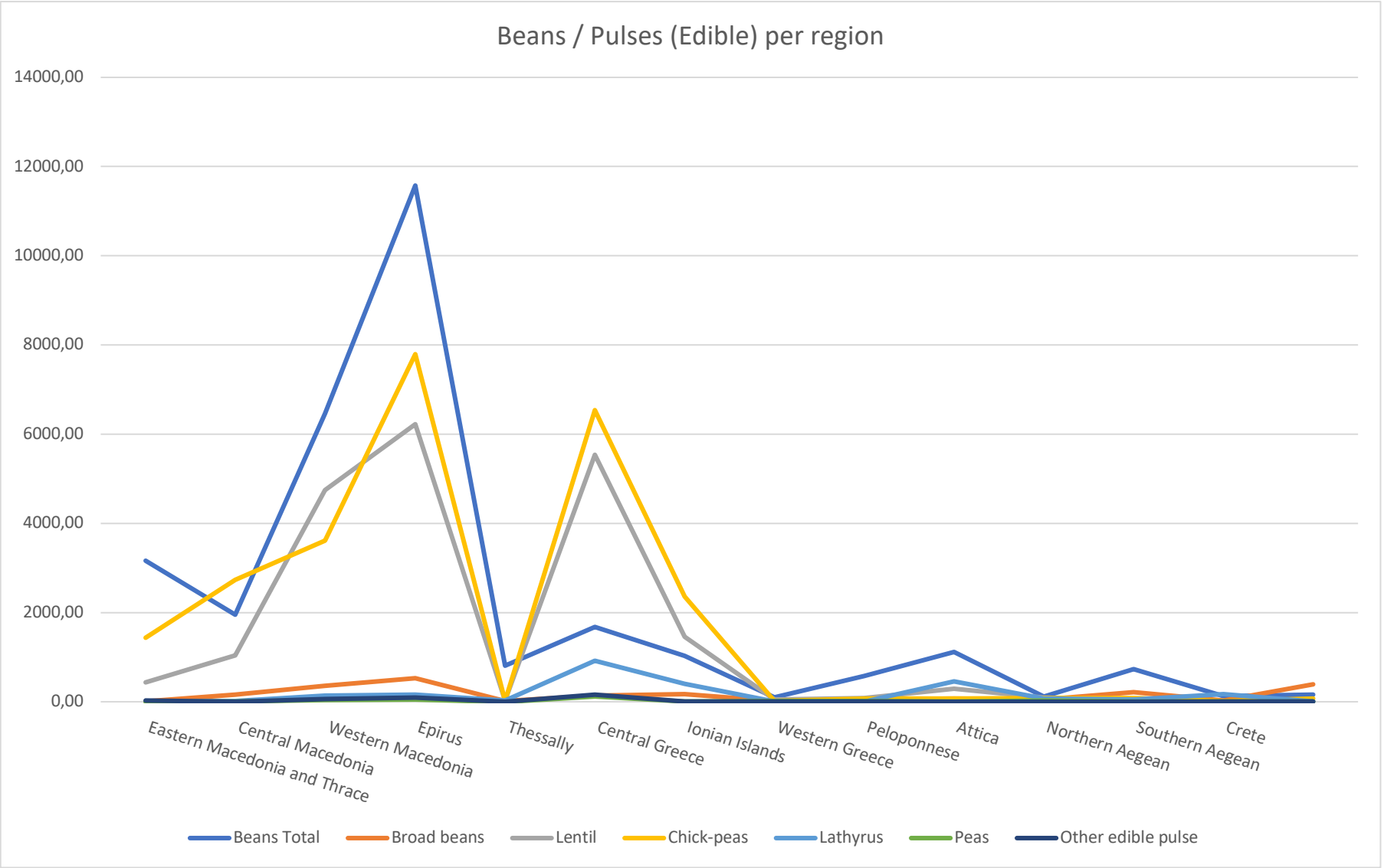

Figure 8: Beans / Pulses (Edible) per region

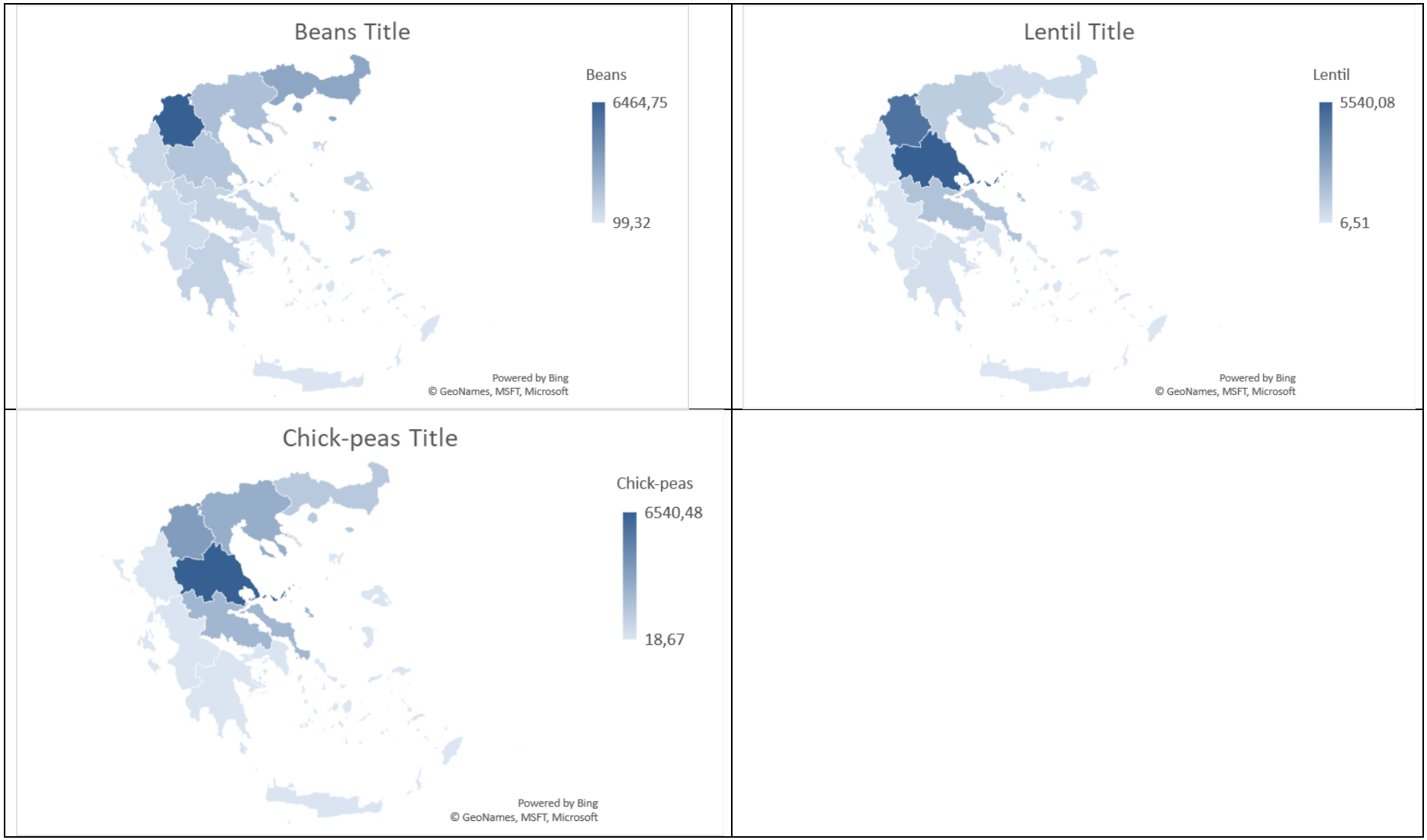

Figure 9: Selected Beans / Pulses (Edible) geographical presentation

Table 8: Vegetables in tons [Source ELSTAT (2018)]

	Broccoli	Cabbages	Cauliflowers	Spinach	Leeks	Onions, fresh	Onions, dry	Garlic, dry
Eastern Macedonia and Thrace	1.367	**5.855**	799	**13.739**	1.019	759	**6.526**	**2.268**
Central Macedonia	**6.616**	**18.767**	**5.513**	**31.399**	**6.501**	**2.496**	**7.096**	152
Western Macedonia	251	1.989	241	3.880	430	368	2.825	104
Epirus	206	626	251	400	252	175	664	133
Thessally	**3.944**	**5.898**	**3.385**	**11.649**	**4.531**	**2.099**	**7.693**	**1.384**
Central Greece	**2.963**	**6.739**	**3.565**	**10.717**	2.448	858	**70.601**	308
Ionian Islands	138	470	307	175	45	69	843	170
Western Greece	**4.185**	**6.008**	**5.075**	1.102	404	677	3.916	320
Peloponnese	**5.854**	**7.023**	**6.490**	3.397	642	1.010	**7.230**	426
Attica	2.627	4.295	2.010	3.068	1.670	1.654	**4.299**	23
Northern Aegean	176	965	531	196	194	324	797	104
Southern Aegean	251	1.376	568	268	272	387	3.275	108
Crete	1.911	**4.802**	**2.840**	1.388	1.063	1.777	**6.501**	536

Table 8: Vegetables in tons [Source ELSTAT (2018)]

	Peas	Lettuce	Chicories and endives	Carots	Tomatoes Industrial	TomatoesTable grown in open	TomatoesTable grown in greenhouses	Beens	Okras	Pumpkins
Eastern Macedonia and Thrace	2.482	1.225	374	276	7.205	**10.342**	3.217	**5.100**	**3.316**	1.506
Central Macedonia	**7.357**	**10.404**	1.579	1.933	**18.951**	**14.711**	**15.091**	**14.506**	1.159	**5.409**
Western Macedonia	584	183	89	94	1.189	2.928	115	1.765	77	238
Epirus	68	521	34	28	55	3.117	4.000	630	128	758
Thessally	420	3.383	717	1.273	**194.605**	**15.865**	9.175	3.308	979	2.764
Central Greece	488	2.869	**6.322**	**18.914**	**66.709**	**24.728**	1.474	7.047	391	**4.163**
Ionian Islands	66	447	162	64	183	3.290	450	283	12	718
Western Greece	355	**10.145**	1.047	369	**101.504**	**28.036**	**13.538**	**6.096**	622	**17.845**
Peloponnese	254	**9.382**	1.577	359	74	**42.593**	**43.288**	**4.395**	471	**9.313**
Attica	88	7.096	4.581	1.318	517	7.269	6.717	797	77	5.511

Northern Aegean	20	556	158	45	11	5.588	1.038	474	76	812
Southern Aegean	36	1.048	314	208	1.137	9.837	5.014	963	147	1.791
Crete	182	2.721	1.164	1.243	186	**22.933**	**98.587**	2.736	1.065	**7.036**

Table 9: Vegetables in tons [Source ELSTAT (2018)]

	Cucumbers, grown in the open	**Cucumbers, grown in greenhouses**	**Eggplants grown in the open**	**Eggplants grown in greenhouses**	**Peppers grown in the open**	**Peppers grown in greenhouses**	**Artichokes**	**Asparagus**	**Strawberries**
Eastern Macedonia and Thrace	664	710	**2.921**	270	**14.589**	2.045	8	8.455	51
Central Macedonia	569	**8.268**	**3.826**	1.417	6.052	3.923	117	2.137	435
Western Macedonia	96	29	281	13	2.121	46	0	62	35
Epirus	551	3.162	378	321	370	343	14	149	19
Thessally	2.458	1.515	**2.816**	401	**15.523**	771	41	1	26
Central Greece	2.332	312	**2.311**	93	2.940	188	31	9	70
Ionian Islands	930	305	439	50	263	49	241	0	5
Western Greece	2.863	2.178	**3.685**	1.000	**16.090**	1.463	196	1.632	**72.356**
Peloponnese	2.349	**42.827**	**7.626**	**3.967**	3.577	4.023	6.134	6	78
Attica	2.165	5.508	2.012	548	1.284	487	90	2	463
Northern Aegean	597	276	822	61	277	17	132	5	2
Southern Aegean	848	1.621	1.412	159	910	341	315	1	19
Crete	**7.156**	**51.812**	**2.688**	**11.028**	1.937	**47.401**	**4.367**	53	598

Conclusion:

It is very important to understand that vegetable production is spread in many different regions. Mainly in Macedonia, Thessaly, Central & Western Greece, Peloponnese and Crete.

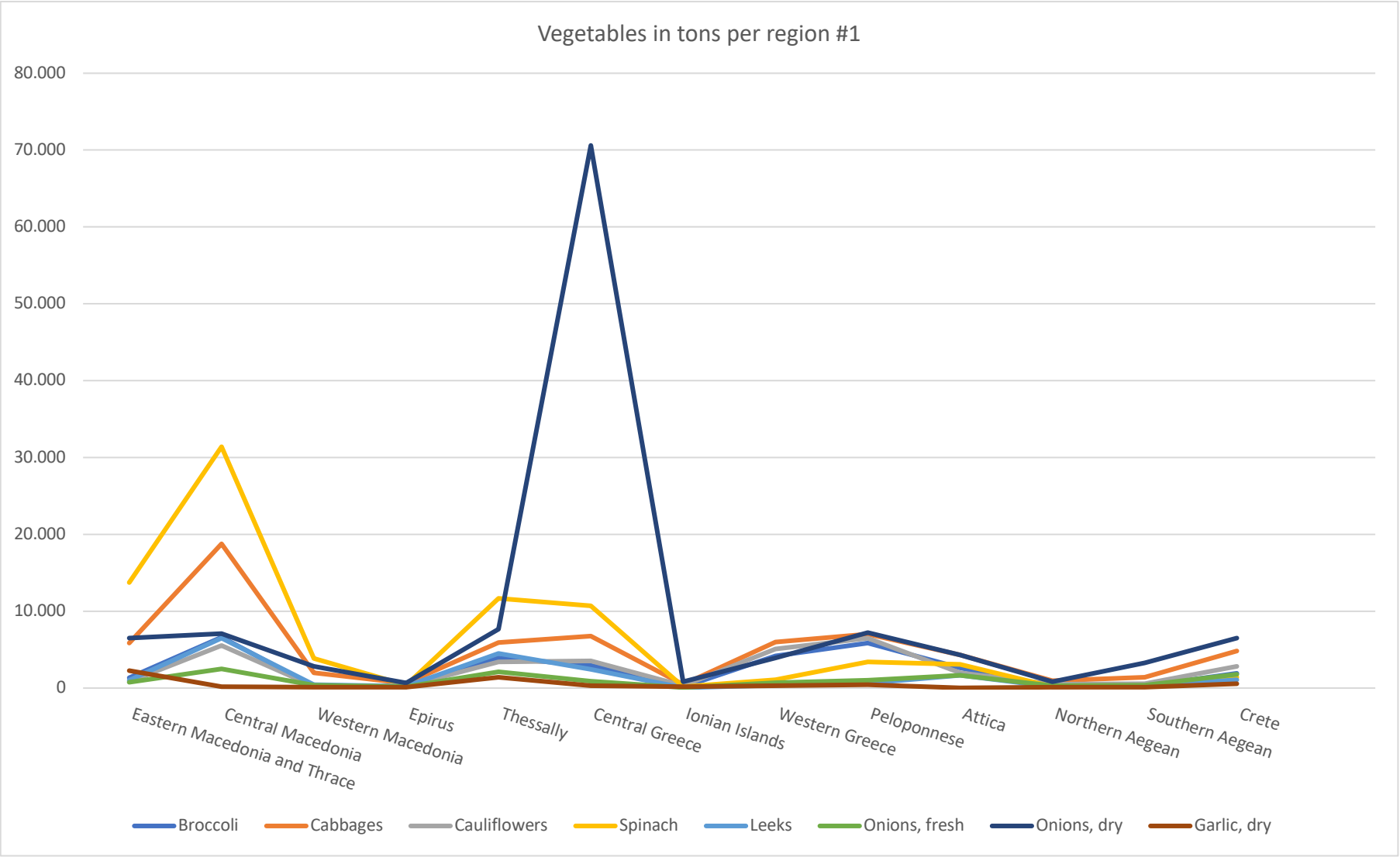

Figure 10: Vegetables in tons/region (a)

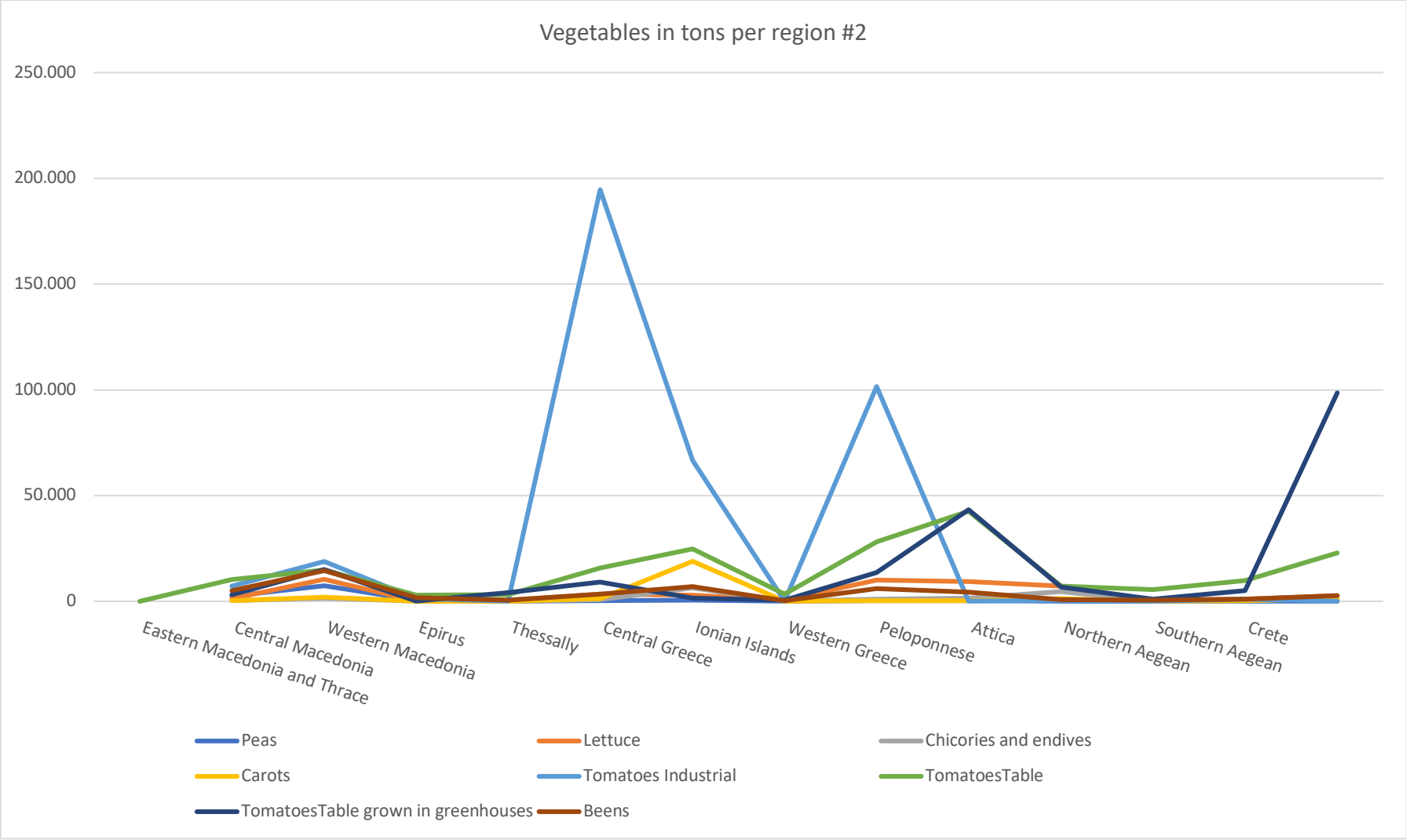

Figure 11: Vegetables in tons/region (b)

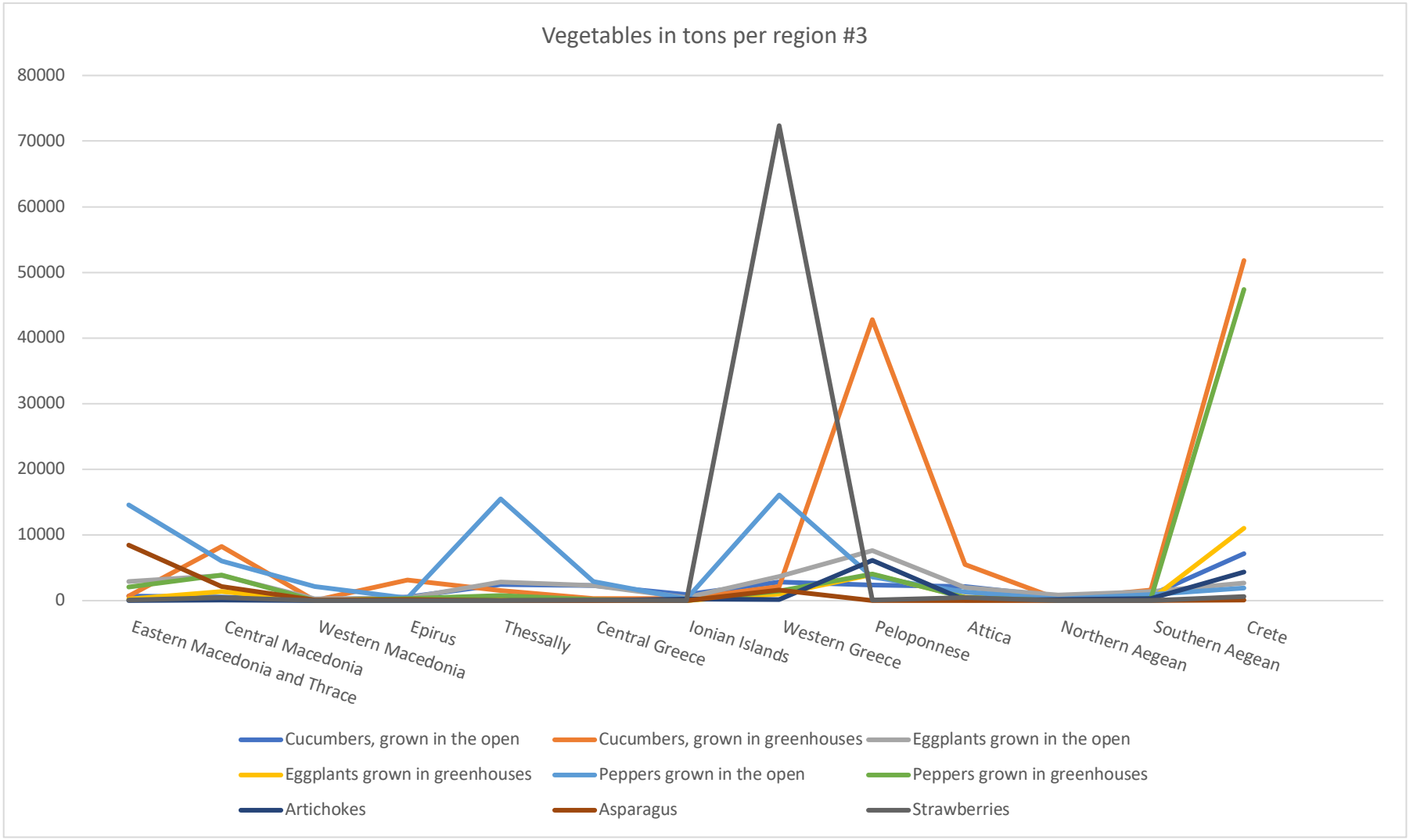

Figure 12: Vegetables in tons/region (c)

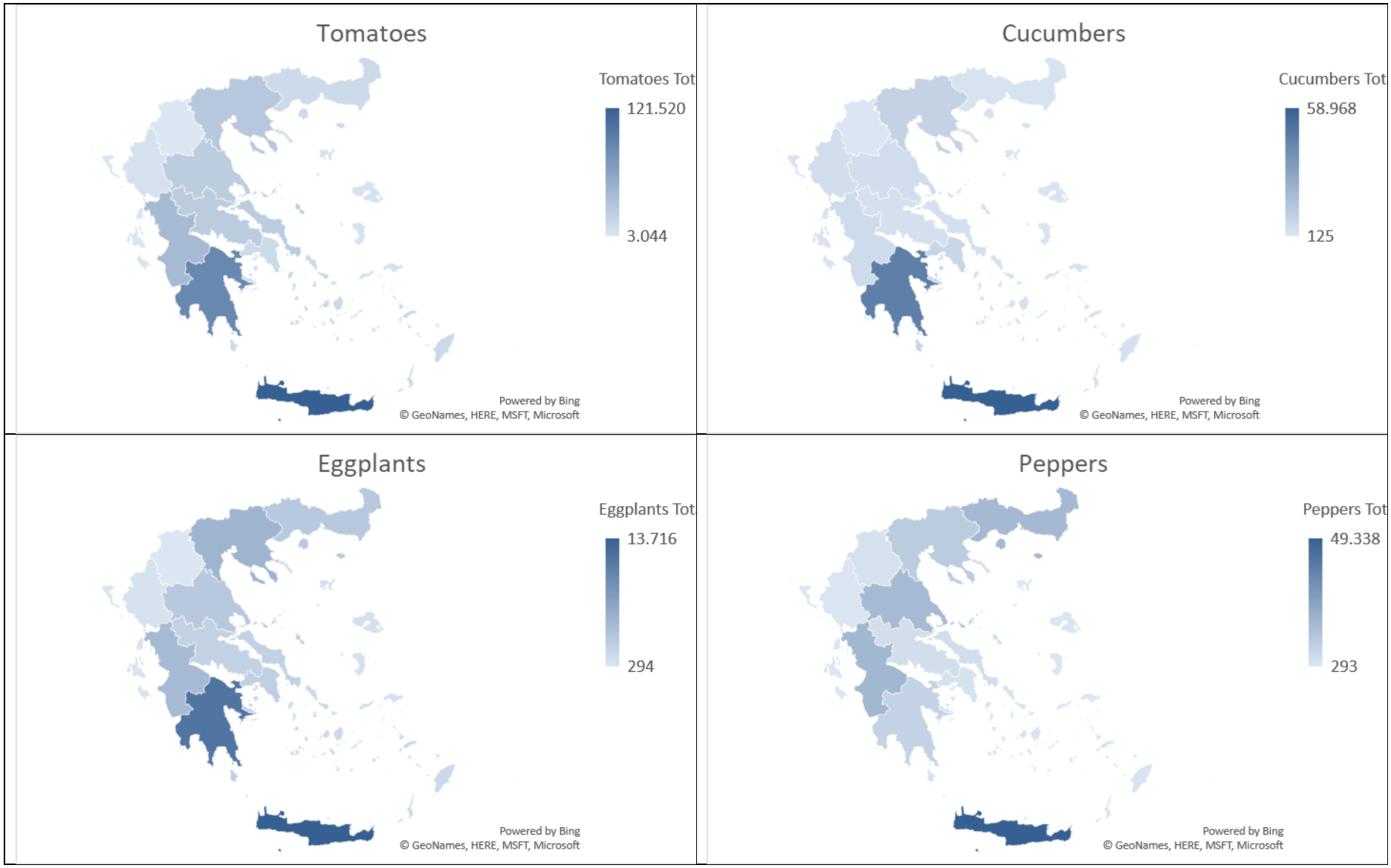

Figure 13: Selected Vegetables geographical presentation

Table 10: Melons, watermelons and potatoes in tons [Source ELSTAT (2018)]

	Watermelons	Melons	Potatoes harvested in spring	Potatoes harvested in summer	Potatoes harvested in autumn or winter	Total Potatoes
Eastern Macedonia and Thrace	**15.179**	**8.650**	**102.157**	7.055	2.275	**111.488**
Central Macedonia	**42.287**	**9.900**	5.449	**10.346**	11.781	**27.576**
Western Macedonia	2.647	1.321	**24.203**	7.730	4.340	**36.273**
Epirus	2.163	454	3.722	7.144	242	11.108
Thessally	**38.669**	**17.037**	5.154	4.573	2.131	11.858
Central Greece	**15.904**	**10.802**	**12.400**	**17.623**	11.864	**41.887**
Ionian Islands	867	529	4.169	560	708	5.437
Western Greece	**192.988**	**18.406**	**59.609**	3.142	49.322	**112.072**
Peloponnese	**37.460**	5.399	**15.352**	**29.451**	5.595	**50.398**
Attica	2.727	4.658	469	1.681	547	2.696
Northern Aegean	5.223	2.274	4.936	1.811	1.389	8.136
Southern Aegean	6.102	1.882	**14.905**	750	4.706	20.361
Crete	**14.668**	**9.466**	**17.435**	**34.872**	7.910	**60.216**

Conclusion:

Key producing areas Macedonia, Thessaly, Western and Central Greece and Crete.

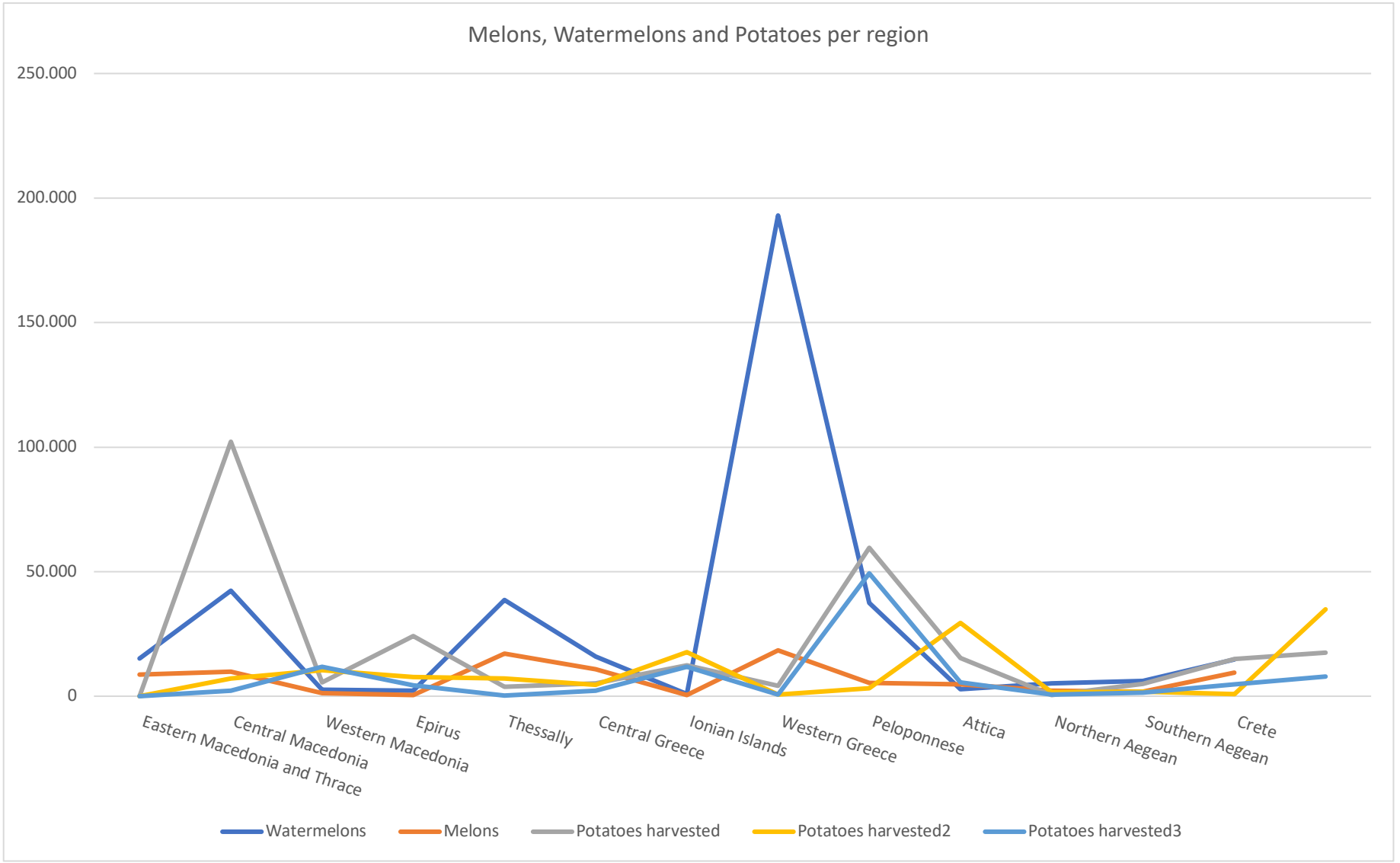

Figure 14: Melons, watermelons and potatoes per region

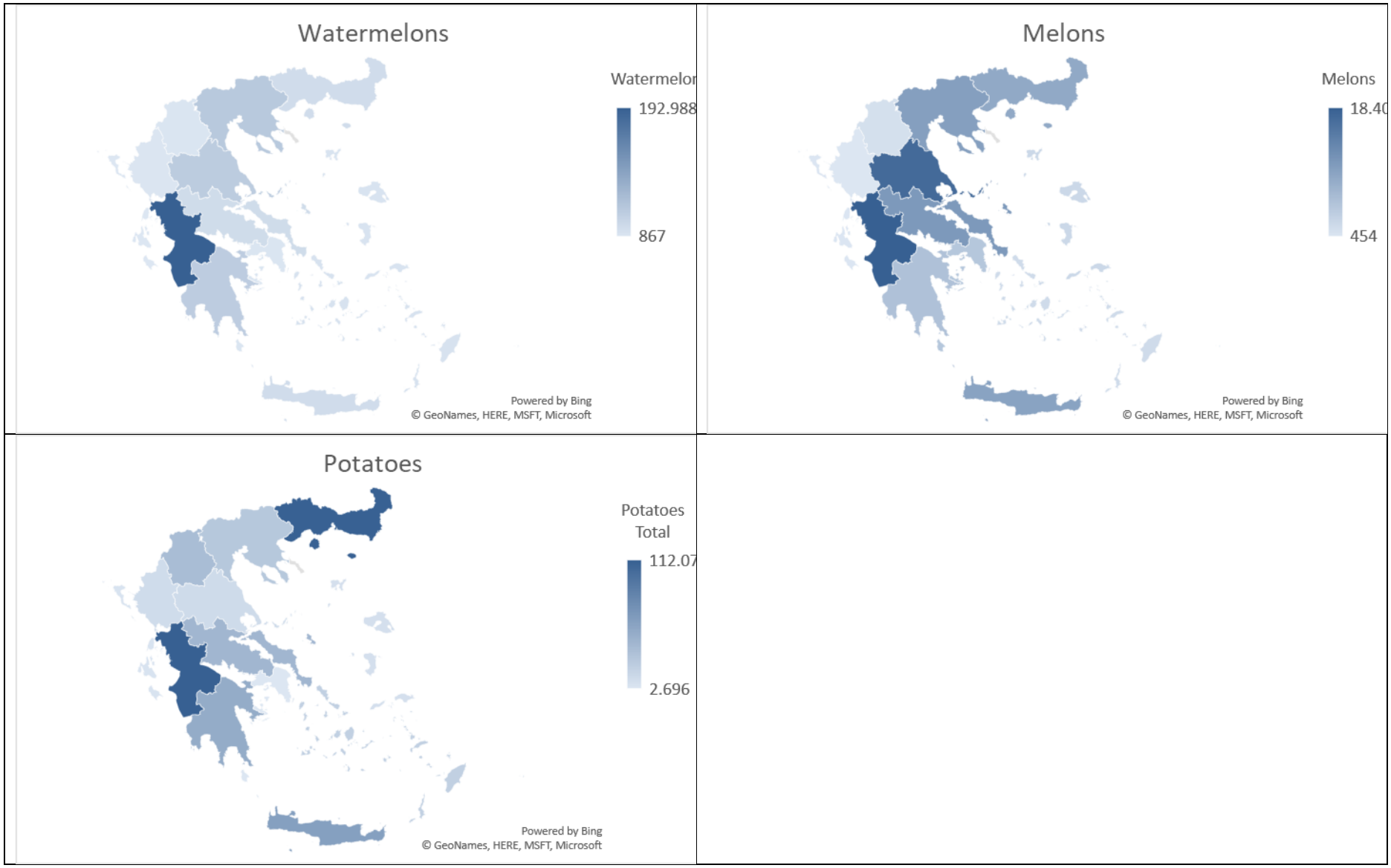

Figure 15: Selected Melons / Watermelons / Potatoes geographical presentation

Table 11: Industrial Plants [Source ELSTAT (2018)]

	Tobacco Eastern type	Berley Virginia	Cotton irrigated	Cotton non-irrigated	Cotton Total	Sesame	Sunflower	Groundnuts	Sugarbeets	Soya seed	Pumpkin seeds	Rapeseed
Eastern Macedonia and Thrace	9.583	1.452	149.598	42.315	**191.913**	372	**126.685**	28	**115.390**	**7.525**	912	3.701
Central Macedonia	11.381	756	209.600	3.874	**213.474**	181	**59.595**	2.198	**174.331**	526	7	**13.010**
Western Macedonia	1.235	0	72	4	76	0	8.796	5	**24.719**	1	14	1.389
Epirus	4	0	241	0	241	0	11	0	3	44	0	0
Thessally	1.392	5.553	282.517	502	**283.018**	59	3.190	162	**73.959**	0	3	561
Central Greece	15	915	103.384	1.304	**104.688**	10	4.568	57	3.857	4	2	187
Ionian Islands	0	0	0	0	0	0	0	0	0	0	0	0
Western Greece	262	148	13.970	0	13.970	9	0	1.748	0	0	0	0
Peloponnese	0	0	0	0	0	0	52	350	0	0	1	0
Attica	7	8	0	1.550	1.550	0	0	0	3	0	0	0
Northern Aegean	0	0	0	0	0	1	1	0	0	0	0	6
Southern Aegean	0	0	0	0	0	2	0	0	0	0	0	0
Crete	0	0	0	0	0	0	1	18	0	0	0	0

Conclusion:

Key producing areas Macedonia, Thessaly and Central Greece.

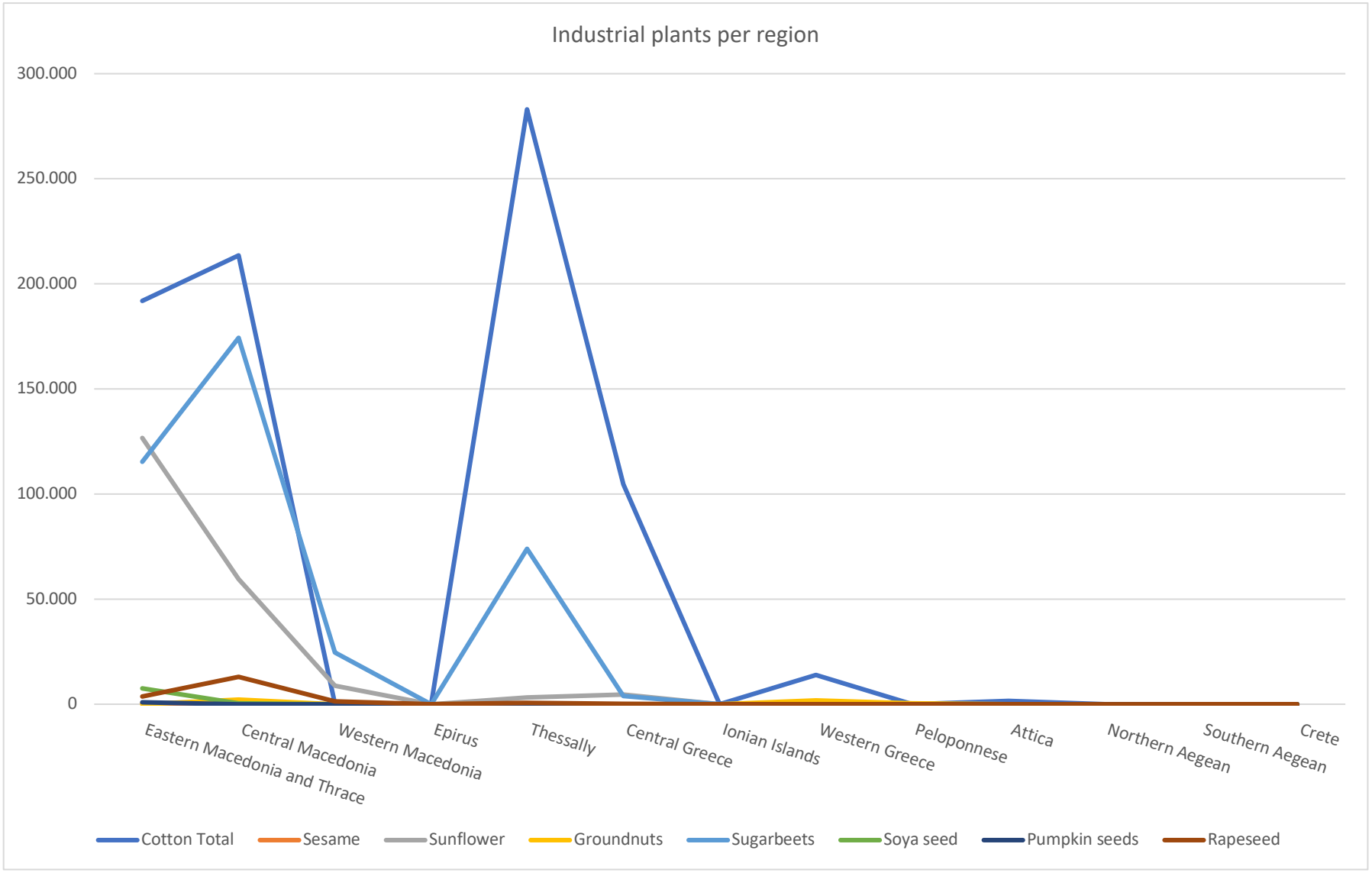

Figure 16: Industrial plants per region

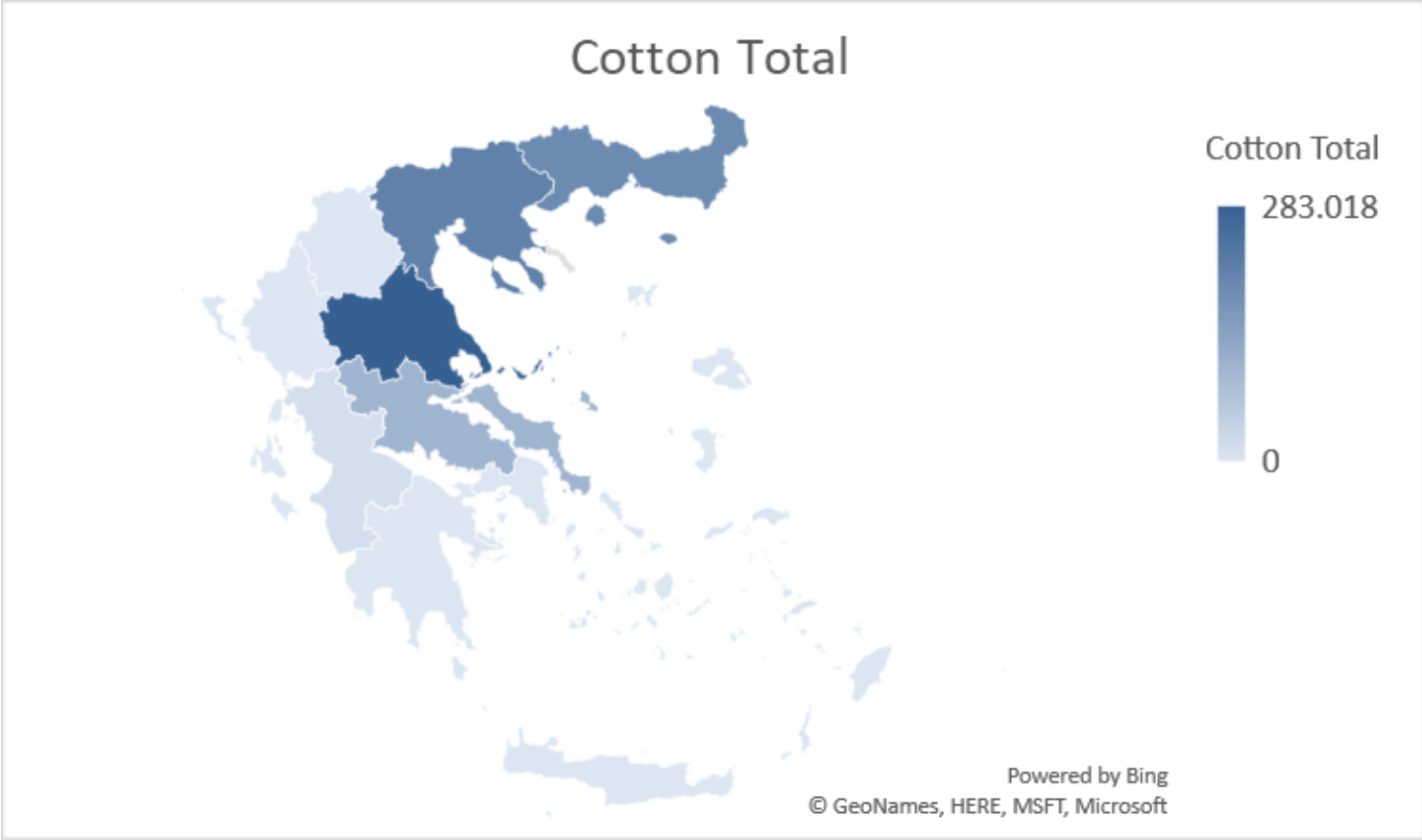

Figure 17: Industrial plants geographical presentation

Table 12: Tree productions in tones(a) [Source ELSTAT (2018)]

	Lemon	Orange	Mandarin	Apple	Pear trees	Kiwi	Pomegranate	Peach - Nectarine
Eastern Macedonia and Thrace	0	0	4	4.321	2.421	**36.239**	**7.472**	2.204
Central Macedonia	4	25	6	**55.287**	**20.345**	**100.977**	**7.691**	**506.334**
Western Macedonia	0	0	0	**95.209**	1.405	8	266	**59.052**
Epirus	3.874	**69.652**	**78.262**	471	423	**47.901**	1.022	314
Thessalia	125	194	69	**75.509**	**59.563**	7.750	4.963	**60.115**
Central Greece	547	1.899	284	5.531	1.195	5.482	5.743	1.446
Ionian Islands	1.619	2.965	629	204	382	0	172	86
Western Greece	**39.543**	**116.898**	**17.035**	2.991	5.004	3.759	3.402	1.602
Peloponnese	**16.108**	**451.072**	**68.350**	**9.608**	6.001	27	4.984	**7.687**
Attica	2.044	1.565	173	16	76	4	143	71
Northern Aegean	883	4.707	1.856	341	437	2	96	186
Southern Aegean	2.378	3.390	1.182	307	253	0	666	1.277
Crete	**9.085**	**75.094**	**8.786**	**3.313**	2.523	314	2.022	600

Table 13: Tree productions in tones (b) [Source ELSTAT (2018)]

	Apricot	Cherry	Almond	Walnut	Chestnut	Hazelnut	Table Olives	Olive for Oil
Eastern Macedonia and Thrace	1.575	3.589	3.101	2.404	269	45	33.782	15.017
Central Macedonia	**50.332**	**49.628**	**7.644**	**3.362**	**5.795**	134	87.854	107.001
Western Macedonia	370	**11.378**	1.784	**3.373**	1.620	51	735	305
Epirus	274	293	268	1.620	1.285	113	74.032	17.956
Thessally	**16.115**	**9.850**	**23.402**	**10.277**	**13.942**	92	114.937	51.167
Central Greece	265	2.020	2.014	5.026	760	14	149.721	101.096
Ionian Islands	148	36	302	159	0	0	136.106	2.525
Western Greece	891	1.789	2.035	**3.598**	1.368	3	450.625	58.871
Peloponnese	**42.572**	1.447	753	**3.473**	**3.841**	8	785.011	57.272
Attica	64	45	157	6	0	10	30.910	707
Northern Aegean	153	78	377	289	185	5	54.172	265
Southern Aegean	322	59	185	52	5	0	15.415	14.045
Crete	700	298	979	2.145	1.234	4	476.651	1.601

Conclusion:

Key producing areas Macedonia, Peloponnese, Thessaly and Western Greece.

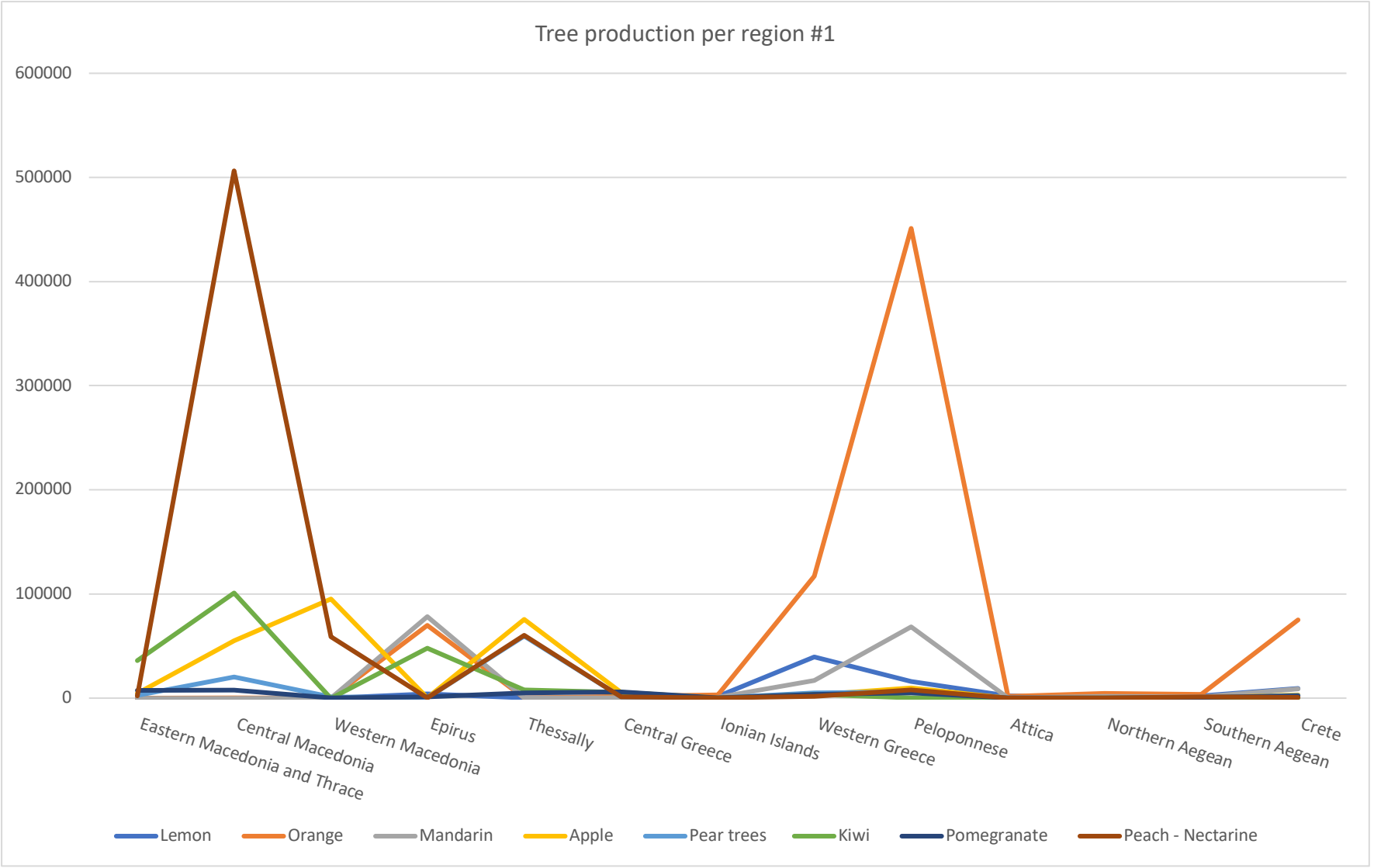

Figure 18: Tree production per region (a)

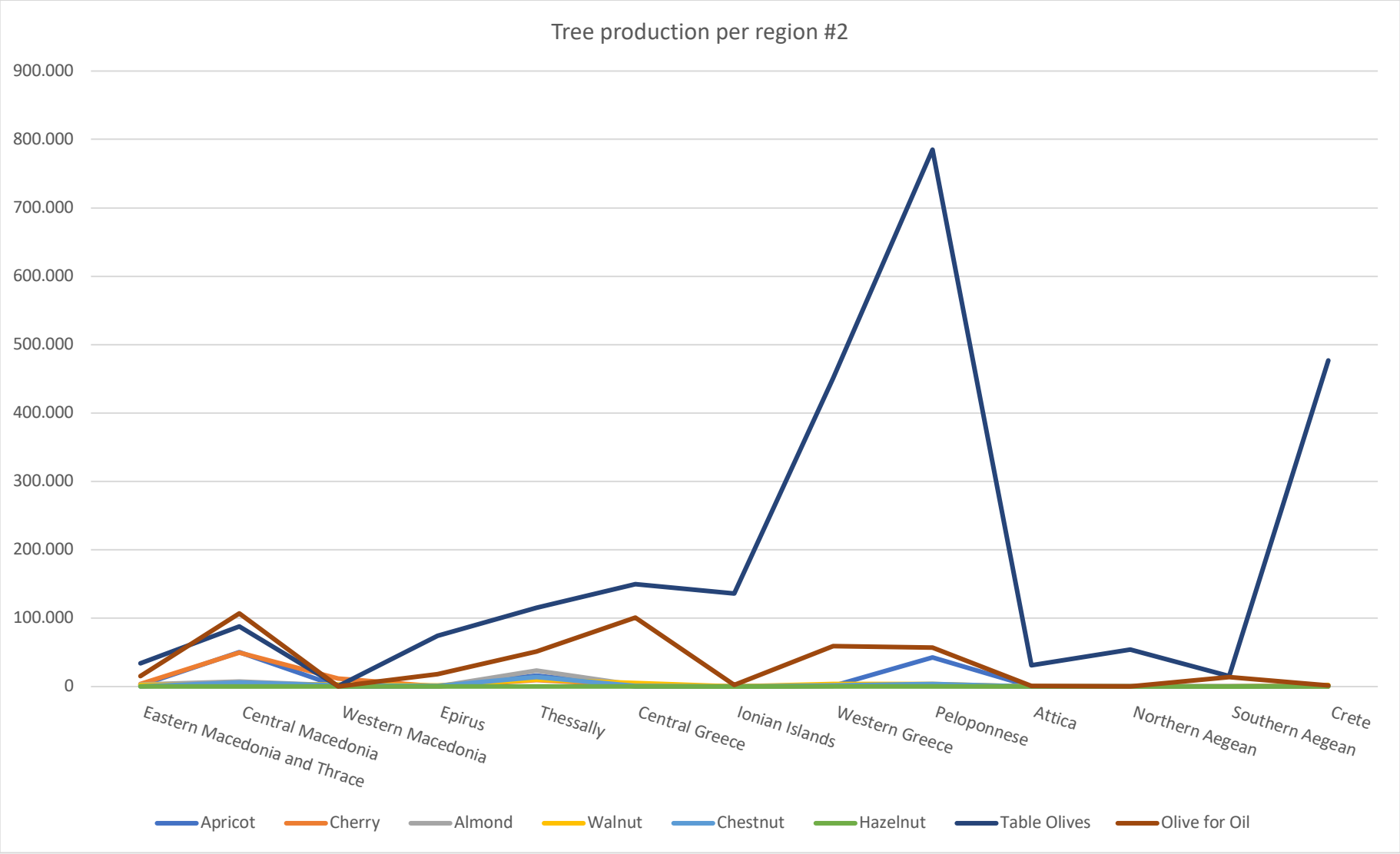

Figure 19: Tree production per region (b)

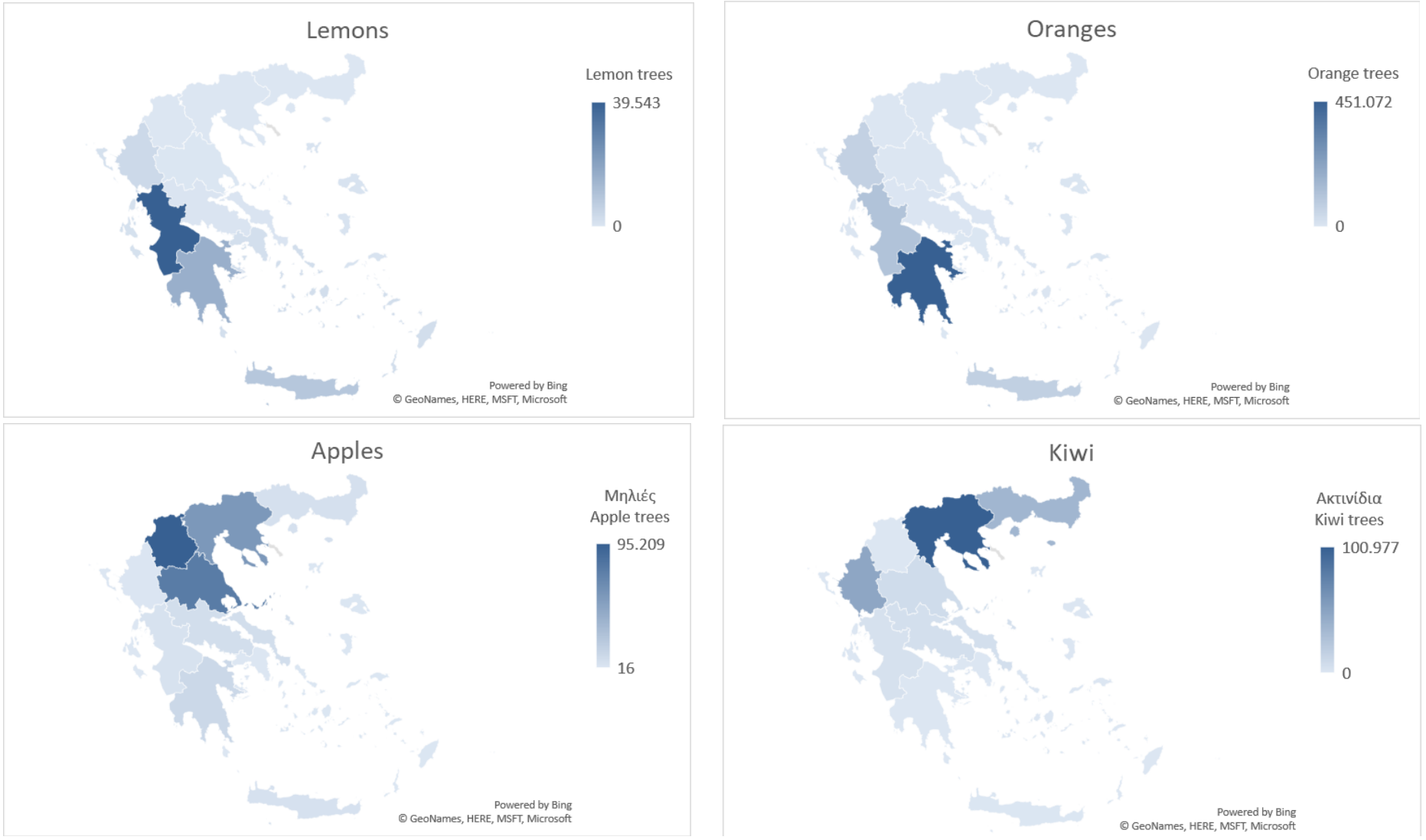

Figure 20: Selected tree production in tons per geographical location

3. Agribusiness and Tourism Sector

Based on the study of the Ministry of Economy and Development on the interconnection of the Agri-food chain and tourism carried out in 2017, only 7% of agricultural (and hunting) products are consumed directly by the tourism industry.

According with the Hellenic Chamber of Hotels more than 850.000 beds are available in Greek hotels. The is the reason why connecting tourism with the agri-food chain is one of the most critical and important actions and opportunity for future development of Agribusiness and Agrologistics Centers.

Tourism is a major source of consumption for the value chains of agri-food and industry. The interface is achieved only through distribution channels. The role of distribution channels (logistics) is very important in the value chain, as it is the connection of the product to the consumer. Agri-nutrition is distinguished for the needs of the present in two distinct chains that of fresh and processed foods.

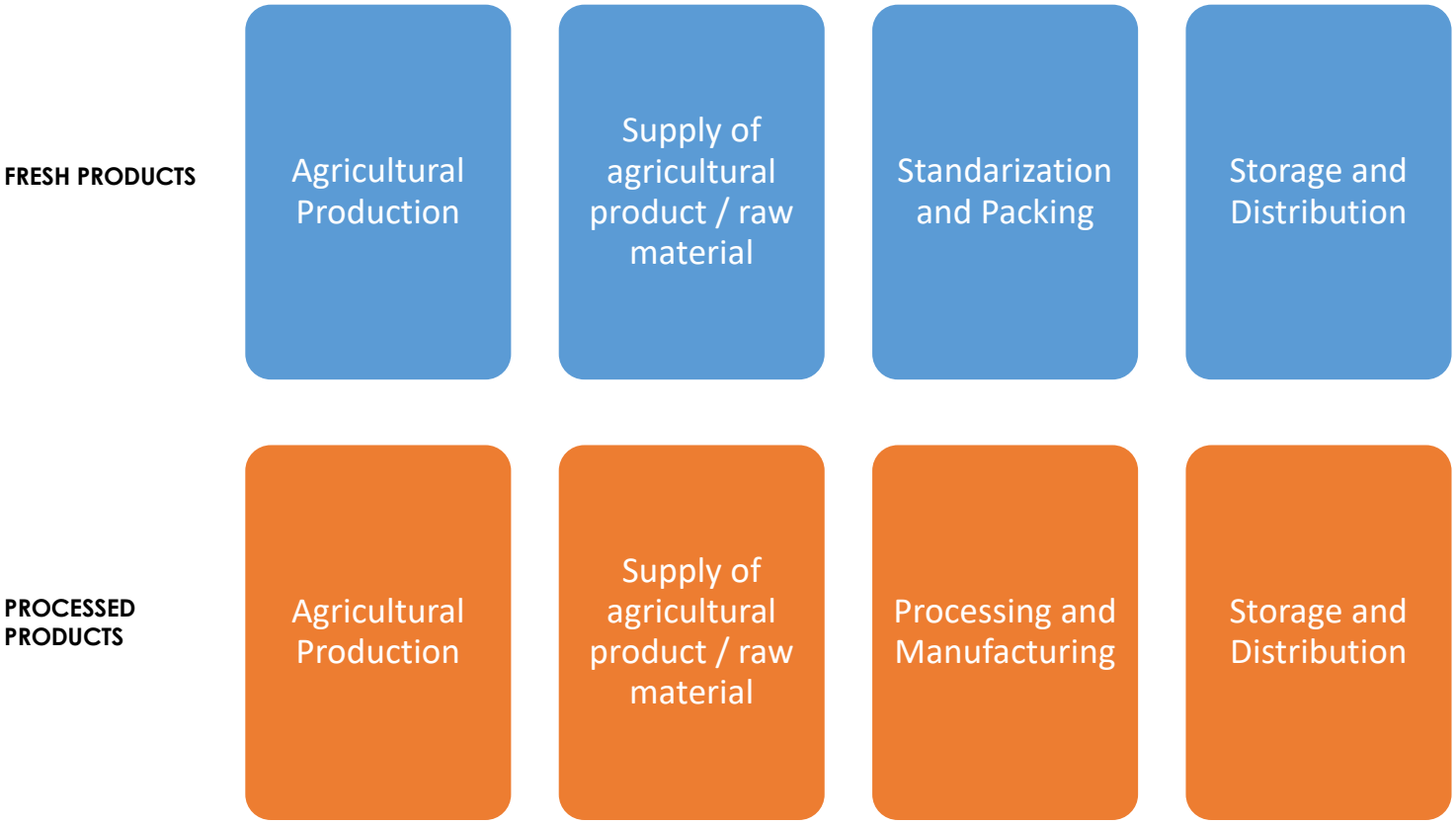

Figure 21: Value Chains Agri-Food

Table 14: Analysis of Hotels, Rooms and Beds in Greece [Source Hellenic Chamber of Hotels]

2019																		
	Units						Rooms						Beds					
	5*	4*	3*	2*	1*	Total	5*	4*	3*	2*	1*	Total	5*	4*	3*	2*	1*	Total
Eastern Macedonia and Thrace	12	31	115	156	72	386	1.185	2.038	3.577	3.361	1.100	11.261	2.463	4.191	7.045	6.521	2.144	22.364
Attica	38	127	157	241	112	675	6.594	9.962	7.063	7.327	2.181	33.127	12.640	19.238	13.118	13.518	4.385	62.899
North Aegean	8	35	134	170	40	387	939	1.839	4.677	3.937	614	12.006	1.909	3.515	9.029	7.386	1.167	23.006
Western Greece	4	44	105	97	24	274	1.461	2.604	3.188	2.426	295	9.974	3.127	5.183	6.036	4.639	578	19.563
Western Macedonia	3	16	58	37	11	125	61	373	1.439	732	233	2.838	137	807	3.157	1.582	783	6.466
Epirus	14	103	165	128	23	433	1.052	2.096	3.237	2.189	373	8.947	2.184	4.435	6.564	4.261	727	18.171
Thessaly	29	116	141	195	74	555	1.487	3.582	3.983	4.350	1.351	14.753	3.038	7.187	7.865	8.352	2.751	29.193
Ionian Islands	62	157	251	437	73	980	9.156	13.133	14.076	13.624	1.456	51.445	18.924	25.890	27.658	26.090	2.843	101.405
Central Macedonia	55	130	282	332	376	1.175	9.307	10.332	10.079	8.638	7.865	46.221	19.497	20.710	20.367	17.047	15.415	93.036
Crete	128	330	392	589	180	1.619	23.027	31.936	17.395	19.461	4.548	96.367	48.061	63.189	32.838	34.899	8.612	187.599
South Aegean	220	394	534	802	204	2.154	31.949	34.893	20.532	20.941	3.197	111.512	66.412	70.705	40.151	40.130	6.283	223.681
Pelloponnese	29	134	238	218	66	685	2.949	4.746	6.406	4.902	850	19.853	6.287	9.403	12.733	9.311	1.650	39.384
Central Greece	8	47	157	249	62	523	685	3.008	4.982	5.622	1.088	15.385	1.511	5.933	9.460	10.630	2.046	29.580
Greece Total	**610**	**1.664**	**2.729**	**3.651**	**1.317**	**9.971**	**89.852**	**120.542**	**100.634**	**97.510**	**25.151**	**433.689**	**186.190**	**240.386**	**196.021**	**184.366**	**49.384**	**856.347**

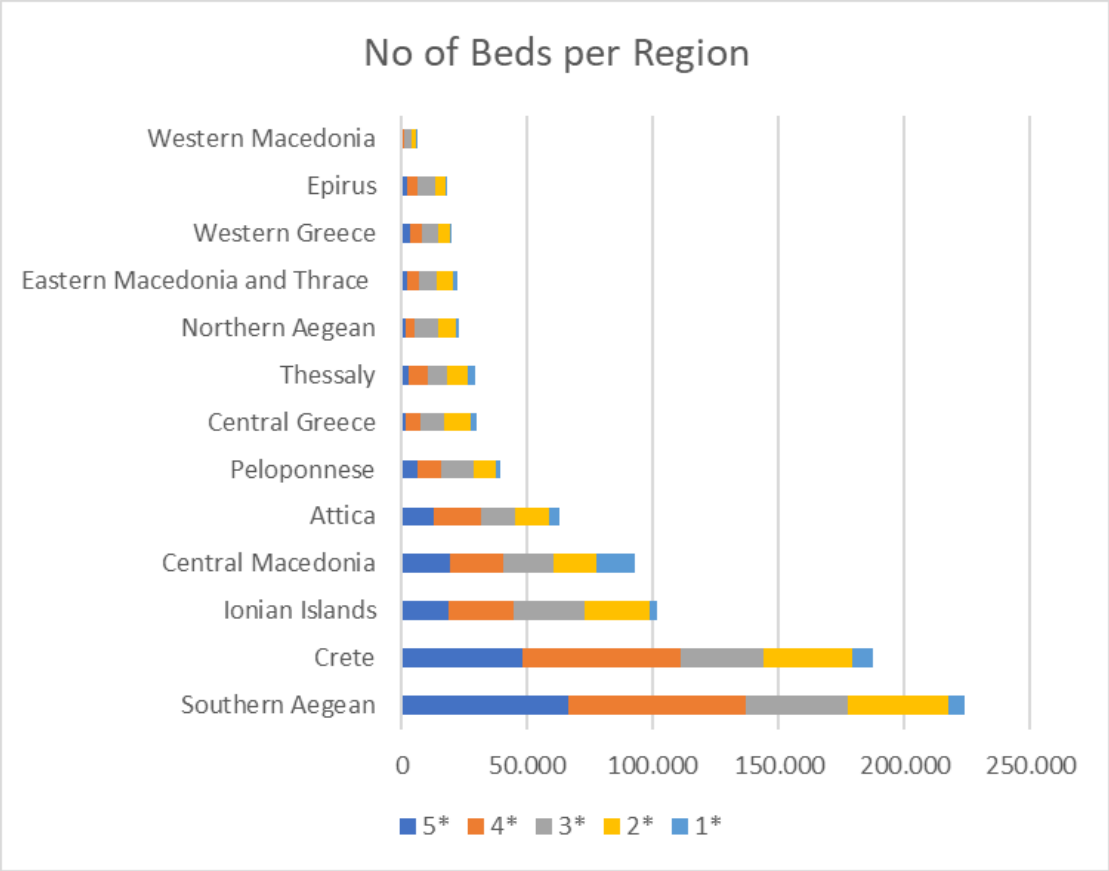

Figure 22: Number of beds/region [Source Hellenic Chamber of Hotels]

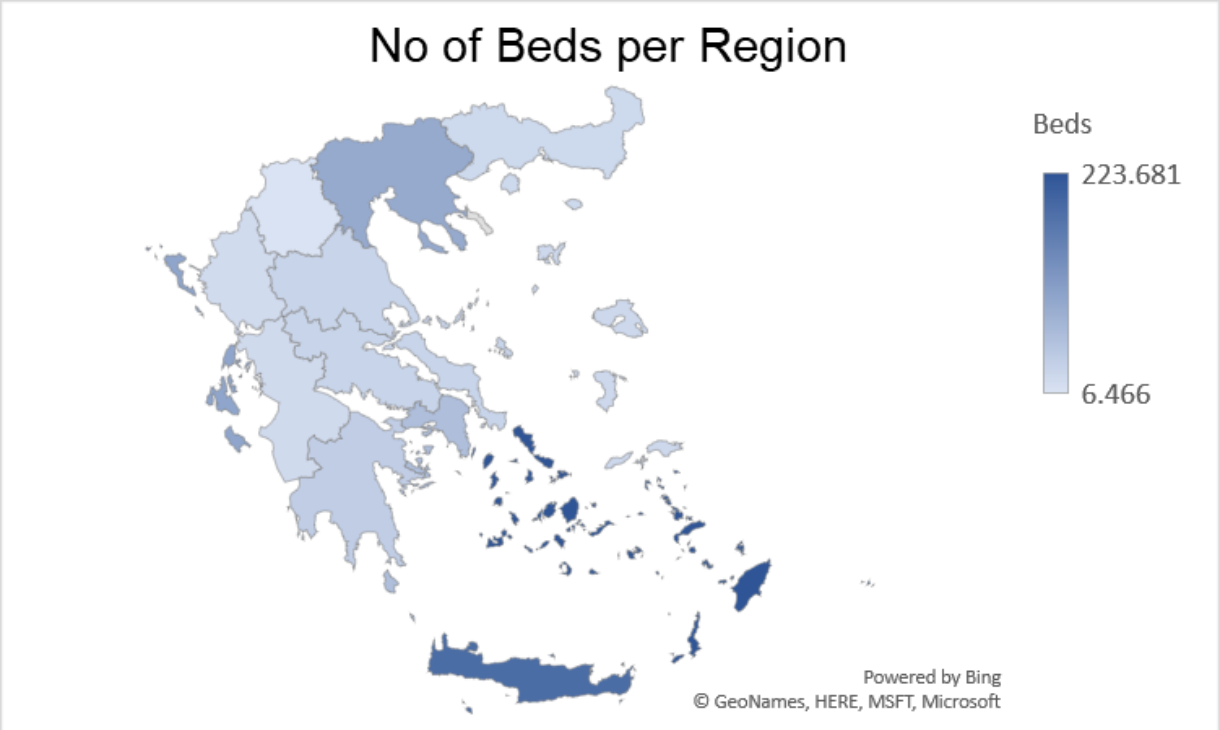

Figure 23: Number of beds/region on map [Source Hellenic Chamber of Hotels]

Table 15: Connecting Agribusiness with Tourism [Source Ministry of Economics & Development / Industry Secretary (2017)]

Annual Average Procurement Cost per Product Category (Greece Average)				
Packed / Processed Food	**Alcoholic excluding wine**	**Wine & Soft Drinks**	**Fresh Food**	
510 €	207 €	195 €	342 €	Per Bed
87.985 €	35.678 €	33.596 €	58.989 €	Per Hotels
233 €	107 €	107 €	136 €	1* -2* - Per Bed
332 €	119 €	108 €	189 €	3* - Per Bed
317 €	124 €	102 €	178 €	4* - Per Bed
842 €	347 €	339 €	612 €	5* - Per Bed

Table 16: Current status and assumption forcasts

Regions	Total Hotels	Annual Average Fresh Food Cost per Hotel (cost 58.596€)	Annual Direct Purchase 7%	Assumption Direct Purchase Increase to 20%
Southern Aegean	2.154	127.062.306	8.894.361	25.412.461
Crete	1.619	95.503.191	6.685.223	19.100.638
Ionian Islands	980	57.809.220	4.046.645	11.561.844
Central Macedonia	1.175	69.312.075	4.851.845	13.862.415
Attica	675	39.817.575	2.787.230	7.963.515
Pelloponnese	685	40.407.465	2.828.523	8.081.493
Central Greece	523	30.851.247	2.159.587	6.170.249
Thessaly	555	32.738.895	2.291.723	6.547.779
Northern Aegean	387	22.828.743	1.598.012	4.565.749
Eastern Macedonia and Thrace	386	22.769.754	1.593.883	4.553.951
Western Greece	274	16.162.986	1.131.409	3.232.597
Epirus	433	25.542.237	1.787.957	5.108.447
Western Macedonia	125	7.373.625	516.154	1.474.725
Greece Total	**9.971**	**588.179.319**	**41.172.552**	**117.635.864**

Hot to accomplish a project “from the field to the shelf / consumer”, could be a 117 million question.

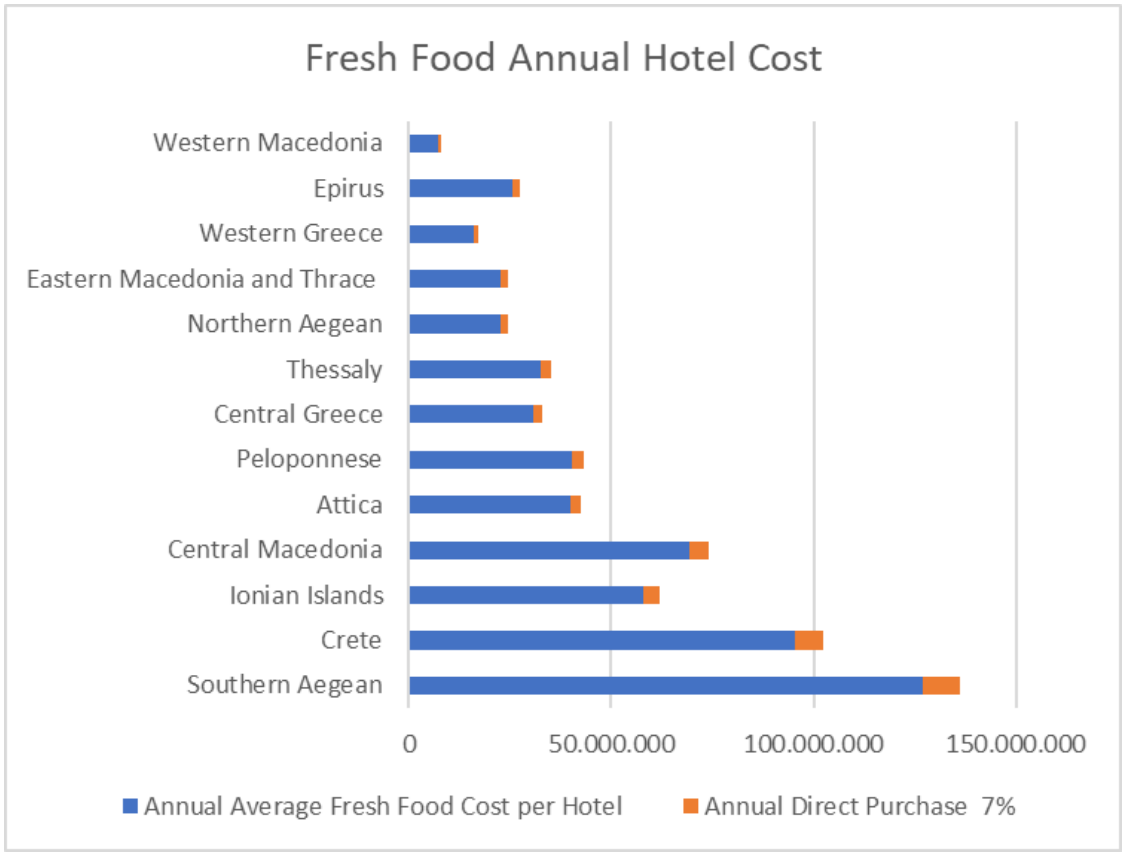

Figure 24: Fresh Food Annual Hotel Cost

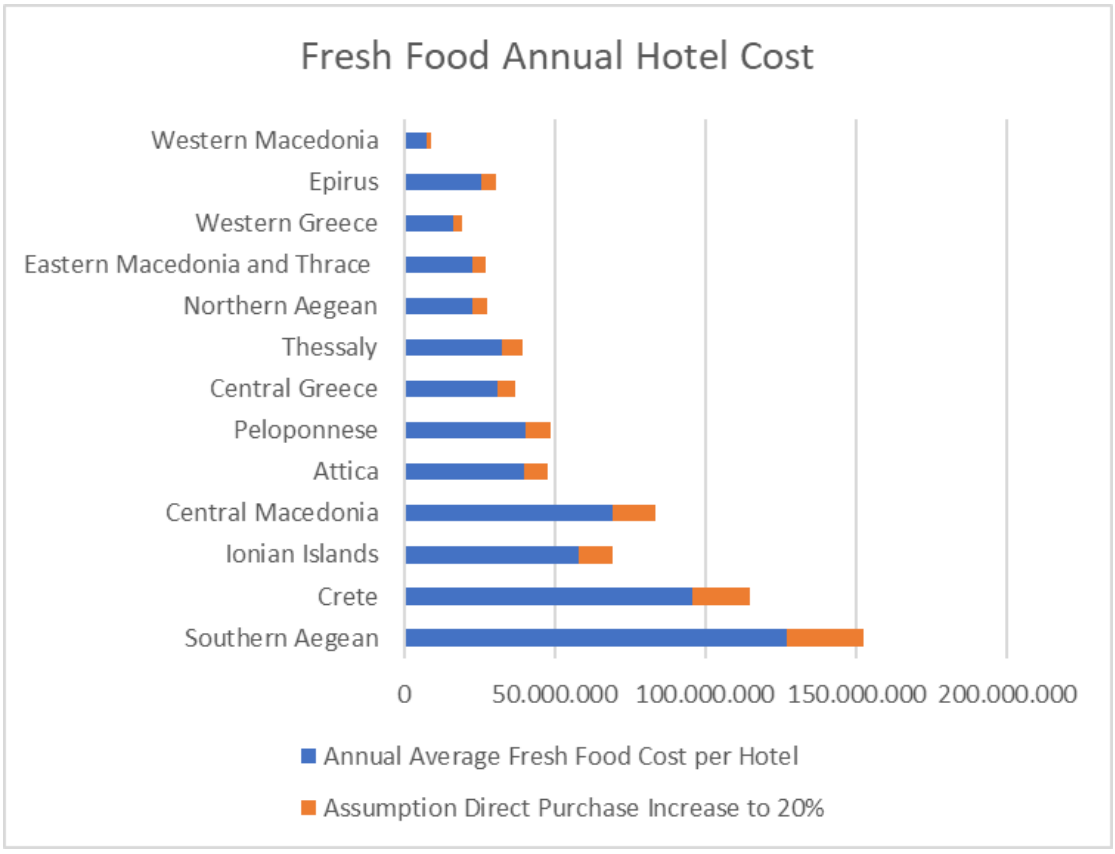

Figure 25: Fresh Food Annual Hotel Cost (a)

4. Critical success factors

Mechanisms to coordinate various sector's operations to ensure integration of SMEs to the value chain, together with institutional representation in policy centers.

Integration into the production of products, values such as improvement of working conditions, environmental protection, engagement of society, promotion of cultural heritage, etc.

Framework, rules and regulations, aid policies, funding, private and public support mechanisms, business culture, etc.

Mechanisms that support the distribution of knowledge and information for the sector, marketing, promotion/ promotion actions, market research etc.

Mechanisms that ensure continuous research and development, cooperation with universities and innovation centers, etc.

Infrastructure, e.g. road network, rail network, airports, etc.

Institutions and mechanisms that ensure the education and continuing training of human resources, professional and educational level of professionals who staff the sector etc.

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