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

Task 3 Deliverable: Assessment of the potential development of a network of Agrologistics hubs

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NEW AGRICULTURE FOR A NEW GENERATION

ΕΞΑΝΤΑΣ
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Chapter 1: Comprehensive analysis of developing a network of Agrologistics hubs in Greece

1.1. Existing network of distribution & storage

Currently there is no structure or operations model of the agricultural sector. The operations are based on ad-hoc needs and there are no capacity needs identification or other planning procedures. The harvest in the field is the central axis. The field is the concentration location of the products that are directed to:

1. Wholesalers / Exporters
2. Central - Urban - Markets (OKAA, ETC)
3. Super Markets
4. Street Markets

The Wholesalers own the necessary storage areas (dry load, cooled and maturation) and the limited dynamic packaging.

Distribution takes place via (a) the rural producers' means of transport, supporting mainly small product volumes for central markets and street markets; (b) the inland freight forwarders and/or transport operators and service providers; and (c) coastal transportation mainly through Ro-Ro vessels carrying vehicles.

It is noted that:

- Marketing of agricultural products is mainly carried out by wholesalers. (Excluding street markets)
- Storage & distribution is done by wholesalers. (Central Markets Model)
- Packaging, maturation rooms and other added value activities are provided by wholesalers

The current status mainly maintains the absence of logistics infrastructure in Agribusiness.

1.2. Introduction to Agrologistics Centers

A description of the scope and functionalities of an Agrologistics Center is presented in the task 1 report. The site selection process and key selection criteria are outlined below.

Location Selection

A set of criteria to be assessed in selecting a proper location for the establishment of a logistics center includes the following:

- National Criteria:
    - Availability and quality of infrastructure
    - Connectivity

- Border administration efficiency
- Openness to trade
- Geographic location
- Land availability
- Domestic market size
- Availability of skilled labor
- Labor market flexibility
- Customs barriers
- Port and airport charges
- Labor cost
- Input cost
- Transport and distribution cost
- Land price
- Political stability
- Macro – economic stability
- Safety and security
- Country resilience
- Corruption Control
- Property rights
- Regulation transparency
- Burden of regulation
- Incentives availability

➢ Subnational Criteria

- Quality and availability of infrastructure
- Land availability
- Location and land cost
- Availability of skilled labor
- Market size
- Labor cost
- Proximity to consumption market
- Proximity to manufacturing market
- Proximity to port and airport
- Availability of regional incentives
- Pollution
- Safety and security
- Life cost and economic development
- Extra services
- Transportation Cost
- Congestion level

Additional operational criteria include the following.

Basic Operation Pillars

The guiding principle of designing an Agrologistics Center is to incorporate the basic standards of eco-industrial facilities while maximizing green space and open space, as well as providing

green zones. Planning should provide for operational jobs by incorporating practical and scientific-based design, including at least the following:

- Provision of basic infrastructure with the necessary facilities, sufficient for the proposed use with expected vehicle traffic and other requirements.
- Space design of product processing facilities and daily operations
- Space design of operations based on needs of mechanical infrastructure.
- Space design for simple and easy traffic connection with the main roads or other axes.
- Space design of a central governing installation for shared facilities and other rising needs.

As regards building infrastructure, basic needs are:

- Buildings shed with dimensions to optimize the economic structure and operation.
- The buildings must be placed on the larger axes of the space, in order to offer greater ease of loading / discharging.
- The buildings must provide parking spaces and a space for necessary heavy vehicle maneuvers
- Buildings with requirements for mechanical installations (cooling chambers) should be designed to be close to each other.
- The size of the buildings should be calculated based on the existing regional production in tons and the number of the desired producer's incubation.

Central Operations

Central operations are listed below:

- Aggregation facilities
- Sorting, grading, packaging facilities
- Storage, ambient & controlled temperature facilities
- Value addition and market intelligence
- Distribution, Collection, Cross Docking & Logistics
- Value chains for end-to-end linkages

Central Infrastructures

- Trading Platforms
- Trading Shops
- Buildings (Management offices, Restaurants etc.)
- Packhouse - Cold Chain
- Fruit-pulping plant
- Packhouse – ambient
- General Cargo Warehouse

- Potato Cold Store
- Onion Store
- Ripening Store
- Business Center
- R&D - Knowledge Center
- Digitalization

All operations should support both physical and visual environment. All services and infrastructures should be supported by modern technological means and electronic platforms. Traceability will be available in all phases of operations for each product.

Available services offered should include the following:

Standardization and Packaging Services

- Processing
- Packaging and Labeling
- Maturation

Quality Control Services

- Laboratories – Chemical Laboratory
- Quality product characteristics specifications
- Evaluation of products - suppliers - producers

Supply Chain & Logistics Services

- Storage / Warehousing
- Order Collection
- Reverse Logistics
- Routing & Distribution
- Cross Docking
- Recycle andWaste Management

International trade services

- Imports & Exports

1.3. Developing a network of Agrologistics hubs in Greece

Analysis of data on agricultural production by region (in tons), is presented in Table 1 and Figure 1.

Table 1: Agricultural production/region (tons) (Ministry of Agricultural Development, 2018)

	Vegetables	Cereals	Beans/Pulse	Industrial plants	Melons and Potatoes	Tree production Lemons etc.	Olives & Olive Oil
Eastern Macedonia and Thrace	92.309	601.456	5.084	457.561	246.835	63.643	176.085
Central Macedonia	185.502	1.155.503	5.909	475.459	107.428	807.564	1.809.983
Western Macedonia	19.654	337.261	15.430	36.234	76.537	174.515	350.070
Epirus	17.633	82.554	895	303	24.846	205.773	503.534
Thessally	107.358	849.933	15.085	367.897	79.487	281.964	730.033
Central Greece	179.093	282.550	5.422	114.301	110.545	32.226	315.269
Ionian Islands	10.659	3.064	212	0	12.299	6.703	152.038
Western Greece	206.014	280.288	814	16.137	437.118	199.916	909.329
Peloponnese	219.549	40.649	2.017	403	143.694	615.929	2.074.141
Attica	78.233	13.340	452	1.568	12.820	4.373	40.362
Northern Aegean	15.282	17.520	1.090	8	23.779	9.596	73.628
Southern Aegean	32.770	10.678	369	2	48.852	10.075	49.611
Crete	291.383	4.347	658	19	144.587	107.098	692.448

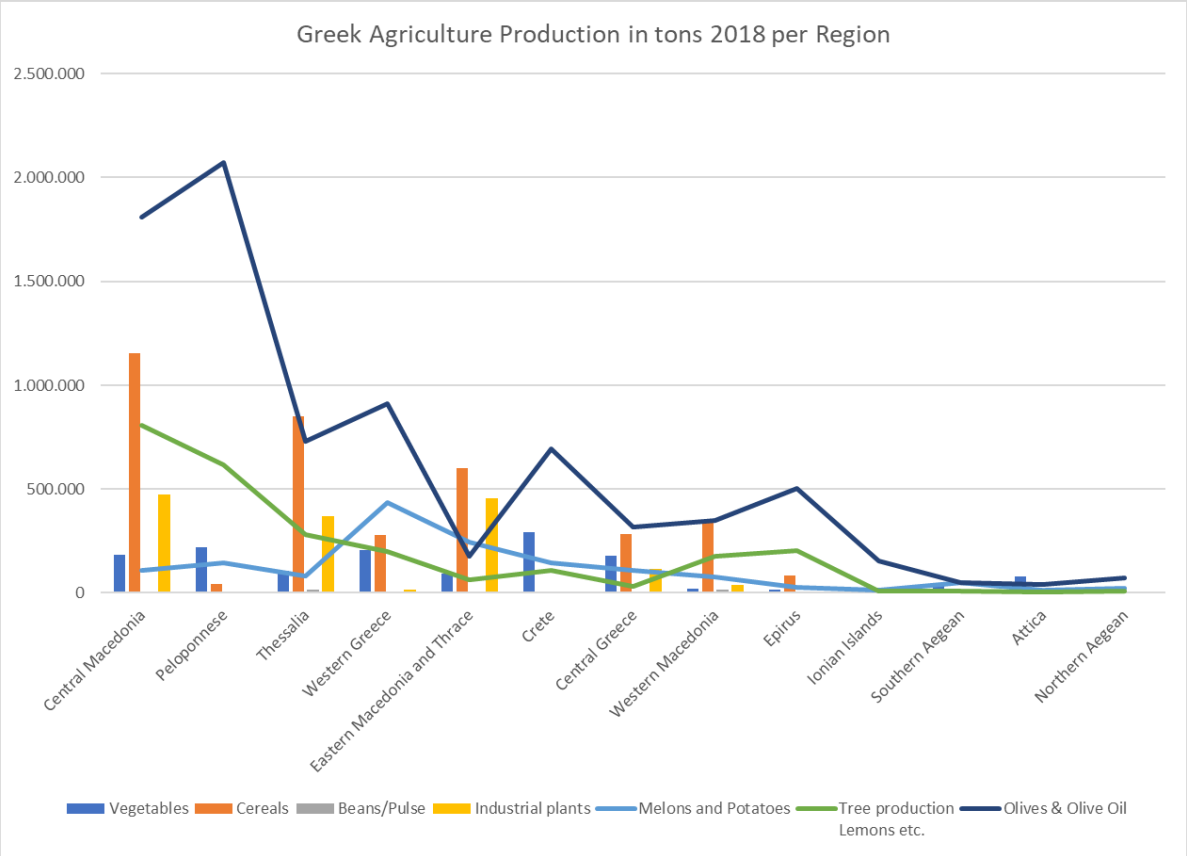

Figure 1: Greek Agricultural Production in tons 2018/ region
Source: Ministry of Agricultural Development

Table 2 shows a similar analysis, presenting the percent share of agricultural production by region.

Table 2: Percent of agricultural production/ region

	Vegetables	Cereals	Beans/Pulse	Industrial plants	Melons and Potatoes	Tree production Lemons etc.	Olives & Olive Oil
Central Macedonia	13%	31%	11%	32%	7%	32%	23%
Peloponnese	15%	1%	4%	0%	10%	24%	26%
Thessalia	7%	23%	28%	25%	5%	11%	9%
Western Greece	14%	8%	2%	1%	30%	8%	12%
Eastern Macedonia and Thrace	6%	16%	10%	31%	17%	3%	2%
Crete	20%	0%	1%	0%	10%	4%	9%
Central Greece	12%	8%	10%	8%	8%	1%	4%
Western Macedonia	1%	9%	29%	2%	5%	7%	4%
Epirus	1%	2%	2%	0%	2%	8%	6%
Ionian Islands	1%	0%	0%	0%	1%	0%	2%
Southern Aegean	2%	0%	1%	0%	3%	0%	1%
Attica	5%	0%	1%	0%	1%	0%	1%
Northern Aegean	1%	0%	2%	0%	2%	0%	1%

This analysis provides useful insights to understand which regions are of main importance for developing Agrologistics centers.

1.4. Proposed Geographical Regions for Agrologistics Centers

Following is a preliminary assessment of different regions in terms of their potential for development of agrologistics centers, either of national or of regional scope. The map in Figure 2 shows the agricultural production per region for year 2018. Figure 3 shows the key transport infrastructure in each region.

Thessaloniki Area (National Scope)

Central Macedonia is the most important region of agriculture production. Thessaloniki is the main hub of agri-food consolidation. It incubates the second largest commercial port of Greece, which is the country's largest export port. The port is connected to the railway system and to the main roadway axis of Egnatia (part of the TEN-T). The area also has an airport, which is currently undergoing major expansions. The transport networks provide access to the northern borders, and connection to the eastern Europe and the Balkans. Furthermore, it should be noted that the main export partners of Greece are located in the Balkan region.

Oinofyta Area (National Scope)

Recommendations have been made for the development of a second large Agrologistics center in the Attica region, and more specifically in the Oinofyta area. Oinofyta is between Central Greece, Attica and Chalkis the broader region of which has a large production of agricultural products. Oinofyta is one of the largest open space areas in Greece with significant industrial activity. There is a large amount of available land, a factor that is important, also for environmental reasons. At the same time, Oinofyta is planned to become a Business Park, which would further emphasize the selection of the area. It should be noted, however, that an assessment of the existing facilities indicates that Attica is already over utilized with small / medium logistics installations.

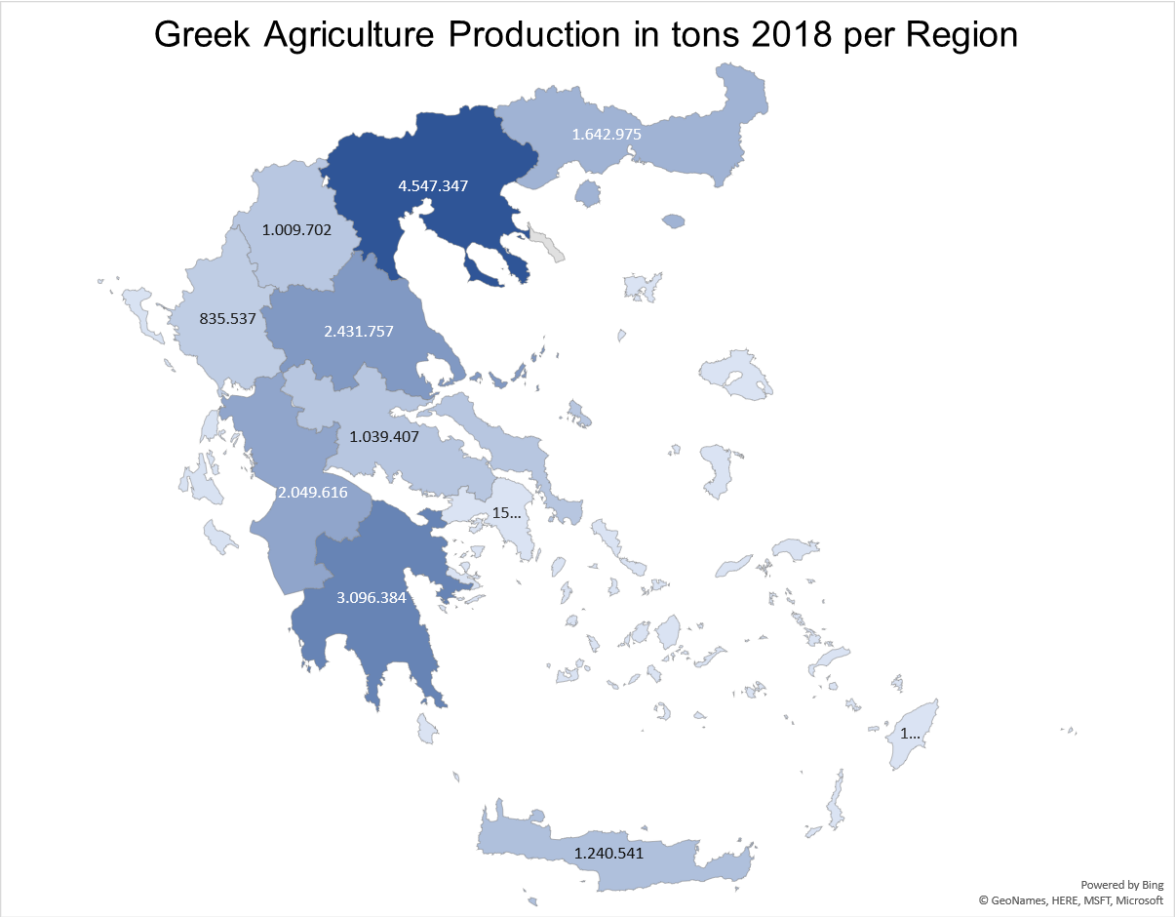

Figure 2: Greek Agricultural Production Map (in tons 2018/ region)

Tripolis Area (Regional Scope)

Tripolis is located in the heart of Peloponnese. It has excellent road connection with the capital city of Athens and concentrates large agricultural production volumes. It has large available land capacity along with an existing industrial zone.

Heraclion, Crete (Regional Scope)

Heraclion is located in the middle of Crete and has a good connection to major production areas, such as the Messaria valley.

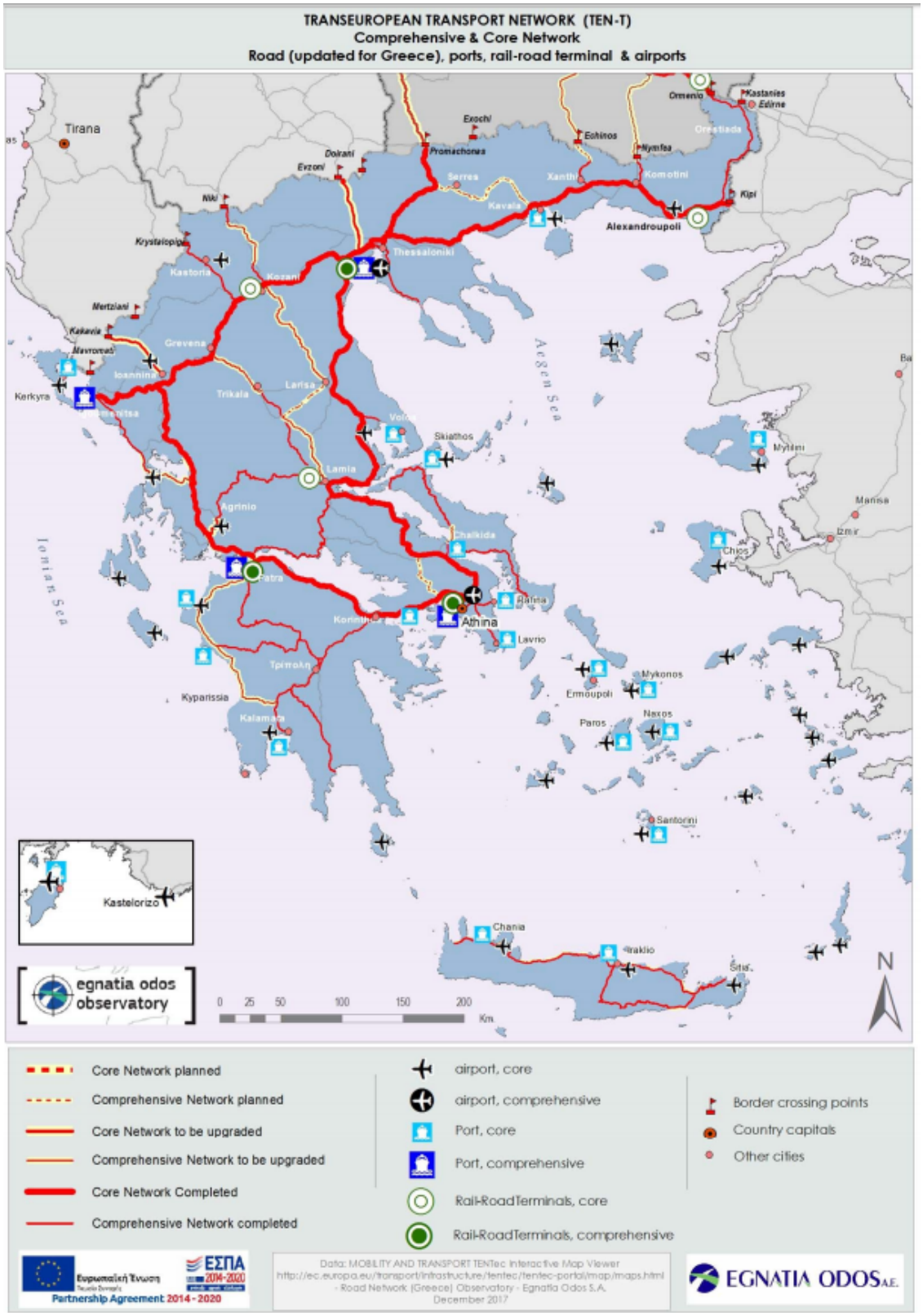

Figure 3: TEN-T Comprehensive and Core Network

Agrinio, Etoloakarnania Area (Regional Scope)

Agrinio has significant land capacity for the development of a regional Agrologistics center and for this reason it has been selected over the larger city of Patras, although the latter is home to a major port.

Larissa Area (Regional Scope)

Larissa is in the middle of one of the largest production areas of Greece. As such, it would present an obvious choice.

Alexandroupolis or Kavala (Regional Scope)

Alexandroupolis has a port with good connection to the Egnatia roadway and railway connection providing access to Bulgaria and Romania. As such, it is a preferred option as compared to Kavala.

Chapter 2: Prefeasibility study to explore the potential development of an Agrologistics center in Thessaloniki

2.1 Exports from Greece to Europe

According with Chatham House Resource Database export of agricultural products from Greece have the following dynamics.

Cereals

Table 3: Cereals exports (Source: [Chatham House Resource Trade Database, CHRTD 2018])

Row Labels	Sum of USD	Sum of Weight
⊞ Caribbean and Central America	799	387
⊞ Central and Northern Asia	243.272	85.375
⊞ China	240	689
⊞ East Asia excluding China	169	246
⊞ Europe	142.662.007	374.088.339
⊞ Middle East and North Africa	42.975.063	147.870.785
⊞ North America	182.321	149.789
⊞ Oceania	8.983	6.090
⊞ South America	90.899	162.261
⊞ South Asia	51.125	48.040
⊞ Southeast Asia	15.721	5.630
⊞ Sub-Saharan Africa	9.060	8.662
Grand Total	186.239.659	522.426.292

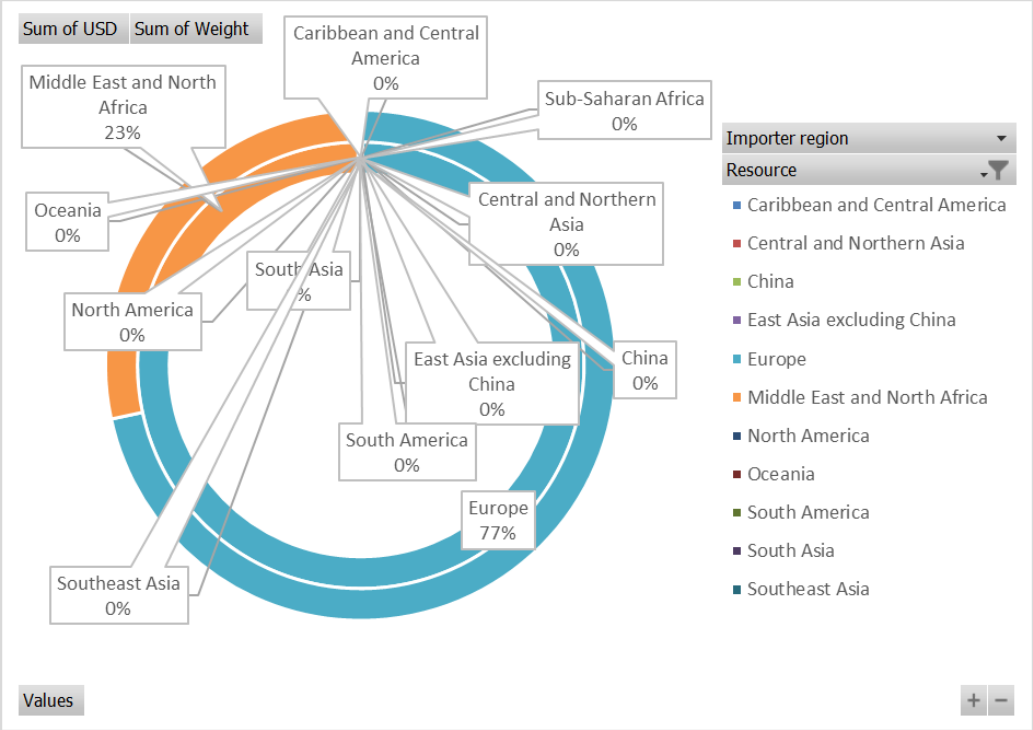

Figure 4: Cereals exports in % (Source: [Chatham House Resource Trade Database, CHRTD 2018])

Europe represents 77% of Cereals total exports and Middle East with North Africa 23% (Figure 4). All other regions are less than 0,5%, actually near to zero. At the same time, as shown in Table 2, Cereals production in Greece comes from Central Macedonia 31%, Eastern Macedonia & Thrace 16% and Thessally 23%, meaning that Thessaloniki Agrologistics Hub (National Scope / Range) concentrates almost half of the national production with connection to regional scope hubs (Alexandroupolis).

Beans

Table 4: Beans exports (Source: [Chatham House Resource Trade Database, CHRTD 2018])

Row Labels	Sum of USD	Sum of Weight
Caribbean and Central America	586	440
China	3.358	847
Europe	4.696.655	3.751.052
Middle East and North Africa	11.890	2.992
North America	569.445	197.607
Oceania	6.757	1.613
Southeast Asia	40.683	11.820
Sub-Saharan Africa	10.158	12.658
Grand Total	**5.339.532**	**3.979.029**

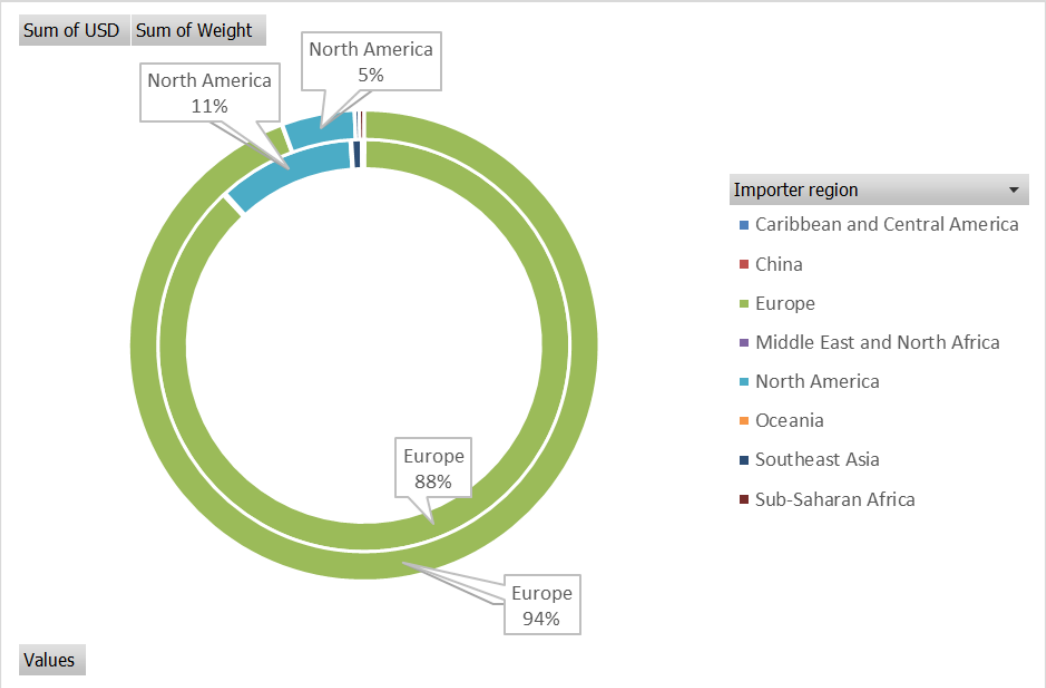

Figure 5: Beans exports in % (Source: [Chatham House Resource Trade Database, CHRTD 2018])

Close to Cereals, Beans' production is concentrated in the Macedonia Region and Europe is the main "client" with more than 90% of the total volume (Figure 5).

Vegetables

Table 5: Vegetables exports

Row Labels	Sum of USD	Sum of Weight
Caribbean and Central America	175.537	88.647
Central and Northern Asia	287.998	270.004
China	237.999	96.098
East Asia excluding China	55.814	2.325
Europe	191.832.385	179.492.387
Middle East and North Africa	2.409.227	1.535.378
North America	3.576.628	1.815.540
Oceania	12.699.355	8.174.523
South America	20.946	12.191
South Asia	23.278	7.458
Southeast Asia	47.693	19.384
Sub-Saharan Africa	111.203	80.764
Grand Total	**211.478.062**	**191.594.700**

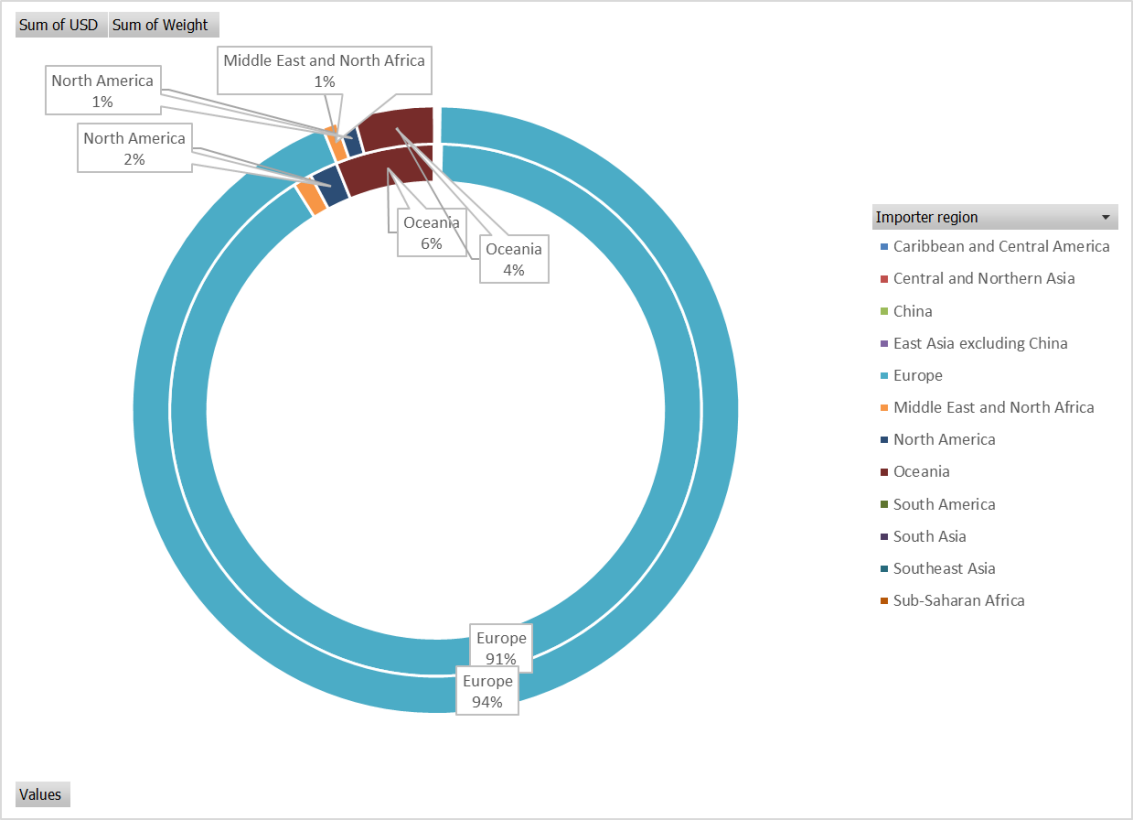

Figure 6: Vegetables exports in %

Vegetable production in Macedonia is not so strong, but still holds almost the 20% of the production (Table 2). Central Macedonia is representing the 13% of total production. Nevertheless, it is crucial that Macedonia produces high value products, such as Asparagus.

2.2 Mediterranean Food Flows

There are significant export flows of agricultural products from neighboring countries to Asia and the Mediterranean. Bulgaria and Romania alone export cereals to the Middle East and North Africa (MENA) exceeding 5,800,000 tons per year. These exports are facilitated via the Black Sea ports, the port of Thessaloniki and the road routes through Turkey.

An Agrologistics Center in Thessaloniki can play an essential role as a hub for the transit of agricultural products. At the same time its facilities can be used for packaging and further processing. The same use of the Agrologistics Center can happen in the reverse flow of agricultural goods from MENA countries to Eastern and Central Europe.

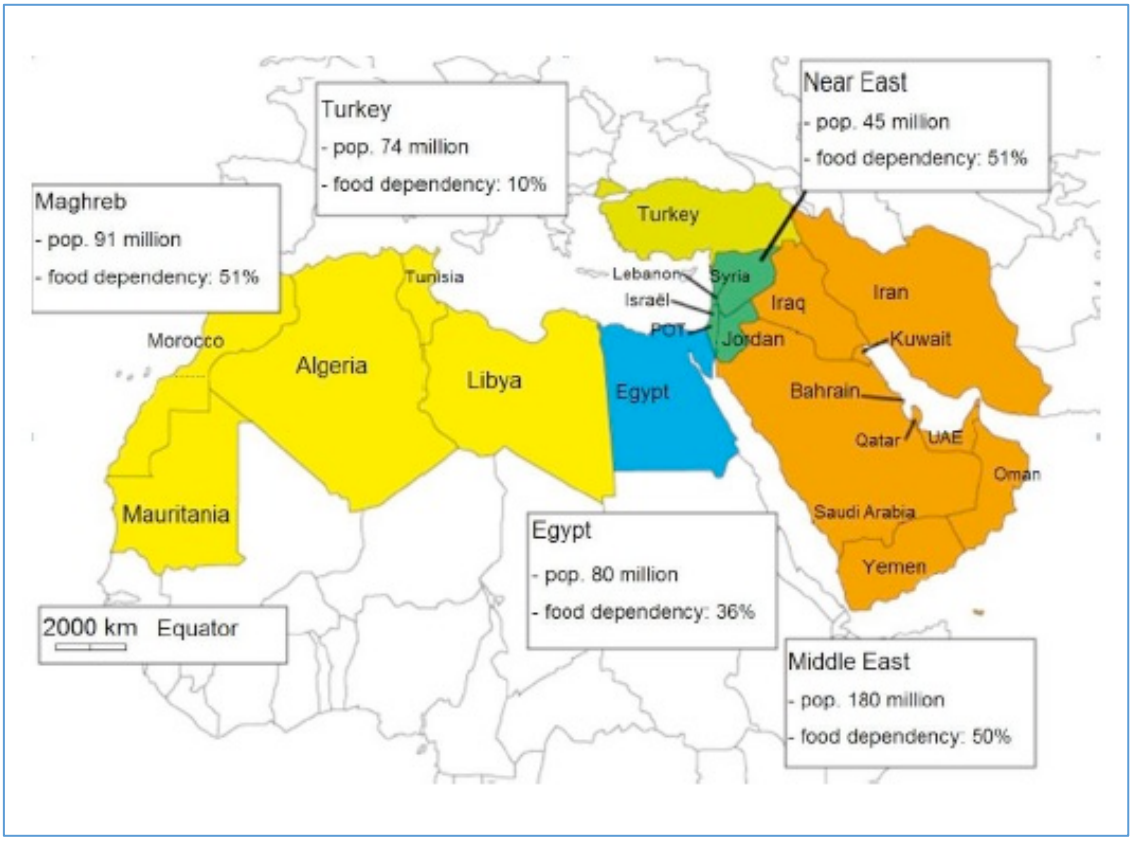

Figure 7: Existing trends in population growth (Source: [Study INRA Science & Impact / Pluriagri 2015])

Existing trends in population growth, eating habits and agricultural production will lead to a continued import dependence on the MENA region by 2050. Increasing dependence on agricultural imports will become more apparent as the effects of climate change are felt. The regions of the Middle East and the Middle East will be more strongly affected, with net agricultural imports reaching 70% of domestic demand.

2.3 The Tourism Sector in Greece

It is obvious that Macedonia concentrates a large percentage of Greek agricultural production. Furthermore, the tourism sector is quite advanced in Macedonia and especially in Chalkidiki region.

According to the Hellenic Chamber of Hotels, Ports General Secretary (2017) and Industry Secretary (2017), the general picture of North Greece / Macedonia is as follows (Tables 6-8):

Table 6: Tourism sector in Greece (PWC – General Secretariat for Industry, 2017)

	Hotels	Beds	Passengers	12month operation	Average operative months
Central Macedonia	1.195	88.568		48,70%	5,20
West Macedonia	127	5.993		100%	
East Macedonia & Thrace	381	21.311		57,10%	4,30
Thessaloniki Port (Annually)			69.508		

Table 7: Share per procurement category in Greece

Share per procurement category in Greece				
	Packed Products	Alcohol (no wine)	Wine & Refreshments	Fresh Products
Central Macedonia	29,60%	8,70%	10,50%	22,20%
West Macedonia	9,40%	36,10%	10,90%	10,70%
East Macedonia & Thrace	25,90%	9,80%	9,30%	23,60%

Table 8: Cost per procurement category in Greece

Cost per procurement category in Greece				
Packed Products	Alcohol (no wine)	Wine & Refreshments	Fresh Products	
510 €	207 €	195 €	342 €	Per Bed (avg)
87.985 €	35.678 €	33.596 €	58.989 €	Per Hotel
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

Based on the reported spending per bed and per hotel, in Central Macedonia the gross margin in fresh food for 1.195 hotels is nearly 70mil Euro.

2.4 Exports and Target Markets

The present study provides useful conclusions for the Thessaloniki Agrologistics Center target markets, which are as follows (Figure 8, 9):

Local Market

Hotels (Connection with Tourism)

Cruising (Connection with Tourism)

Traders

Wholesalers

SME Industries

Figure 8: Local Market

Export Markets

Exports to Countries (EU) Key Targets

1. Bulgaria
2. Germany
3. Romania
4. Czech Republic
5. Austria
6. Slovakia

Exports to Countries (EU) Secondary Targets

1. Albania
2. Serbia
3. Cyprus
4. The Netherlands
5. North Macedonia

Exports to Countries (MENA) Key Targets

1. Egypt
2. Saudi Arabia
3. Jordan
4. Tunis
5. Israel
6. Lebanon
7. IRAN

Figure 9: Export Markets

Chapter 3: Agrologistics Center sites in Thessaloniki - Scenarios Development

3.1 Suggested Sites Available

According to the key criteria and the preliminary market analysis presented above, the selection of a proper site for the development of an Agrologistics Center in Thessaloniki is mainly based on the following considerations:

- The category of products, such as fresh, animal, cheese, etc. (market demand).
- The volume of products produced in the broader geographical area per category (market sufficiency).
- Connection to main transport routes (road, rail, ports, airports).
- The connection of the planned production model of the geographical area with the products produced and possible future productions.

In the Thessaloniki area, the two main options are the following:

1. Gonnos Camp
2. Ziaka Camp

Both sites are currently empty and comprise unused land spaces. The Gonos Camp (Figure 10) has been characterized as a National Logistics Hub. However, it has several disadvantages, including a major one, which is the presence of mines in the site, which will need to be removed. Although some mine removals have taken place, the site is not yet available for development.

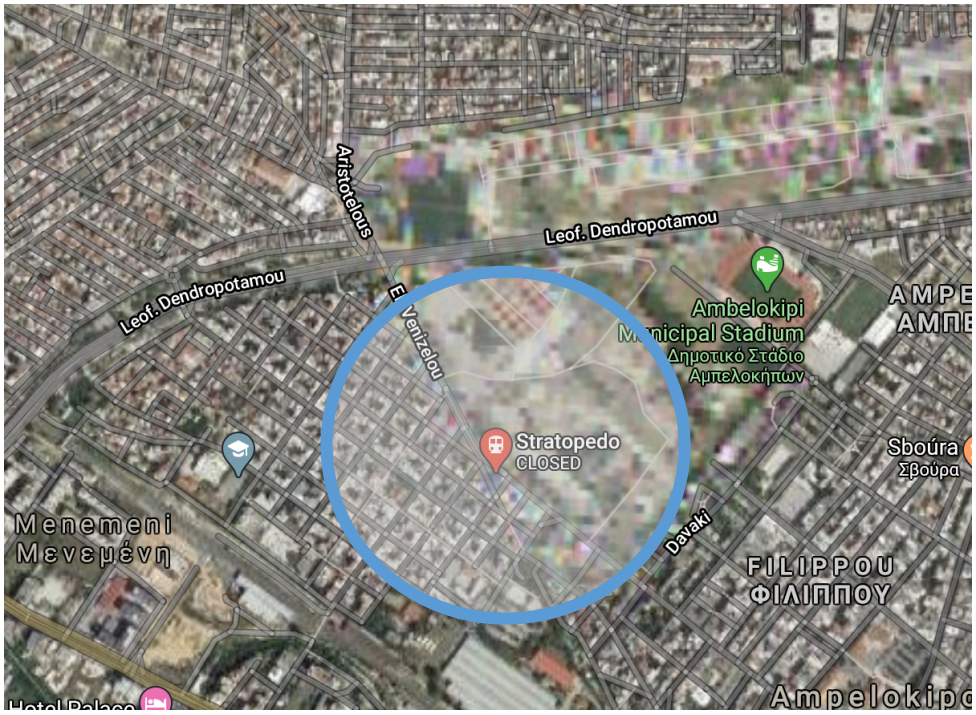

Figure 10 Location of Gonos Camp

The Ziakas Camp has the advantage of being near the entrance of Thessaloniki City, near the port, relatively near the airport, and near the national roads to West Macedonia and East Macedonia. It is also characterized as a National Logistics Hub. It is bordering the Thessaloniki central fresh produce market. It is adjacent to the national roadway and has an abandoned rail line, which may be revitalized, to connect the site to the national railroad network. The site (Figure 11) has a size of 124.37 acres, which is adequate for the proposed development.

Figure 11: Location of Ziakas camp

Based on this preliminary analysis and according to their main characteristics, it seems that the Ziakas Camp presents a preferred option for the development of the Thessaloniki Agrologistics Hub.

3.2 SWOT Analysis

Analysis of the characteristics of the Thessaloniki area as well as the characteristics of the proposed sites, reveals the following strengths and weaknesses, as well as opportunities and threats associated with the development of an Agrologistics Center. These key points are summarized in Figure 12.

Strengths

The main strengths revealed from the analysis include the great agricultural production of the region; existence of a dense transport network and connectivity to various modes of transport; proximity to the Central Vegetable Market, proximity to the port and airport.

Weaknesses

The main weakness is the lack of culture and relevant prior experience.

Opportunities

The high tourist traffic, exports to the Eastern Europe as well as the MENA countries, the development of processing plants and investment interests present opportunities for an Agrologistics center development.

Threats

Threats include the institutional delays and instability in the Balkan region.

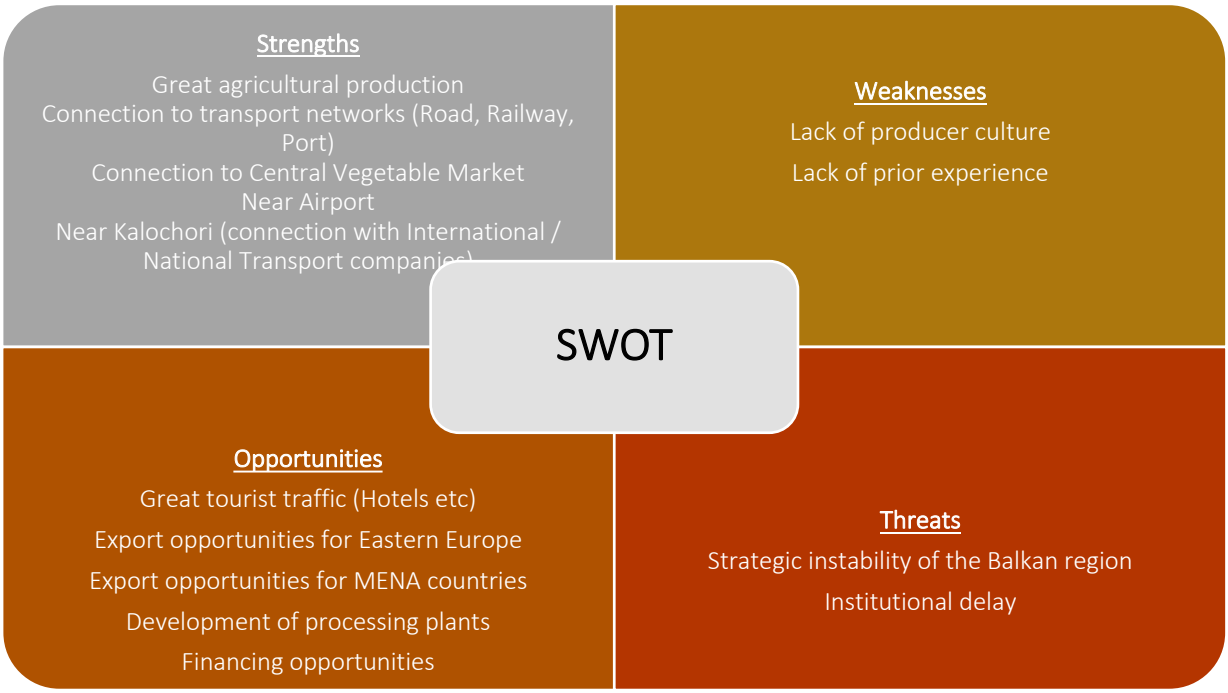

Figure 12 SWOT Analysis for the Agrologistics Center Development in Thessaloniki

3.3 Development Scenarios

The development of a network of regional and local Agrologistics centers should be considered. In collaboration with local stakeholders, social economies should be strengthened to target the improvement in quality, quantity and control of agricultural production and costs of distribution as compared to the existing systems.

Currently, there is lack of relevant culture with organized groups of producers who will transform their production process to smart agriculture, while at the same time they will increase the quality of their products. Furthermore, digitization and organized distribution networks that are actively managed to reduce the cost of collecting, storing, processing packaging and transporting the products are deemed essential. The main idea is to implement scenarios of integrated networks, to overcome issues related to the small size of productions.

A pessimistic scenario includes small clusters with insignificant footprint in the agricultural sector.

Clustering and networking of production and distribution should be considered as part of a national strategic plan, aiming to increase exports and further expand and develop the distribution networks, so as to overcome issues related to the geography and geomorphology of the country, which results in increased costs. Networking and integration with local logistics centers should be considered. Transport, storage and distribution costs should thus be reduced, to increase the profitability of the primary sector and reduce the cost for the consumer.

It is important to carefully consider the location selection of the Agricultural centers of local and regional significance, their networking and the mapping of flows over these networks. Exclusive goods movement or freight transport oriented multimodal transport and logistics networks should be designed, to efficiently connect production areas to distant markets. Today, for example, products from the Messara valley in Crete, move through a sequence of road and sea routes, as follows: by truck to Heraklion, from there by boat to Piraeus, from Piraeus by truck to Patras, from Patras by boat to Ancona, and from there by truck to central markets in Belgium and Germany. The possibility of deploying vessels directly from Heraklion to Trieste and from there by rail to the central European markets should be examined. Either Ro-Ro services or Ro-Pax to also support touristic activity could be used.