Kantor
Management Consultants

Embassy of the Kingdom
of the Netherlands

GREECE – Market Special "Developments in the Greek Horticulture Sector: Greenhouses and Agro logistics"

Evaluation of Current Situation & Business Opportunities for Strategic Investors

Athens, 23 December 2015

Executive Summary

- The scope of this Market Special is to analyze the current state of the greenhouse sector in Greece, for vegetables in particular, and the corresponding agro logistics that accompany the production.
- The analysis investigates and sheds useful light in related to the horticulture and greenhouse areas, such as labor costs, energy costs, ease of doing business in Greece, vegetable and greenhouse key parameters (i.e., cultivation, production, consumption, imports, exports), financing tools for financing such type of investments, financial analysis of the sector, supply chain, value chain, dynamics and potential of the sector.
- The analysis identifies certain points of pain and areas that can be improved. These areas include low production yields, supply deficit and demand-supply imbalance, opaque pricing system of central markets in the agro logistics part, absence of critical mass that could boost vegetable exports and others.
- The analysis reveals a great potential in the greenhouse sector for strategic investors, especially those who would be eager to invest in State of the Art greenhouses. The significant potential of the sector is an outcome of the following factors:
  - Leading internal consumption even at pan-European level
  - Supply deficit and apparent market gap which is historically serviced by imports
  - Favorable production factors (e.g., labor costs and high caliber skills, energy costs)
  - High quality vegetable crops powered by superior weather conditions (e.g., sunlight, temperature, etc.)
- Investments can be made possible by multiple ways of financing, including Greek state financing tools (e.g., upcoming Development Law) as well as additional European financial instruments or favorable financing.
- Our analysis concludes on the following developmental pillars for potential domestic and/or foreign investors:
  - Greenhouse know-how & technology expertise
  - State of the Art greenhouse investments
  - Creation of critical mass, export amplification and access to major European markets

Acknowledgements

- The Dutch Ministry of Economic Affairs and the Embassy of the Kingdom of the Netherlands in Greece, represented by Mr. Robert-Jan Sieben, Deputy Head of Mission, commissioned Kantor Management Consultants S.A to provide the aforementioned analysis. However, the depth of analysis and the sophistication of insights would not be achieved if it were not for the contribution of key people and sector's experts in the following ways:
  - Mrs. Siwarde J. Sap, Sr. Economic and Trade Advisor, Embassy of the Kingdom of the Netherlands in Greece who initiated and directed the project by providing continuous guidance and support, critically reviewed the progress of the market special and orchestrated the initial contact between the consultants and the experts.
  - Mr. Christos D. Katsanos, Executive Director, DKG Group who contributed with his expertise providing useful insights and thoroughly reviewing the content.
  - Mr. Vassily Haitas, Managing Director, Agritex S.A. who contributed with his expertise and alongside Mr. Nikos Efthymiadis, Chairman of REDESTOS Efthymiadis Agrotechnology Group of companies and Honorary Consul of the Embassy of the Kingdom of the Netherlands in Greece who provided a thorough review of the content.
  - Mr. Panagiotis Choudalis, Owner and General Manager, Greentech Co. LTD who provided useful insights and contributed with his expertise and thorough review of the content.
  - Entreprise Greece contributed with its expertise in matters of starting and financing a new venture.

- Kantor Management Consultants S.A. would like to express their gratitude to the aforementioned experts.

- For further information on each expert's profile, please refer to the Annex.

Global Facts on Greenhouse Horticulture

The Case of Greece

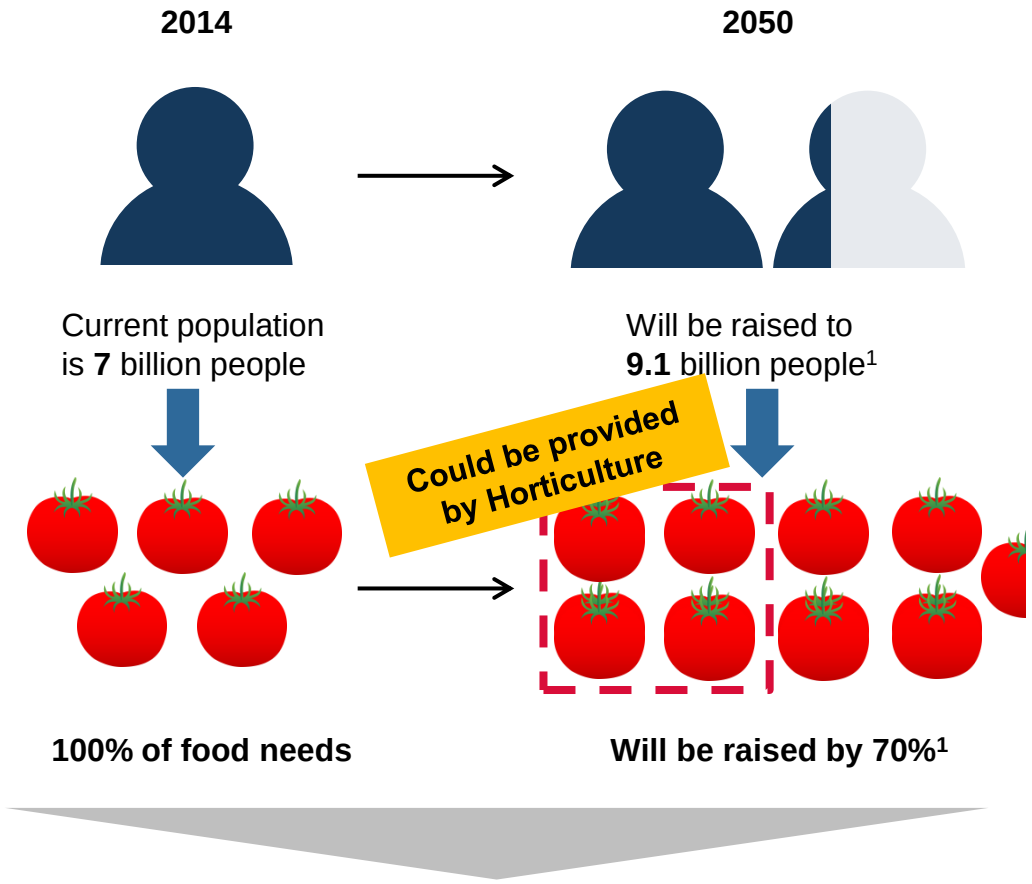
Analysis of Financial Data of Sector Companies

Agrologistics

Business Opportunities for Strategic Investors

Annex

Globally, agriculture needs are expected to rise significantly the next 35 years



- Rise in food needs by 2050 will be disproportionate to the rise of world population.

Key Facts

- The agricultural sector plays a significant role to the world economy, as 40% of the global population earns its livelihood through it.[2]
- Aided by the issues of malnutrition and food insecurity, food production and distribution on a global scale is a very important issue.
- Horticulture enables farmers and industrial producers of food to control some of the parameters that affect the output of food.
- Future nutrition increased needs can be accommodated largely by horticultural food production[3]
- As a result, through greenhouse horticulture cultivations, matters of food needs and proper food distribution can be addressed effectively.

1. Food and Agriculture Organization of the United Nations (hereinafter FAO)
2. United Nations
3. International Horticultural Congress

The term Greenhouse refers to "all permanent structures, with or without heating, covered by glass or plastic or other material that lets daylight through, in which crops, transplants or ornamentals are cultivated[1]"

- The effect of a greenhouse on the crop ranges based on the technological sophistication applied.[2]
- In simple structures the most important element is that the effect of sunlight is enhanced.
- In more advanced structures temperature, air humidity, light, water supply and carbon dioxide are controlled within the greenhouse.
- In modern greenhouses pests and pathogens can be restricted or even prevented completely.

History in brief

- Greenhouse-like structures that allowed temperature and humidity control were first witnessed in Korea during the 15th century.
- In Europe appeared in the Netherlands and then England on the 17th century.
- During the 1960s polyethylene film was adopted as the covering material of choice.

Area of focus

Vegetables

- Tomatoes
- Cucumbers
- Eggplants
- Peppers
- Lettuce

Present study focuses only on vegetable cultivation in greenhouses (for the other types of crops, refer to the Annex)

1. Final Report on Greenhouse Production (Final Cropping)
2. "Total areas in major greenhouse production countries", University of Arizona, 2012

Three prevalent types of greenhouses for horticulture cultivation exist

1 Local-type Greenhouses

- Low-cost, low level of investment structures, built with materials obtained locally (i.e., wood) and covered with polyethylene plastic film.
- Restrictions in technology applied result in lower than expected agricultural practices, which in turn result in lower yields
- Limited climate control due to low ventilator surface area and inefficient ventilator designs.
- Suitable for small farms.
- Prevalent in southern Europe (e.g. Spain).
- For further information on greenhouse technology, refer to the Annex

2 Industrial-type Greenhouses

- The arch-shaped multi-span type is made with galvanized steel and the roof is covered with plastic film.
- Due to more advanced applied technology the climate control is higher and thus the production yields are higher.
- Extended climate control in terms of cooling, heating and roof ventilation. However, danger of dripping in humid and cold weather.
- Suitable for ornamental growers and nurseries.
- Prevalent in Israel.
- For further information on greenhouse technology, refer to the Annex

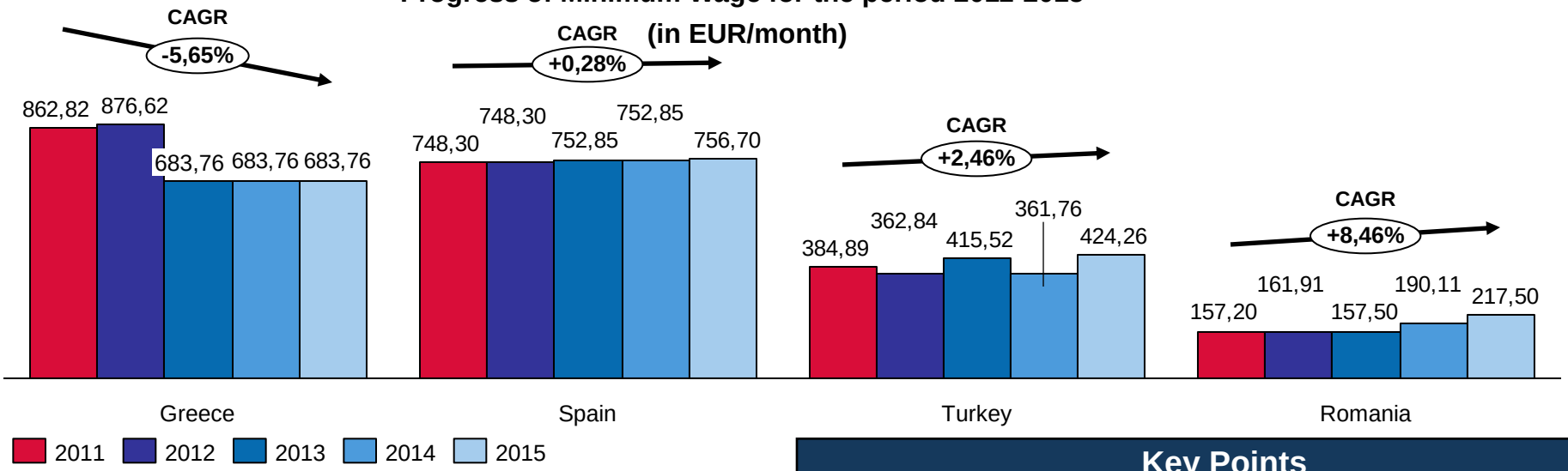
3 State of the Art Greenhouses[1]

- Steel structures surrounded by 3mm “horticultural glass” grade (glasshouses) or good quality plastic[2] .
- Such sophisticated structures offer stable production of high quality crops throughout the year.
- Built in large compartments so as to achieve lower cost per unit and improve efficiency.
- Total climate control in terms of cooling, heating and roof ventilation.
- Suitable for every cultivated crop.
- Prevalent in Northern Europe (e.g. the Netherlands).
- For further information on greenhouse technology, refer to the Annex

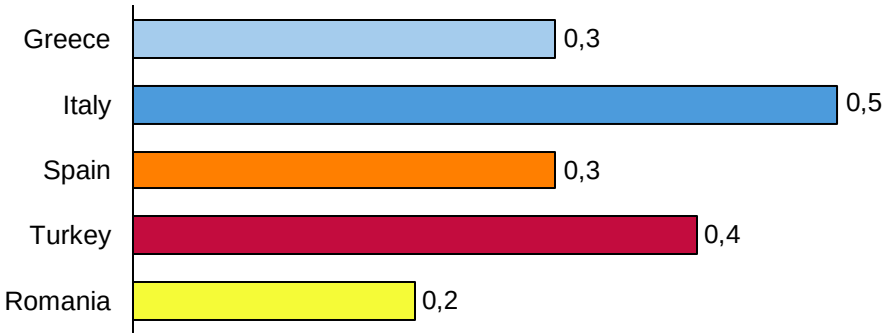
1. FAO
2. interviews with sector experts

Greece has exhibited the greatest decline in minimum wages among southern Eurozone countries, offering at the same time a very good compromise between wages paid to labor force and value added by it

Progress of Minimum Wage for the period 2011-2015[1]



Ratio of minimum wage to value added per worker for 2015[2]



Key Points

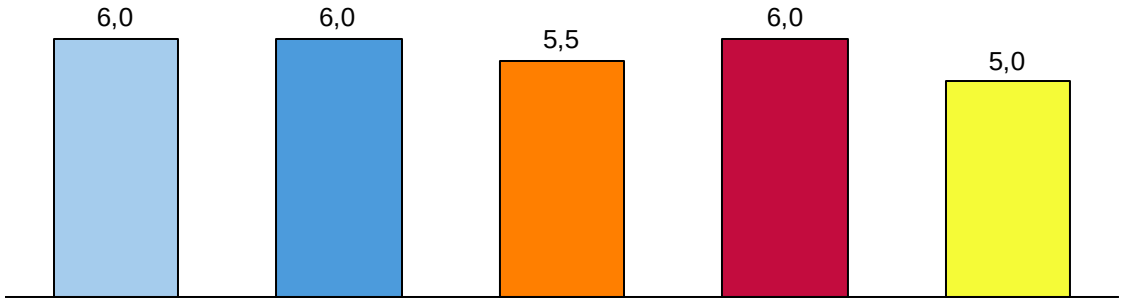
- Greece has higher minimum wages compared to countries that do not belong in the Eurozone, which depict however a steady upward trend.
- In certain occasions (mainly in Turkey), minimum wages may fluctuate from year to year, which is indicative of a non-stable business environment.
- Greece holds a similar position on the ratio of minimum wage to value added per worker, to other Eurozone countries, but with lower minimum wage level.
- Academic education contributes to an employee's efficiency and regarding agriculture, can be acquired by the list of institutions that is found in the Annex.

1. Eurostat
2. World Bank Doing Business 2016 report (Greece, Turkey, Romania, Italy, Spain)

Greece has the highest number of working days per week, whereas rest days and overnight work compensations are relatively high compared to other southern Eurozone countries

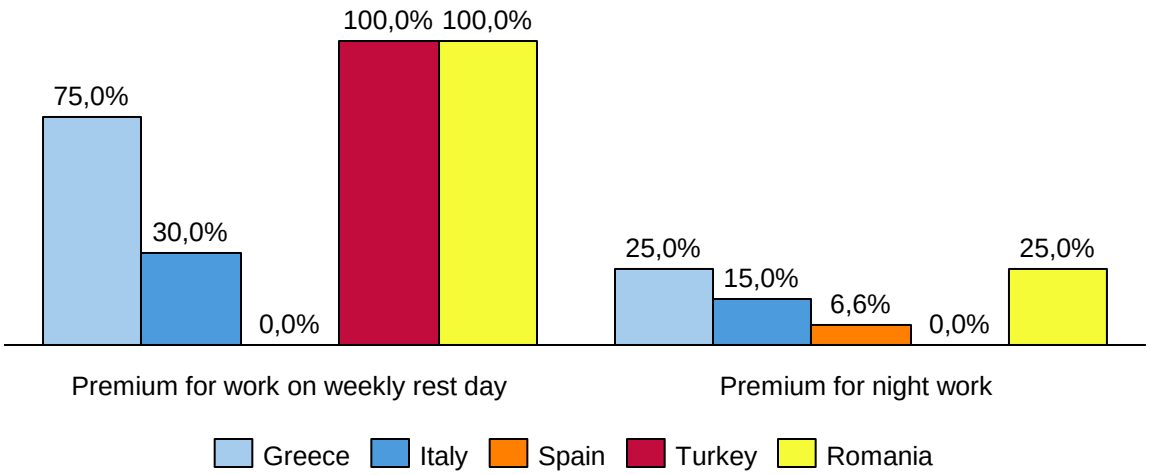
Maximum day of work per week for 2015[1]

(in days)



Premium paid for overtime for 2015[1]

(in % of hourly wage)



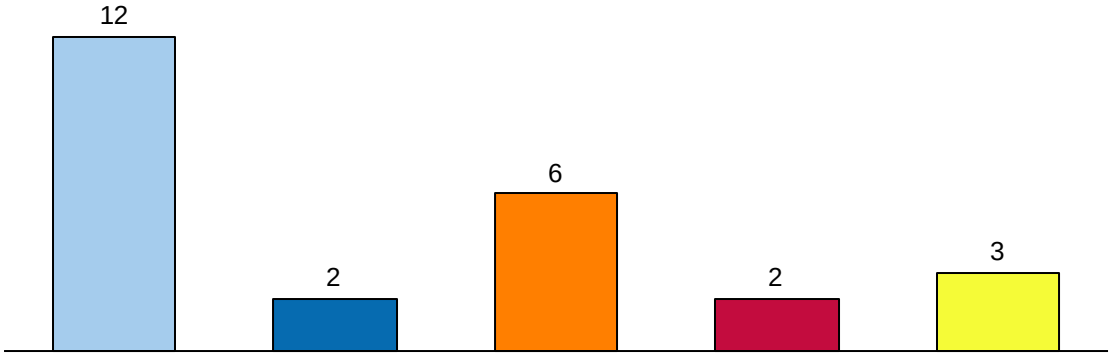
Key Points

- The premium that is paid in Greece for work on weekly rest days (75%) is less than the corresponding one paid in countries with lower minimum wages.
- The lower level of premiums provides the employers with lower additional costs (in the case of keeping extra workforce on weekly rest days) than the corresponding costs in countries with lower minimum wages.
- Premium paid for nighttime work in Greece is slightly relevant in the case of greenhouses, as the majority of work is done during day time.
- Additional information can be found in the Annex.

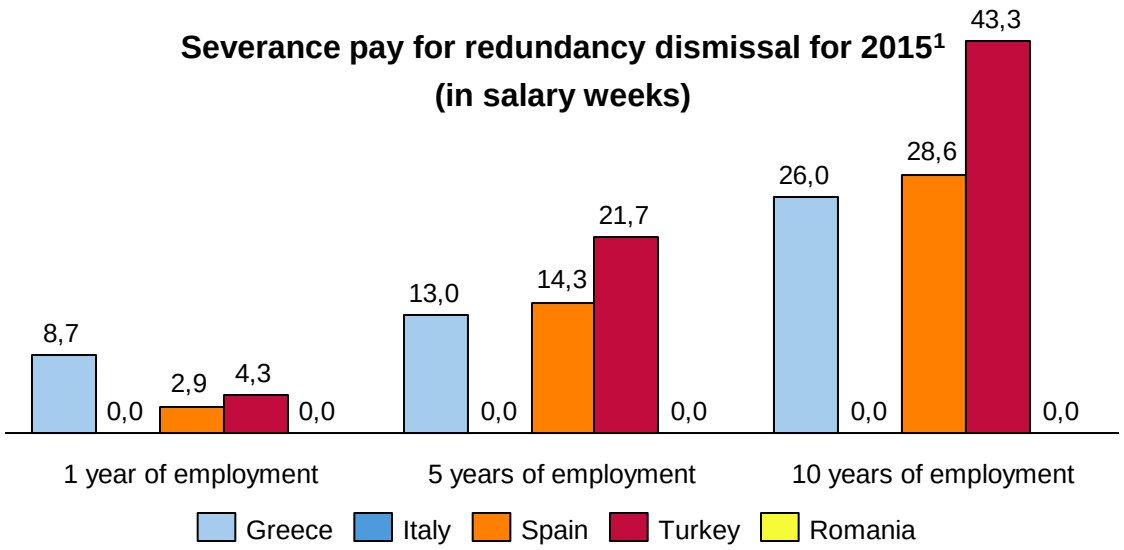
1. World Bank Doing Business 2016 report (Greece, Turkey, Romania, Italy, Spain)

Labor force in Greece can be employed for a greater amount of time on a probationary basis before it becomes permanent, whereas the compensation paid for dismissal varies based on the years of experience

Maximum length of probationary period of work for 2015[1] (in months)



Severance pay for redundancy dismissal for 2015[1] (in salary weeks)



Key Points

- Greece offers the longest period of probationary work, providing employers with more time to verify the working attributes of a new employee.
- Greece has lower mandatory severance pay for the dismissal of medium and long term employees (5 and 10 years of employment respectively), which allows employers to readjust their personnel according to their needs, without major additional financial burdens.
- Italy and Romania do not provide severance pay in case of redundancy dismissal.
- Additional information can be found in the Annex.

1. World Bank Doing Business 2016 report (Greece, Turkey, Romania, Italy, Spain)

Global Facts on Greenhouse Horticulture

The Case of Greece

General Facts and Figures

Labor

Energy

Ease of Doing Business

Vegetables and Greenhouses

Investments, financing & technology know-how

Analysis of Financial Data of Sector Companies

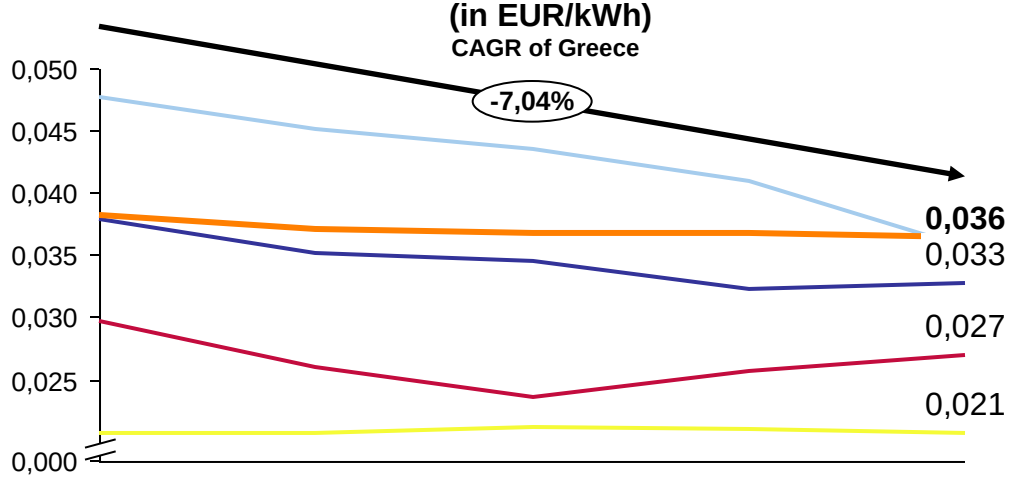
Agrologistics

Business Opportunities for Strategic Investors

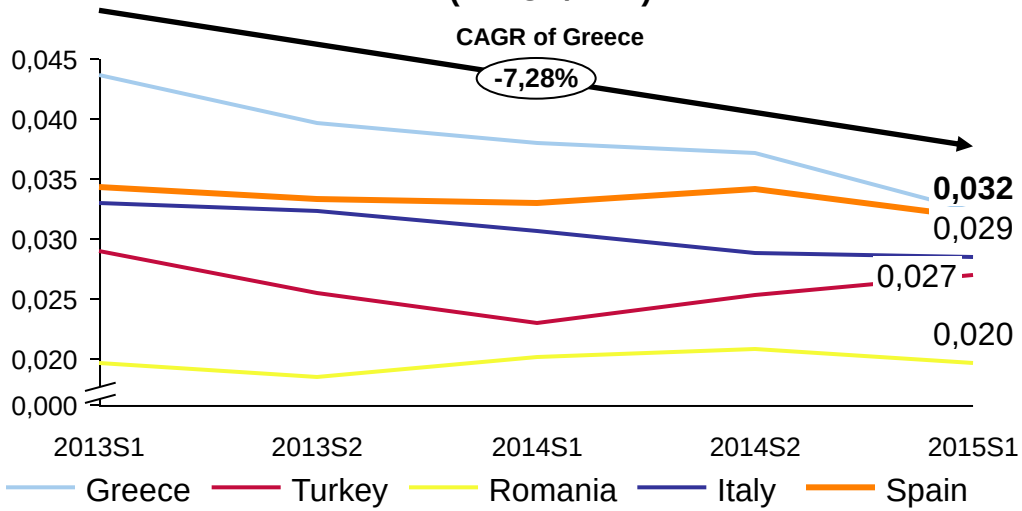
Annex

Natural gas energy costs have exhibited a significant decline over the past period, converging to the other southern Eurozone countries value

Comparison of Prices – 2,800 MWh < Consumption < 28,000 MWh[1] (in EUR/kWh)

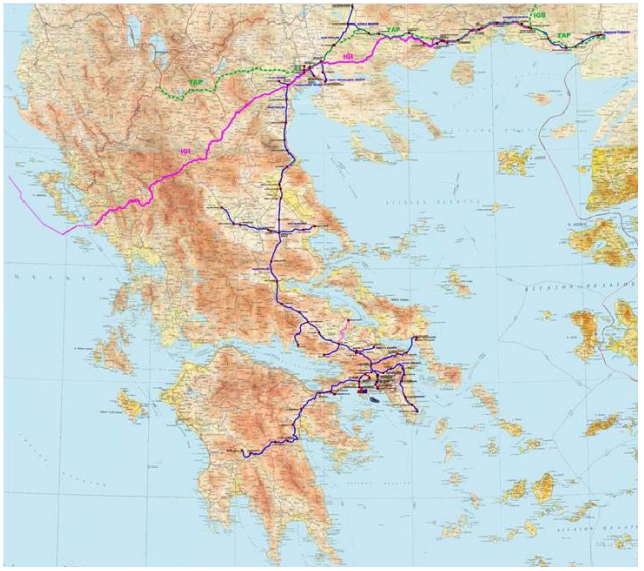


Comparison of Prices – 28,000 MWh < Consumption < 280,000 MWh[1] (in EUR/kWh)



Key Points

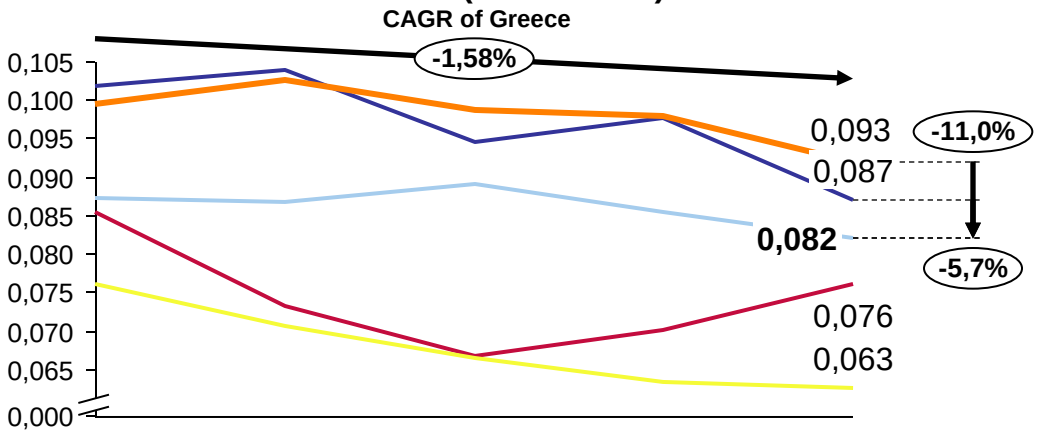
- Natural Gas consumption in State of the Art greenhouses, falls into the consumption ranges of the two diagrams.
- Energy costs of countries outside of the Eurozone are far lower than in Greece, however depicting an upward trend towards the costs of the Eurozone countries.
- For a complete overview of the costs of Natural Gas, refer to the Annex



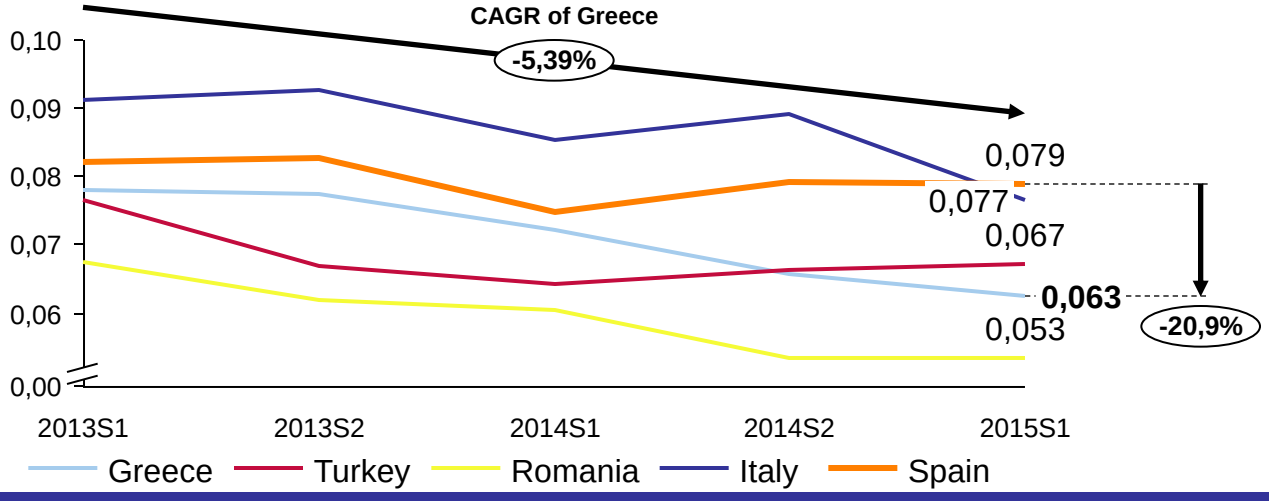
1. Eurostat

Greece is even more competitive in energy costs when electricity is considered for energy production

Comparison of Prices – 2,000 MWh < Consumption < 20,000 MWh[1] (in EUR/kWh)



Comparison of Prices – 20,000 MWh < Consumption < 70,000 MWh[1] (in EUR/kWh)



Key Points

- State of the Art greenhouses electricity consumption falls in the ranges included in this slide.
- Electricity costs of countries outside of the Eurozone are far lower than Greece.
- For a complete overview of the costs of electricity, refer to the Annex.

1. Eurostat

The ease of starting a business depends on a series of procedures and other time and cost parameters, which have been simplified over the last few years

Required procedures to start a limited by shares company (S.A.) in Greece[1]

Procedures	Estimated time	Costs
1. Obtain tax clearance form from tax authority (online procedure)	<1 day	No charge
2. Submit with GEMI* the application of establishment and all its forms	10 days	€850*
3. Register the employees with IKA (online procedure)	<1 day	No charge
4. Register with OAEE	1 day	€111
Paid-in minimum capital: €24.000		

*Including incorporation fee, free for submitting the documents with GEMI registration fee and first year subscription with Athens chambers of commerce, notary fees, Capital Accumulation Tax, Duty paid to the Hellenic Competition Commission, annual GEMI fee

Key Points

- Economies can implement certain types of reforms in order to facilitate the launch of a new business. Such types of reforms include, among others, setting up an one-stop shop, making procedures simpler and faster by the use of technology, reduction of minimum capital requirements, etc.
- The paid-in minimum capital that companies must deposit before registration has been reduced from 60,000€ to 24,000€.

Recent reforms in Greece that have been established to improve ease of doing business[1]

2012	Implementation of an electronic platform that interconnects several government agencies.
2014	New type of limited liabilities company with streamlined registration process and 1 EUR capital requirement. Overall, lowered registration cost for starting a new business (2.2% of income per capita, from 32.5% a decade ago).
2015	Greece made it easier to transfer property by reducing the property transfer tax and removing the requirement for the municipal tax clearance certificate.

Global Facts on Greenhouse Horticulture

The Case of Greece

General Facts and Figures

Vegetables and Greenhouses

Agriculture in general

Vegetable and greenhouse cultivation

Vegetable and greenhouse production

Vegetable and greenhouse consumption

Investments, financing & technology know-how

Analysis of Financial Data of Sector Companies

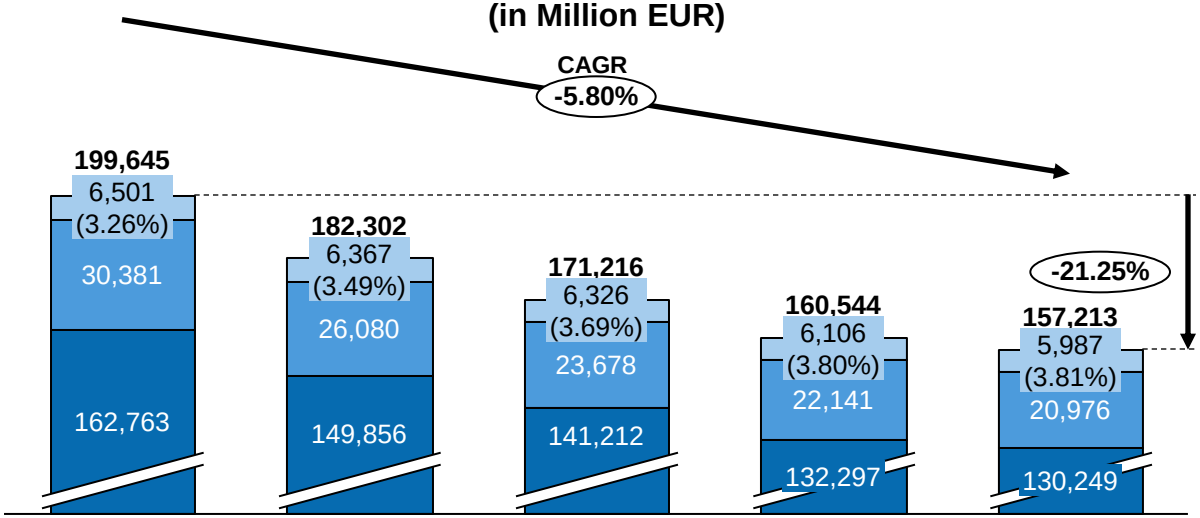
Agrologistics

Business Opportunities for Strategic Investors

Annex

The agricultural sector in Greece proved resilient during the financial crisis with its contribution to country's GDP being increased…

Gross Value Added (GVA*) 2010-2014 per sector[1]
(in Million EUR)

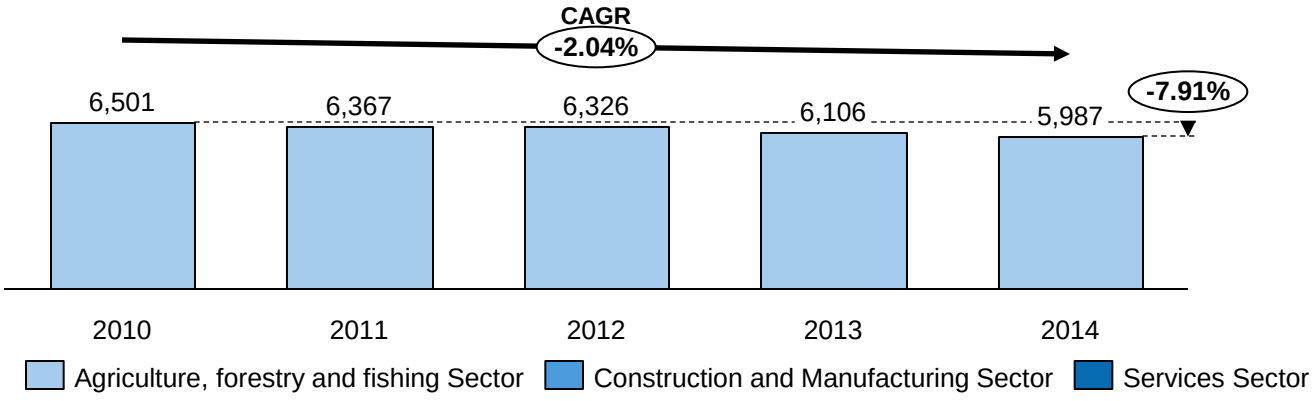


* GDP = GVA + Taxes – Subsidies

Key Points

- Greece has been traditionally an agricultural country with agricultural sector contributing substantially to country's GDP.
- Even though the Gross Added Value of the Agricultural sector decreases in absolute numbers by almost 8%, its decrease is significantly lower than the overall downfall rate of the Greek economy.

Gross Value Added (GVA*) of the primary sector 2010-2014[1]
(in Million EUR)

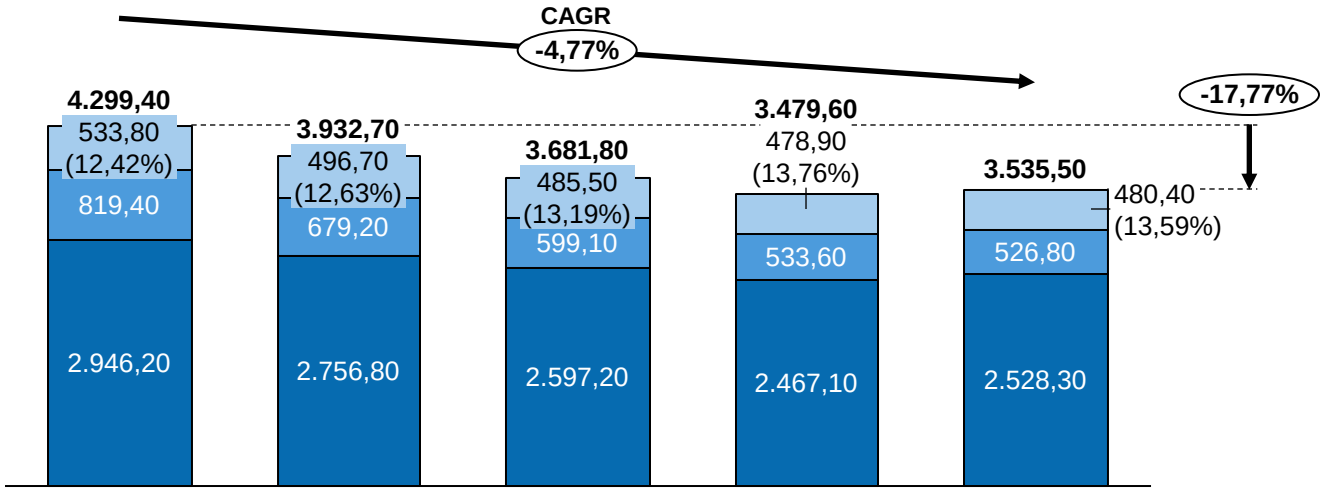


Tobacco plantation in Greece

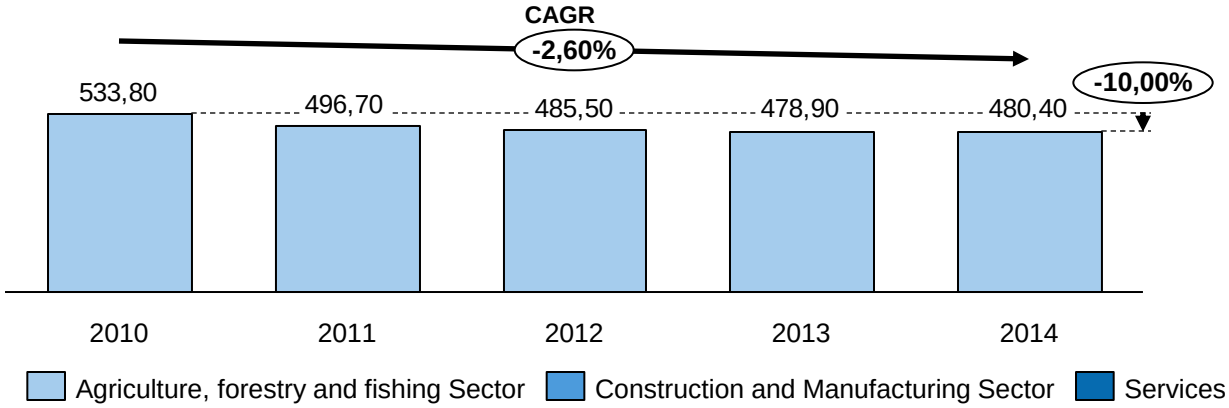
1. Greek Statistical Office

… as well as its corresponding contribution to employment

Number of Employed people 2010-2014 per sector[1] (in '000)



Number of Employed people in the primary sector 2010-2014[1] (in '000)



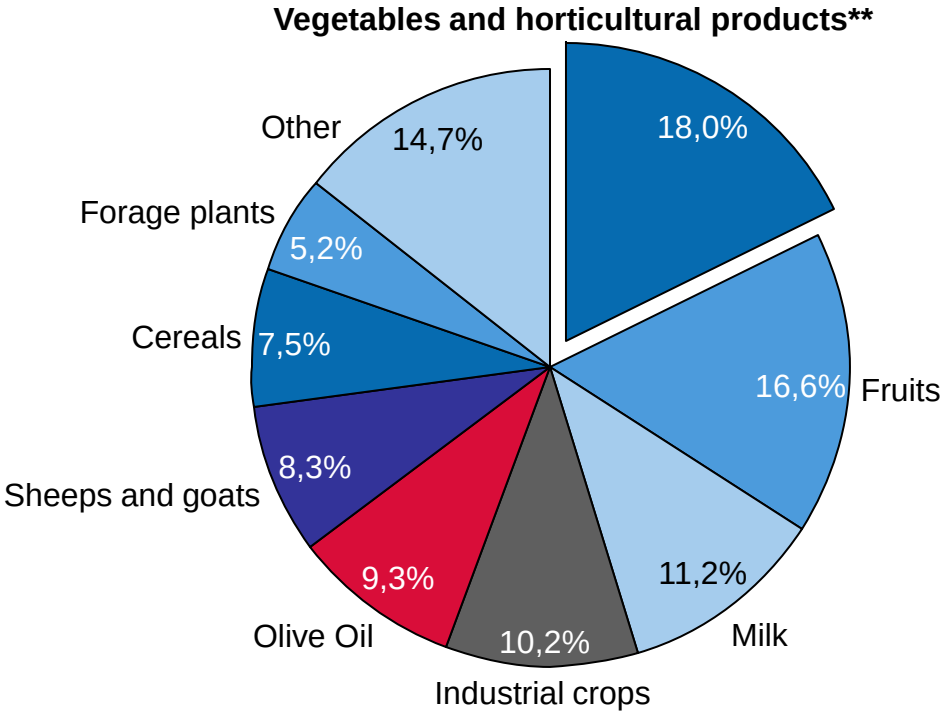
Key Points

- As unemployment rate grows, the percentage of employed people in the primary sector decreases at a lower rate.
- Agricultural sector managed to attract new people from other sectors thus suffering smaller human resource "leakage" compared to the other two sectors.

1. Greek Statistical Office

Vegetable and horticultural production is the leading category among overall agricultural production

Agricultural Production (in Values* 2009-2013)[1]



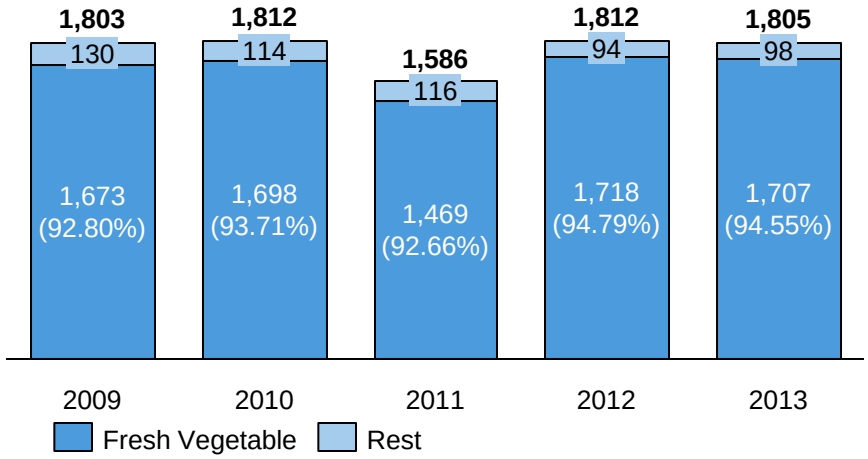
* Value is calculated at constant producer prices.

** Includes also plants and flowers, nursery plants, ornamental plants and flowers (incl. Christmas trees) and plantations.

Key Points

- Greece exhibits a wide range of different agricultural products, which are evenly distributed.
- Fruit and vegetable production holds a dominant place among overall agricultural production, as a result of the Mediterranean diet.
- Even though the section “vegetables and horticultural products” includes also other products apart from vegetables, fresh vegetables in Greece account for almost 95% of the total production of this category.

Breakdown of Vegetables and horticultural products (in Values* of m. EUR 2009-2013) [2]



Global Facts on Greenhouse Horticulture

The Case of Greece

General Facts and Figures

Vegetables and Greenhouses

Agriculture in general

Vegetable and greenhouse cultivation

Vegetable and greenhouse production

Vegetable and greenhouse consumption

Investments, financing & technology know-how

Analysis of Financial Data of Sector Companies

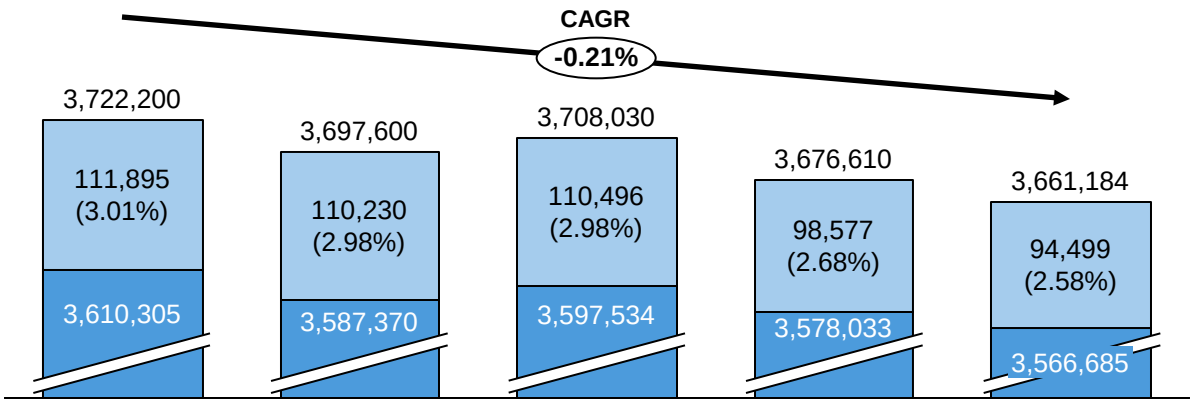
Agrologistics

Business Opportunities for Strategic Investors

Annex

Total Greek cultivated area has been more or less steady through the last decade and traditionally exhibits a high degree of fragmentation

Total cultivated fields of Greece[1]
(in hectares)

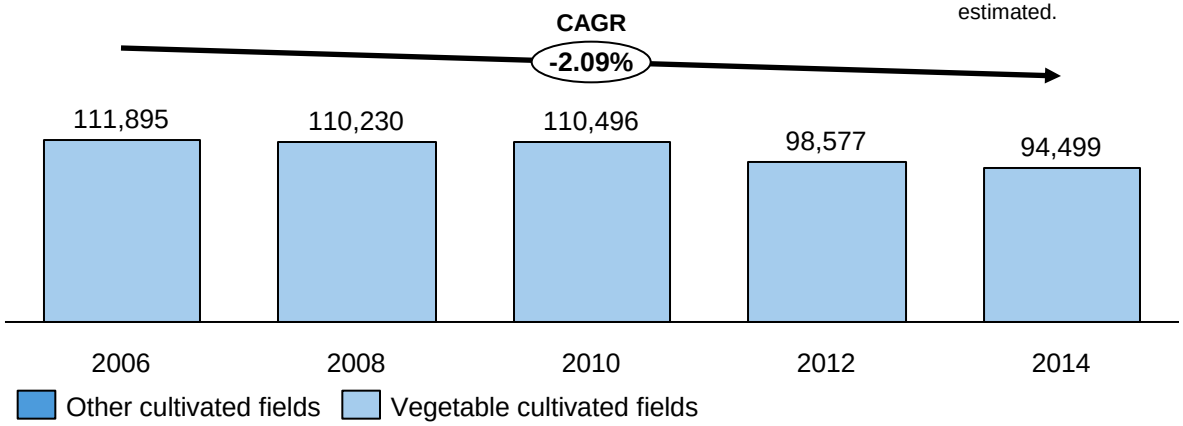


Key Points

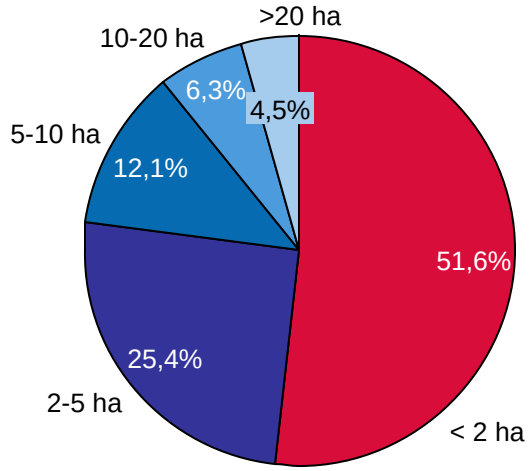
- Total cultivated fields of Greece do not really fluctuate over the last decade.
- Fields that are cultivated with vegetables (e.g., tomato, cucumber, eggplant, etc.) account for around **3%** of the total cultivated fields in Greece.
- Greek cultivated area is considered largely fragmented as half of the cultivated land comprises of fields under 2 hectares.
- 18% of the total value of the agricultural sector is produced by the 3% of the total cultivated area.

Total vegetable cultivated fields of Greece[1]
(in hectares)

* 2014 numbers are estimated.



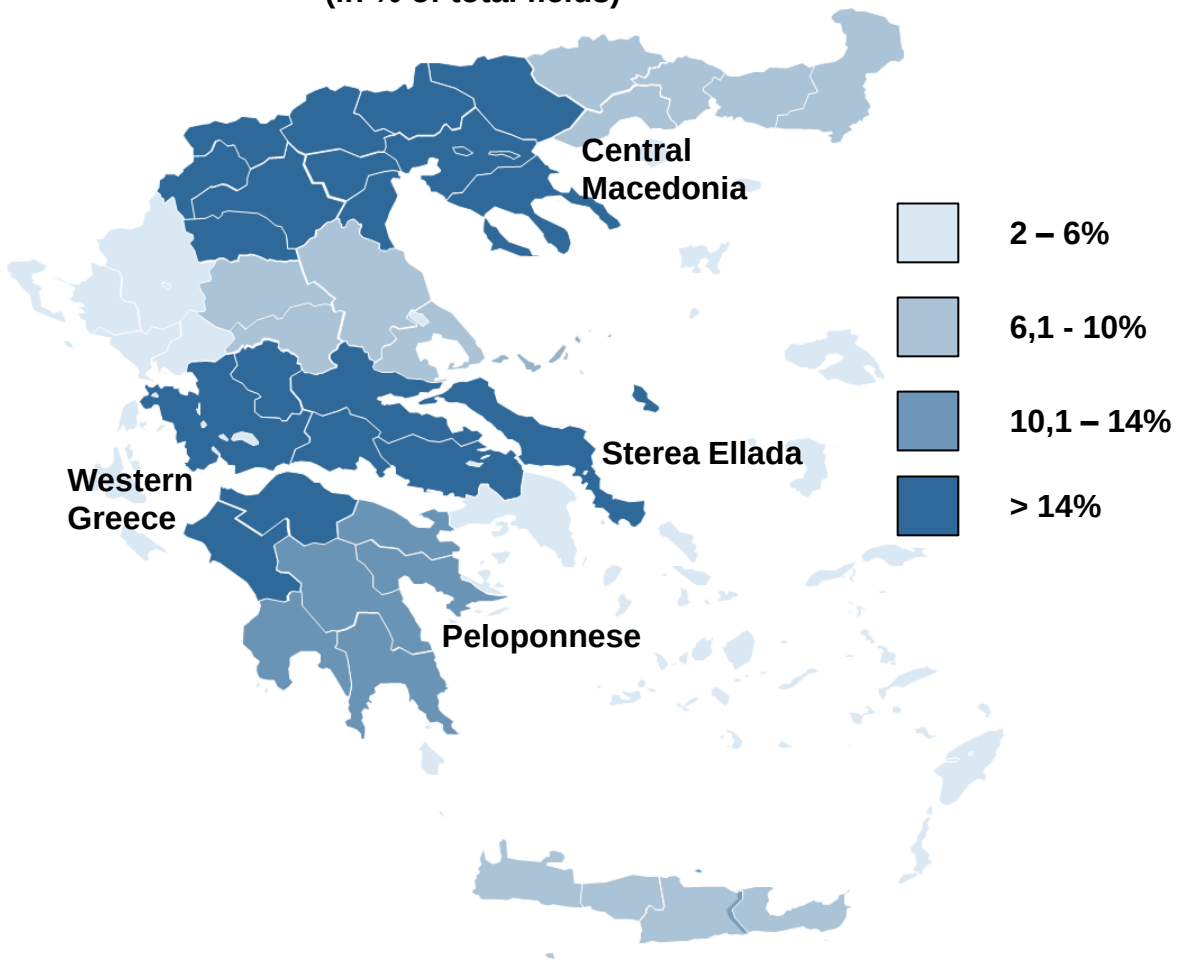
Fragmentation of Utilized agricultural holdings[2]



1. Greek Statistical Office
2. DG Agriculture and Rural Development (published January 2015 including data up to 2010)

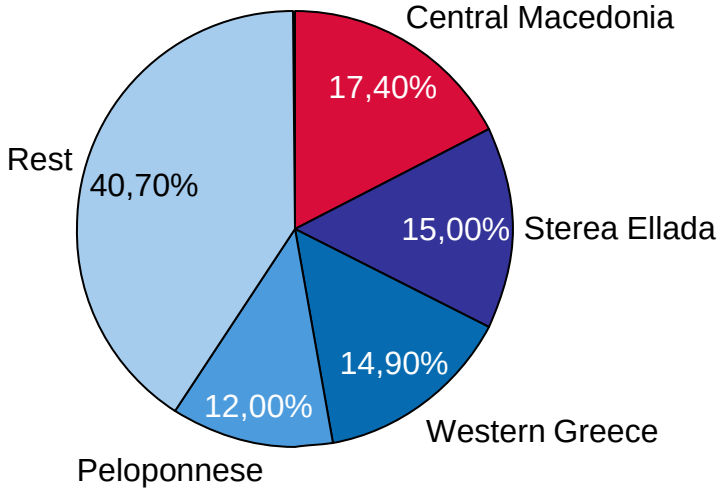
Differences in local climate and soil characteristics determine the suitability of vegetable crops and their degree of cultivation among the different geographical regions of Greece

Concentration of vegetable cultivated fields – 2012[1]
(in % of total fields)



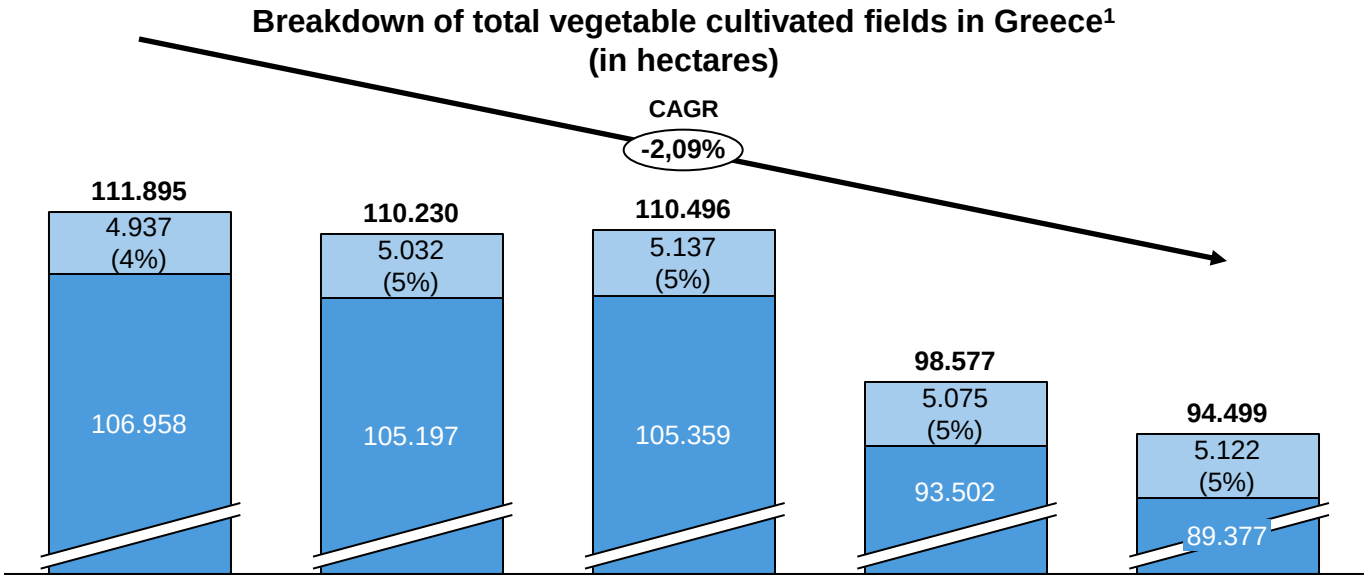
Key Points

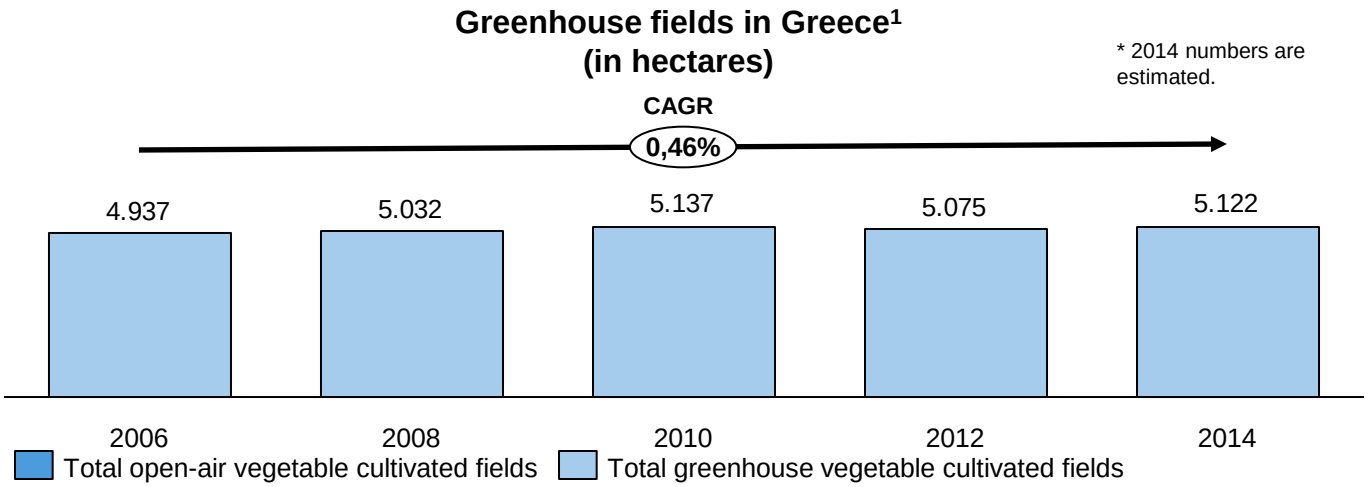
- Regions of Central Macedonia, Sterea Ellada, Western Greece and Peloponnese are the ones with the highest percentages of land devoted to vegetable cultivation.
- The sum of percentages of these regions accounts for 60% of the total land devoted to vegetables.



1. Greek Statistical Office

Although greenhouse vegetable fields represent a small fraction of total cultivated fields devoted to vegetables, they exhibit a tiny upward trend





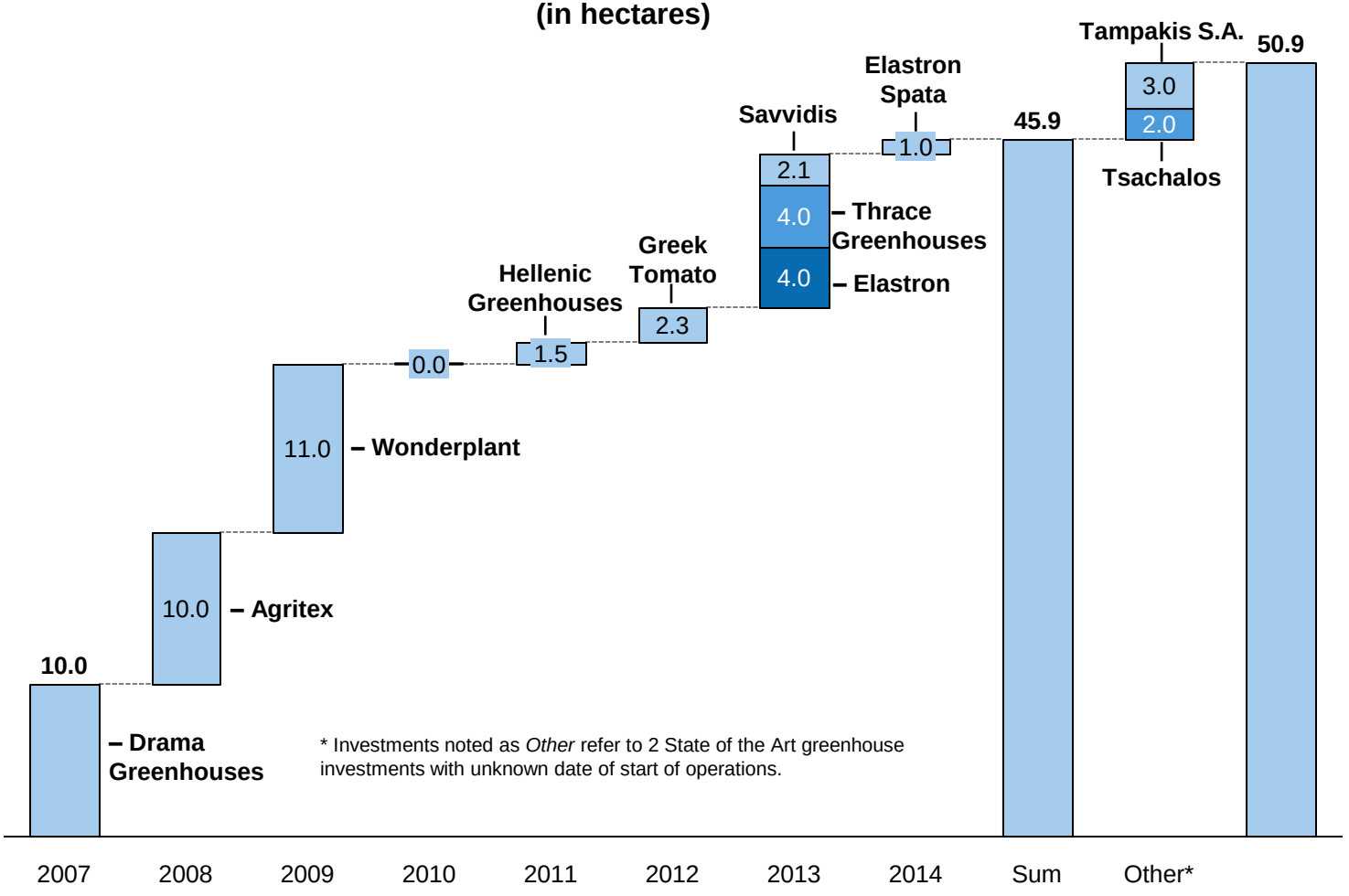
Key Points

- Greenhouse vegetable cultivated fields account for around **5%** of the total vegetable cultivated fields in Greece.
- The total greenhouse fields show relatively small growth (**0,46%**).

1. Greek Statistical Office

During the same period, investments in State of the Art greenhouses take place, starting with major ones and with smaller investments following

Timeline of major State of the Art greenhouse investments[1] (in hectares)



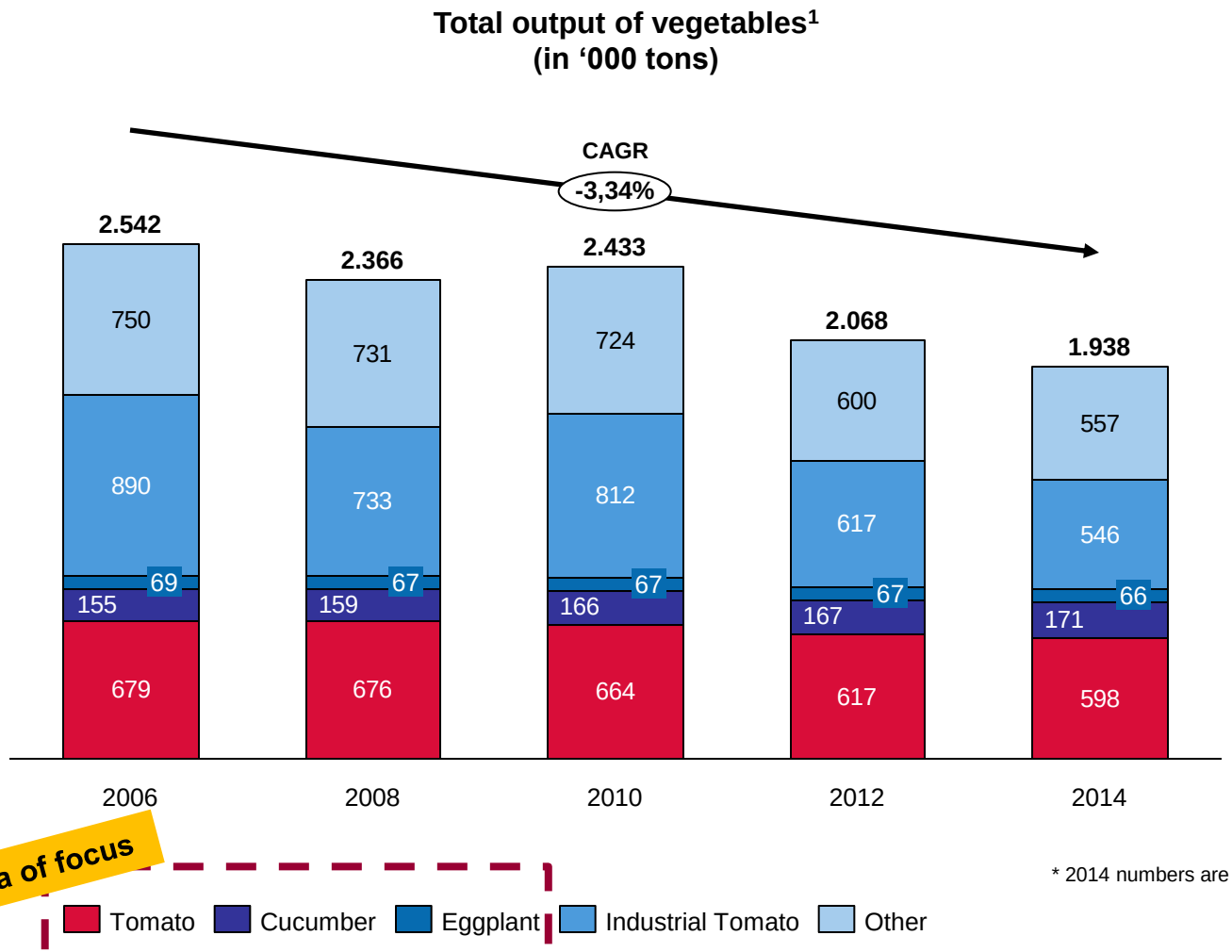
* Investments noted as *Other* refer to 2 State of the Art greenhouse investments with unknown date of start of operations.

Key Points

- State of the Art greenhouse investments in their entirety took place in 2007 at the earliest, due to the liberation of energy production in 2006.
- Major investments took place right after the liberation of energy production, which indicates that investors were waiting for such a law to materialize their investments.
- Further analysis of these investments can be found in the Annex.

1. Interviews with sector experts

Total vegetable production exhibits a continuous decrease over the years, …



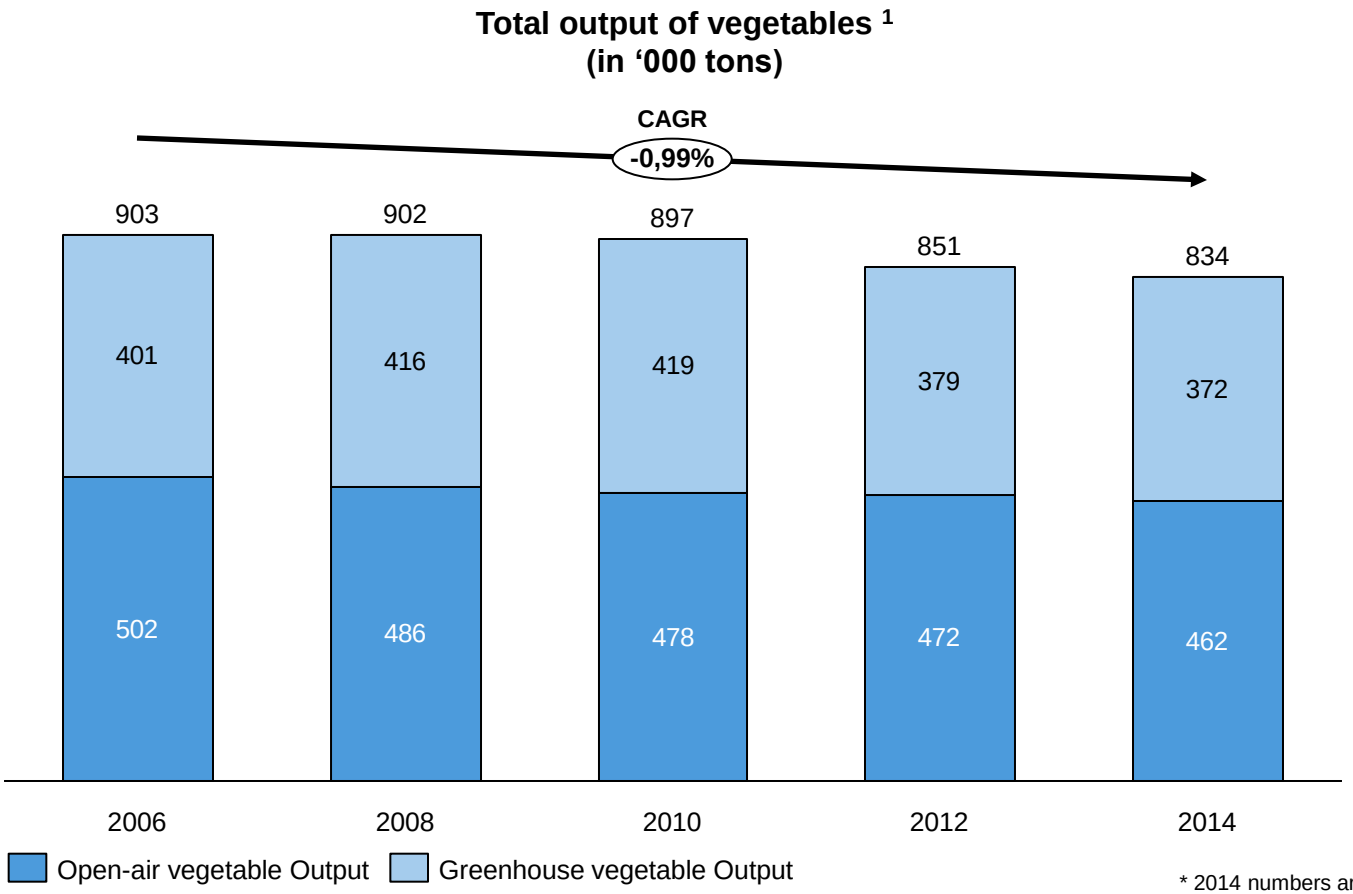
* 2014 numbers are estimated.

Key Points

- Tomato, cucumber and eggplant cultivation account for the lion's share of the total vegetable output.
- Industrial tomato and other reduction is the main driver for the CAGR of **-3%**.

1. Greek Statistical Office

… however tomato, cucumber and eggplant production remains relatively stable in absolute figures



* 2014 numbers are estimated.

Key Points

- Greenhouse vegetable output has decreased with a CAGR of **-1%** and the corresponding CAGR rate for open-air vegetable production is also around **-1%**.

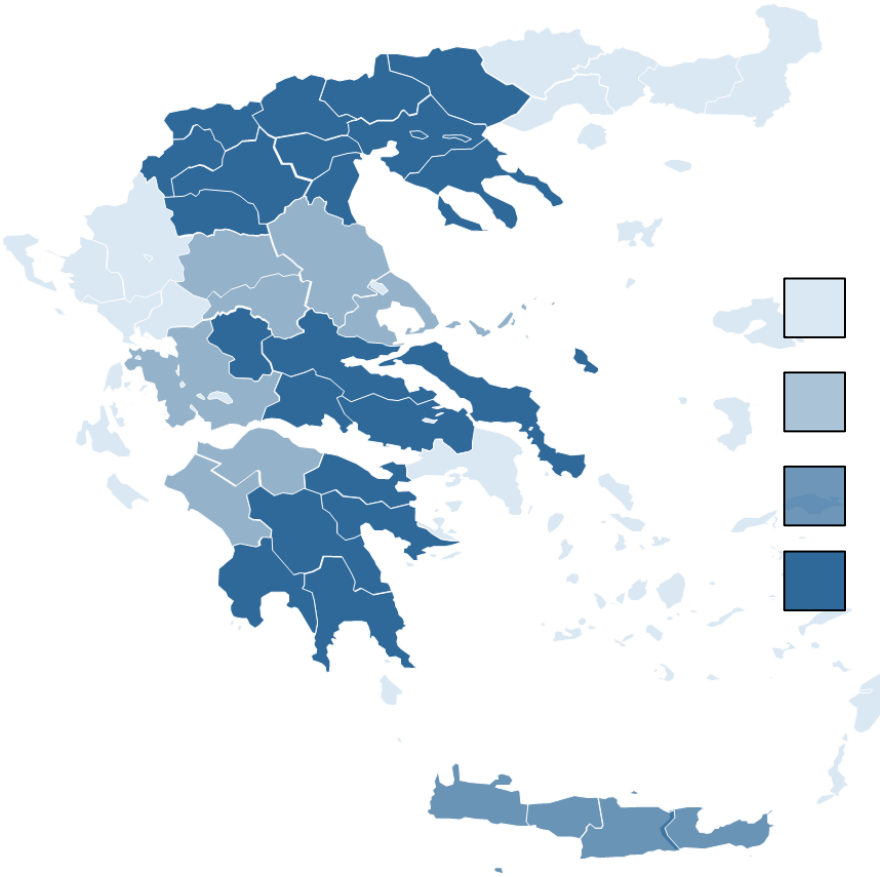
Note 1: Tomato, cucumber and eggplant are the vegetables for which numerical data were able to be retrieved, thus these types of vegetables were considered in our analysis for total production

Note 2: Only tomatoes for fresh consumption were considered. Industrial tomato (i.e., tomato that is being processed for the creation of juices and other products) has been excluded from the calculations.

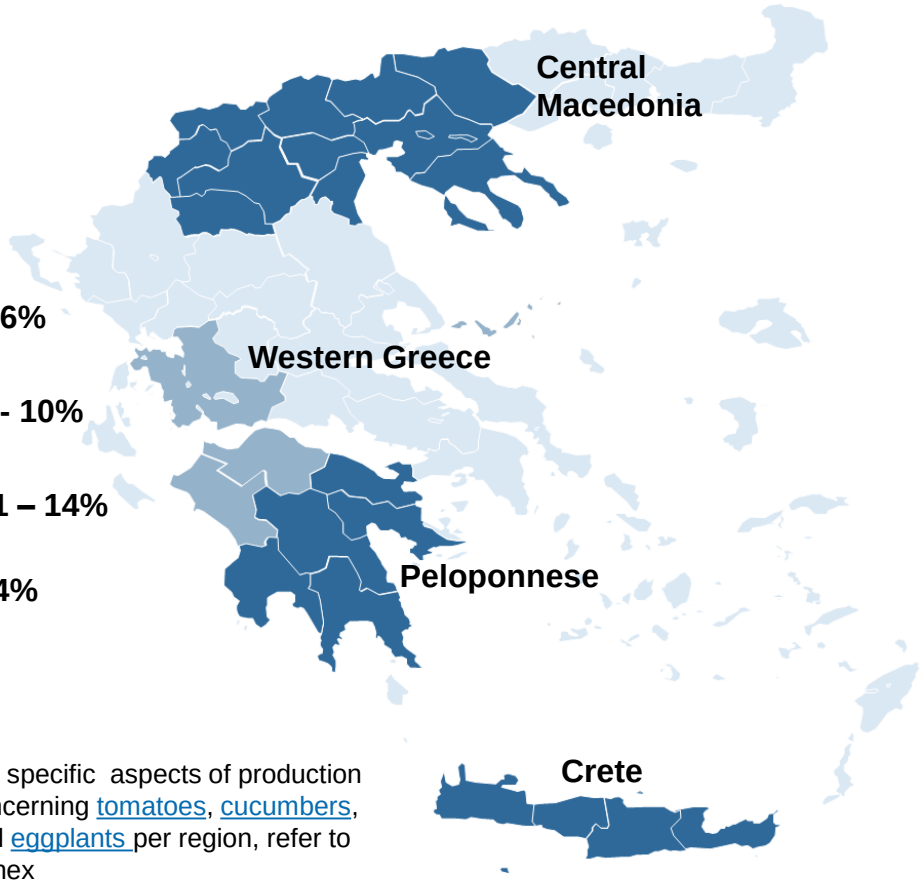
1. Greek Statistical Office

While open-air vegetables are produced in multiple regions in Greece, greenhouse production is dominant in certain regions

Concentration of open-air vegetable output in 2012 (in % of total fields)



Concentration of greenhouse vegetable output in 2012[1] (in % of total fields)

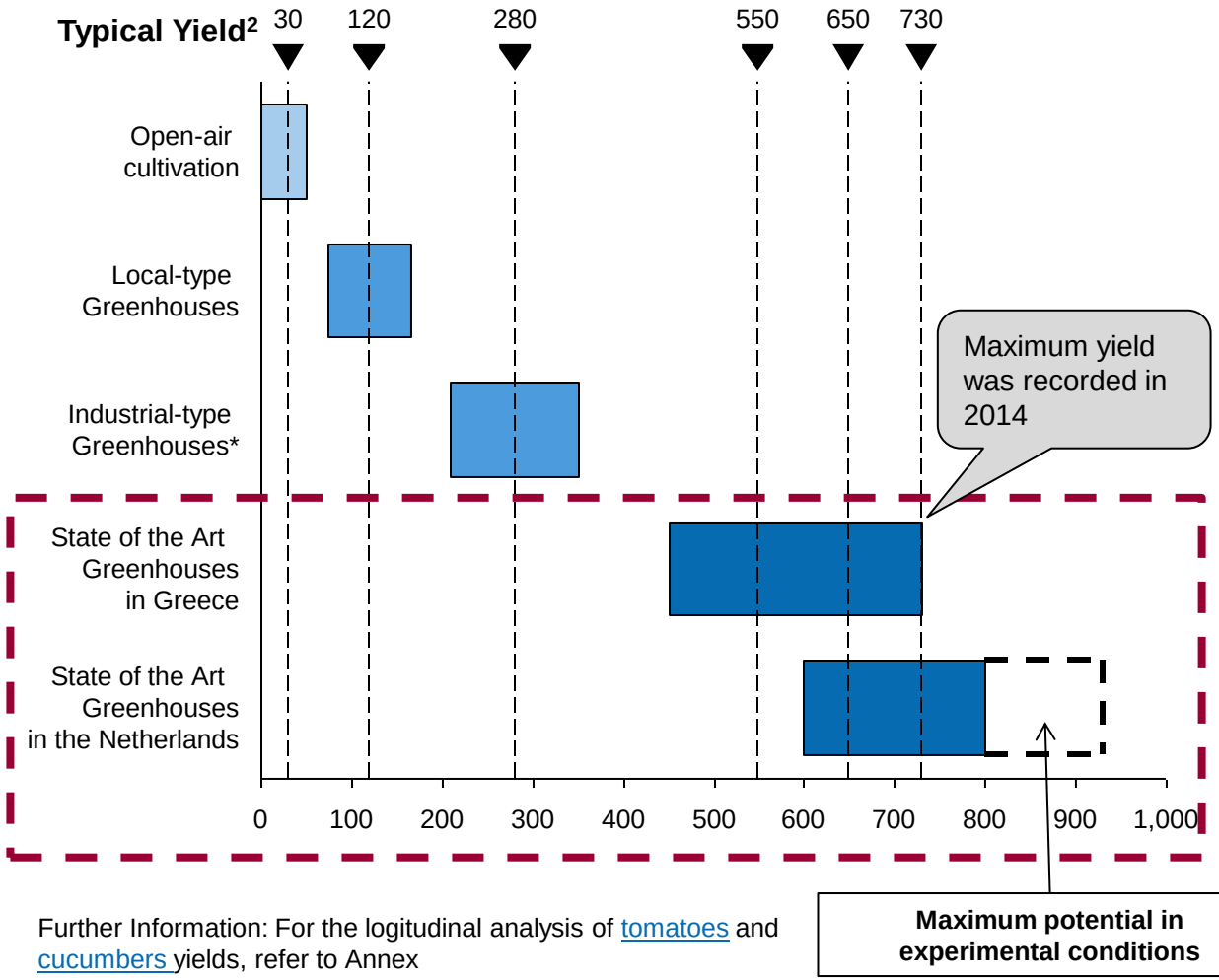


For specific aspects of production concerning tomatoes, cucumbers, and eggplants per region, refer to Annex

1. Greek Statistical Office

Resulted yields are below typical international standards for greenhouse cultivated tomatoes in certain cases…

The case of Tomato: Yield per category of greenhouse[1] (in tons/hectare)



Key Points

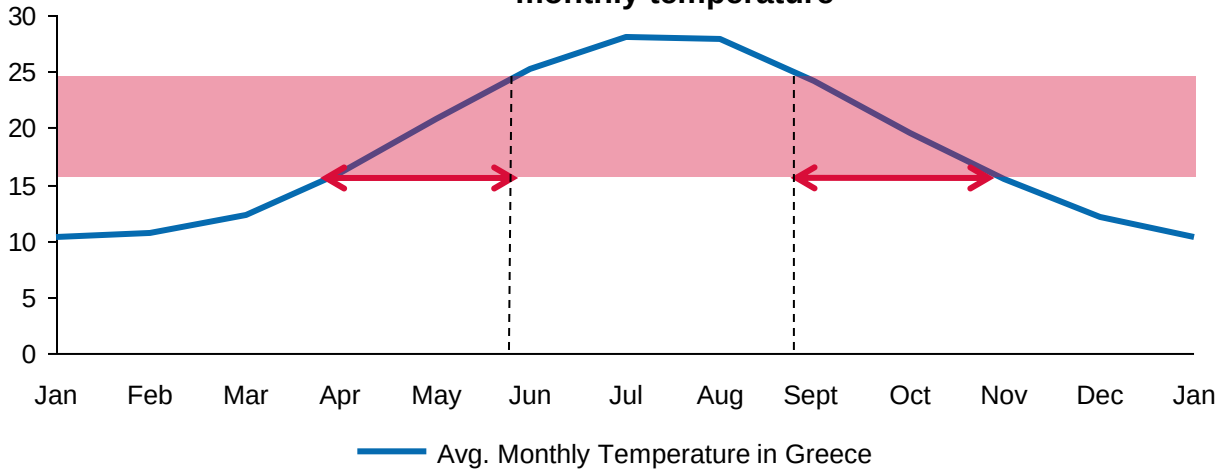
- Open-air and local type greenhouse cultivations are subject to external climate conditions, which can largely impact the derived yields (e.g., severe heat waves that have become increasingly common, deteriorate the production)
- State of the Art Greenhouses (even in the lowest possible yield) outperform the yields of the other types of greenhouses.
- Greek State of the Art greenhouses are below typical international standards, due to their limited time of operation and the accompanying learning curves, however they are now approaching international standards.
- Different climate conditions dictate different application of existing technology (e.g., need for cooling) for the construction and operation of State of the Art greenhouses.
- The actual boundaries of the **maximum potential of State of the Art greenhouses** in Greece, **remain yet to be explored.**

Further Information: For the logitudinal analysis of tomatoes and cucumbers yields, refer to Annex

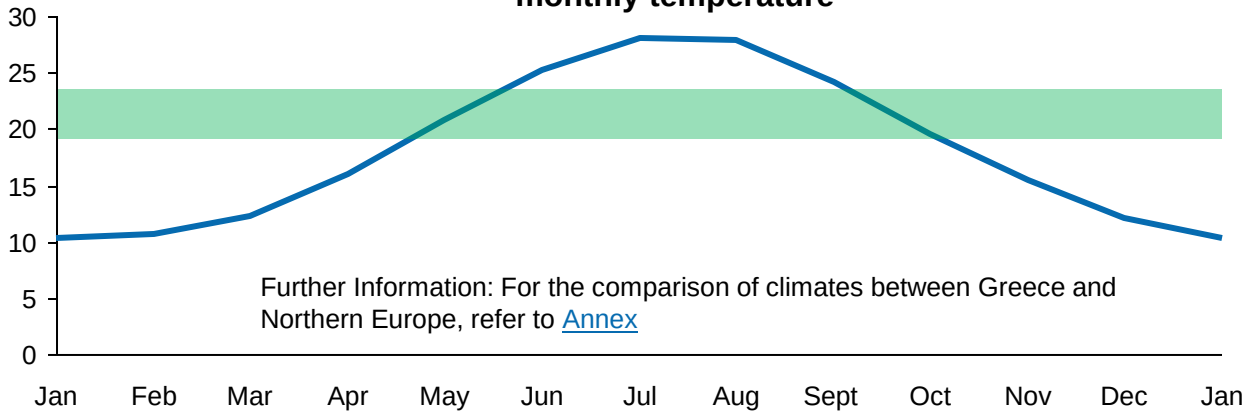
1. Interviews with sector experts

… however, their quality is superior due to favorable weather and climate conditions that provide a more suitable growing environment

Optimal growing temperature for tomato cultivation – average monthly temperature[1]



Optimal growing temperature for cucumber cultivation – average monthly temperature[1]



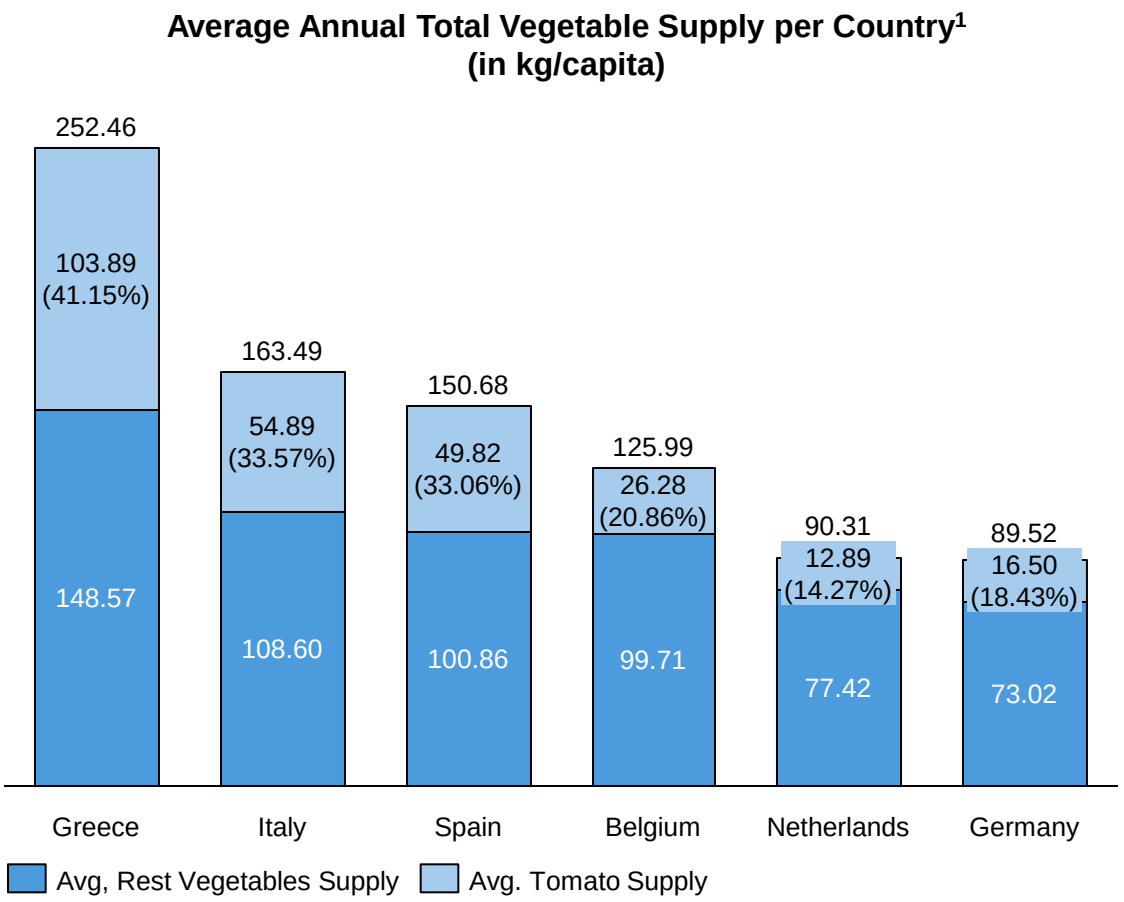
Further Information: For the comparison of climates between Greece and Northern Europe, refer to Annex

Key Points

- Tomatoes and cucumbers are vegetables that require high temperatures and extended sunshine.
- For the case of tomato, optimal temperatures coupled with extended sunlight contribute to the improved development of crop characteristics such as red color, firmness of the exterior and more "intense" taste; characteristics that signal higher quality[2].
- In Greece, It is possible to grow tomatoes in the field 2 periods within a year.
- For the case of cucumber optimal climate conditions contribute to the size of the crop, taste and growing time[3].

1. Hellenic National Meteorological Service
2. "Tomato Plant culture in the Field, Greenhouse and Home Garden", Jones, 1999.
3. Agricultural ministry of Cyprus

Tomato and cucumber refer to the main ingredients of internationally branded product named "Greek salad" raising per capita consumption to multiples of European standards



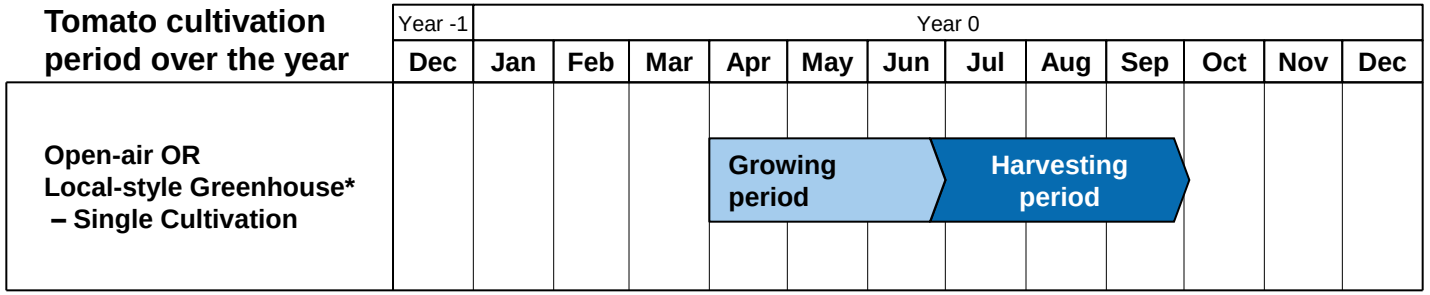
Key Points

- Average vegetable supply is a good indicator of the average vegetable consumption per capita (this method does not diversify processed from fresh vegetables)[2].
- Tomato holds the leading position in Greece in consumption among all vegetables (almost 40% of the vegetable consumption).
- During the summer months "Greek salad" becomes the salad of choice for the tourists that visit Greece, which increases consumption and creates the urge for further vegetable supply.

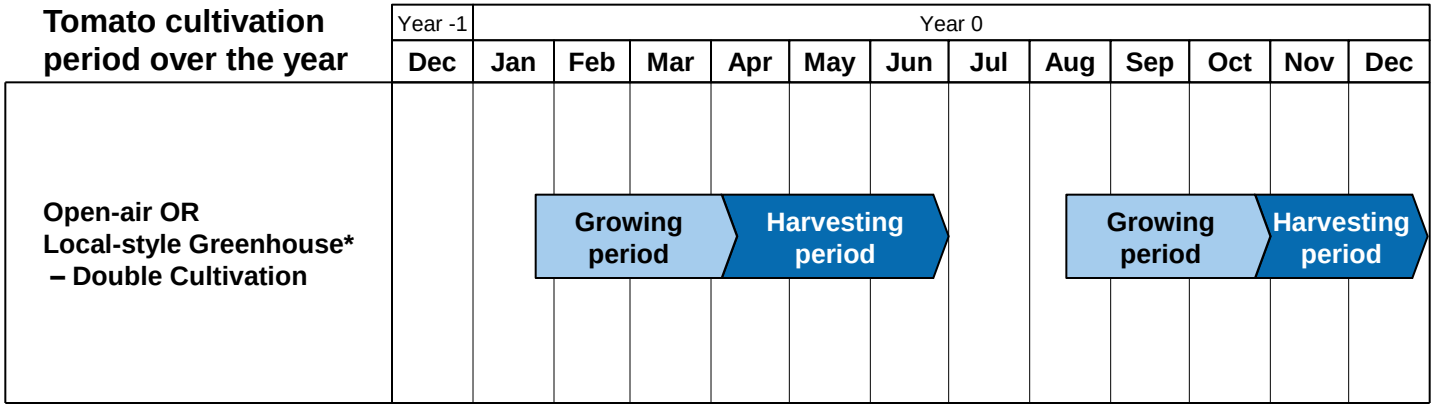
1. FAO
2. European Commission "Evaluation of the school fruit scheme"

Consumption is tightly coupled with production flow, which for the tomato case varies according to the number of cultivations within a year

Single cultivation[1]



Double cultivation[1]



Key Points

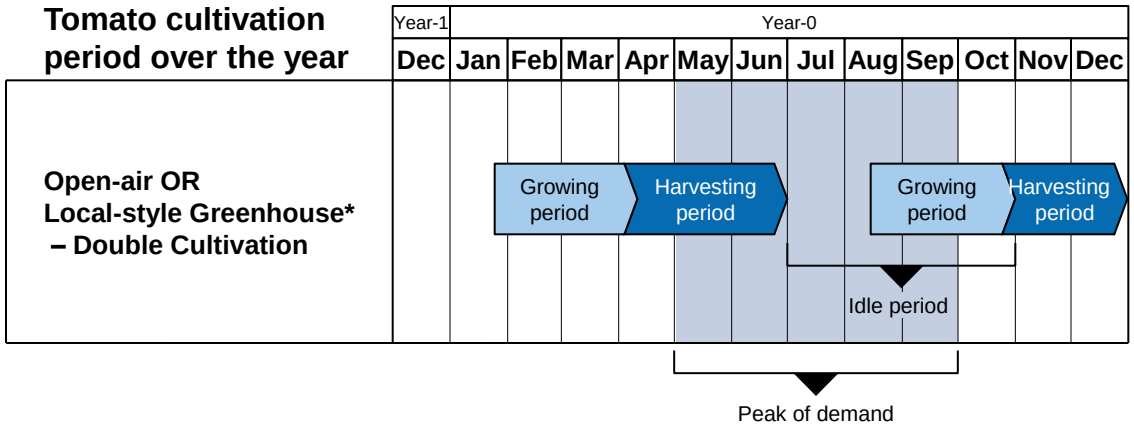
- Double cultivation appears to be the most frequent case as it is more compatible with the country's temperature range and maximizes revenues on the producer's side.

* Open-air cultivation and local-style cultivation are grouped since both ways are tightly bound to the climate condition, even though the one is considered greenhouse cultivation and the other is not.

1. Interviews with sector experts

However, mismatch between peak of demand and timing of production flow in the case of tomatoes creates a market gap which is historically serviced by import trade

Double cultivation[1]

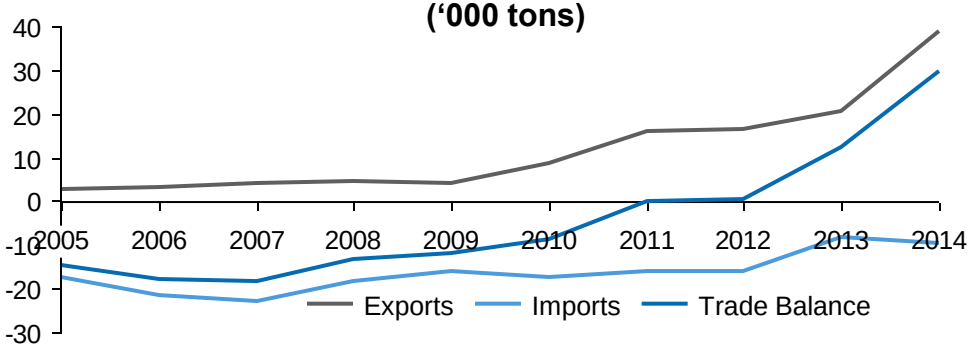


* Open-air cultivation and local-style cultivation are grouped since both ways are tightly bound to the climate condition, even though the one is considered greenhouse cultivation and the other is not.

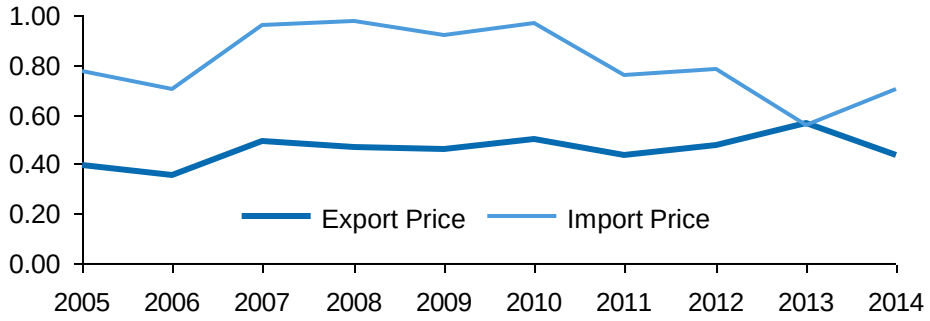
Key Points

- The peak of demand coincides with the peak of tourist arrivals and domestic demand peak for “Greek Salad”.
- Open-air or Local style greenhouse cultivation fails to satisfy the increased demand.
- Often, different criteria and priorities for product selection between retailers and end-consumers create an imbalance in the system “producer-retailer-end consumer” (for more info please refer to Annex)
- Tomato external trade is negligible, while trade balance appears historically negative.
- Tomatoes are exported in a rather stable price, while tomatoes are imported on a higher price.
- The corresponding analysis for the case of cucumber is provided in the Annex

External trade of tomatoes[2] (‘000 tons)



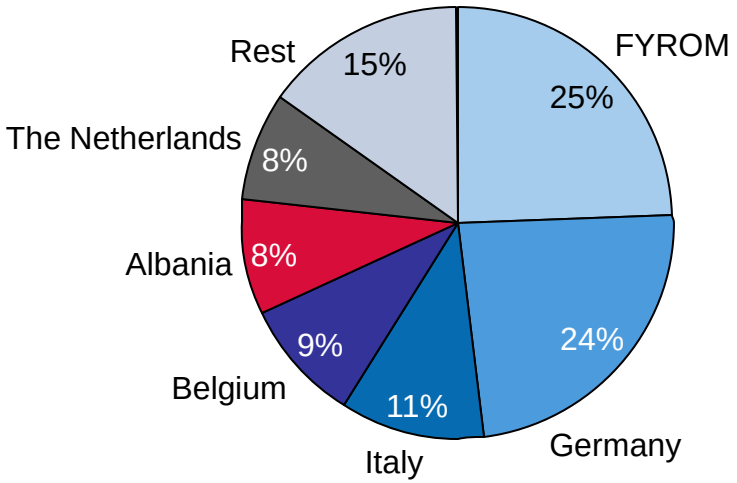
Comparison of import – exports prices of tomatoes[2] (in EUR/ kg)



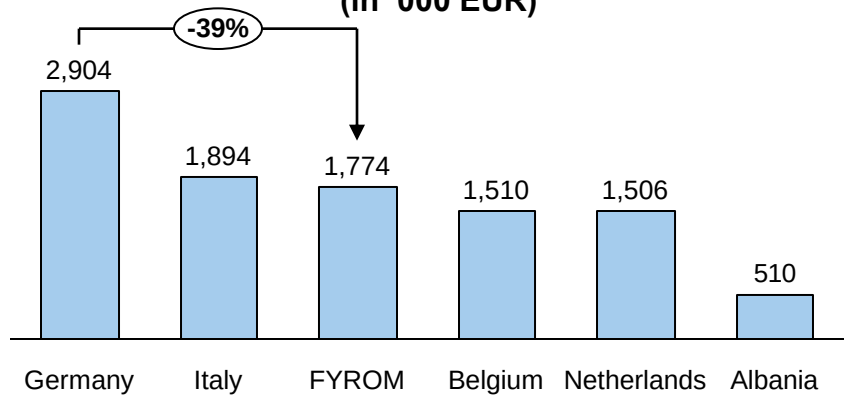
1. Greek Statistical Office
2. interviews with sector experts

Imported tomatoes comprise of open-air and greenhouse tomatoes and are the only means of servicing the gap when tomato deficit in the market arises

Average Percentage of volume of imported* tomatoes for the last 5-year period[1]



Average Value of imported* tomatoes for the last 5 years[1] (in '000 EUR)



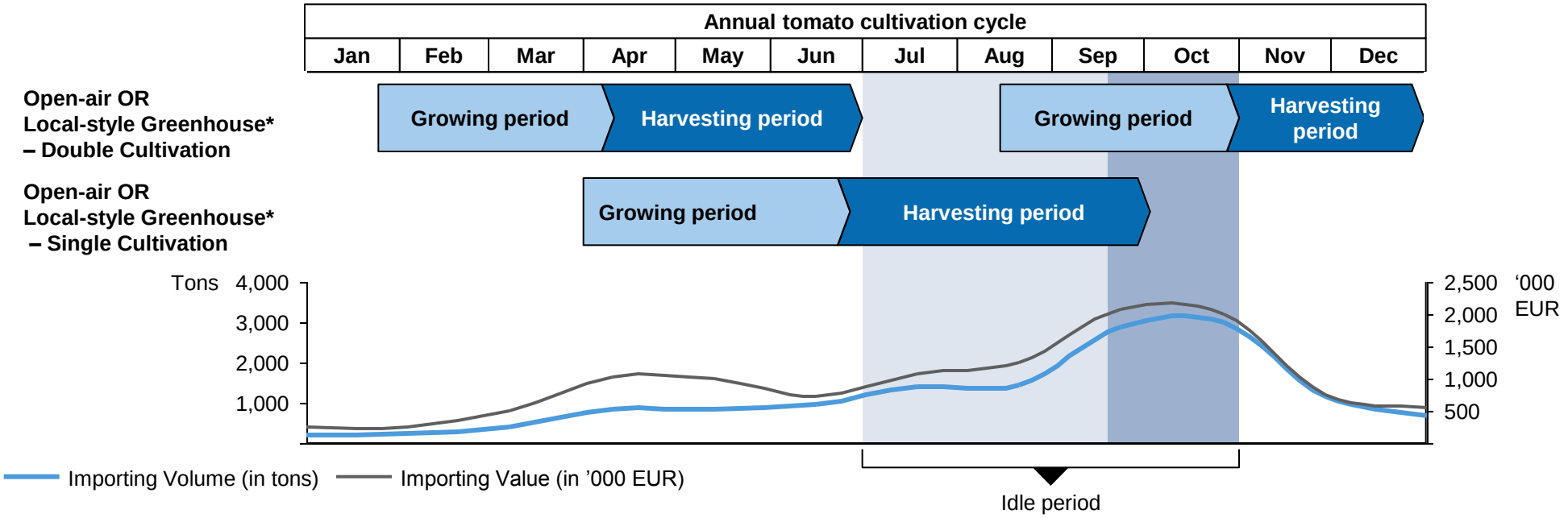
Key Points

- Germany and FYROM have almost equal volumes of tomatoes imported to Greece.
- However, the value of tomatoes from Germany is almost 40% higher than the corresponding one from FYROM because of their higher quality.
- Main imports are happening on August – September and in some periods over November through March[2].
- Detailed information about exports and local prices for open-air and greenhouse tomatoes is provided in the Annex.
- Similar information for cucumber prices is also listed in the Annex.

* The countries listed in the graphs refer to the countries from where tomatoes were imported and not necessarily the countries that tomatoes were produced in (e.g. invoiced in Germany although being originally produced in Belgium).

1. Greek Statistical Office
2. interviews with sector experts

The import distribution exhibits two local maximums during the idle period which are correlated with the tomato cultivation cycle



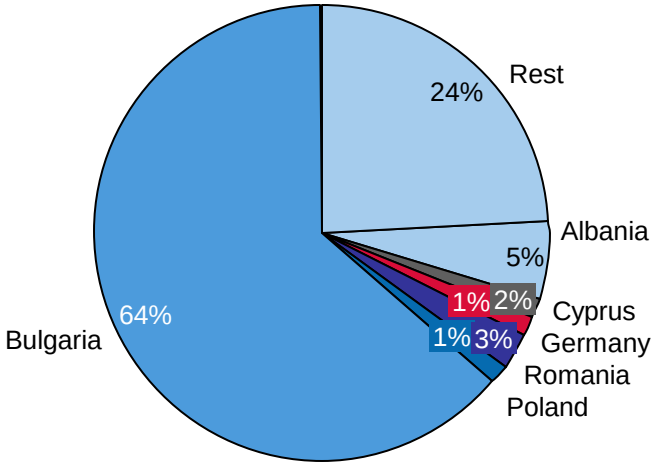
Key Points

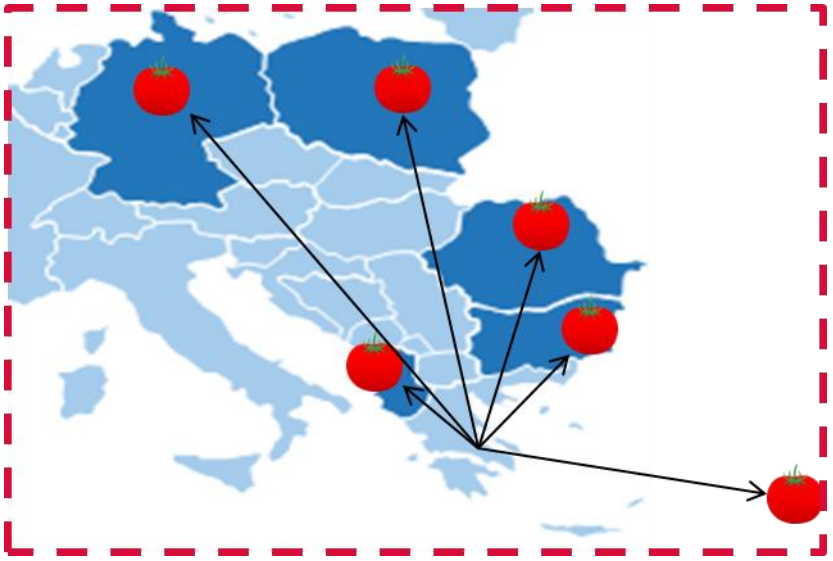
- The July's spike of imports seems to coincide with the end of the 1st harvesting period (for producers who choose double yearly cultivation) and the start of harvesting for producers who choose single cultivation.
- September's-October's spike of imports, which is the highest, seems to coincide with the end of harvesting for producers choosing single cultivation and the last growing month for the 2nd cultivation cycle of producers choosing double cultivation; at this period internal tomato production is at its lowest level.
- During the first 4 months of the year, the absence of open-air and local-style greenhouse tomato production and the reduced production of State of the Art greenhouses[2] (approximately 25%-30% of the regular production) drive the need for imported tomatoes.
- Given the above, State of the Art greenhouse tomatoes can partially alleviate the need for imports, particularly if such type of tomatoes could become more price competitive (e.g., by achieving a critical mass).

1. Greek Statistical Office
2. interviews with sector experts

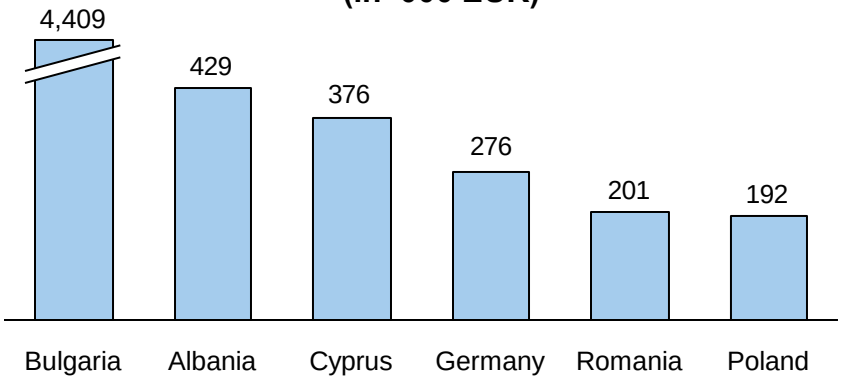
Exported tomatoes are heading mostly towards nearby markets with Bulgaria receiving the lion's share

Average Percentage of volume of exported* tomatoes for the last 5-year period[1]





Average Value of exported* tomatoes for the last 5 years (in '000 EUR)[1]



Key Points

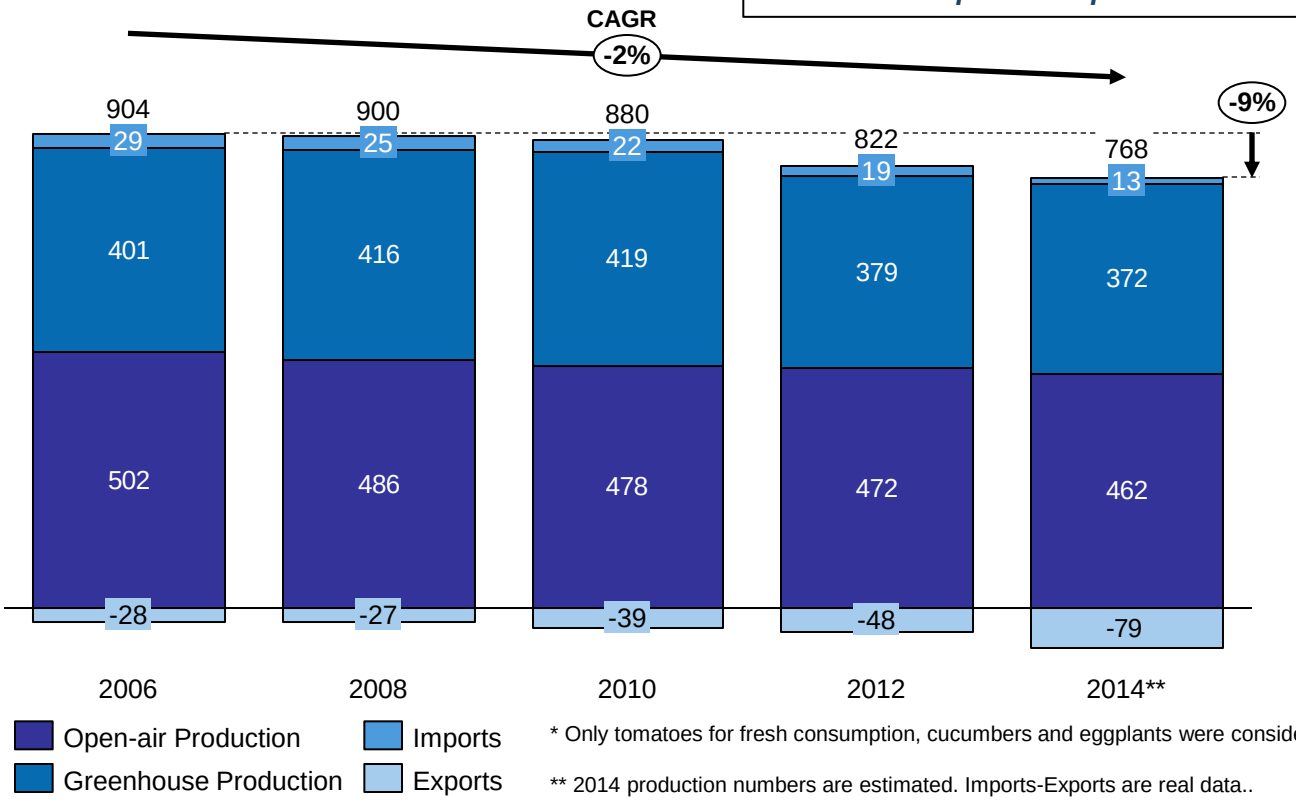
- Bulgaria is the main exporting destination for Greek cultivated tomatoes.
- 90% of the value of exported tomatoes in the top 6 countries, corresponds to Bulgaria.
- Exports are happening on a "spot" base [2].

* The countries listed in the graphs refer to the countries where tomatoes were exported and not necessarily the countries that tomatoes were consumed in. For instance, due to the embargo imposed to Russia by EU since 2013, tomatoes are still transferred to Russia through third countries.

1. Greek Statistical Office
2. interviews with sector experts

Conclusively, local production and consumption present the major drivers of the vegetable market

Apparent consumption[1]
(in '000 tons)



* Only tomatoes for fresh consumption, cucumbers and eggplants were considered for this calculation

** 2014 production numbers are estimated. Imports-Exports are real data..

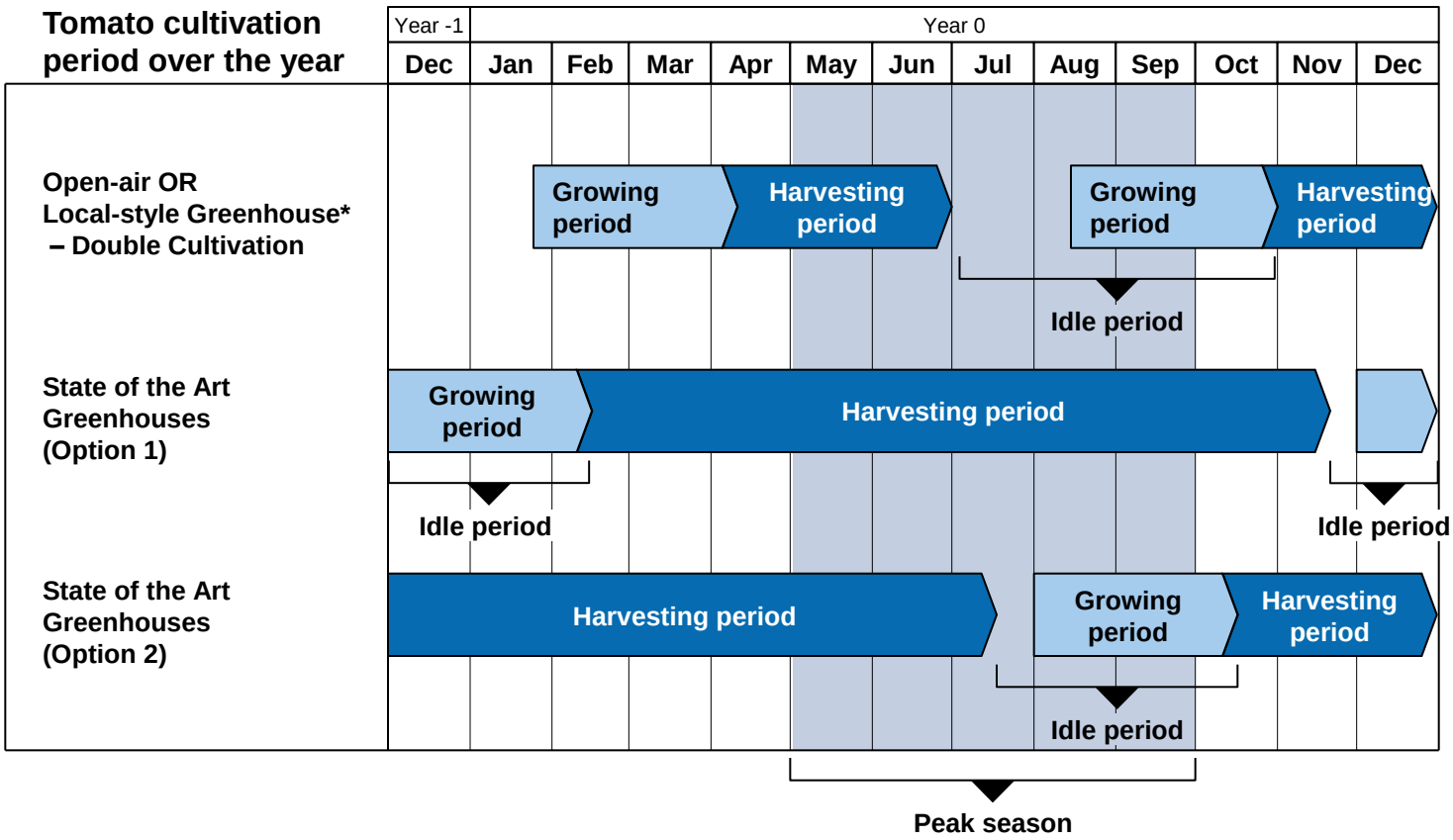
Key Points

- Collectively, apparent consumption dropped **9%** of its levels on 2006.
- Exports and imports are only a small margin compared to total open-air and greenhouse production.
- Even though imports are a small margin, they are taking place during the peak of demand, when climate conditions in Greece do not allow the cultivation of tomatoes.[2]
- On the other hand, exports take place as "spot" trade and not as a result of a specific exporting strategy. [2]

1. Greek Statistical Office
2. interviews with sector experts

Contrary to open-air and local-style greenhouses, State of the Art greenhouses enable a prolonged and evenly distributed harvesting period

Timeline of State of the Art greenhouse cultivation[1]



Key Points

- State of the Art greenhouses provide totally controllable climatic conditions throughout the year, allowing the operators to seed and grow the crops according to the market needs.
- Yield is affected by the time of plantation and growing, i.e. cultivation option 1 provides higher yield by approximately 15% (although the producer achieves lower price/kg due to higher supply of cheaper, open-air tomatoes the same period).
- State of the Art greenhouses can enable more efficient and accurate production planning.
- In parallel, State of the Art greenhouses also help to alleviate the misalignment between different priorities via the production of high quality standardized vegetables (Annex).

* Open-air cultivation and local-style cultivation are grouped since both ways are tightly bound to the climate condition, even though the latter is considered greenhouse cultivation and the former is not.

1. Interviews with sector experts

Thus, a potential solution to the market gap problem would be smooth, all year round standardized production provided by sophisticated greenhouses…

International categorization of greenhouses[1]	Types of greenhouses operational in Greece[2]	Greenhouse characteristics
3 State of the Art greenhouses	State of the Art greenhouses	• Stable level of quality throughout the year – standardized product. • Continuous production with fluctuations depending on the period of the year. • Optimum output in contrast to other types of greenhouses (typical yield of 550 tons/hectare).
2 Industrial-type greenhouses	Ability to grow year-round crops	• Fluctuating level of quality. • More stable production throughout the year. • Enhanced production in contrast to local-type greenhouses (typical yield of 280 tons/hectare).
1 Local-style greenhouses	Covered Fields Basic equipment for climate control	• Fluctuating level of quality. • Unstable production throughout the year. • Enhanced production in contrast to open-air cultivation (typical yield of 120 tons/hectare).

Key Points

- The specific characteristics of State of the Art type greenhouses led the people behind such investments to identify and capitalize on a business opportunity.
- The opportunity to capture the market by offering a highly competitive product, aided by the sustainable competitive advantage of extended sunlight, all year round.
- Major retailers rely on such producers for the timely delivery of a fixed amount of product for a fixed price, thus reducing the dependence on imported vegetables.

1. FAO
2. http://hydroponic-news.blogspot.gr

… a trend currently identifiable along with a shift of consumer demand towards "organics"

1 Strengths

- The uniqueness of the Greek landscape
- The sustainable competitive advantage of superior climate condition
- The global market penetration of branded and unique Greek products
- The transferrable knowledge from companies that specialize in conventionally grown products

2 Weaknesses

- The falling local demand of an already small market on organic products
- The high level of operational expenses
- The lack of "scale" in biological production to a certain extent keeps the prices high
- The low level of awareness towards the benefits of organic consumption, by the end consumers

3 Potential[1]

- The steadily increasing and unaffected by the economic recession global demand
- The low level market penetration, which is among the lowest in Europe
- The investment incentives regarding organic cultivation from EU and Greek authorities
- The growing interest for involvement in organic cultivation both from experienced people in related fields and from young farmers

1. Piraeus Bank, unit of economic analysis and markets, Sectoral analysis, Biological Agriculture

Global Facts on Greenhouse Horticulture

The Case of Greece

General Facts and Figures

Vegetables and Greenhouses

Investments, financing & technology know-how

Analysis of Financial Data of Sector Companies

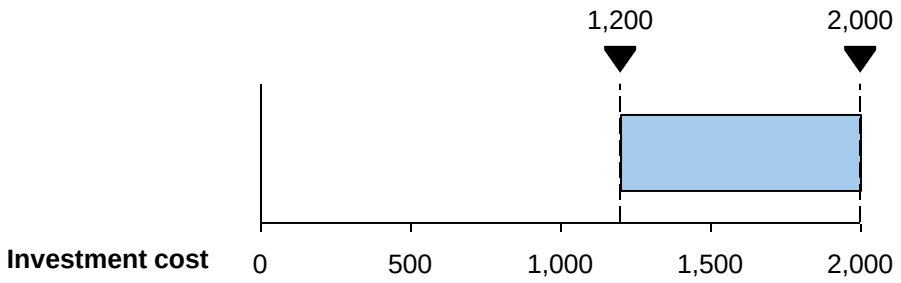
Agrologistics

Business Opportunities for Strategic Investors

Annex

In the case of State of the Art operations CAPEX ranges from 1.2 - 2 million EUR / hectare…

Range of Investment for State of the Art Greenhouses[1] ('000 EUR/hectare)



Indicative elements of CAPEX

- Cooling systems
- Heating systems through pipes that operate as tracks for irrigation and fertilization purposes
- Climate control system and software, managing the other sub systems (e.g. cooling, heating etc.)
- Acquisition/Leasing of the land (usually fixed rate)
- Excavation & landscaping expenses
- Curtains for shadow and energy saving
- Greenhouse infrastructure expenses: pipes, steel foundations, "covering materials", etc.

Key Points

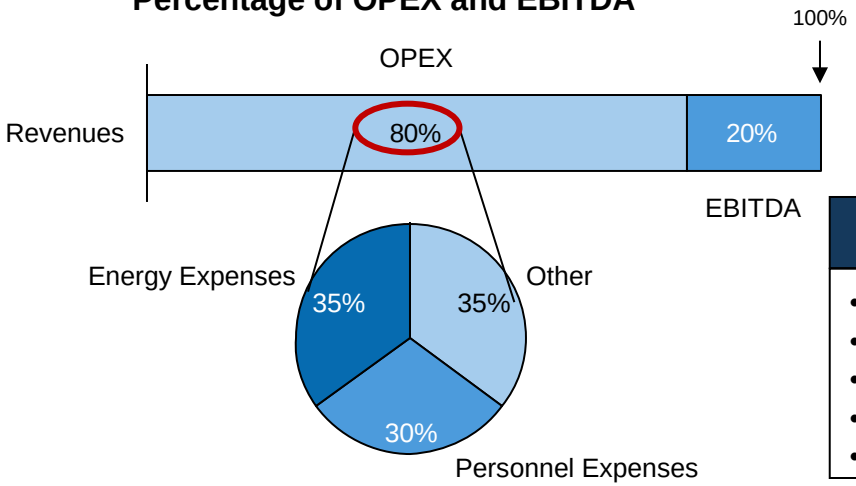
- Latest investments in State of the Art Greenhouses in Greece apply hydroponics for vegetable cultivation and exploit natural gas, geothermal sources (where available) or biomass for energy needs.
- State of the Art greenhouses that operate Cogeneration Heat and Power (CHP) systems bear an extra cost of **600,000-700,000** EUR/hectare.
- The total expenses are determined not only by the size of the construction, but also by the level of desired segmentation* within the greenhouse (e.g., a greenhouse of total size 10 hectares might have a segmentation per hectare, for better climate control, whereas another greenhouse might not have a segmentation at all).

*Segmentation is defined as the area within the greenhouse that offers total climate control. A segmentation process is followed in cases of cultivation of different crops, radical changes in the greenhouse's climate, etc.

1. Interviews with sector experts

… providing an EBITDA approximately of maximum 20% on sales

Percentage of OPEX and EBITDA[1]



Other Expenses

- Seeds
- Fertilizers
- Packaging
- Transportation
- Other

Key Points

- From the OPEX categories, energy expenses can be reduced, either by gaining access to clean, cheap and renewable energy (geothermal) or by selling energy back to the grid (cogenerated heat and power systems).
- Learning curves restrict optimization of production for the first 2 years of operation.

Energy Expenses

- State of the Art Greenhouses greater than **2** hectares, usually use Natural Gas (or the available form of energy in the region). Additionally the structures have the capability to produce electric energy and sell it back to the grid.
- State of the Art Greenhouses of a smaller size employ biomass energy.
- Some State of the Art Greenhouses employ geothermal energy, which can reduce the energy expenses up to 50-60%.

Personnel Expenses

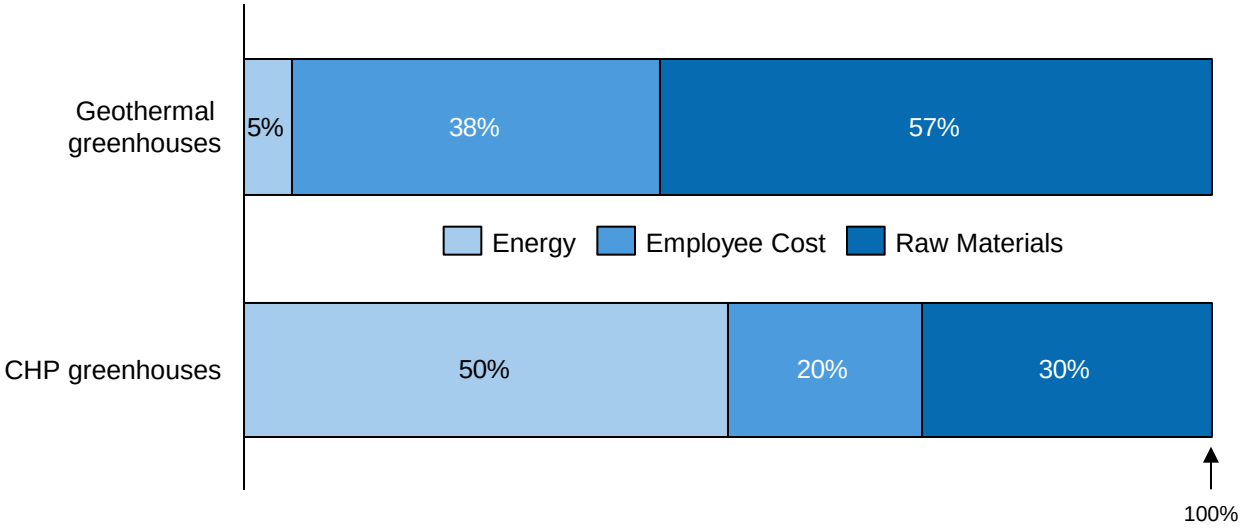
- Knowledgeable personnel is required, otherwise a failed intervention to the internal climate can lead to lower yields.
- Learning curves exist and it is estimated that personnel efficiency is optimized on the 3rd year of production.
- Employee Churn rate* is also an important factor on the expenses.

* The rate of the trained personnel voluntarily leaving their jobs after a period

1. Interviews with sector experts

Employing a geothermal energy source or CHP systems can contribute to significant energy cost savings and improve EBITDA

Breakdown of OPEX according to energy source[1]



Note

Employing CHP systems with natural gas, would mean high energy costs, but at the same time would secure additional revenue streams (that could be as high as 40% of the turnover), which normally exceed the cost of natural gas.

Key Points

- The level of achieved EBITDA is widely determined by energy expenses.
- Employing geothermal energy would minimize energy needs and the OPEX would be only employee expenses and raw materials.
- If neither geothermal source nor CHP systems exists, then energy expenses incurred from simpler heating systems (employing olive kernel, natural gas or heating oil) mount up to road-blocking levels for the region of Northern Greece, while in the case of Southern Greece amount up to 20% of the OPEX.

1. Interviews with sector experts

The Development Law provided significant grants and financing tools for State of the Art Greenhouse investments …

Development Law 3908/2011[1]

The main tool of **state support** towards enterprises in Greece
The level of support is determined by **3 criteria**: a) Location of enterprise, b) Size of enterprise, c) Size of investment.
Ways of support:
1. Grants 2. Tax relief 3. Leasing subsidy 4. Soft loans by ETEAN* (with low interest rates).

Types of investments aided:
1. **General Entrepreneurship**
2. Regional Cohesion
3. Technological Development
4. Youth Entrepreneurship
5. **Large Investment Plans** (up to **50** m. EUR)
6. Integrated, Multi-Annual Business Plans (Companies legally formed at least 5 years prior to application attempting to implement multi-annual business plans with a minimum budget of **2** m. EUR).
7. Partnerships and Networking (clusters of companies- **at least 5** for the regions of Attica and Thessaloniki and **at least 3** for other regions).

Key Points

- State of the Art Greenhouse investments were aided financially by the Development Law, as they were included in the categories of General Entrepreneurship and Large investment plans.

* Greece's National Fund for enterprise support. Provides access to capital through friendly and soft loans, through the major banks.

1. http://www.enterprisegreece.gov.gr

… with some variations so far and is expected to be the main tool for financing such type of investments

Main alterations (L.4146/2013) to the Law of 2011 – applicable after 2013[1]

- The **beneficiary chooses the mix of ways of support** (e.g. grant and tax relief). For investments that choose the measure of **tax relief support**, the years of relief have been **expanded from 8 to 15 years**.
- Up to **100% down payment of the financial support**, in the case of subsidy, with a letter of guarantee.
- **Tax relief can be up-front**, as a liquidity boost, in the form of tax-exempted reserves or offsetting past tax debts.
- The investor's capital requirement for the investment (minimum of 25% of total budget) can be covered by using company liquefiable assets.
- Increase of the cumulative support limit, **from 15 m. EUR to 20 m. EUR**.
- Sectors of entrepreneurship aided by the law, are expanded.
- **Application deadlines are lifted**.

Until December 2015 the new Development Law is expected, therefore new alterations will be applied to the current status quo. Nevertheless the key facts concerning the financial support towards such greenhouse-related investments are the following:

Key Facts	
Percentage of subsidy	15% - 50% (Depending on region)
Budget of a project, so as to be eligible for inclusion in the Law	>100,000.00 EUR

Key Points

- Hydroponic, greenhouse-related investments are considered a cutting-edge sector and it is assumed that they will be included in the new Development Law.
- Additionally, SMEs will be the main beneficiary from the new Law.
- The new Development Law is going to differ considerably from its predecessors and a shift towards the use of the tax relief tool is expected, due to the limited state funds that can be devoted on subsidies[2].
- Priority will also be given on enterprises with production targeted at foreign markets[3].

1. http://www.enterprisegreece.gov.gr
2. http://www.taxheaven.gr
3. http://www.kathimerini.gr

The Program for Agricultural Development 2007 – 2013 has been very supportive for smaller scale greenhouse projects

Program for Agricultural Development 2007-2013

- During the period of 2007-2013 the installation and modernization of greenhouses was funded through the measure 121 "Modernization of agricultural utilizations". **The funding was in the form of grants**[1].
- Additionally, other tools were used towards the financial aid of such investments, such as issuing **loans with minimum interest.**
- The financial aid was provided from the Fund for Agricultural Development, which operated as the funnel of the funds towards the beneficiaries.

Beneficiary (2007-2013)	Percentage of subsidy for Islands in the Aegean	Percentage of subsidy for Mountainous – Disadvantageous	Rest
Farmers	75%	50%	40%
New Farmers	75%	60%	50%
Total amount of subsidy	< 500,000.00 EUR for legal entities – The remaining part can be a loan		

Program for Agricultural Development (PAD) 2014-2020

- The PAD aims at the development of Greece's Rural sector, by drawing on national funds, as well as funds from Pillar I of the CAP 2014-2020. For the totality of the period the community funds will amount to 4.22 bn. EUR[2].
- For the period of 2014-2020 the program has been submitted and awaits its evaluation from European Commission.
- So far, the proposed measures cover a wide range of areas that would render the Greek agricultural economy competitive.

Key Points

- In case of overlap of the sectors that the PAD and the new Development Law will financially benefit, greenhouse related investments might fall under the former's support, in which case financial aid is limited.
- Given the budget restriction of 500,000.00 EUR, projects that are aided by the PAD Program are restricted to local-type and industrial-type greenhouses.
- Greenhouse-related investments will remain a central part of the new Program for Agricultural Development 2014-2020.
- A shift towards the use of financial tools, such as loans with favorable terms, is expected given that the same policy appears in other funding programs.

1. Ministry of Agricultural Development
2. European Commission

In addition, there exist several structured programs which potentially could be leveraged for financing greenhouse SMEs

Brief description of additional European financial instruments[1]			
Program	**Financial Instruments**	**General information about the program**	**Sector**
COSME LGF	Loan guarantees	Main funding instrument for the aid of SMEs' credit in Europe. Operating as "first risk recipient" of SMEs' loans, aiming at a multiplying effect in the economy	All SMEs are eligible
COSME EFG	Investments in VCs and PE funds	Funneling of funds in VCs and PE firms to financially strengthen SMEs without issuing of new loans	All SMEs are eligible
Horizon 2020 – Innovfin	Loan guarantees	Main funding instrument for pioneering SMEs in specific sectors	Viable production and food processing
	Investments in VCs and PE funds	Funneling of funds in VCs and PE firms to financially strengthen SMEs without issuing of new loans	Innovative SMEs in the sector of viable food production and food processing
Horizon 2020 – SME Instrument	Grants*	3-phase process of SME development, with grant issue for development stages such as business plan formulation and product / service development	Innovative SMEs in the sector of viable food production and food processing, with a product or service with significantly high level of technological readiness

Criteria for an enterprise to be classified as SME		
Number of Employees	**Revenues**	**Total assets**
< 250	≤ 50 m. €	≤ 43 m. €

Key Points

- State of the Art greenhouses fall under the category of SMEs and thus being able to draw additional funding from a pool of EU programs.

* Grant is not considered a financial instrument but it is included in the table for the sake of completeness

1. European Commission

Finally, there are also other European programs and initiatives which have not yet been finalized and could potentially assist in further greenhouse financing

Brief description of additional European financial instruments[1]			
Program	**Financial Instruments**	**General information about the program**	**Sector**
EFSI – Juncker Initiative	Loans, loan guarantees, equity funding (for SMEs)	European Fund for Strategic Investments with a sub-program (≈ 25%) for funding SMEs in specific sectors	Viable production and food processing Investments using RES*
EIB – EIF	Jessica, Jeremie etc.	Targeted programs at specific sectors of the economy, coming to an end on 2015	Not relevant with Greenhouse type of investments
	PPPs and "Green" investments	Investments using Renewable energy sources (e.g., geothermal energy) can be benefited from such programs	Investments using RES
EBRD	Loans and loan guarantees	Depending on the projects, several funding instruments are available	Depending on program

Criteria for an enterprise to be classified as SME		
Number of Employees	**Revenues**	**Total assets**
< 250	≤ 50 m. €	≤ 43 m. €

Key Points

- 2015 is a transitional period and thus some of the programs have expired or not yet renewed, thus further investigation on a case by case basis is advised.

* Renewable Energy Sources

1. European Commission

Greek providers of technology and know-how are currently in the process of building up the offered technical expertise, with some indicative examples provided below

List of companies involved in greenhouse construction and operation in Greece[1]		
Name	**Expertise**	**Areas of known projects**
Agrotechniki Ltd	Design and construction of local-type, industrial-type and State of the Art greenhouses, installation of equipment, etc.	Northern Greece
Diamantopoulos	Construction, remodel and repair of smaller-sized State of the Art greenhouses.	Peloponnese
DKG Group (IQ Crops)	Advise & supervision, consultation on turn-key projects, consultation on hydroponics, branded solutions, etc.	Greece and Europe
Elbimek S.A. (Tsagkarakis)	Design and construction of local-type, industrial-type and State of the Art greenhouses, installation of equipment, etc.	Crete
Greenhouses of Crete – Construction company (Sariklakis)	Design and construction of steel-based structures, turn-key projects, installation of equipment, etc.	Crete and other hand-picked areas
Greentech Co. Ltd	Advise & supervision, turn-key projects, project management etc. on the electrical/mechanical infrastructure of an State of the Art greenhouse.	Global

Key Points

- Greek providers of technology are preferred in projects of a smaller size and less technological sophistication.
- Greek companies and develop expertise in certain aspects of greenhouse construction and operation and seek to expand in other markets.

* This is not an exclusive list. Attention was given to companies involved in State of the Art projects.

1. Interviews with sector experts

Global Facts on Greenhouse Horticulture

The Case of Greece

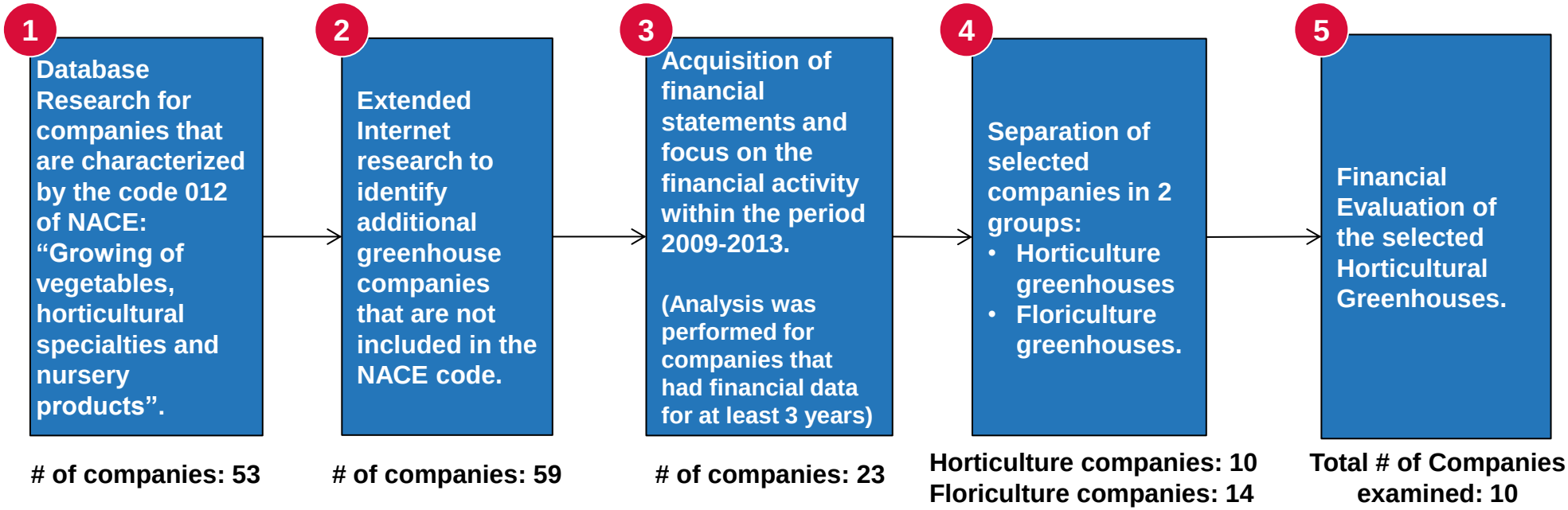
Analysis of Financial Data of Sector Companies

Agrologistics

Business Opportunities for Strategic Investors

Annex

The financial analysis of the Greek greenhouse sector was performed on the basis of a few companies due to the rather limited size of the sector and the lack of historical financial data

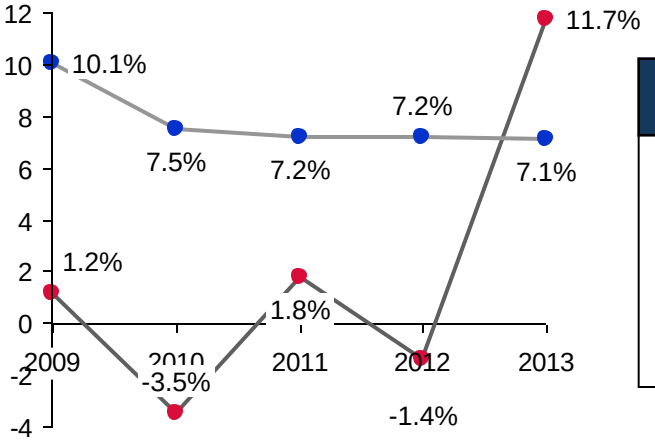


Key Points

- Even though 58 companies were registered, 23 of those did not share their financial information, so they were immediately excluded.
- From the remaining companies, 12 of them ended their operations at the beginning of the 5 year period or started their operations at the end of the 5 year period. This is an indicator of the transitional phase that the sector is in.

The financial analysis of the sector reveals a weaker and less stable performance than the Greek companies' average , exhibiting however a trend to stabilize and gradually improve over the last few years

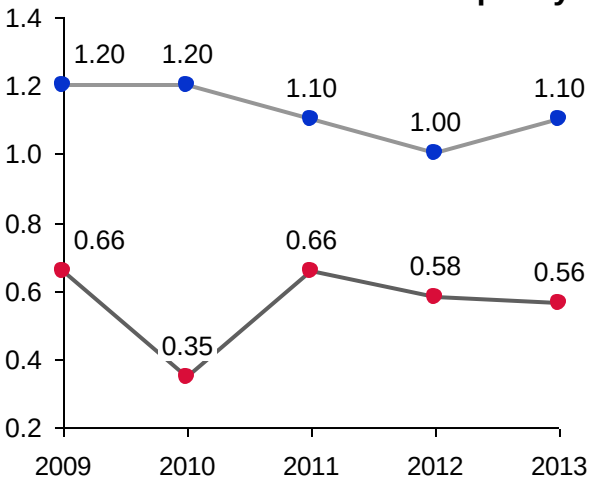
% EBITDA



Key Points

- EBITDA margin is quite volatile, presenting rapid increase on 2013.

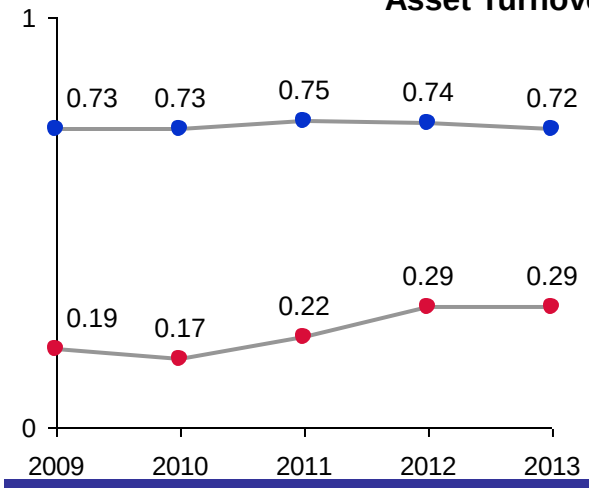
Liquidity



Key Points

- Liquidity dropped significantly in the sector, showing a recent, stabilizing trend.

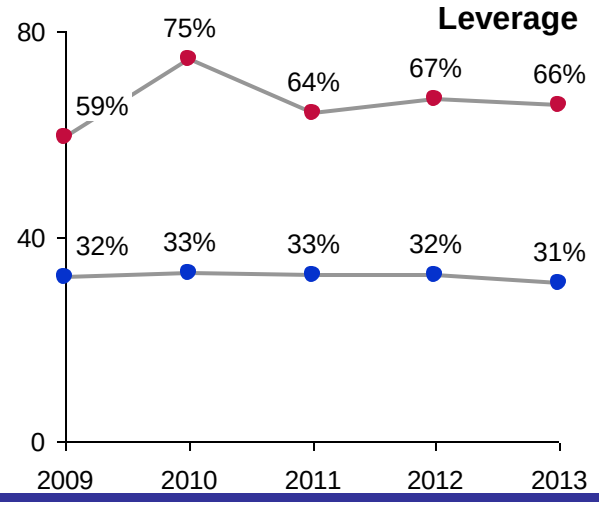
Asset Turnover



Key Points

- Relatively stable, but lower than the national average.

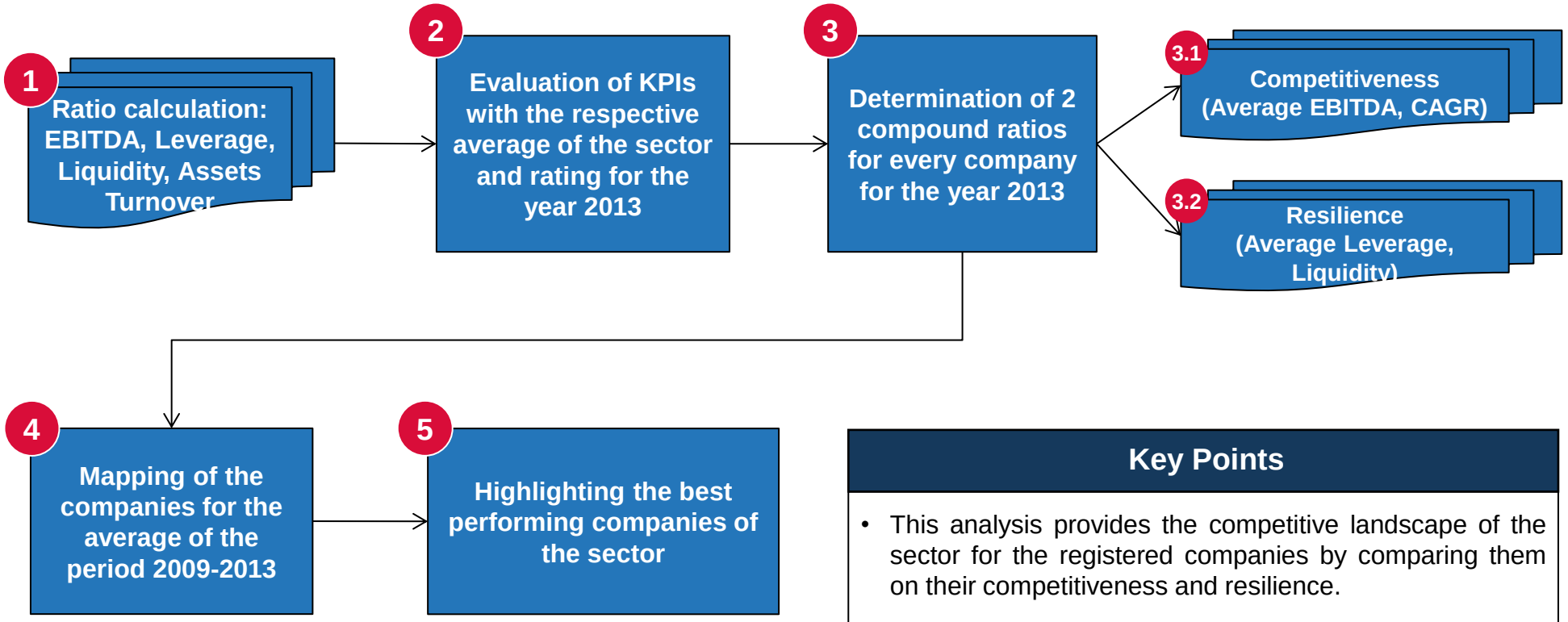
Leverage



Key Points

- Relatively stable, but higher than the national avg.

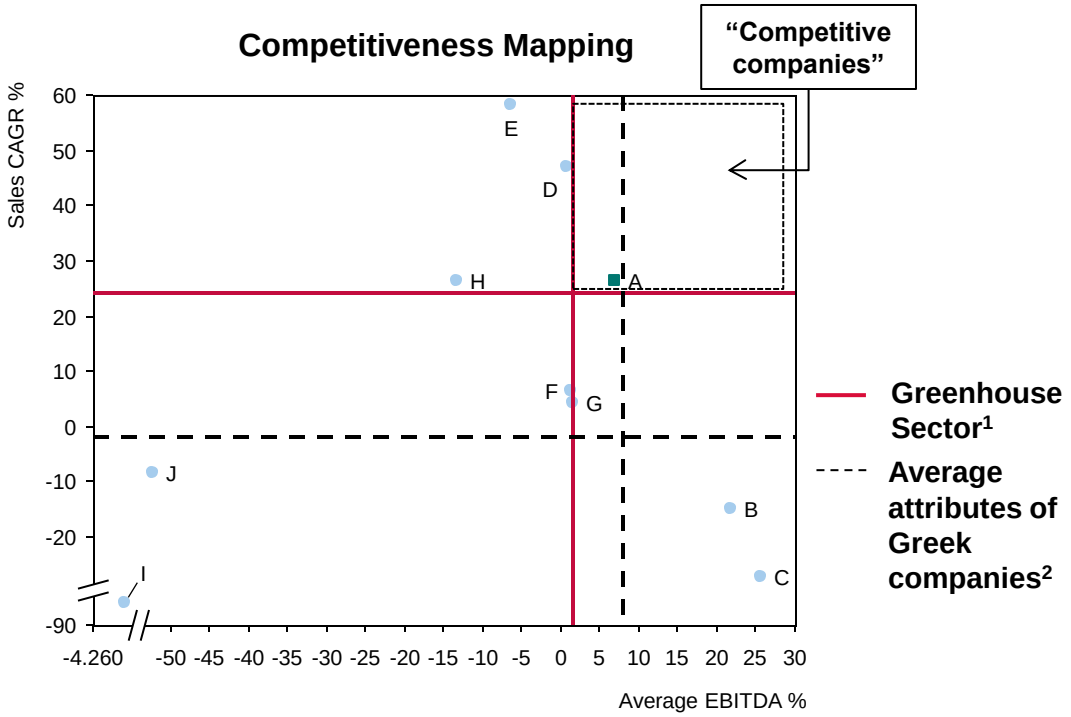
Subsequently, the selected companies were evaluated based on their financial ratios according to the methodology described below…

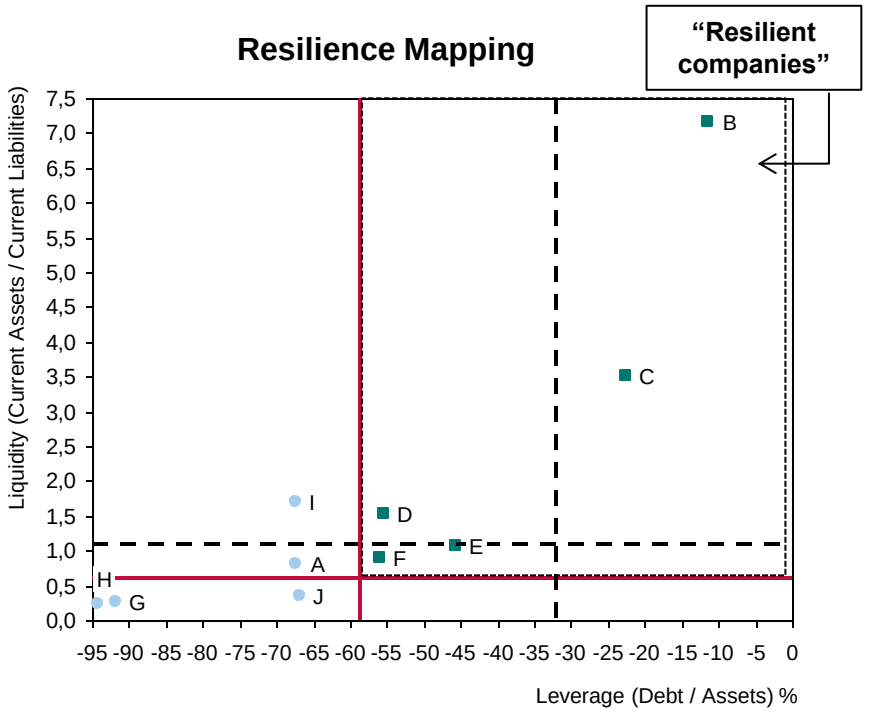


Key Points

- This analysis provides the competitive landscape of the sector for the registered companies by comparing them on their competitiveness and resilience.
- The analysis uses as benchmark sectoral and national averages.
- Apart from describing the current situation, the analysis can illustrate the “future path” of the sector’s companies.

… and their current position in the sector is mapped in terms of competitiveness and resilience





Key Points

- More companies meet the criteria of "resilient" performance than "competitive" one
- However none of them meets both criteria at the same time
- The evaluation reveals several companies with relatively good resilience but only a single one with satisfactory competitiveness.
- The average, worse performance of the greenhouse sector in the 2009-2013 compared to the Greek economy, is viewed by the position of the average ratings, in each map. As seen, only the Sales CAGR rating is better than the average of the Greek companies.

1. HELLASTAT, September 2015
2. Grant Thornton «Greek Entrepreneurship», December 2014

Typically, logistics operations for agricultural products involve a wide range of activities that span from harvest to transportation…

Preparation Phase - Logistics operations that describe every step of the process[1]

Harvest	Transportation to the packing station	Preselection	Grading/ Sorting/ Sizing	Packaging	Refrigerating and storing	Ready for transportation
Process that takes place at the optimum level of maturity, so as to extend the crops shelf life at maximum days.	Transportation of the crops from the growing field (open-air cultivation or local-style greenhouse) to the station where packaging takes place.	Preselection of crops, which includes disposal of crops that do not fulfill the requirements.	The process of arranging (sizing) the crops based on the size (grading) and quality characteristics such as color and firmness (sorting).	The process starts with individual or cluster packaging or the crop and concludes in the grouping of the packages for the creation of palettes.	Storing of the palettes in cold chambers so as the crop remains fresh for as long as possible.	Loading of the palettes in transportation trucks via custom made loading docks.

Key Points

- Even though this process can be modified according to the crops specific requirements, the sequence remains the same.
- The number of actors involved in this process varies, as these processes can be incorporated in the processes of one actor in the chain, or distributed among other actors.

1. Ministry of Agricultural Development

… and are part of the agricultural supply chain which for the case of vegetables can be of two types (1/2)

	Soil preparation and transplanting	Crop development, harvest and transportation to packaging station	Selection, packaging, storing and transportation	Reselling and transportation to retailer	Labelling and store placing	Purchase and consumption
Key Players	• Providers of transplants, raw materials, fertilizers, etc.	• Open-air cultivations • Local –style greenhouses	• Coops • Middle man	• Wholesalers • Central Markets	• Smaller Retailers • Flea markets • Restaurants • Hotels	• End consumer
Examples			• A.S. Ierapetra • A.S. Tympaki E.A.S. Messara	• Wholesalers (Annex) • Central Markets (Annex)	• Retailers of these types can be found in appropriate exhibitions (Annex)	

Key Points

- The first (“traditional”) version of the Supply chain was structured in service of the small-in-size farmer[1]. Small farmers do not own the means to reach the end consumer, as a result a series of links were created in the supply chain to assist such producers in their effort.
- However, the existence of so many links between the producer and the end consumer resulted in a highly inefficient and opaque pricing system, and as result the Central Markets received a vital role and, until now, withholding part of the value, by becoming the connecting point for both ends of the chain.

The Central Market “Grey Area”[2]

The central markets represent the **main funnel** for producers of any size (but exclusive funnel for small producers) to the market. The trade deals between the producer or Coop and the central market are **not clear**, and the exact prices of crops are determined after the sale, by the salespeople of the Central market. As a result, producers of a small size are **bound in this supply chain**, whereas producers of significant size on the other hand, would search for **alternative ways** to funnel their products to the market.

1, “Restructuring of the Supply Chain for Agricultural products”, Zervos, 2008
2. Interview with sector experts

… and are part of the agricultural supply chain which for the case of vegetables can be of two types (2/2)

	Soil preparation and transplanting	Crop development and harvest	Selection, packaging, storing and transportation	Labelling and Placing the product to stores	Consumes the product
Key Players	• Providers of transplants, raw materials, fertilizers, etc.	• State of the Art Greenhouses		• Retailers	• End consumer
Examples		• Wonderplant • Agritex S.A. • Greek Peppers - Drama Greenhouses • Thrace Greenhouse etc.		• Major retail chains (for an elaborative list with contact details, refer to the Annex)	

Key Points

- State of the Art greenhouses include in their operations, logistics processes, namely from harvest till transportation.
- As these processes constitute separate links in the previous version of the supply chain, State of the Art greenhouses retain a piece of the value that would be disseminated to the aforementioned links.

The State of the Art Greenhouse "Success"[1]

In order to keep as much part of the value as possible, State of the Art greenhouses **take up the intermediate procedures** of the preparation phase (e.g. packaging, distribution, etc.) in an effort to **eliminate the middle-man.**

Long-term contracts with retail chains provide State of the Art greenhouses with **demand-side stability**, which could possibly **trigger further investments** in core or complementary procedures.

1. Interview with sector experts

Several means of transport exist with road transportation being the common choice of preference for fresh agricultural products both for local and export trade

Forms of transportation for Fruits and Vegetables[1]			
Means of transport	**Vehicle**	**Advantages**	**Disadvantages**
Road	Big/small trucks	• Flexibility in transportation • Easiness in handling the crops	• Wastage due to travel turbulence or bad weather conditions • Increased fee of transportation.
Rail	Temperature regulating containers	• Limited turbulence • Single fee • Transfer of significant volumes of crops irrelevant of the weather conditions.	• Limited flexibility in travel planning • Limited or non-existent railway infrastructure in several region.
Boat	Refrigerator ships with temperature regulating containers	• Low cost/unit of crop	• This form of transportation is limited to crops that endure for days after their harvest. Thus, this form is not recommended for vegetables.
Airplane	Aircrafts carrying containers	• Small duration of transportation	• High cost/unit of crop • Dependence on local weather conditions.

Key Points

- Air transportation is not used as it can be very costly for the producer, even though it minimizes transportation time.
- Boat transportation is usually employed for fruits and vegetables that can remain fresh for several days, which is not the case for the vegetables such as tomato, cucumber, pepper etc.
- Train infrastructure in Greece is not expanded to an extent that could service rail transportation of goods from rural areas to urban centers.
- As a result, the preferred means of transport is road transportation via trucks.
- For an elaborative list on the Logistics operators, refer to the Annex

1. “Restructuring of the Supply Chain for Agricultural products”, Zervos, 2008.

Global Facts on Greenhouse Horticulture

The Case of Greece

Analysis of Financial Data of Sector Companies

Agrologistics

- Supply Chain
- **Value Chain**

Business Opportunities for Strategic Investors

Annex

Added values and final prices depend on the origin of the vegetables and the supply chain type that is used (1/2)

Indicative Value Chain of the 1st type of the supply chain per Kg of tomato (excl. VAT)[1]

Open-field or local-style greenhouse	Coop / Middle-man	Wholesaler / Central Market	Retailer	End Consumer - Shelf
Indicative Price: 0.45-0.60 EUR	**Indicative Added Value: 0.16 EUR**	**Indicative Added Value: 0.08 EUR**	**Indicative Added Value: 0.25 EUR**	**Indicative Retail Price: 0.90 – 1.10 EUR**
				

Key Points

- Central Markets operate with a fix margin of 12% on the selling price.
- However, Central Markets remain the most obscure and opaque step of the supply chain as it is unclear the way the Central Markets determine the selling prices of the sold volume, in an effort to secure the fix margin of 12%.
- The cost of transportation included in the Coop / Middle-man step of the value chain varies, depending on the distance to be covered (from 0.05-0.06 EUR/kg for proximate distances to 0,12 - 0,13 EUR/kg for greater distances). This link also includes the cost of packaging, selection and pre-transportation.
- The end consumer may buy the tomato at the shelf at a price double than the price the producer sells.

1. Interviews with sector experts

Added values and final prices depend on the origin of the vegetables and the supply chain type that is used (2/2)

Indicative Value Chain of the 2nd version of the supply chain per Kg of tomato (excl. VAT)[1]

State of the Art Greenhouse	Retailer	End consumer - Shelf
Indicative Price: 1,00-1,25 EUR	**Indicative Added Value: 0,35-0,40 EUR**	**Indicative Retail Price: 1,35-1,65 EUR**
		

Key Points

- The prices listed above are indicative and their range refers to both traditional type of tomatoes (e.g., beef) and sophisticated ones (e.g., cluster tomato, tomato in a cup etc.). The lower end of the price range corresponds to the former type, whereas the higher end corresponds to the latter one.
- The indicative end price of the tomato is significantly higher as a result of two reasons:
  - ❑ It is a standardized crop of a higher quality
  - ❑ It is targeted mainly at a niche market
- State of the Art greenhouses aim at supplying directly their products to the retailer, bypassing the middle links of the "traditional" supply chain (for more information, refer to the Annex).
- By direct marketing to retailer significantly higher cost savings in the "middle part" of the supply chain are achieved.
- State of the Art Greenhouses and Retailers are "absorbing" intermediate parts of the supply chain, yielding thus to partial vertical integration of the supply process.

Servicing the "supply anomaly" along with niche marketing and price setting at higher levels provides a solid ground for further development of the State of the Art Greenhouses

State of the Art Greenhouse targeting niche markets	Crop	
AGAN – Greek Tomato	• Cluster Tomato*	
Agritex	• Cluster Tomato • Cocktail Tomato • Mini Tomato (snack tomato in a cup)	 
Greek Peppers – Drama greenhouses	• "California - style" peppers (5 colors)	
Hellenic Greenhouses - Tomaccini	• Mini Tomato (snack tomato in a cup)	
Wonderplant	• Cluster Tomato* (although it represents a small margin of the total production)	

* Apart from the niche type of tomato the company produces standard "beef" tomato

Key Points

- The consolidation and further development of revenues that are established by providing a stable supply of vegetables, are reinforced by providing vegetables that are considered "premium" or are hard to find in the Greek market.[1]

1. Interviews with sector experts

Global Facts on Greenhouse Horticulture

The case of Greece

Analysis of Financial Data of Sector Companies

Agrologistics

Business Opportunities for Strategic Investors

Annex

Undoubtedly, Greece provides remarkable investment opportunities for State of the Art Greenhouses for the following reasons

Production

- Potential for achieving significant energy cost savings due to better weather conditions and use of geothermal fields.
- Lower personnel expenses than northern European and other southern Eurozone countries.
- Advanced quality of crop due to extended sunlight and superior weather conditions in general.

Internal Consumption

- Leading internal consumption among European countries...
- … which is enhanced by the influx of tourists during the summer months and the increased popularity of the branded “Greek Salad” product.
- In the absence of critical mass, local supply does not meet the local demand and imports are considered.

Financing

- New financing instruments via European Programs 2014 – 2020.
- Increased possibility for Greece to attract European funding.

Key Points

- Low operational costs coupled with increased internal demand, create favorable conditions and high potential for further expansion of State of the Art Greenhouses in Greece.
- Vegetable production can be enhanced and shifted towards more stable, standardized products to service Greek internal market needs and fill the existing gap.
- Increased all year, high quality vegetable production may boost exports and set the foundation for the development of a targeted horticulture export strategy.
- Weak economic conditions in Greece, mainly in terms of liquidity, render SMEs in Greece more probable candidates for receiving financial support through the new European financing instruments.

There is a wide range of opportunities that strategic investors can exploit rendering the State of the Art greenhouse sector very attractive

1 Greenhouse know-how & technology expertise	2 State of the Art greenhouse investments	3 Exports and access to major European markets
• Provide support, advice and assistance on local State of the Art greenhouse implementations.	• Form and participate in joint venture investment schemes with other greenhouse local players. • Perform own investments in the Greek vegetable greenhouse industry.	• Identify international market opportunities, enhance relative marketing activities and boost horticulture export sizes. • Provide support to the international logistics operations.

Primarily, strategic investors can offer specialized know-how and technology expertise to the Greek greenhouse sector

1

Greenhouse know-how & technology expertise

- **Sophisticated technology**: Strategic investors can offer specialized knowledge and know-how by exploiting their vast experience in the greenhouse sector.
- **Consulting services**: Investors can also offer consulting type of services to align their technological sophistication to Greece's requirements and optimize greenhouse yields.
- **Operations contractor**: Strategic investors can be also engaged on a more permanent basis in order to support or drive the operation of State of the Art greenhouses for some years, particularly in the beginning of their lifecycle.
- **Spare parts distributors / producers**: Strategic investors may have technological presence in Greece through warehouses and/or limited production lines in order to effectively support local and regional greenhouse operations, e.g., provide spare parts and other equipment materials on a timely manner to greenhouse facilities in Greece and the wider geographical region.

Additionally, strategic investors can either perform or participate in new attractive State of the Art Greenhouse investments

2 State of the Art greenhouse investments

- **Greenhouse investments**: Strategic investors can directly invest in State of the Art Greenhouses, either in a Joint Venture with Greek companies or in its own to exploit certain benefits:
  - ❑ Low operating expenses (e.g., energy costs, employee costs, etc.)
  - ❑ Pool of remarkably trained, skilled and knowledgeable personnel
  - ❑ Local market that guarantees high levels of demand
  - ❑ Financing support through state subsidies and other financing tools (i.e., the upcoming Development Law, Program for Agricultural Development, new European financing tools, etc.)

Finally, strategic investors can actively assist in boosting greenhouse vegetable exports, by identifying and entering new external markets and optimizing export operations

3 Exports and access to major European markets

- **Assistance in the identification and penetration of new markets**: Strategic investors could provide consulting type of services and support major Greek greenhouse operators to extend their footprint in external markets by:
  - ❑ Assessing the appropriate markets and identifying new opportunities for exporting standardized, high quality vegetables
  - ❑ Determining the appropriate distribution and sales channels
  - ❑ Approaching and establishing contact with suitable retailers abroad
  - ❑ Providing support for enhancing the Greek vegetable branding through appropriate marketing initiatives.
- **Logistics optimization**: Leveraging on their extended exporting experience, strategic investors could support in improving the logistics operations (e.g., by establishing appropriate distribution centers) to target greater distances in shorter timeframes.

The Greek greenhouse sector current situation along with its potential for further development are summarized in the SWOT analysis below

Strengths

- Superior climate conditions assist on the development of high quality crops
- Climate conditions allow additional months of cultivation
- High internal consumption aided by tourist influx during the summer months
- Low operational costs

Weaknesses

- Under-achieving yields
- Absence of critical mass in horticulture products
- Inefficient supply chain due to “Central Market” deficiencies
- Low degree of greenhouses clustering compared to EU standards
- Lack of a long term, state agricultural strategy, with greenhouses and agro logistics in its focus

Opportunities

- Converging energy costs to the EU level
- Labor cost is being reduced at a national scale
- Possibility to increase yields and achieve critical mass production
- Demand that cannot be serviced by locally grown vegetables during certain periods of the year
- Potential for enhancing vegetable exports
- “Room for growth” in the sector given the low penetration of State of the Art Greenhouses
- Potential to attract financing through new and existing financing tools at a state and European level
- “Greek” brand on PDO products such as “feta cheese” and “Greek yogurt” can be leveraged in order to be applied also on agricultural and vegetable products

Threats

- Country risk and instability create negative country perception and an investment aversive environment
- Vegetable supply from nearby low-cost countries that if they reach to a critical mass they could gain larger share in the local market
- Rigid and bureaucratic system for enterprise registration
- In absence of a state strategy, the “Greek” brand ceases to exist, rendering Greek agricultural products as commodities

The dynamics of the State of the Art Greenhouse sector is highlighted in the following analysis

New Entrants

- Barriers of entry almost non-existent.
- In absence of "critical mass", new entrants will be incentivized to enter the sector.

- **Opportunity for new entrants**

Suppliers

- Every kind of raw materials can be purchased by an extensive pool of suppliers.

Rivalry of Competitors

- Due to the market gap and export opportunities, there is still "room to grow" for existent players, thus rivalry is not so fierce.

Customers

- In absence of "critical mass", major retailers are seeking the deals with State of the Art Greenhouses, which would provide them with standard and high quality of fresh vegetables, all year round.

Substitutes

- The general public is unaware of the quality of greenhouse crops.
- Open-air cultivated crops are more appealing due to their lower prices.
- On the other hand, greenhouse crops are available all year round, thus being the only option when the market gap is apparent.

Strong Threat **Moderate Threat** **Weak Threat**

Critical success factors span different areas that extend both at national and company level

Success factors on national level

- Establishment of a national strategy for agriculture products
- Formulation of an exporting strategy for horticulture on regional or national level

Success factors on firm level

Financing	Business Establishment	Crop Development	Post-Production
• Secure the required capital for equity • Leverage on available national and European financial instruments	• Cheap or renewable energy sources nearby the glasshouse site • Staff selection • Optimization of employee efficiency	• Development of technical know-how • Optimum cultivation method (e.g., hydroponics) • All-year production • Achieving critical mass	• "Niche" marketing • Fixed deals with retail chains • Efficient logistics operations

Key Points

- Critical success factors span a wide range of issues, covering various stages over the course of the investment, not only on the production level
- Success is also determined by the existence of an overall strategy for agriculture products, as well as an overarching national horticulture exporting strategy

The assistance of sector experts has been critical to the outcome of the Market Special… (1/3)

Name	Expert's Profile
 **Christos D. Katsanos** DKG GROUP breathe life into the future	*Christos D. Katsanos is an awarded Brand Strategist/Total Greenhouse & Farm Management Consultant. With studies in Agronomy, Business Administration, International Business and Negotiations has contributed in numerous branded products and business concepts. Currently holds the position of the Executive Director of the DKG Group working mainly in Southeast Mediterranean markets. More info at his personal webplace www.christoskatsanos.com and http://about.me/christoskatsanos* *DKG Group (www.dkggroup.com) is a diversified international group of companies and initiatives with operations manly in food industry. Actually we are a consulting, inspection, urban farming, foliage based architecture, intelligent crop supplies and training facilitator body, offering specialized sustainable solutions to individuals, professional groups and corporations within the fresh produce and agro supplies trade industry creating value through people, and for people, all driven by a brand-centric philosophy. Although the headquarters of the Group are located in Thessaloniki, Greece, with additional advocacy office operating in Crete, Greece, the activities are conducted principally in Balkan and Southeast Mediterranean Countries (Greece, Romania, Bulgaria, Serbia, FYROM, Bosnia, Montenegro, Albania, Cyprus, Egypt and Turkey).*

Name	Expert's Profile
 **Vassily Haitas** agritex ΕΝΕΡΓΕΙΑΚΗ Α.Ε.	*Vassily Haitas is an agribusiness manager having more than 25 years of professional experience on crop supplies industry, food industry service, food production and agrotourism development.* *He holds a university diploma in agronomy, also possessing a MSc in plant breeding. He speaks English and French.* *During his carrier he had hold the positions of commercial director of K+N.Efthymiadis SA (producer and distributor of plant protection products), general director of Agrolab SA (analytical laboratories and food industry services) and general director of agrotourism business unit of Themeliodomy group. The last 6 years he holds the position of managing director of Agritex Energy SA (10 ha hydroponic greenhouse combining to CHP technology)* *He has performed several presentations in scientific conferences and congresses as well as publications on agricultural aspects.*

The assistance of sector experts has been critical to the outcome of the Market Special… (2/3)

Name	Expert's Profile
 **Panagiotis Choudalis** GREENTECH greenhouse technology	*Panagiotis Choudalis graduated from the Department of Mechanical Engineering,Faculty of Engineering, of University of Patras in 1982. He completed his postgraduate studies in Agricultural Engineering at the University of Canterbury, New Zealand. From 1985 to 1990, he worked in New Zealand and Australia as a consulting engineer. Since 1992 he maintains the technical - trading company GREENTECH Co. LTD, with main activity in Electromechanical Applications in Agricultural Sector, and particularly in the design, installation & technical support of high-technology hydroponic greenhouses.* *GreenTech, in the last five years is also active in major projects both in Greece and abroad. In 2010, in cooperation with the Dutch company Van der Hoeven BV (VDH), implemented the installation of all electrical & mechanical systems and equipment in a glass greenhouse of 110 acres, in Drama named «Wonderplant SA». In 2012 delivered a "Turn-Key" Project of 23 acres greenhouse in Messinia and in 2014 with VDH, involved in the construction of two glass greenhouses, 58 and 48 acres, at Afyon Karahisar, Turkey.This year 2015, Greentech is participating in the most high - technology project in the greenhouse sector, of 200 acres called "Sundrop Project" in Western Australia in cooperation with VDH (the main contractor of the project).*

Name	Expert's Profile
Enterprise Greece INVEST & TRADE	*ENTERPRISE GREECE is the official agency of the Greek State, under the supervision of the Ministry of Economy, Development & Tourism, to showcase Greece as an outstanding destination for investment and to promote the highly competitive products and services produced in Greece for export.* ***Making Greece More Global, More Attractive, More Competitive*** *Enterprise Greece follows international best practices in uniting the nation's outward-oriented support and promotion efforts to fully realize Greece's potential to attract foreign direct investment and to optimize the export efforts of Greek enterprises. Enterprise Greece assists foreign investors and enterprises to do business with Greece, troubleshoots issues related to the public administration, provides key information about Greece as an investment destination and promotes the investment sectors in which Greece excels. In addition, it promotes Greek products and services to the global marketplace, helps Greek businesses reach new markets, find new business partners, and become more competitive and attractive.* *To learn more about the many investment and trade opportunities Greece offers, visit us today at www.enterprisegreece.gov.gr*

The assistance of key contributors has been critical to the outcome of the Market Special (3/3)

Back

Name	Key contributor's Profile
 **Siwarde J. Sap** **Embassy of the Kingdom of the Netherlands**	*For over 20 years, Siwarde has been inspired by and focused upon strategy and business development in the financial services industry and European government trade affairs. She has a Master's degree in law from Leiden University and has worked in several leading companies. She has a proven track record of success, creating and delivering value in multiple settings and geographies, in senior management, advisory and hands-on roles. Three-lingual in Dutch, English and Greek.* https://gr.linkedin.com/in/siwarde-j-sap-ll-m-21b7b7b *The Netherlands Embassy in Greece www.dutchembassy.gr Sr. Economic and Trade advisor:* • *Advising business and government representatives on economy and trade affairs.* • *Industry and sector knowledge: banking, insurance, energy, agribusiness, transport, logistics and shipping.* • *Connecting people. Public and economic diplomacy. International Trade. Innovation.* • *Orange Grove young entrepreneurship startup incubator, key contributor http://www.orangegrove.biz/* • *Economic and Commercial Diplomats Club Greece, vice-chair.*

Globally, main plant categories cultivated in greenhouses are vegetables, herbs, ornamentals and transplants

Back

Area of focus

Vegetables

- Tomatoes
- Cucumbers
- Eggplants
- Peppers
- Lettuce

Present study focuses only on vegetable cultivation in greenhouses

Herbs

- Basil
- Chives
- Cilantro
- Drill
- Lavender

Ornamentals

- Orchids
- Lilies
- Roses
- African Violet

Transplants

- Plants in their first stages of development (e.g., begonia, Hydrangea, Strawberries etc.)

Greenhouses vary between simple to highly complex and sophisticated operations both targeting various degrees of climate control

Back

1 Local-type Greenhouses

- Restricted to passive climate control.
- Lack of tightness, low transmission radiation during the winter and lack of good ventilation result in lower than expected agricultural practices, which in turn result in lower yields.
- Due to limited climate control, total production is sensitive to extreme weather conditions.
- As a result, production is fluctuating according to the regional weather conditions and the same applies to production quality.

2 Industrial-type Greenhouses

- Mixed level of climate control, depending on the specific structure.
- Due to more advanced applied technology the climate control is higher and thus the production yields are higher. However, structural limitations in the structure can create overly humid climate and endanger the crops. Sturdier (steel) foundations do not endanger the structure in times of extreme weather conditions.
- As a result, the production is more or less stable throughout the year, with good product quality.

3 State of the Art Greenhouses[1]

- Provide active climate control and the ability to grow standardized crops.
- Through the applied technology these structures achieve the perfect conditions of CO_2, humidity, sunlight and water. Similarly to industrial-type greenhouses, state of the Art greenhouses have steel foundations and do not endanger the structure.
- As a result, such sophisticated structures offer stable production of high quality crops throughout the year.

Key players and contact details – Agricultural Universities

Back

List of Greece's Educational and Research institutes – contact details						
A/A	**Name of Institute**	**Type Institute**	**Areas of Location**	**Telephone**	**Email**	**Further Information**
1	Agricultural University of Athens	University	Athens	30 210 5294742	saoa@aua.gr	Contact info of Agricultural Economy and Management Dept.
2	Faculty of Agriculture, Aristoteleio University of Thessaloniki	University	Thessaloniki	30 2310 998636	info@agro.auth.gr	
3	School of Agricultural Sciences, University of Thessaly	University	Volos	30 24210 93007	deana@uth.gr	
4	Agricultural Department, Technological Educational Institute of Crete	Technological Educational Institute (TEI)	Crete	N/A	info-fp@staff.teicrete.gr	
5	Department of Agricultural Technology, Technological Educational Institute of western Macedonia	TEI	Florina	30 23850 54622	sec-steg@florina.teikoz.gr	
6	Department of Agricultural Technology, Technological Educational Institute of Peloponnese	TEI	Kalamata	30 27210 45215	gstathas@teikal.gr	Contact info of the Head of the Dept.
7	Department of Agricultural Technology, Technological Educational Institute of Larissa	TEI	Larissa	30 2410 684272	pr@teilar.gr	Phone number of the Secreteriat of the Department – email is generic
8	National Agricultural Research foundation (NAGREF)	Research Institute	Athens	30 210 8392000	N/A	No email in the website
9	Institute of Viticulture, Floriculture and Vegetable crops of Heraclion	Research Institute	Heraclion	30 2810 302300	N/A	Part of NAGREF – No email available but there is a contact form: http://www.nagref-her.gr/en/content/contact-us
10	Mediterranean Agronomic Institute of Chania	Educational and Research Institute	Chania	30 28210 35000	info@maich.gr	
11	American Farm School	Educational and Research Institute	Thessaloniki	30 2310 492700	info@afs.edu.gr	

Note: Information displayed in the table above is published on company websites

Labor market regulation measures flexibility in the regulation of employment, specifically as it affects the hiring and redundancy of workers and the rigidity of working hours (1/2)

Back

Greece and neighboring countries labor market regulation indicators [1]					
Rigidity of hours index	**GR**	**TUR**	**ROM**	**ITA**	**ESP**
Maximum working days per week	6	6	5	6	5.5
Premium for night work (% of hourly pay)	25%	0%	25%	15%	6.6%
Premium for work on weekly rest day (% of hourly pay)	75%	100%	100%	30%	0%
Premium for overtime work (% of hourly pay)	27.5%	50%	75%	15%	0%
Major restrictions on night work	No	No	No	No	No
Major restrictions on weekly holiday	Yes	No	Yes	Yes	No
Paid annual leave for a worker with 1 year of tenure (in working days)	20	14	20	26	22
Paid annual leave for a worker with 5 years of tenure (in working days)	22	20	20	26	22
Paid annual leave for a worker with 10 years of tenure (in working days)	25	20	20	26	22
Paid annual leave (average for workers with 1,5 and 10 years of tenure, in working days)	22,3	18	20	26	22

1. World Bank Doing Business 2016 report (Greece, Turkey, Romania, Italy, Spain)

Labor market regulation measures flexibility in the regulation of employment, specifically as it affects the hiring and redundancy of workers and the rigidity of working hours (2/2)

Back

Greece and neighboring countries labor market redundancy indicators [1]

Difficulty of redundancy index	Data				
	GR	TUR	ROM	ITA	ESP
Maximum length of probationary period (months)	12	2	3	2	6
Dismissal due to redundancy allowed by law	Yes	Yes	Yes	Yes	Yes
Third-party notification if 1 worker is dismissed	No	No	No	Yes	Yes
Third-party approval if 1 worker is dismissed	No	No	No	No	No
Third party notification if 9 workers are dismissed	Yes	No	No	Yes	Yes
Third party approval if 9 workers are dismissed	Yes	No	No	No	No
Retraining or reassignment obligation before redundancy	No	No	Yes	Yes	No
Priority rules for redundancies	Yes	No	Yes	Yes	No
Priority rules for reemployment	No	Yes	Yes	Yes	No

Redundancy cost indicator (in salary weeks)	Data				
	GR	TUR	ROM	ITA	ESP
Notice period for redundancy dismissal for a worker with 1 year of tenure	0	4	4	2.9	2.1
Notice period of redundancy dismissal for a worker with 5 years of tenure	0	8	4	4.3	2.1
Notice period of redundancy dismissal for a worker with 10 years of tenure	0	8	4	6.4	2.1
Notice period fro redundancy dismissal (average for workers with 1,5,10 years of tenure)	0	6.7	4	4.5	2.1
Severance pay for redundancy dismissal for a worker with 1 year of tenure	8,7	4.3	0	0	2.9
Severance pay for redundancy dismissal for a worker with 5 year of tenure	13	21.7	0	0	14.3
Severance pay for redundancy dismissal for a worker with 10 year of tenure	26	43.3	0	0	28.6
Severance pay for redundancy dismissal (average foe workers with 1,5,10 years of tenure)	15,9	23.1	0	0	15.2

Key Points

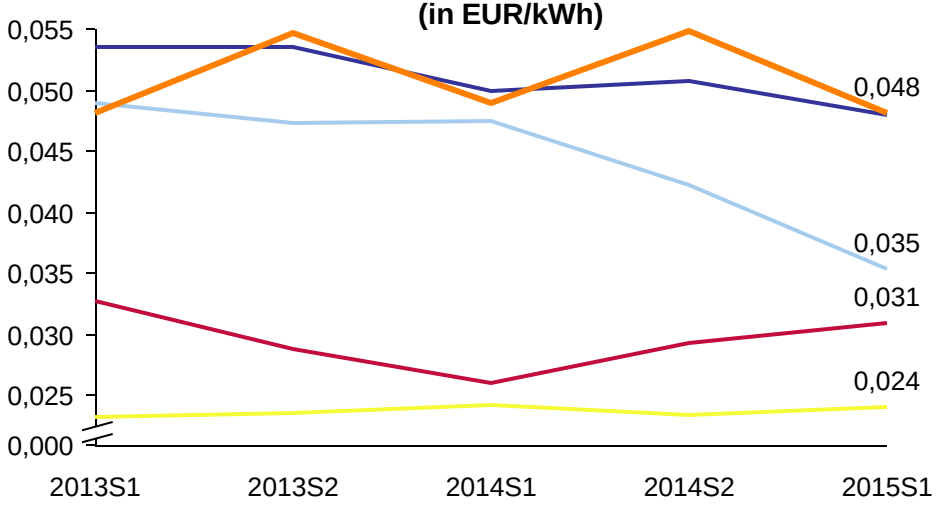
- In 2012, Greece decreased the severance pay applicable in case of redundancy dismissals
- Many economies that changed their labor market regulation in the past 5 years did so in ways that increased labor market flexibility

1. World Bank Doing Business 2016 report (Greece, Turkey, Romania, Italy, Spain)

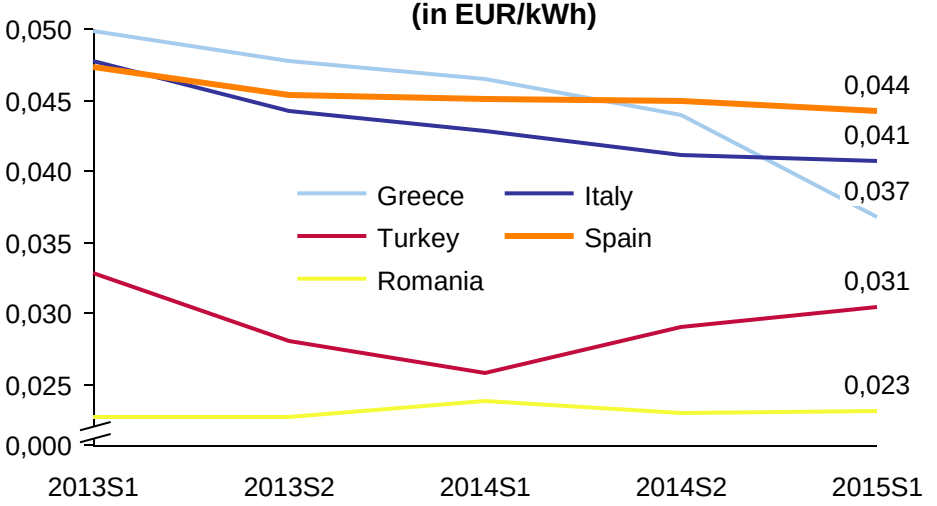
Energy Expenses – Natural Gas cost per kWh per category of consumption

Back

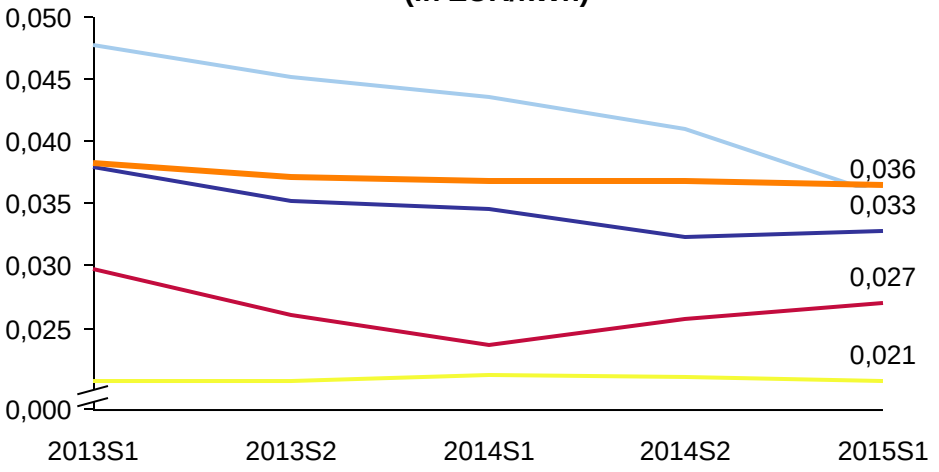
Comparison of Prices – Consumption < 1,000 GJ [1] (in EUR/kWh)



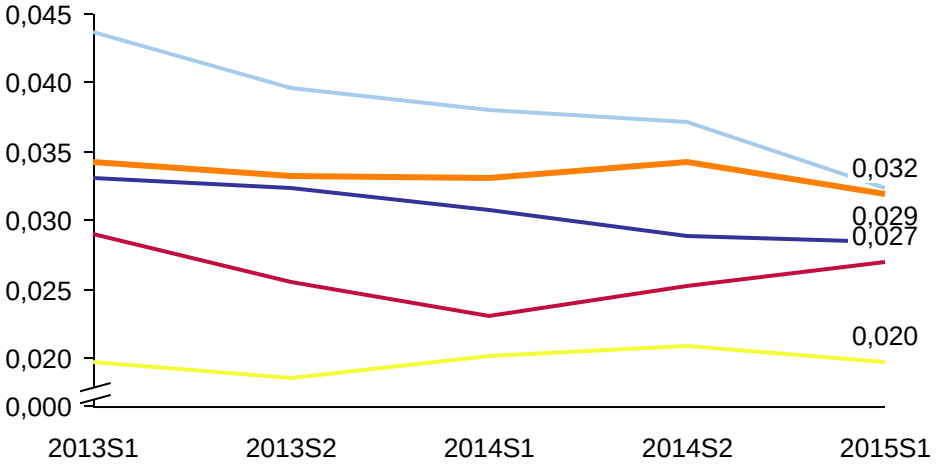
Comparison of Prices – 1,000 GJ < Consumption < 10,000 GJ [1] (in EUR/kWh)



Comparison of Prices – 10,000 GJ < Consumption < 100,000 GJ [1] (in EUR/kWh)



Comparison of Prices – 100,000 GJ < Consumption < 1,000,000 GJ [1] (in EUR/kWh)

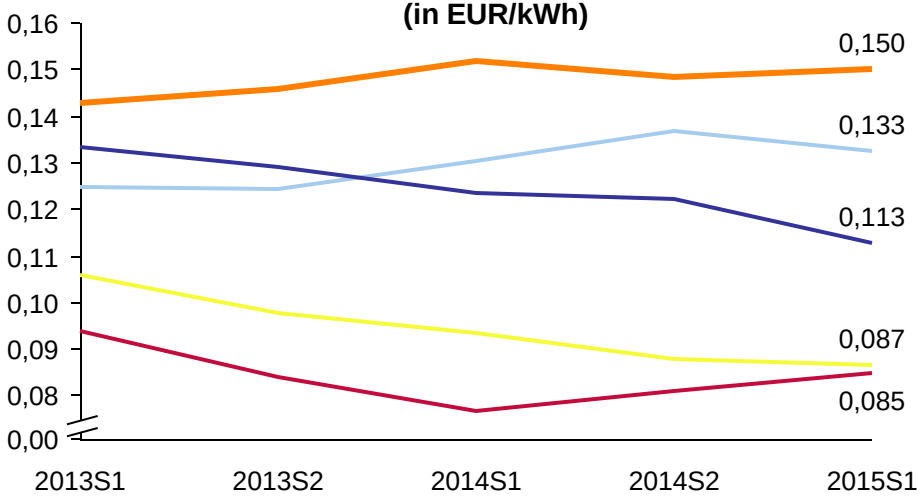


1. Eurostat

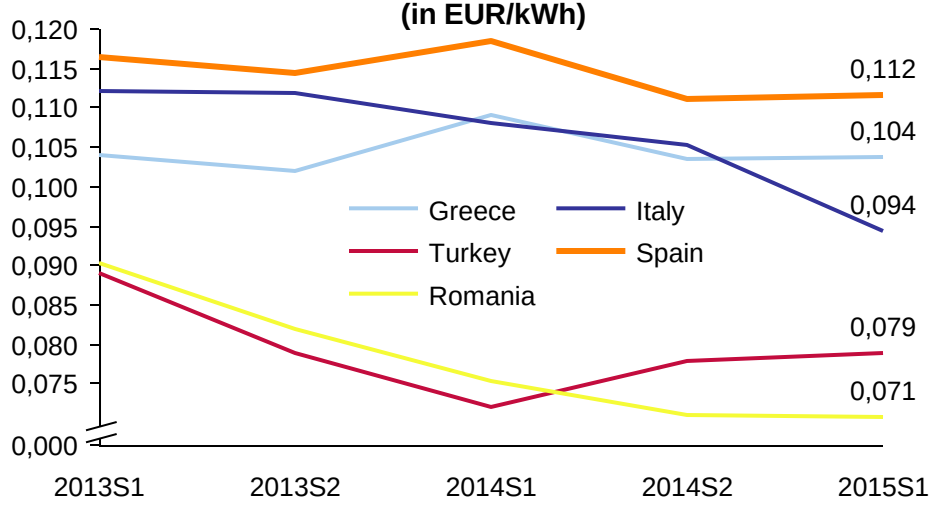
Energy Expenses – Electricity cost per kWh per category of consumption

Back

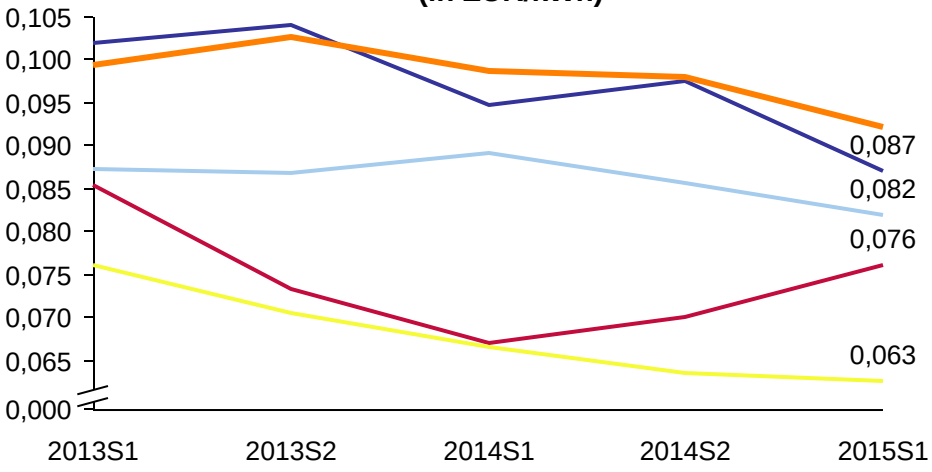
Comparison of Prices – 20 MWh < Consumption < 500 MWh [1] (in EUR/kWh)



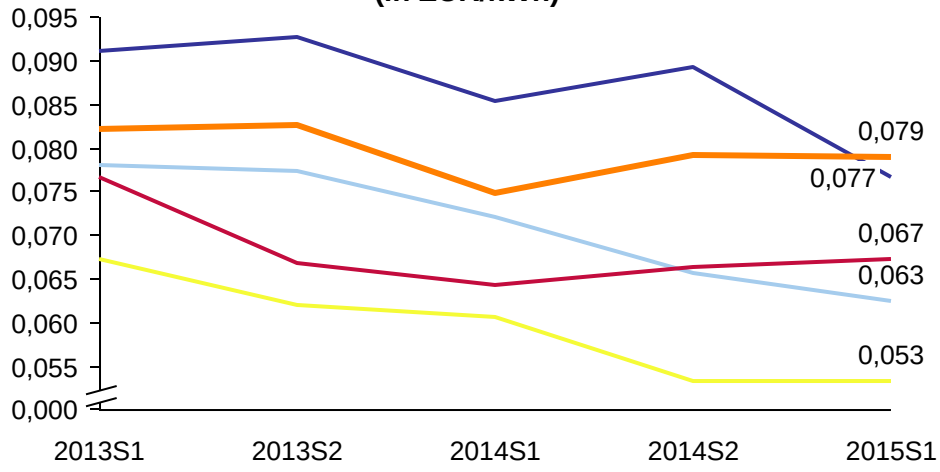
Comparison of Prices – 500 MWh < Consumption < 2,000 MWh [1] (in EUR/kWh)



Comparison of Prices – 2,000 MWh < Consumption < 20,000 MWh [1] (in EUR/kWh)



Comparison of Prices – 20,000 MWh < Consumption < 70,000 MWh [1] (in EUR/kWh)



Latest investments in State of the Art Greenhouses in Greece apply hydroponics for vegetable cultivation

Back

Recent major investments in State of the Art greenhouses employing hydroponics* in Greece [1]

Name of Greenhouse	Area (hectares)	Region	Crop	Investment (million EUR)	Covering Material	Energy source
Wonderplant	11 ha	• Drama	• Tomatoes	32 m	• Glass	• Natural Gas
Agritex S.A.	10 ha	• Alexandria Imathias	• Tomatoes	22 m	• Glass	• Natural Gas
Greek Peppers - Drama Greenhouses	10 ha	• Drama	• Peppers	20 m	• Glass	• Natural Gas
Thrace Greenhouse	4 ha	• Xanthi	• Tomatoes • Cucumbers	2.3 m	• Glass	• Geothermal
Elastron Agrotiki	4 ha	• Xanthi	• Tomatoes	1.9 m	• Glass	• Geothermal
Greek Tomato - AGAN	2.3 ha	• Messinia	• Tomatoes	2 m	• Plastic	• Biomass
Savvidis Greenhouses	2.1 ha	• Drama	N/A	N/A	• Plastic	• Natural Gas
Tomaccini – Hellenic Greenhouses	1.5 ha	• Samos Island	• Small tomatoes	2 m	• Glass (1 hectare) • Plastic (0.5 hectare)	• Biomass
Tsachalos S.A.	3 ha	• Varda Ilias	• Strawberries	N/A	• Plastic	• Biomass
Tampakis	2 ha	• Ierapetra Crete	• Tomatoes • Cucumbers • Peppers	N/A	• Plastic	• Biomass
Elastron Agrotiki - Spata	1 ha	• Spata, Attica	N/A	N/A	• Glass	• Biomass

Key Points

- Tomato cultivations are prevalent among the investments.
- The greatest majority of the recent investments uses glass as covering material to secure total climate control. Plastic as covering material is cheaper, but also more vulnerable to extreme weather conditions.
- Investments in Macedonia and Thrace (Drama, Alexandria, Xanthi) leverage on the existing natural gas infrastructure to achieve energy cost savings through CHP systems (next slide).

Hydroponics: A method of growing plants using mineral nutrient solutions, in water, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only, or in an inert medium, such as perlite or gravel.

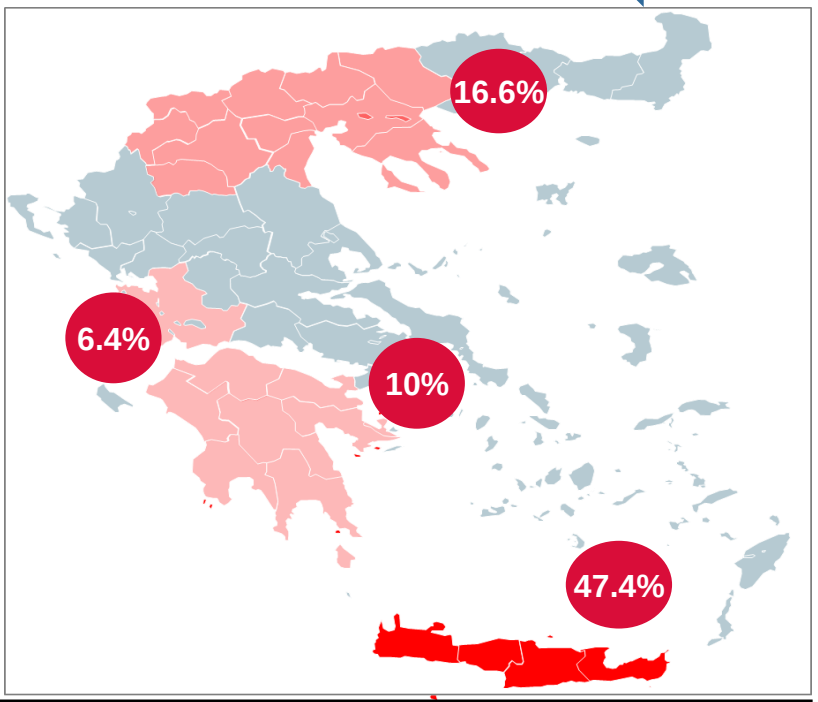
1. Interviews with sector experts

There appears to be a high degree of geographical concentration regarding the production of greenhouse-cultivated tomato…

Back

Average statistics of the highly concentrated areas on greenhouse cultivated tomato for the period 2003-2012 [1]

Region	Total area (% of Greek total hectares)	Output (% of Greek total tons)	Average Yield (tons/hectare)
Crete	38,8%	47.4%	92.2
Macedonia	15.2%	16.6%	80.5
Peloponnese	9.5%	10%	37.4
Western Greece	12.3%	6.4%	18.3



Key Points

- The three regions collectively account for the **75%** of the total cultivated area and the **80.4%** of the total output.
- Actual yields underperform the typical expected yields, particularly given that the majority of the greenhouses is of local-type (limited industrial-type and State of the Art greenhouses).
- The regions of Crete, Peloponnese and Western Greece have high tomato production because they exhibit small range of temperatures and adequate sunlight throughout the year.
- Concentration in the region of Macedonia is partially explained due to lower energy cost, as the region offers cheap access to natural gas and geothermal fields.

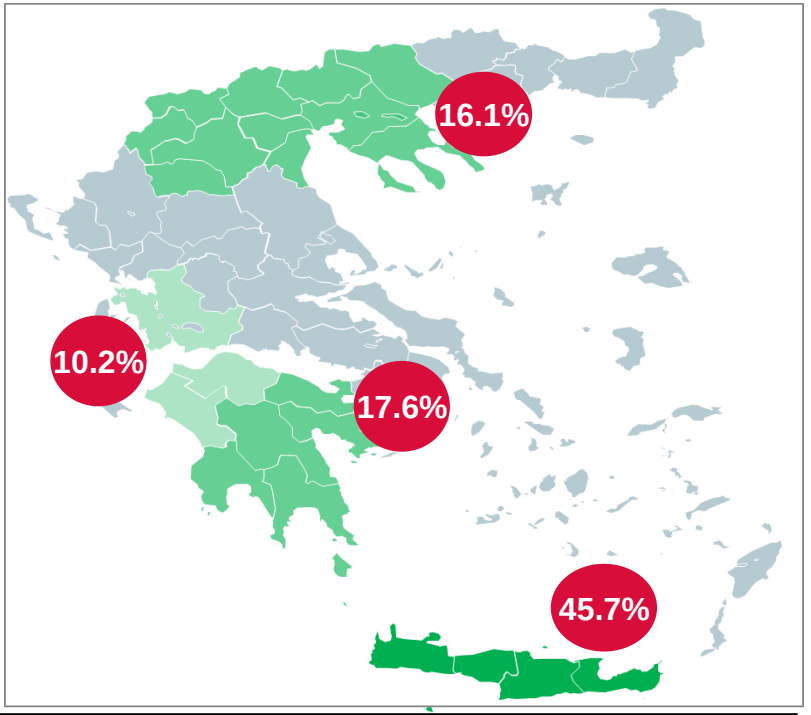
1. Greek Statistical Office

… as well as greenhouse-cultivated cucumber…

Back

Average statistics of the highly concentrated areas on greenhouse cultivated cucumber for the period 2003-2012 [1]

Region	Total area (% of Greek total hectares)	Output (% of Greek total tons)	Average Yield (tons/hectare)
Crete	44.6%	45.7%	96.6
Peloponnese	11%	17.6%	75.7
Macedonia	16.8%	16.1%	89.7
Western Greece	11%	10.2%	43.1



Key Points

- The three regions collectively account for the **83.4%** of the total cultivated area and the **89.6%** of the total output.
- All regions underperform, when comparing actual and typical yields.
- Sufficiently high temperatures allow cucumber production mainly in southern but also in northern Greece.
- Again, concentration in the region of Macedonia is partially explained due to lower energy cost, as the region offers cheap access to natural gas and geothermal fields.

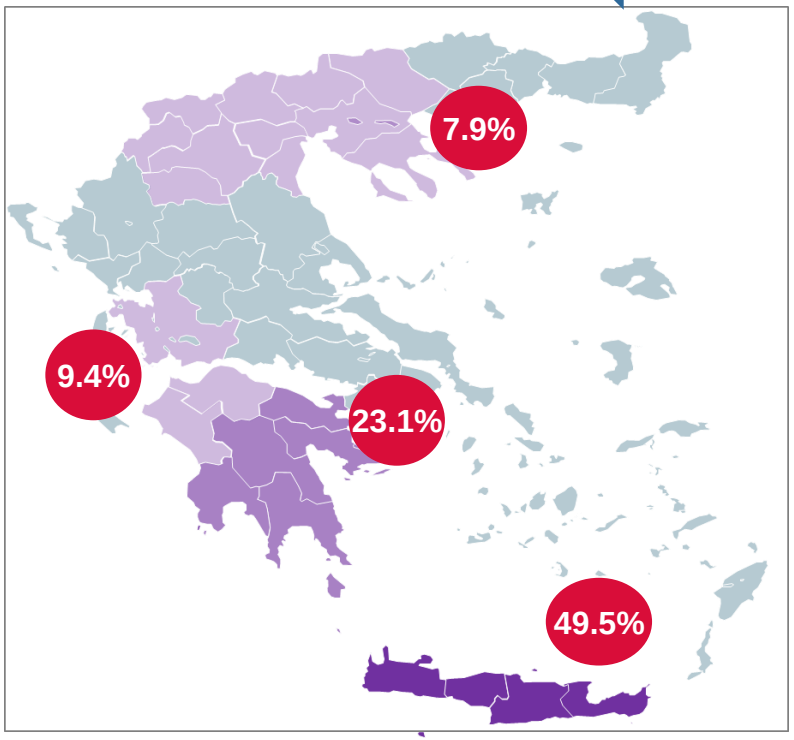
1. Greek Statistical Office

… and greenhouse cultivated eggplants

Back

Average statistics of the highly concentrated areas on greenhouse cultivated eggplant for the period 2003-2012 [1]

Region	Total area (% of Greek total hectares)	Output (% of Greek total tons)	Average Yield (tons/hectare)
Crete	35.2%	49.5%	60.5
Peloponnese	23.9%	23.1%	28.4
Macedonia	12%	7.9%	27.9
Western Grece	9.8%	9.4%	13.1



Key Points

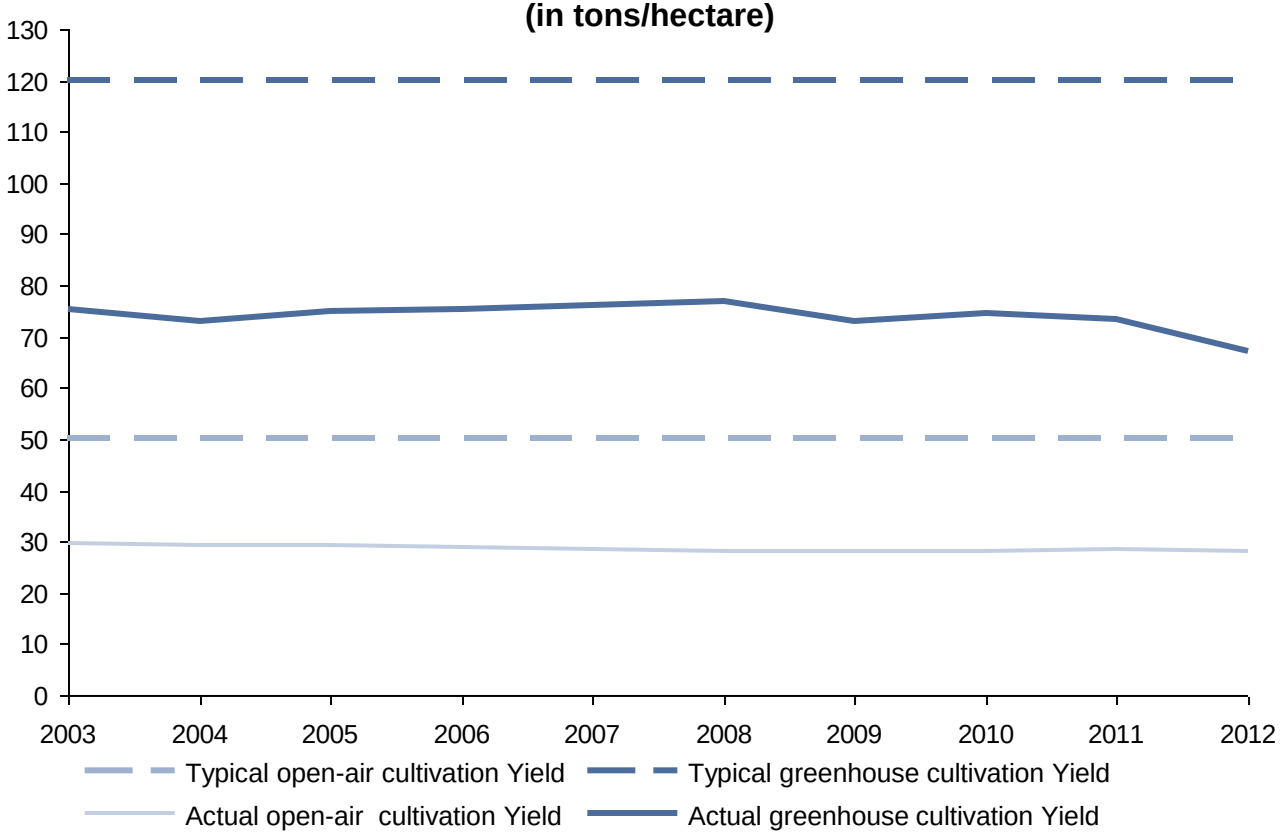
- The three regions collectively account for the **80.9%** of the total cultivated area and the **89.9%** of the total output.

1. Greek Statistical Office

Resulted yields are below typical standards both for open-air and greenhouse cultivated tomatoes

Back

Tomato Yields for the period 2003-2012[1]
(in tons/hectare)



Key Points

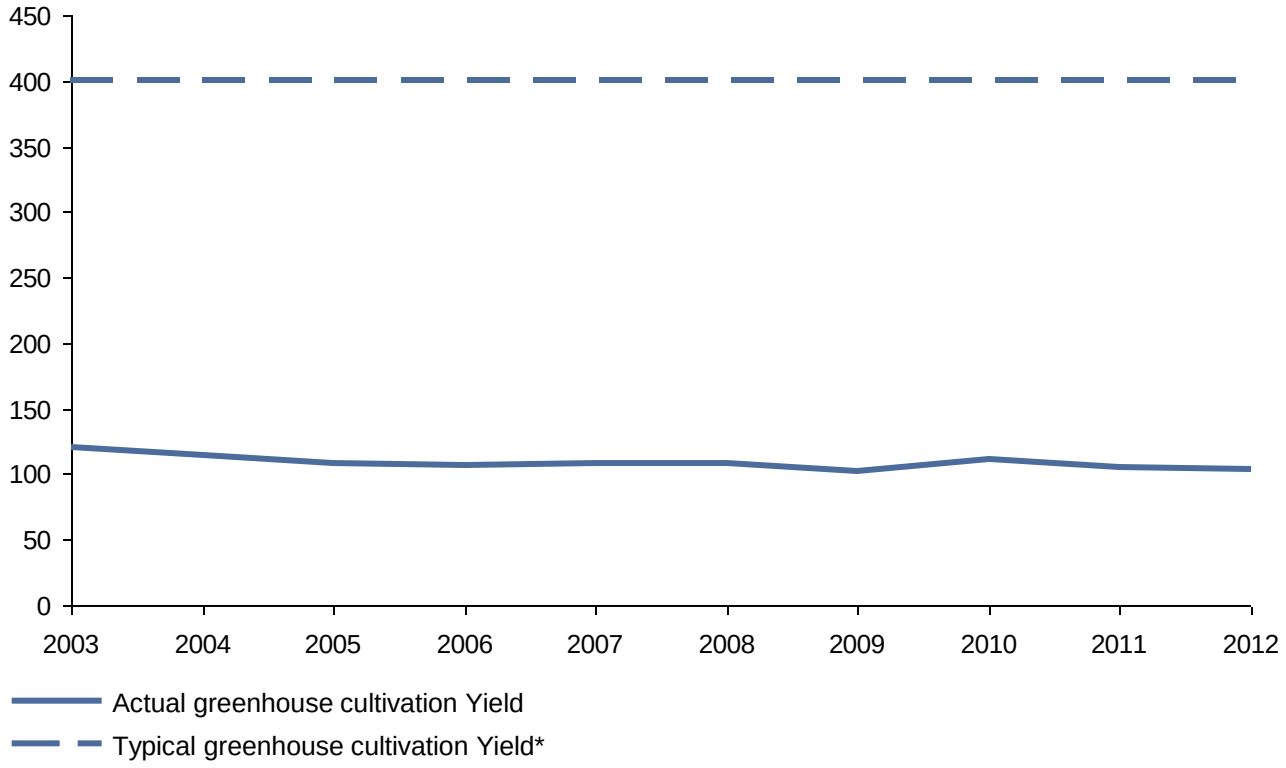
- Constant underperformance over the decade, for both open-air and greenhouse cultivated tomato.

1. Greek Statistical Office

Similar is the case for cucumbers' resulted yields

Back

Cucumber Yields for the period 2003-2012 [1]
(in tons/hectare)



Key Points

- Cucumber crop needs less time to develop than tomato, allowing cultivation twice a year, or joint cultivation with another crop, in turns.
- Greenhouse actual yield is below the expected standard.

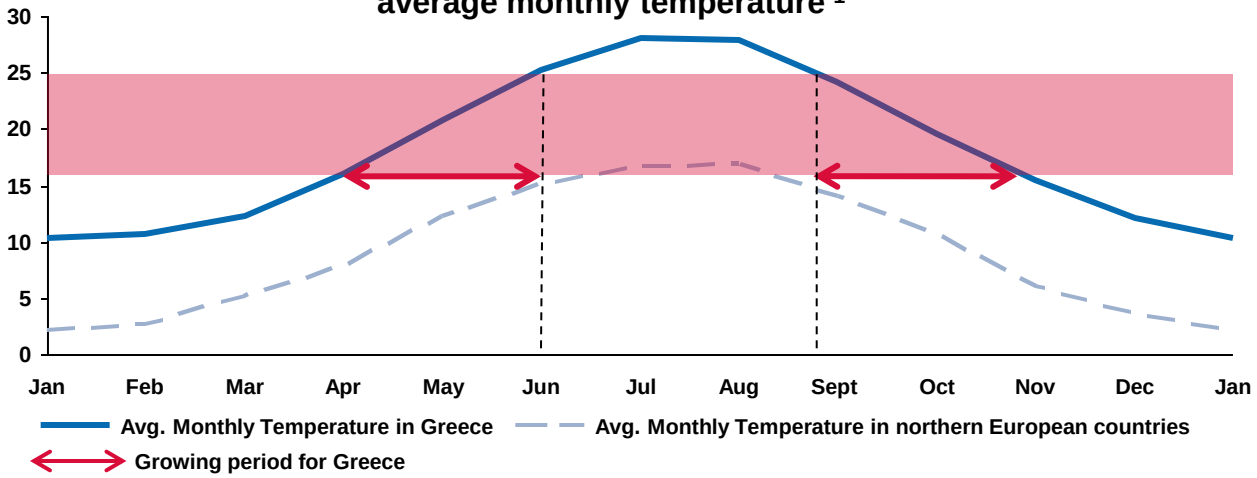
*Note: The typical yield refers to 2 cultivation seasons per year

1. Greek Statistical Office

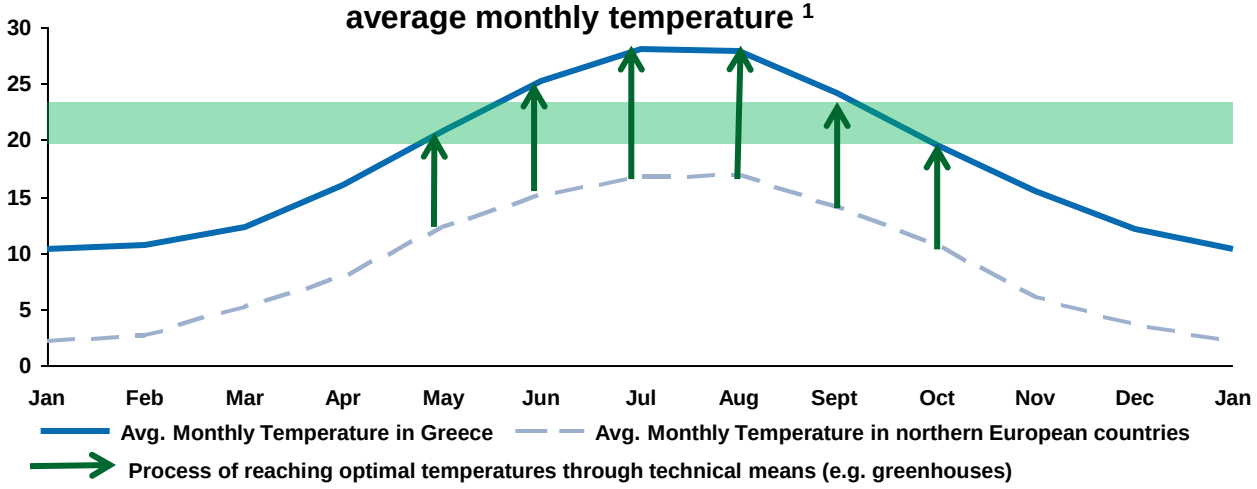
Superior weather and climate conditions offer prolonged growing periods and enable higher quality vegetable crops

Back

Optimal growing temperature for tomato cultivation – average monthly temperature [1]



Optimal growing temperature for cucumber cultivation – average monthly temperature [1]



Key Points

- In Greece It is possible to grow tomatoes in the field 2 more months than western Europe countries.
- In the case of tomato, countries of northern Europe can only grow in open fields for 2-3 months per year.
- In the case of cucumber, for countries of northern Europe, it is almost impossible to grow in the open air, thus cultivation needs to be done solely in greenhouses. [2]

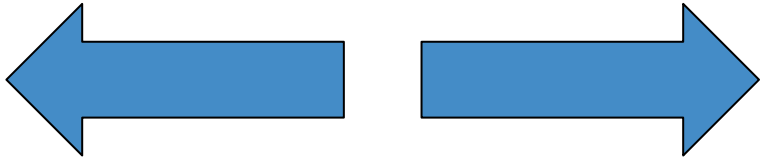
1. Hellenic National Meteorological Service
2. Agricultural ministry of Cyprus

Often, different criteria and priorities for product selection between retailers and end-consumers exist

Back

The different priorities between the retailers and the end-consumers force the end product to be evaluated based on different criteria.

Retailer Criteria [1]	End-consumer Criteria [2]
• Standardization • Shelf life • Timely delivery • Year-round Supply • Price • No visible damage • Transportation to the retailer	• Taste • Aroma • Color • Place of origin • Price • No damage • Firmness



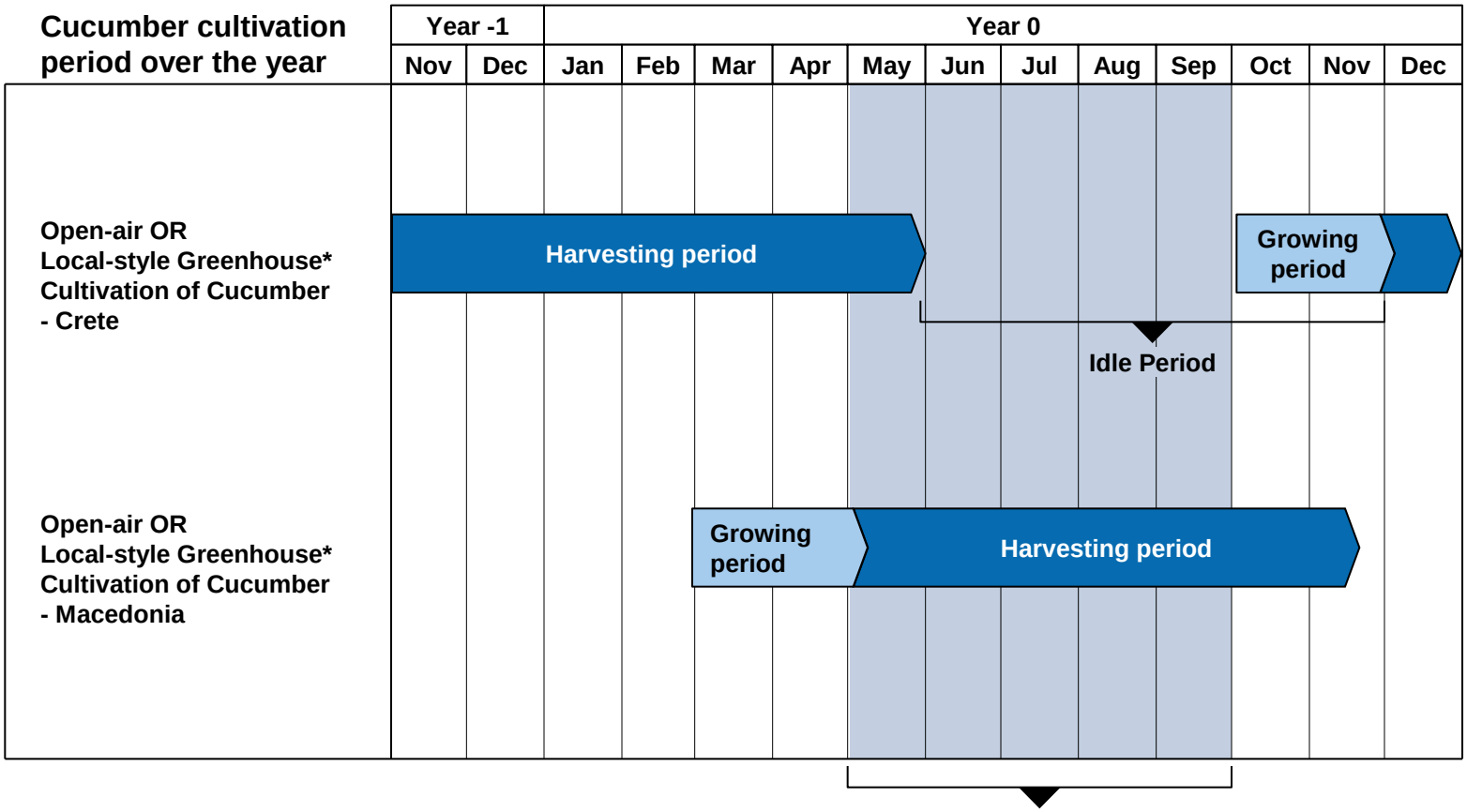
Key Points

The clash of the different criteria between the stakeholders creates an imbalance in the system "producer-retailer-end consumer".

1. Interviews with sector experts
2. http://www.hortinfo.nl

The corresponding market gap for the case of cucumbers is less severe…

In the case of cucumber production flow differentiates according to the area of cultivation [1]



Key Points

- Cucumber is as well an important ingredient of the "Greek Salad".
- Demand during peak season is serviced by the production of cucumbers in Macedonia.

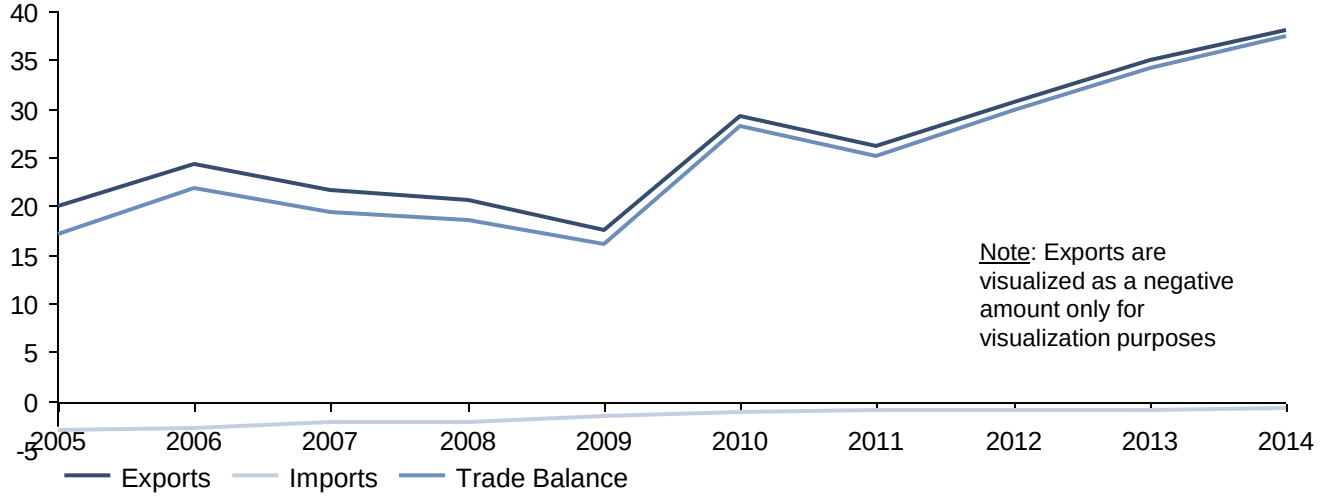
*Note: Open-air cultivation and local-style cultivation are grouped since both ways are tightly bound to the climate condition, even though the one is considered greenhouse cultivation and the other is not.

1. Interviews with sector experts

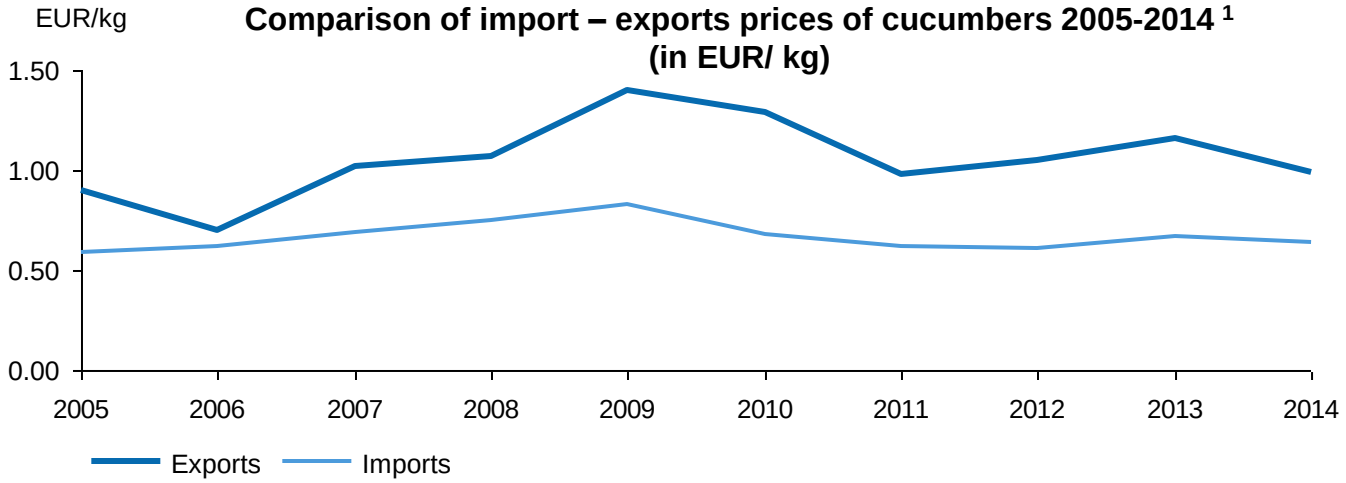
… whereas cucumber external trade is equally negligible, with a positive trade balance

Back

External trade in relation to production of cucumbers 2005-2014 [1]
(in '000 tons)



Comparison of import – exports prices of cucumbers 2005-2014 [1]
(in EUR/ kg)



Key Points

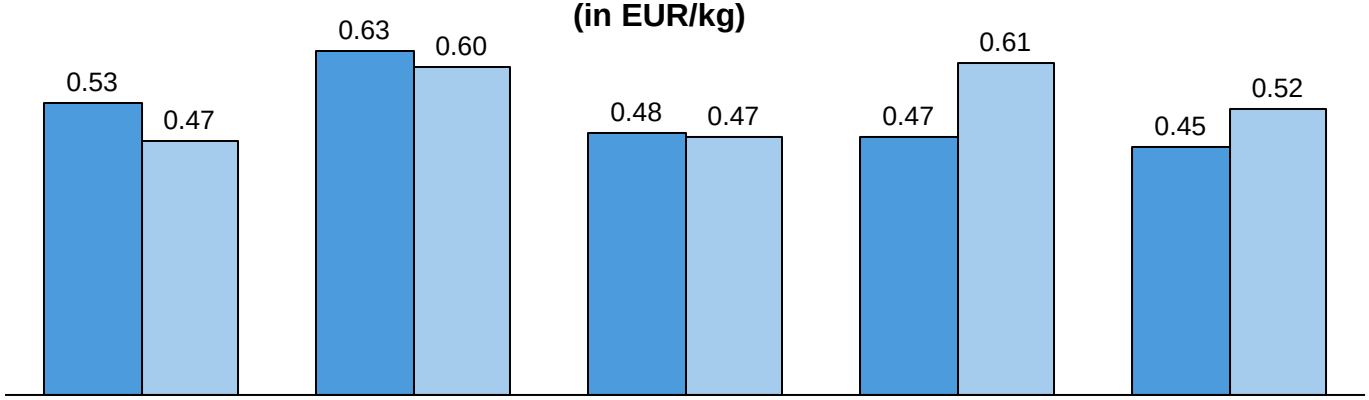
- Export trade presents some spikes and appears to be on the rise for recent years, whereas import trade is negligible.
- Cucumber prices are exported in a more volatile price, compared to tomatoes, however the exporting price is higher than the importing one.

1. Greek Statistical Office

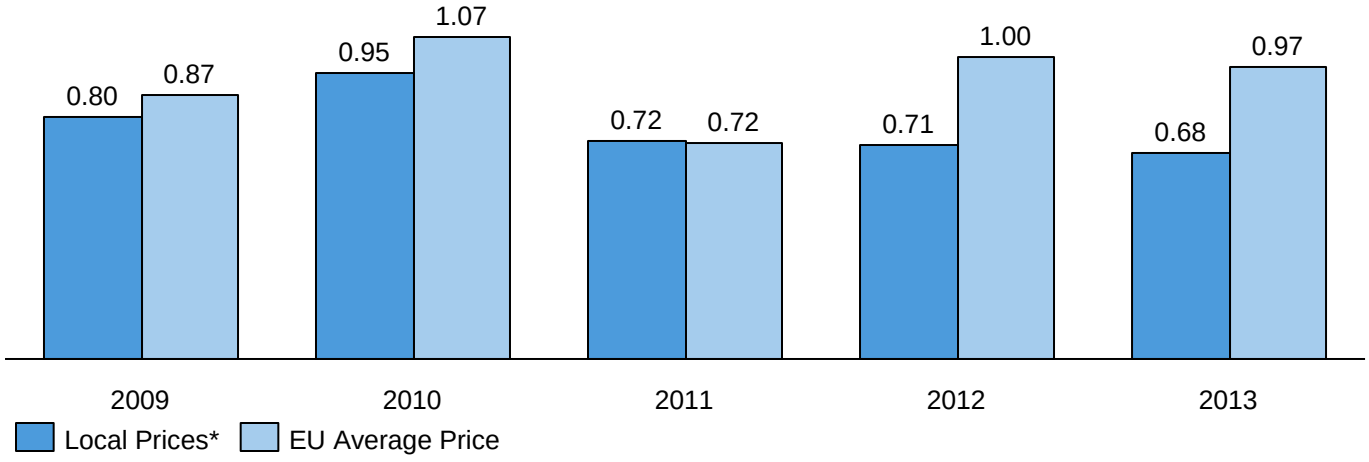
Local prices both for open-air and greenhouse tomato are set at levels below the average European standards in the last years…

Back

Comparison of Prices for open-air cultivated tomato for the period 2009-2013 [1] (in EUR/kg)



Comparison of Prices for greenhouse cultivated tomato for the period 2009-2013 [1] (in EUR/kg)



Key Points

- Local prices for open-air cultivated tomatoes becoming gradually lower over the course of the 5 years.
- For greenhouse cultivated tomatoes the prices are lower than EU average prices, becoming gradually even lower.

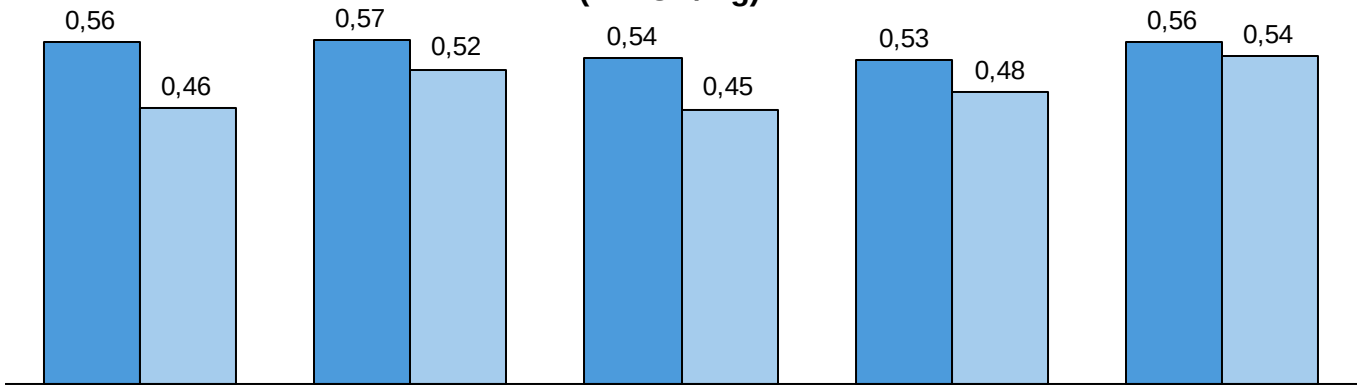
*Local Prices: EUROSTAT does not have data on the prices of greenhouse cultivated crops for Greece. The price was set by following the experts assumption that Greenhouse price = 1,5 x Open-air price.

1. EUROSTAT

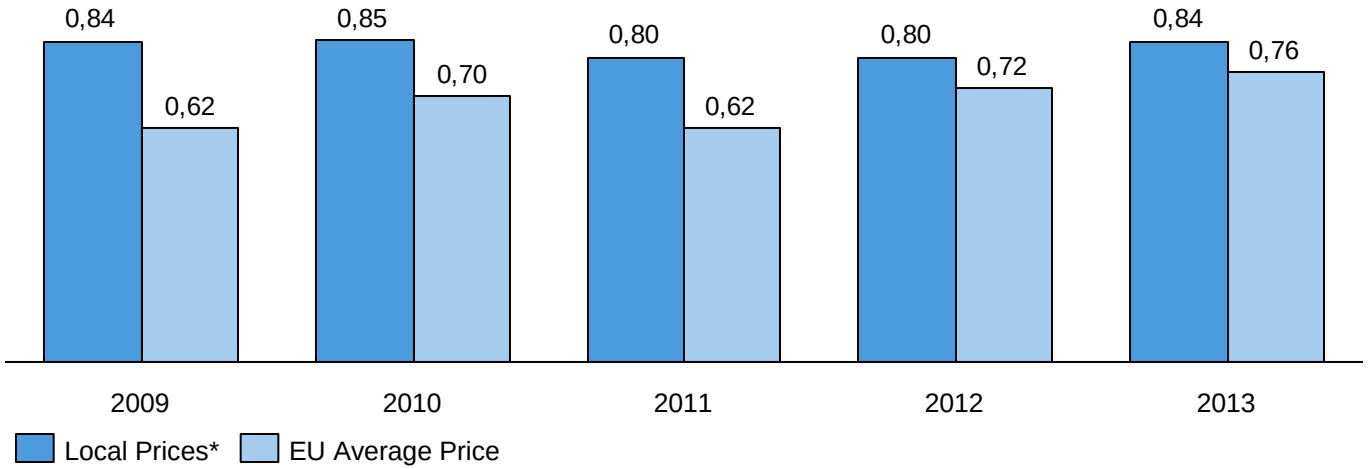
Local prices for both open-air and greenhouse cultivated cucumbers are set at higher levels than average EU standards

Back

Comparison of Prices for open-air cultivated cucumber [1] (in EUR/ kg)



Comparison of Prices for greenhouse cultivated cucumber [1] (in EUR/ kg)



Key Points

- Local prices remain higher than those of EU on average.

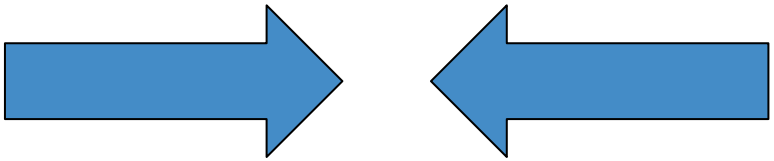
*Local Prices: EUROSTAT does not have data on the prices of greenhouse cultivated crops for Greece. The price was set by following the experts assumption that Greenhouse price = 1,5 x Open-air price.

1. EUROSTAT

In parallel, State of the Art greenhouses also help to alleviate the misalignment between different priorities via the production of high quality standardized vegetables

Back

Retailer [1]	End Consumer [2]
• Standardization • Shelf life • Timely delivery • Year-round Supply • Price • No visible damage • Transportation to the retailer	• Taste • Aroma • Color • Place of origin • Price • No damage • Firmness



Key Points

The convergence of the different criteria between the stakeholders increases the efficiency of the "producer-retailer-end consumer" system

1. Interviews with sector experts
2. http://www.hortinfo.nl

State of the Art greenhouses exploit natural gas, geothermal sources (where available) or biomass for energy needs

Back

Natural Gas (Cogeneration Heat and Power – CHP)[1]

State of the Art Greenhouse investments of a significant size, usually invest in Cogeneration Heat and Power systems, with Natural Gas as Fuel. In this way the greenhouse uses Natural Gas and generates the required heat and CO_2 for the optimal cultivation of the crops, while operates as a power generation unit for electricity, offering the following advantages:

- Reduced fuel consumption
- Energy-independent operation
- Higher yield of energy production in comparison to separate production of heat and power (85% compared to 58%)*
- Diffusion of electricity to local areas, assisting in the decongestion of the grid.

Geothermal Fields[2]

Geothermal energy fields are a source of mild and practically endless source of pollutant-free energy. The energy regulations in Greece did not incentivize investments that take advantage of the rich geothermal energy landscape. However, the regulatory status changed on 2013, with two greenhouses already employing geothermal energy to cover their heating needs.

Since the heating cost is a major component of the total energy cost of a greenhouse, the use of geothermal energy can reduce that component up to 60%**.

Biomass[3]

Similarly to Natural Gas, Cogeneration Heat and Power systems can operate with biomass as a fuel. Such systems have been installed in investments of smaller size. Additionally to the aforementioned advantages of energy independency and electrical energy diffusion to the grid, this energy source provides the following advantages:

- Reduction of organic waste produced by biofuel cultivations
- Adds value to plant and animal waste, by collecting and using it, while reducing the threat of fire during the summer period***.

Key Points

- For Greenhouses of a significant size the option of CHP systems with Natural Gas is the most financially viable as it provides a second source of revenue, with an attractive selling price, due to state subsidies for CHP energy production.
- The high reduction in energy expenses that are an outcome of energy production from geothermal fields, deem this source of energy as very promising.
- Greenhouses of a smaller size employ biomass CHP systems for cost reduction and operational energy-independency from the grid.

Note: * “Economic analysis of CHP Unit of Agritex S.A.”- Kaltsa Helen, 2010. ** Interviews with sector experts. *** “Cogeneration of electric and heating energy through gasification of Biomass” presentation presented in “Energy & Development” Conference of 2011.

1. http://www.depa.gr
2. http://www.agrotypos.gr
3. http://www.excelixi.org

COSME Loan Guarantee Facility (LGF) – Equity for Growth (EFG)

Back

European Investment Fund[1] (EIF)

All SMEs are eligible for both programs

European Investment Fund[1] (EIF)

A Loan Guarantees for SMEs (μειωμένης εξασφάλισης και συμμετοχικά)

B Involvement in the securitization of SME loans, held by the IFI*, through loan guarantees

IFIs

SMEs

A Venture Capitals / Private Equity Funds

B Fund of Funds

SMEs

Key Points

- **LGF**: Access to funding by increasing the "credibility" of SMEs.
- Average duration of loan guarantee: 10 years.
- Can be used for working capital, capital expenses, capital for expansion.
- First in, first out on a European level.

- **EFG**: It is expected 500 SMEs to receive funding.
- The program includes equity funding and intermediate funding, such as subordinated loans (mezzanine) and participation loans.
- EFG investments are long-term (5-15 years) and will not exceed the 20 years of duration.

*IFIs: Intermediate Financial Institutions

Horizon 2020 – InnovFin

Back

4 financial instruments that would lead innovative companies to successful fund raising[1]

1 Financing of investments of significant size

- **Loans and loan guarantees ranging from 25-300 m. EUR for R&D projects of big enterprises , universities, research centers, etc.**

2 Mid-cap financing

- **Long-term loans (normal or subordinate loans or "mezzanine") ranging between 7.5 – 25 m. EUR (some SME belong in this category).**

3 Mid-cap loan guarantees

- **Loan guarantees for loans through financial institutions up to 50 m. EUR aiming at incentivizing R&D.**

4 Loan guarantees for innovative SMEs and Venture capital funds for SMEs

Key Points

Loan guarantees for innovative SMEs

- Concerns SMEs in production or development of innovative products or services that include high technological or industrial risk of failure.
- The loan guarantee can be used for securing liquidity for working capital or capital expenses.
- Loan guarantees for loan issue ranging from 25,000 to 7.5 m. EUR.
- Duration of guarantee is 10 years.

Venture capital funds for SMEs

- Investment in VCs in collaboration with Business Angels aiming at innovative startups and SMEs, at a very early stage.

3 4 → Funding takes place via Intermediate Financial Institutions (IFI)

1. European Commission

Horizon 2020 – SME Instrument

Back

3 phases of SME assistance by Horizon 2020[1]

Phase 1: Feasibility study (6 months)

- Level of grant: 70%.
- Amount of grant: up to 50,000 EUR.
- Goal: Feasibility study and business plan formulation.

Phase 2: Development (12-24 months)

- Level of grant 70-100%.
- Amount of grant: 500,000 – 2.5 m. EUR.
- Goal: Further development of innovative products and services.

Phase 3: Market placement (Indefinite)

- Level of grant: N/A.
- Amount of grant: N/A.
- Goal: Through Coaching and mentoring sessions, the SMEs would identify ways towards optimum penetration of European markets.

Relevant Sectors

- High risk innovation in ICT companies
- Nanotechnology
- Space Research and Development
- Clinical research on the verification of diagnostic instruments and bioindicators
- **Viable production and food processing**
- "Blue" development & maritime
- Energy systems that run low on carbon fumes
- Green and holistic transportation
- Eco-innovation and viable supply of raw materials
- Urban infrastructure
- Industrial processes based on biotechnology
- E-governance applications solely on mobile phones (only during 2015)
- Business model on innovation in SMEs (only during 2015)

Key Points

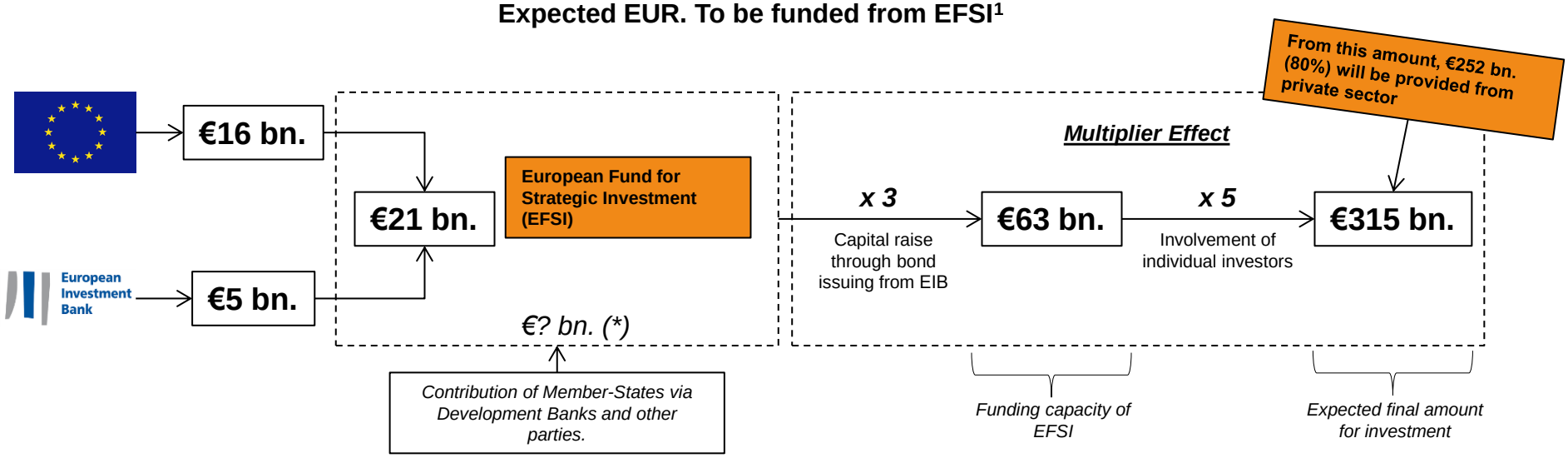
- Projects will be judged on their **Technological Readiness Level** (on a scale of 1-9 the project should be at least a 6)
- Additional selection criteria are:
  - ❑ Idea completeness
  - ❑ Impact
  - ❑ Quality and efficiency of implementation

1. European Commission

European Fund for Strategic Investments – Juncker Initiative

Back

Expected EUR. To be funded from EFSI[1]



Key Points

- From the total expected amount for investment, 75 bn. EUR will be targeted at the financial aid of SMEs.
- SMEs interested in loan issue from EFSI, can gather information about the process from Intermediary Financial Institutions, which are determined by EIF.

Key players and contact details – Wholesalers (1/2)

List of major Wholesalers – Contact Details							
A/A	**Name of Company**	**Type of Product**	**Areas of Service**	**Telephone**	**Email**	**Contact Form**	**Comments**
1	Siampis	Fruit & Vegetables	Greece, expertise in Peloponnese and Macedonia	+30 27210 27354	N/A	http://www.siampis.gr/epikinonia/	
2	Food Hellas	Vegetables	Thessaloniki and greater Macedonia	+30 2310 842886	info@food-hellas.com	http://www.food-hellas.com/el/contact	Producer with rented fields, it assumed that the company perfors as a wholesaler
3	Gatsos D. LTD Fruits & Vegetables Wholesaler	Fruit & Vegetables	Veroia, Macedonia and exporting	+30 698 0585700	N/A	N/A	Exporting company and wholesaler operator
4	Kokalas Trading	Fruit & Vegetables	Thessaloniki and greater Macedonia	+30 690 7911880	N/A	N/A	Exporting company and wholesaler operator
5	Agrogreece	Fruit & Vegetables	Greece, Europe and the US	+30 26810 85834	N/A	N/A	Exporting company and wholesaler operator
6	A.S. Froutopigi	Fruit & Vegetables	Greece, Europe and Middle East and North Africa	+30 23310 51034	info@froutopigi.gr	http://www.froutopigi.gr/index.php?id=6&lang=gr	Exporting company and wholesaler operator
7	Marmarinos Fruits	Fruit & Vegetables	Greece, Europe, Russia & Turkey	+30 210 48 24 230	N/A	N/A	Exporting company and wholesaler operator
8	Petikas Fruits & Vegetables	Fruit & Vegetables	Greece, Europe, US & Middle East	+30 23310 51557	info@petikasfruits.eu	http://petikasfruits.eu/%ce%b5%cf%80%ce%b9%ce%ba%ce%bf%ce%b9%ce%bd%cf%89%ce%bd%ce%af%ce%b1/	Packaging, trading and exporting company
9	Anastopoulos - Tsagkanelias Fruits	Fruit & Vegetables	Greece and Europe	+30 697 6983594	N/A	N/A	Packaging, trading and exporting company
10	Hellas VK Fruits	Fruit & Vegetables	Greece and globally (not specified)	+30 23310 28400	hellasvkfruit@gmail.gr	N/A	Packaging, trading and exporting company

Note: Information displayed in the table above is published on company websites

Key players and contact details – Wholesalers (2/2)

Back

List of major Wholesalers – Contact Details						
A/A	**Name of Company**	**Areas of Service**	**Telephone**	**Email**	**Contact Form**	**Comments**
11	FreshCo (Limpatsis S.A.)	Greece (Thebes) and S.E. Europe	+30 22620 85500	N/A	http://www.freshco.gr/index.php?option=com_content&view=article&id=49&Itemid=80&lang=el	Packaging, trading and exporting company
12	Menelaos Import Export	Greece and abroad (not specified)	+30 210 4829333	sales@menelaos.gr	N/A	Packaging, trading and exporting company
13	Oporello	Greece and abroad (not specified)	+30 2410 972 700	oporellolar@Lamproulis.gr	N/A	Packaging, trading and exporting company
14	Giannakakis S.A.	Greece and Europe	+30 28920 51660	ggianak@otenet.gr	N/A	Packaging, trading and exporting company (From Crete)
15	Fresh Line (George Rigakis)	Greece and Europe	N/A	N/A	N/A	Packaging, trading and exporting company (From Crete)
16	Tsourdinis & Co O.H.G	Greece and abroad (not specified)	+30 28920 53396	tsurdinis@hol.gr	http://www.tsurdinis.gr/contact-us/	Packaging, trading and exporting company (From Crete)
17	Zahagold (Zahariadis)	Greece and abroad (not specified)	+30 28420 41340	N/A	http://www.zahagold.gr/index.php/el/contacts	Packaging, trading and exporting company (From Crete)

Note: Information displayed in the table above is published on company websites

Key players and contact details – Central Markets

Back

List of Greece's Central Markets – Contact Details						
A/A	**Name of Company**	**Areas of Service**	**Telephone**	**Email**	**Contact Form**	**Comments**
1	Central Market of Athens	Attica Region and Greece	+30 210 4821111	info@okaa.gr	http://www.okaa.gr/gr/epikoinonia/	The Central market place of Athens for F&V wholesalers. A "retailer's wing" was recently added.
2	Central Market of Patras	Patras and Western Greece	Same as above (both are owned by the same entity)			The Central market place of Western Greece for F&V wholesalers. Future plans include the development of an auction and logistics center for F&V.
3	Central Market of Thessaloniki	Thessaloniki and Central and Eastern Macedonia	+30 2310 764023	N/A	http://www.kath.gr/index.php?SCREEN=contact	The Central market place of Nothern Greece for F&V wholesalers.
4	Central Market of Larissa	Larissa and Central Greece	+30 2410 575386	laxanagoralarisas@gmail.com	http://www.laxanagoralarisas.com/	The Central market place of Central Greece for F&V wholesalers.
5	Central Market of Volos	Volos and Central Greece	+30 24210 83893	volos@poeol.gr	http://www.poeol.gr/volos/info	Another great market for Central Greece.
6	Central Market of Heraklion	Crete	+30 2810 381730	heraklio@poeol.gr	http://www.poeol.gr/heraklio/info	One of the two Central market places of Crete for F&V wholesalers (tel. number and e-mail were taken from peoel.gr website).
7	Central Market of Hania	Crete	+30 28210 96641	xania@poeol.gr	http://www.poeol.gr/xania/info	The second Central market place of Crete for F&V wholesalers (tel. number and e-mail were taken from peoel.gr website).

Note: Information displayed in the table above is published on company websites

Conferences and exhibitions

Back

List of Exhibitions and conferences relevant to Greenhouses and Agro logistics			
A/A	**Name of Exhibition**	**Description**	**Date of upcoming event**
1	Agrotica	A bi-yearly organized exhibition that presents the latest global developments concerning Machinery, Equipment and Supplies applied in Agriculture.	28-31/01/2016 - Thessaloniki
2	Food Expo	A yearly organized exhibition that showcases Greek products of the greater food and beverage category.	19-21/03/2016 – Athens
3	Freskon	Similar to food Expo exhibition, taking place in Thessaloniki.	21-23/04/2016 - Thessaloniki
4	Ho.Re.Ca.	HORECA is an international exhibition for the provisioning and equipment of Hospitality and Foodservice companies. It is a yearly event targeted at not only Tourism professionals, but also with the ones from supply chain of Hospitality and Foodservice industry.	12-15/02/2016 – Athens
5	Logistics and Supply chain	A three day event that is held in Athens in Greece. This event showcases all the products and services associated with the manufacturing, packaging and logistics and the industry associated with it.	Late 2015 – Athens

Note: Information displayed in the table above is published on company websites

Key players and contact details – Retailers (1/3)

List of Greece's Super market Retailers – Contact Details							
A/A	**Name of Company**	**Number of Stores**	**Areas of Presence**	**Telephone**	**Email**	**Contact Form**	**Further Information**
1	AB Vasilopoulos	316	Nationwide	+30 210 66 08 000	N/A	https://www.ab.gr/corporateContactUs?redirectUrl=%2Fourcompany%2Fhistory	One of the biggest retail chains in Greece (part of the Belgian Delhaize group).
2	Veropoulos	185	Nationwide	+30 800 11 35000	info@veropoulos.gr	http://www.veropoulos.gr/contact/	One of the biggest retail chains in Greece (part of the SPAR International) Since May 2015, the chain is a 100% subsidiary of Sklavenitis retail chain.
3	Sklavenitis	107	Main focus is on Athens, but now after successful expansion, the chain owns stores (through its affiliates) to Crete and othe main cities	+30 210 5739536	info@sklavenitis.com	http://www.wiw.gr/greek/periseteri_sklavenitis_sa/	In terms of revenues one of the biggest retail chains in Greece. On early 2015, the chain acquired Veropoulos (100% subsidiary) and Makro Cash & Carry (bulk stores targeted at retailers and professionals) and on 2014 acquired 60% of a Cretan retail chain, Chalkiadakis, which was then owned by Veropoulos.
4	Carrefour - Marinopoulos	329	Nationwide	+30 801 802 5000	N/A	http://www.carrefour.gr/contact	Wide presence in Greece, having the biggest sales network in the sector of retail stores/super markets. The chain is in a joint venture with Carrefour, the French retail chain.
5	Carrefour - Express	333	Nationwide				
6	OK Anytime Markets	65	Attica region, Thessaloniki region and one shop in Chalkida	+30 210 9810090	info@okmarkets.gr	http://www.okmarkets.gr/index.php?option=com_content&view=article&id=64&Itemid=69&lang=el	Part of Marinopoulos Group.
7	Smile Market	106	Northern Greece	+30 2310 754351-2-5	N/A	http://www.smilemarkets.gr/epikoinonia/	Part of Marinopoulos Group.

Note: Information displayed in the table above is published on company websites

Key players and contact details – Retailers (2/3)

List of Greece's Super Market Retailers – Contact Details							
A/A	**Name of Company**	**Number of Stores**	**Areas of Presence**	**Telephone**	**Email**	**Contact Form**	**Further Information**
8	My Market	65	Attica region with plans of expansion in Nothern Greece	+30 210 2893500	N/A	http://www.mymarket.gr/Epikoinonia/forma-epikoinonias.aspx	
9	Market In	125	Mainly Athens and western - central Greece	+30 22991 50500	info@market-in.gr	http://www.market-in.gr/contact	
10	Market In daily's	9	Attica region				
11	Market In Economy	5	Attica region				
12	Lidl	226	Nationwide	+30 800 111 3333	N/A	https://ssl.lidl-hellas.gr/el/epikoinwnia.htm	
13	Proton	617	Nationwide	+30 210 2724511	info@eleta.gr	http://www.protonmarkets.gr/contact-us/	Retail chain of independent retailers operating as a brand and buying as a group, with stores operating independently.
14	Masoutis	230	Mainly nothern and central Greece	+30 2310 803803	N/A	http://www.masoutis.gr/swift.jsp?CMCCode=2901&mod=contact&extLang=	
15	Chalkiadakis	38	Crete	+30 2810 824140	info@xalkiadakis.gr	N/A	Partly (60%) owned by Sklavenitis, but operates autonomously.

Note: Information displayed in the table above is published on company websites

Key players and contact details – Retailers (3/3)

Back

List of Greece's Hyper Market Retailers – Contact Details							
A/A	**Name of Company**	**Number of Stores**	**Areas of Service**	**Telephone**	**Email**	**Contact Form**	**Further Information**
1	Carrefour	35	Nationwide	+30 801 802 5000	N/A	http://www.carrefour.gr/contact	
2	Grand Masoutis	10	Northern Greece	+30 2310 803803	N/A	http://www.masoutis.gr/swift.jsp?CMCCode=2901&mod=contact&extLang=	Part of Masoutis Group
3	Sklavenitis	3	Attica region	+30 210 5739536	info@sklavenitis.com	http://www.wiw.gr/greek/periisteri_sklavenitis_sa/	

List of Greece's "Cash & Carry" Retailers – Contact Details							
A/A	**Name of Company**	**Number of Stores**	**Areas of Service**	**Telephone**	**Email**	**Contact Form**	**Further Information**
1	ENA	14	Nationwide	+30 210 6608521	infoena@ab.gr	http://www.enafood.gr/contact.php	Part of AB Vasilopoulos - Delhaize Group
2	Makro	9	Nationwide	+30 210 3496500	info@makro.gr	http://www.makro.gr/public/ContactForm	
3	Masoutis Cash & Carry	19	Northern Greece	+30 2310 803803	N/A	http://www.masoutis.gr/swift.jsp?CMCCode=2901&mod=contact&extLang=	Part of Masoutis Group
4	Metro	45	Nationwide	+30 210 2893500	N/A	http://www.metrocashandcarry.gr/Epikoinonia/forma-epikoinonias.aspx	
5	Terra Market	6	Attica Region	+30 211 7802928	info@terracare.gr	N/A	Part of Marinopoulos Group

Note: Information displayed in the table above is published on company websites

The following list provides an overview of the main logistics operators in Greece

Back

Indicative list of the main Logistics operators in Greece[1]		
Name of Logistics Operator	**Type of Transport provided**	**Areas of Service for highly sensitive products (fruits & vegetables)**
Logika LTD	Air, Boat, Road	Greece and for highly sensitive products such as vegetables: UK, the Netherlands, Germany, France, Spain, Italy
Foodlink	Road	Greece
Frakapor Logistics Hellas S.A.	Air, Boat, Road	Greece
IFCO Systems	Air, Boat, Road	Greece and for highly sensitive products such as vegetables: UK, the Netherlands, Germany, France, Spain, Italy, Norway
Greek distributors' network (Elliniko diktyo dianomeon)	Road	Attica and several main distribution points in Greece
Metron Logistics S.A.	Air, Boat, Road	Greece
Trans cargo Hellas	Air, Boat, Road	Greece and Europe
Orphee Beinoglou S.A.	Air, Boat, Road	Greece and Europe
Okialos S.A.	Road	Greece, Germany, the Netherlands

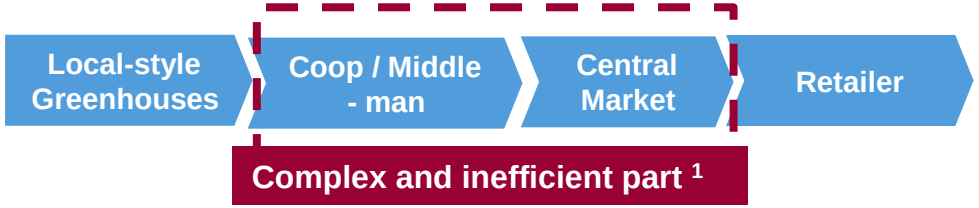
Key Points

- Producers of any size cooperate with 3rd party and 4th party logistics because the cost of creating and operating a fleet of vehicles requires capital and expertise[2].
- Due to the fragile state of tomatoes, cucumbers and vegetables in general, and the duration of the crop's shelf life (spanning from 8 days for the tomato, to 14 for the cucumber), transportation of vegetables is limited to European countries.

1. peed.gr
2. Interviews with sector experts

State of the Art Greenhouses bypass intermediate parts of the supply chain skipping inefficient and expensive links

Back



Key Points

- The second link to the chain is an optional step for producers of large size, however a mandatory step for small producers, as the latter group does not have the required resources to reach the central markets.
- Producers of small-medium output are bound to use the various central markets (Rentis, Thesalloniki, Patra) to funnel their products to the market.
- Central markets do not buy the products for a pre-determined price, however the employees inform the producers about the price and size of output they sold, giving the producers limited monitoring and control over the process.
- The fluctuations of revenues, aided by the risk of having unsold products left to rot in the central markets, urged producers of a greater scale to seek for direct channels to the retailer, through year-round deals of a fixed price for a fixed quantity.

Key Points

- The higher, standardized output combined with a production of nearly 10 months, led to the identification of direct links with major retailers, that would be able to funnel the output on the market, bypassing central markets.
- Major retailers substitute imported vegetables with ones grown in State of the Art greenhouses.
- Thus, State of the Art greenhouses created stable and profitable links with major retailers.
- However, due to the low number of such greenhouses and the low number of major retailers, it is difficult to identify the economics of such links.

1. Interviews with sector experts