

# **Organic versus conventional citrus farming: A case study on the region of Arta (Greece)**

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# 1 INTRODUCTION TO THE THESIS

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## 1.1 GENERAL INFORMATION ABOUT CITRUS FRUITS

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Citrus fruits grow on low trees, whose leaves do not fall (evergreen) and which thrive in tropical or semi-tropical and temperate countries, such as Greece. The climate required is warm, with some moisture. Even though sharp and prolonged temperature drops are fatal for the trees, explicit seasonal temperature changes are beneficial for development of good quality fruits. Constant high temperatures and moisture, which are common in the tropics, prevent the fruits from developing sufficient acid content and also the highly pigmented rind which are considered essential to quality oranges and mandarins. The more moderate and dynamic Mediterranean climate is on the other hand ideally suited to grow excellent quality and quantities of citrus fruits (Spiegel-Roy et al., 1996). For this purpose, we are going to make use for our case study the plain of Arta, which is located in the north-west part of Greece and the microclimate of this area is characterized by a moderate and dynamic Mediterranean climate. There are many species of citrus fruits, but we are going to concentrate on the ones most consumed, which are orange, mandarin and lemon. Orange fruits are divided in two main categories: those that are grown for direct consumption (edible) and to those that are grown for juicing.

Greece is the third citrus producer and exporter among the European Union member states, after Spain and Italy. Regarding the destination of the Greek citrus production in 2007, of a total harvested of 1093,5 thousand tons, 23% was exported outside of the European Union, 14% was exported to Europe and 63% was used for domestic consumption (EUROSTAT 2012). Conventional citrus growing in Greece is located mainly in three regions: Ipiros, Peloponnisos and Crete. Organic citrus growing in Greece is located mainly in four regions: Ipiros, Peloponnisos, Crete and Attiki.

Regarding the evolution of organic citrus production, there has been a considerable increase after the implementation of EU's Agenda 2000, partially influenced by the agro-environmental subsidies of the Common Agricultural Policy (CAP) rural development programs. However, the surface of organic citrus has remained more or less stable since then. The surface of organic citrus, with 1.909 ha registered in 2010, was equivalent to 3.7% of the conventional citrus surface, which was estimated at 51.800 ha the same year (EUROSTAT 2012; EL.STAT. 2012). Hence, organic citrus production is still marginal. There are many reasons for this, such as the technical requirements of Regulation (EEC) 2092/91 and the high production costs, that make it difficult for farmers to grow citrus organically.

The average area per farm cultivated with conventional citrus fruits in Greece in 2007 was approximately 2 stremma (EUROSTAT). The respective area concerning organic citrus fruits in 2007 was approximately 13 stremma (EL.STAT.). These small farms constitute a weak point in citrus production. The small scale production in combination with low wholesale prices lead to a low farm income. As a consequence, farmers engage in off-farm job activities. In addition, most citrus farmers only grow and maintain citrus trees; collection of citrus fruits from trees is done mostly by traders.

## 1.2 PROBLEM STATEMENT

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The business environment of agricultural firms is nowadays characterized by greater risk and volatility than in the past due to a large number of factors, such rapid growth of niche markets, intense competition from traditional and non-traditional sources, increased coordination across players throughout the total food chain, new and more streamlined distribution channels, and a higher level of social awareness and responsiveness (Gray, et al., 2004). For instance, during recent years there is a remarkable increase in the interest in organic agricultural products on the part of consumers. Nevertheless, organic production still constitutes a very small percentage of the Greek citrus sector.

Every agricultural firm is confronted with a variety of internal and external forces which can embody potential stimulants or limitations regarding the performances of the firm (Houben et al., 1999). Therefore, in order to identify the key factors which stimulate or stunt citrus production within Greek agriculture, we have to investigate both internal strengths and weaknesses, as well as threats and opportunities of the external environment of the firms producing citrus fruits. We are going to make use of one of the representative regions concerning citrus production in Greece, the region of Arta. Hence, the main aim of the thesis is to identify the critical economic and institutional factors determining the success of organic citrus production in the region of Arta.

## 1.3 RESEARCH OBJECTIVE AND QUESTIONS

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Research objective:

*What are the critical economic, social and institutional factors determining the success of organic citrus production in the region of Arta?*

Research questions:

- What are the critical economic, social and institutional factors determining the competitiveness of organic citrus production in relation with conventional production?
- What is the existing structure of the citrus sector in the region and how it influences the development of organic citrus production?
- What are the key factors determining the success of organic citrus farming compared to conventional citrus farming?

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## 1.4 DATA

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We will make use of quantitative data in order to describe and explain citrus production and distribution. We intend to collect data from the statistics of European Commission (EUROSTAT) and the Hellenic statistical authorities (EL.STAT.).

In addition, we will make use of face-to-face semi-structured interviews to individual farmers, agricultural cooperatives and other stakeholders of the sector -such as processors and traders-, within the framework of the case-study of Arta. The acquired data from the interviews will serve as a complement to the data from official sources. The interviews will cover a range of economic, social and institutional topics in order to shape the business environment of conventional and organic citrus production in the region of Arta.

It must be noted that when indicating a surface of land, we use the prevailing unit 'stremma' instead of 'hectare'. One stremma equals 1,000m<sup>2</sup> which equals 0.1hectare. The reason for it being that the stremma is a more relevant unit of measurement for our purpose, as the majority of orchards, that this thesis will be dealing with, cover only a few stremma of land. When expressed in hectares, the numbers in our tables would in many cases be less than 1, which would form a hindrance to readability, and confuse the reader regarding the scale involved in Greek citrus farming.

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## 1.5 METHODS

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Quantitative data provided by official sources are often insufficient for painting a country's business operating environment. Interviews with involved actors in citrus farming will be performed to obtain information on a broad range of variables for which data are scarce or nonexistent. The interviews thereby serve as an instrument for gathering qualitative data on citrus production. These qualitative data, identifying and highlighting the strengths and weaknesses of citrus production and its operating environment, combined with quantitative data, will provide a useful tool for analyzing the economic and institutional factors that characterize citrus farming in Arta (Schwab, et al., 2008). A comparative analysis will be further performed on the quantitative data provided from the interviews, in order to measure the economic performance of organic citrus production in relation to the conventional one.

Therefore, by gathering our data we will be able to compose a description of conventional and organic citrus farming of Arta and to identify the distinguished key factors of the sector, based on a SWOT analysis (Gray, et al., 2004; Houben et al., 1999). Describing the business environment of Arta's citrus farming, we will make use of the Five Forces Model of Porter (Figure 1) (Porter, 2008), in order to investigate the external environment of the firms included in our case-study. In order to investigate the internal environment of these firms, we will make use of the Value Chain Model of Porter (Figure 2) (Porter, 1985). Based on the findings of the description of the sector, we will identify the key factors for the success of organic and conventional citrus farming.

Initially we provide a description of the basic elements of the citrus supply chain in Greece, including its particularities, in order to introduce the overall environment under which Arta's citrus sector is formed. Moreover, we describe the theoretical framework under which we are going to frame our result. Furthermore, we describe the citrus sector of Arta and we provide a summary of the acquired data from the conducted

interviews. As a next step, we present the gathered data framed under the theoretical background and we analyze the results. Finally, we draw the conclusions which prompted from the analysis of our results and we answer to the research questions.

## 2 CITRUS SECTOR ANALYSIS

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The aim of this chapter is to describe the citrus sector in Greece, based on reports and studies concerning the Greek citrus sector, as well as quantitative data derived from official sources providing statistical information on the Greek citrus sector. The chapter provides a description of the basic elements of the citrus supply chain in Greece, including its particularities.

The chapter is structured in five sections. The first section contains a brief description of the Greek citrus sector and the main citrus varieties grown in Greece. The next three sections contain a description of the area and spatial allocation, the particularities of the main grown varieties, production, processing and trade, for orange, mandarin and lemon respectively. The last section contains a description of the organic citrus production in Greece.

### 2.1 GENERAL SITUATION OF THE CITRUS SECTOR

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Citrus production has a share of 9% in EU-27 fruits and vegetables production. Production equaled almost 11 million tons in 2009. Production of citrus fruits is mainly located in the Mediterranean regions of Spain, Italy and Greece, they originate more than 95% of EU citrus production. Oranges (58%) and mandarins (29%) represent over 85% of citrus production, whose shares have further increased at the expense of lemons. During the decade 2001-2011 Spain and Greece faced a great price volatility for their fruits. Citrus imports from extra-EU countries have increased to a share of more than 31% in 2009. South Africa is the first largest extra-EU supplier country, followed by Argentina and thirdly by the Mediterranean Partner Countries, such as Egypt, Turkey and Syria (Dell'Aquila et al., 2011).

The cultivation of citrus trees is favored by the microclimate of many regions of Greece. Peloponnesus, western Greece (Arta, Aitolioakarnania, etc.) and Crete are the main regions where citrus trees are cultivated. The total surface of citrus trees in Greece is 53,000 ha, with an annual production of 1.3 million tons. Orange trees cover 70% of the total surface, mandarin trees cover 18 %, lemon trees cover 11 %, while the rest 1% is covered with other citrus trees. The biggest volume of citrus production is destined to fresh consumption, while about 350,000 tons per year are destined to exports. The majority of Greek citrus production up to 40% is destined for interior consumption, while 28% is destined to processing and 27% is destined to exports (EuroMedCitrusNet, 2007). The average area per holding of citrus orchards cultivated with conventional farming system in 2007 was approximately 7 stremma (Table 3).



**Table 1. Citrus fruit Supply and Distribution in Greece.**

Citrus fruit	2000	2001	2002	2003	2004	2005	2006	2007
Area of production (1000 ha)	59.8	59.7	59.6	52.3	51.9	52.0	52.0	54.7
Yields (100 kg/ha)	187.6	175.1	231.3	196.1	167.6	223.4	188.0	200.0
Harvested production (1000 t)	1,122.4	1,045.7	1,379.6	1,025.3	869.3	1,162.0	977.9	1,093.5
Usable production (1000 t)	1,078.0	1,123.0	1,052.0	1,379.6	1,025.3	869.3	1,162.0	1,003.0
Losses (1000 t)	200.0	127.3	223.0	206.4	264.7	60.9	46.6	15.5
Total imports (1000 t)	75.5	60.6	124.3	69.8	119.3	160.9	123.0	376.4
Total exports (1000 t)	125.9	122.8	72.1	400.0	328.5	229.6	369.8	364.5
Total domestic uses (1000 t)	1,027.6	1,060.8	1,104.2	1,049.4	816.1	800.6	915.2	1,014.9
Gross human consumption (1000 t)	827.6	933.5	881.2	843.0	551.4	739.7	868.6	999.4
Degree of self-sufficiency (%)	104.9	105.9	95.3	131.5	125.6	108.6	127.0	98.8

Source: self-constructed data from EUROSTAT

**Table 2. Citrus fruit Production, Consumption and Distribution in Greece.**

(quantity: 1,000 ton)

Year	Total Imports	+	Usable Production	=	Total Exports	+	Domestic Consumption
2000	75.5		1,078.0		125.9		1,027.6
2001	60.6		1,123.0		122.8		1,060.8
2002	124.3		1,052.0		72.1		1,104.2
2003	69.8		1,379.6		400.0		1,049.4
2004	119.3		1,025.3		328.5		816.1
2005	160.9		869.3		229.6		800.6
2006	123		1,162.0		369.8		915.2
2007	376.4		1,003.0		364.5		1,014.9

Source: self-constructed data from EUROSTAT

**Table 3. Citrus Orchards applying Conventional Farming System in 2007.**

(area: stremma = 1,000m<sup>2</sup> = 0.1hectare)

	Citrus trees	
geographic area	Holdings	Areas
<b>Greece</b>	<b>88,121</b>	<b>526,806.9</b>
up to 1.9 str.	35,471	29,638.1
2 - 4.9 str.	22,509	64,510.9
5 - 9.9 str.	13,555	89,598.7
10 - 19.9 str.	10,499	139,586.9
20 - 29.9 str.	3,217	74,982.0
30 - 39.9 str.	1,469	48,926.2
40 - 49.9 str.	644	27,722.3
50 - 69.9 str.	503	28,209.8
70 - 99.9 str.	184	14,642.5
100 - 199.9 str.	66	7,815.5
200 str. and more	4	1,174.0

Source: self-constructed data from EL.STAT.

## 2.2 ORANGE PRODUCTION

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Orange trees are been cultivated in the regions of Argolida, Laconia, Arta, Chania and Aitolokarnania (EuroMedCitrusNet, 2007). The major orange varieties cultivated in these areas are the “Washington Navel”, “Commons”, “Valencia”, “Navalina” and “Newhall” (GAIN, 2011). The varieties of “Navel Late” and “Lane Late” have been also spread the last years in order to contribute to the expansion of the commercial period (EuroMedCitrusNet, 2007).

The majority of oranges produced is destined to fresh consumption. The variety “Washington Navel” is predominant, constituting 60% of total orange production and covers the commercial period between November to March. The early varieties “Navalina” and “Newhall” participate at a low share in total orange production and cover the commercial period of September and October. The late varieties “Navel Late” and “Lane Late” constitute only 0.2% of total orange production, while they could contribute to the expansion of the commercial period. The production of the late variety “Valencia” is insufficient for covering the increased demands of the late commercial period and at the same time faces competition due to the parallel cultivation of this variety in Spain and Morocco (EuroMedCitrusNet, 2007).

The quantity of oranges destined to fresh consumption, as well as the quality of the orange fruit, form the total volume of oranges channeled to processing (GAIN, 2011). The total volume of oranges channeled to processing averages 25-30% of the annual production of oranges. The variety “Commons” is predominantly used for processing, constituting of 14% of the total orange production and covers the commercial period of January and February. Some quantities of the variety “Washington Navel” are also used in processing (EuroMedCitrusNet, 2007).

Greece exports a big volume of orange fruits during the winter period. But while there is an important Greek participation in exports during the late summer exports among Spain, Morocco and Egypt, the rate of Greek participation in exports during the autumn period among Egypt and Turkey is only 5% (EuroMedCitrusNet, 2007). Romania, Serbia and Germany are the main destination countries of Greek orange exports. Greece imports 40% of its total orange imports from South Africa (GAIN, 2011).

There are two types of agricultural exploitations of conventional orange orchards. First, the “non-financially sound exploitations” consisting of small agricultural exploitations because of the land fragmentation and characterizing of size of less than 1.5 hectares. These orange orchards have no access to irrigation water, they are characterized by low productivity and their production is destined to processing. The farmers who exploit these orange orchards don’t operate citrus cultivation as their main profession or they are usually old. Second, the “financially sound exploitations” consist of orange orchards which have access to good quality of water, they are characterized by good productivity and sanitation and they are equipped with measures of anti-frost protection. This second type consists of orchards with size of over 1.5 hectares (EuroMedCitrusNet, 2007).

**Table 4. Orange Supply and Distribution in Greece.**

Oranges	2000	2001	2002	2003	2004	2005	2006	2007
Area of production (1000 ha)	41.0	41.0	40.9	38.0	38.2	38.3	38.3	39.5
Yields (100 kg/ha)	220.1	219.2	287.5	223.4	200.6	265.6	223.4	245.7
Harvested production (1000 t)	902.6	897.7	1,176.0	848.9	765.1	1,017.2	855.6	970.0
Losses (1000 t)	178.0	0.0	230.0	201.5	209.1	58.9	44.2	10.1
Total imports (1000 t)	57.0	38.0	23.1	39.5	77.4	54.7	49.3	298.2
Total exports (1000 t)	272.0	382.0	282.0	302.9	254.2	184.9	250.1	329.6
Total domestic uses (1000 t)	611.0	556.0	584.1	795.0	587.2	607.6	714.7	760.6
Gross human consumption (1000 t)	433.0	548.0	354.1	593.5	378.1	548.7	670.5	750.5

Source: self-constructed data from EUROSTAT

## 2.3 MANDARIN PRODUCTION

Mandarin trees are cultivated in the regions of Argolida, Arta, Chania and Korinthia (EuroMedCitrusNet, 2007). The major mandarin variety cultivated in these areas is the “Clementine” (GAIN, 2011). The “Mediterranean” (or “Willow-leaf”) mandarin is a traditional mandarin variety, which is cultivated in the regions of Peloponnesus and the islands Chios and Kalymnos (EuroMedCitrusNet, 2007).

The majority of mandarin production is destined to fresh consumption. The variety “Clementine” is predominant, constituting the 75% of total mandarin production and covers the commercial period between January to May. While the traditional “Mediterranean” variety has an “excellent taste”, its distribution faces problems due to the big number of the fruit seeds (EuroMedCitrusNet, 2007).

The total volume of mandarins channeled to processing is 2% of the annual production of mandarins. Greece begins its mandarin exports in late November, and continues till late January and the beginning of February (EuroMedCitrusNet, 2007). Romania, Bulgaria, Serbia, and Germany are the main destination countries of Greek mandarin exports. Greece imports 68% of its total mandarin imports from Italy and France (GAIN, 2011).

## 2.4 LEMON PRODUCTION

Lemon trees are cultivated in the regions of Korinthos, Achaia, Piraeus, and Ilias (EuroMedCitrusNet, 2007). The major lemon variety cultivated in these areas is the “Maglini” (GAIN, 2011). The varieties of “Adamopoulou”, “Vakalou” and “Zambettakis” have also been spread the last years, as more tolerant varieties to the disease “Mal secco” which caused massive damages to the “Maglini” variety (EuroMedCitrusNet, 2007).

The majority of lemon production is destined to fresh consumption. The variety “Maglini” covers the commercial period between December to May, as well as the commercial period between September to November after artificial ripening (EuroMedCitrusNet, 2007).

The total volume of lemons channeled to processing is 10% of the annual production of lemons. Greece exports small quantities of lemons during the winter period (EuroMedCitrusNet, 2007). Bulgaria and Italy are the main destination countries of Greek lemon exports. Greece imports large quantities of lemons mainly from Argentina

and Turkey during the summer period, in order to satisfy its needs for lemon juice (GAIN, 2011).

## 2.5 ORGANIC CITRUS PRODUCTION

Greece as a member of the European Union complies with the European Community (EC) laws and measures as well as the Common Agricultural Policy (CAP) and hence, the Greek citrus sector is formed under the European policies and laws. Regulations such as the “EC regulation No 2202/96 about the reform of the support regime for processed citrus” fruits shapes the development of the Greek citrus sector (EuroMedCitrusNet, 2007). Regarding the evolution of organic citrus production, there has been a considerable increase after the implementation of EU’s Agenda 2000, partially influenced by the agro-environmental subsidies of the Common Agricultural Policy (CAP) rural development programs.

The total surface of organic citrus crops, 1,909 ha registered in 2010, was equivalent to 3.7% of the conventional citrus surface, which has been estimated at 51,800 ha in the same year. From this total surface of organic citrus crops registered in 2010, 86% represents fully converted crop area and hence the crop area under conversion is 14% (EUROSTAT, 2012; EL.STAT, 2012).

Aitolokarnania, Lakonia, Argolida, Attiki Achaia, Arta, Chania and Korinthia are the main regions which apply organic farming in their citrus orchards. The average area per holding of citrus orchards cultivated with organic farming system in 2007 was approximately 62 stremma (Table 7). Hence, organic citrus orchards are approximately nine times bigger than the conventional ones. In 2010 the 74% of the total organic citrus surface was cultivated with oranges, 15% with mandarins, 10% with lemons and the 1% with other citrus fruits (EUROSTAT, 2012).

**Table 5. Organic Citrus Fruit in Greece.**  
(area: hectare)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Total crop area</b>	1,856	2,073	2,168	2,002	2,571	2,015	2,133	2,043	1,909
<b>Fully converted crop area</b>	1,298	660	1,626	1,406	1,637	1,385	1,646	1,717	1,641
<b>Crop area under conversion</b>	558	1,413	542	596	934	630	487	326	268

Source: self-constructed data from EUROSTAT

**Table 6. Organic Orange, Mandarin and Lemon Fruit in Greece.**  
(area: hectare)

Crop	Orange			Mandarin			Lemon		
Year	2008	2009	2010	2008	2009	2010	2008	2009	2010
<b>Total crop area</b>	1,576	1,516	1,412	326	313	284	209	191	187
<b>Fully converted crop area</b>	1,215	1,268	1,217	230	256	243	185	175	163
<b>Crop area under conversion</b>	361	248	195	96	57	41	24	16	24

Source: self-constructed data from EUROSTAT

**Table 7. Citrus Orchards applying Organic Farming System in 2007.**  
(area: stremma = 1,000m<sup>2</sup> = 0.1hectare)

geographic area	Citrus trees	
	Holdings	Areas
<b>Greece</b>	<b>2,086</b>	<b>26,780.3</b>
up to 4.9 str.	43	37.9
5 - 9.9 str.	174	488.7
10 - 19.9 str.	442	3,417.6
20 - 29.9 str.	274	2,247.3
30 - 49.9 str.	414	5,101.8
50 - 79.9 str.	331	6,448.1
80 - 99.9 str.	102	2,337.8
100 - 149.9 str.	172	3,400.2
150 - 199.9 str.	50	1,385.1
200 - 249.9 str.	22	388.5
250 - 299.9 str.	17	273.8
300 - 399.9 str.	13	564.9
400 - 499.9 str.	4	151.5
500 - 999.9 str.	26	499.1
1000 str. and more	2	38.0

Source: self-constructed data from EL.STAT.

### 3 THEORETICAL FRAMEWORK

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The aim of this chapter is to provide the theoretical framework to analyze the internal and external business environment and subsequently identify the key factors influencing citrus farming in Greece. The theoretical framework provided is based on literature.

The chapter is structured in three sections. The first section contains a brief description of the business environment of agricultural firms. The second section analyzes the components of the external environment of agricultural firms. The third section analyzes the components of the internal environment of agricultural firms.

#### 3.1 INTRODUCTION TO THE THEORITICAL FRAMEWORK

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The business environment of agricultural firms is nowadays characterized by greater risk and volatility than in the past due to a large number of factors, such as increased focus on value by producer/customers, a more commercial mentality on the part of producers/customers, the different goals of part-time and commercial producers, growth in the recreational agricultural segment, rapid growth of niche markets, intense competition from traditional and non-traditional sources, pressure for efficiency in all phases of operations, increased coordination across players throughout the total food chain, increasing consolidation at all levels of the input distribution channel, new and more streamlined distribution channels, and a higher level of social awareness and responsiveness (Gray et al., 2004).

In order to make a comparative analysis of the economic and institutional factors between organic and conventional citrus production, we have to understand and identify the business environment of citrus firms. Every agricultural firm is confronted with a variety of internal and external forces which can embody potential stimulants or limitations regarding the performances of the firm (Houben et al., 1999). Hence, a useful tool for identifying the firm's environment is to conduct a SWOT. Using a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis we will be able to investigate which internal strengths and weaknesses of the firms can be used to take advantage of the opportunities while avoiding the threats of their external environment.

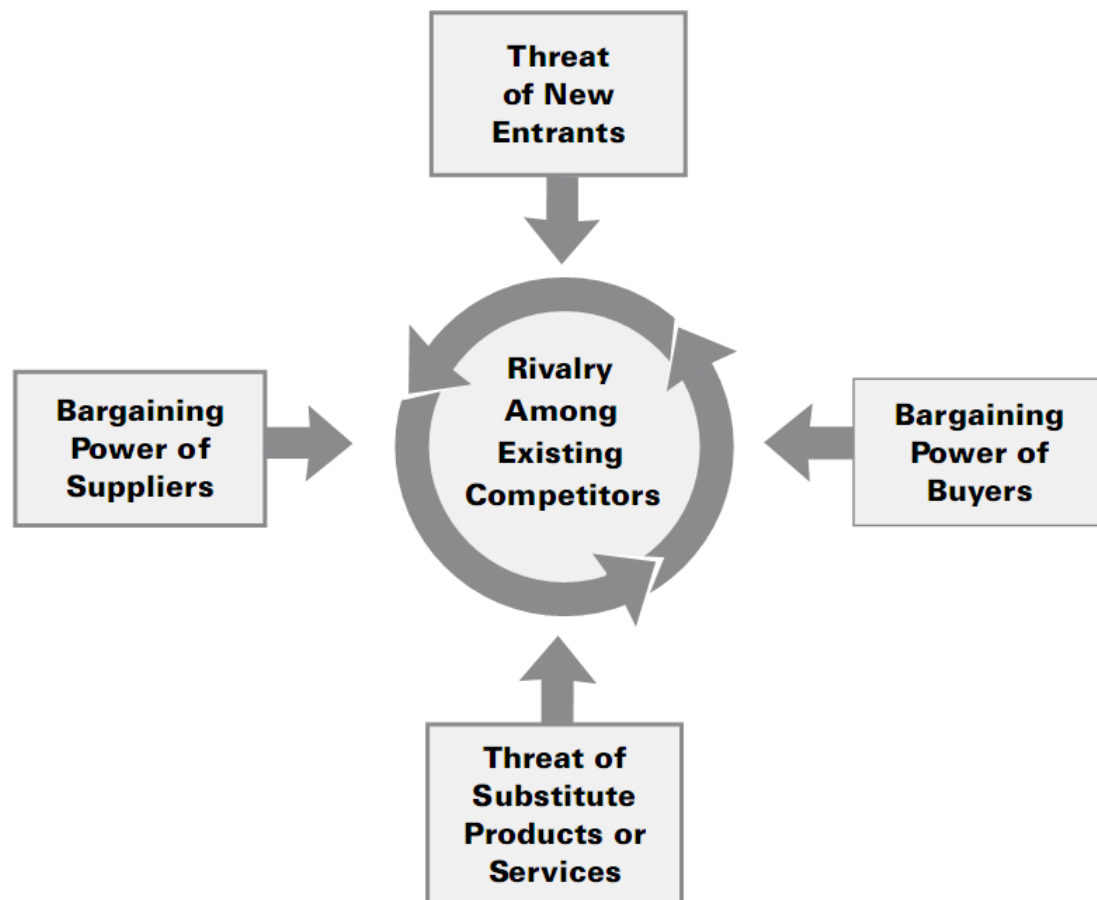
#### 3.2 EXTERNAL BUSINESS ENVIRONMENT

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The external environment of the firm consists of variables existing outside the company, which form the context in which the firm exists and functions. The external environment can be further subdivided into a direct environment and an indirect environment. The direct environment includes those variables which are directly influenced by the actions of the firm, such as the processors, the government, the suppliers, the local authorities, the competitors, the clients, the creditors and the employee's organizations. The indirect environment includes the economic, socio-cultural, technological, political and juridical forces which primarily have an influence on the long-term decisions of the firm (Houben et al., 1999).

In order to investigate the external environment of agricultural firms which are related to citrus production we will make use of the Five Forces Model (Figure 3.1) of Porter (Porter, 2008).

Figure 3.1. Five Forces Model



Source: Porter, 2008.

According to Michael Porter, there are five forces that shape industry competition:

*New entrants* usually bring new capacity and competition for customers and resources. This is a threat to existing businesses in the industry, which depend on the presence of entry barriers, such as economies of scale and capital requirements. *Substitute products* are products that appear to be different but can satisfy the same need as another product. When switching costs are low, substitutes can place a price ceiling on products. *Bargaining power of suppliers* affects their ability to raise prices. Suppliers are likely to be powerful if they are few in number and there are good substitutes of the product purchased. *Bargaining power of buyers* affects the industry through their ability to force down prices, bargain for higher quality or more services, and play competitors against each other. Buyers are likely to be powerful if a buyer purchases a large part of the sellers product, or if alternative suppliers are plentiful because the product is undifferentiated. *Rivalry among existing firms* refers to the amount of direct competition in an industry. Industries that have intense competition are characterized by competitors that are roughly equal in size, slow rates of industry growth, high fixed costs, and high exit barriers arising from investments in specialized equipment (Porter, 2008).

In addition to these five forces of Porter, there also other stakeholders, which can impose various limits on the actions that firms can take. These stakeholders include EU,

state and local governmental units, such as creditors, special-interest groups, and local community organizations (Gray et al., 2004).

Under the scope of SWOT analysis, these external variables shape the existing opportunities for a firm, such as proximity to a major market, as well as the existing threats that a firm faces, such as new competitors, changes in agricultural production and changes in environmental policies. In this context, we will further investigate at the fifth chapter the aspects of rural development investments, market regime for citrus, imperfect competition, social norms and behavior of farmers which influence citrus farming in Greece.

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### 3.3 INTERNAL BUSINESS ENVIRONMENT

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The internal environment of the firm consists of variables within the firm itself, which form the enterprise context in which work takes place, including the firm's structure, the firm's culture and the resources of the firm (Houben et al., 1999).

In order to analyze the internal environment of a firm, we have to investigate the factors which are related to the resources, capabilities, and core competencies of that firm.

*Resources* are inputs into a firm's production process and they can be further subdivided into tangible and intangible resources. For most agribusinesses, tangible resources would include things like capital equipment and cash, such as storage facilities, trucks, manufacturing facilities, etc. Intangible resources are not so easy to identify. Intangible resources would include technological or mechanical know-how, family or corporate commitment, organizational structure, reputation, etc. Nonetheless, intangible resources are increasingly becoming the key to the long-term success of businesses both in and out of agriculture. *Capabilities* are a part of the organizational structure and control systems of the firm. They refer to the firm's capacity to deploy resources that have been purposely integrated to achieve a desired end state and they determine the way a company makes decisions to achieve objectives. *Core competencies* represent the integration of resources and capabilities that help build a competitive advantage. Therefore, they are strengths that allow a business to achieve superior efficiency, quality, and innovation (Gray et al., 2004).

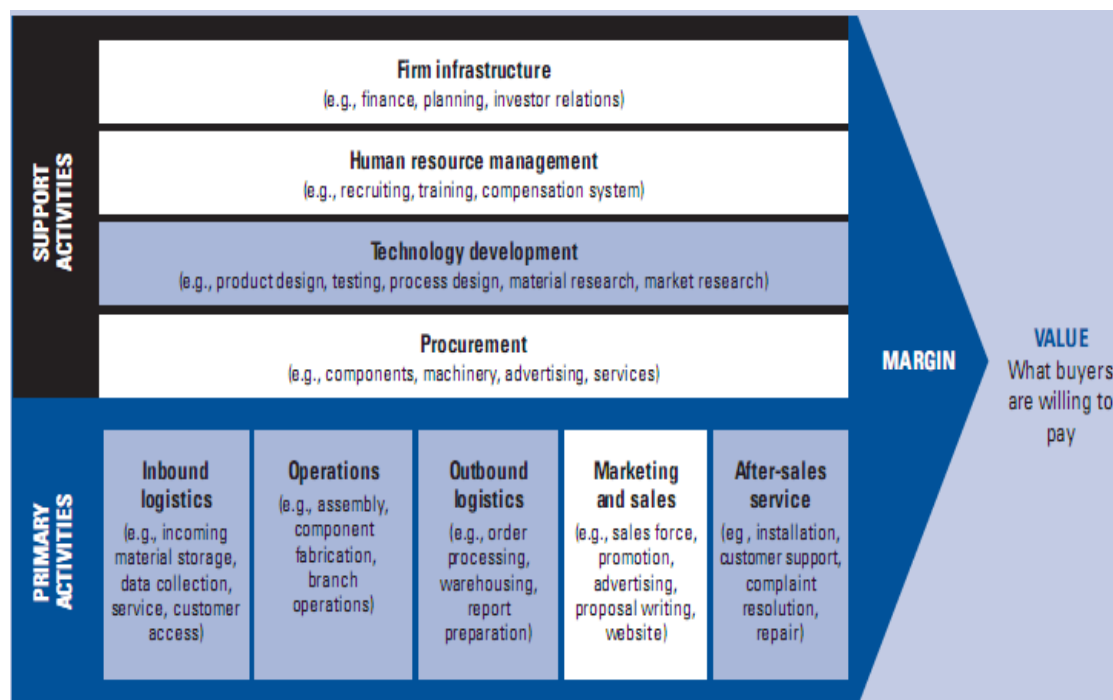
Core competencies are the key to developing a competitive advantage. For a firm to build a core competency, it must have either a unique and valuable resource and the capabilities to use it, or a unique capability to manage common resources. Unique resources are those which are either rare, costly to imitate or non-substitutable. Valuable capabilities are those that create value for the business by exploiting opportunities and/or neutralizing threats in the external environment. A rare capability is one that few if any competitors possess. Costly to imitate capabilities are those that competitors would have a difficult time developing. For example, some input suppliers or processors have unique or well positioned physical facilities, but in many cases it may be the services and information combined with these facilities that is really hard for competitors to imitate. Non-substitutable capabilities are those that gain a competitive advantage for the firm, which cannot be reached by the competitors. For example, the trust-based working relationship that some managers may have with their employees or in some cases with buyers or processors. Trust-based relationships take time to develop, are many times hard for competitors to recognize, and have very few, if any, close substitutes for gaining the same advantage. Nevertheless, if a firm doesn't have a unique resource to build a core competency, it must have capabilities that competitors do not



have. For instance, the basic resources to deliver and apply chemicals may be readily available, but in order for a farmer to be extremely efficient and responsive to environmental and adjoining landowner/neighbor concerns, requires specialized knowledge and skills that are not commonplace. However, most research conducted in this area suggests that it is hard for firms to develop and protect more than a few core competences (Gray et al., 2004).

In order to investigate the internal environment of agricultural firms which are related to citrus production we will make use of the Value Chain Model (Figure 3.2) of Porter (Porter, 1985). Using this model, we will be able to identify the resources, activities and core competencies of these firms, which create a competitive advantage for them.

Figure 3.2. Value Chain



Source: Porter, 2009

The Value Chain provides the conceptual framework to analyze company operating practices and strategy, by identifying the activities the firm conducts to create value. The firm creates value for its buyers, by performing certain activities. To the extent that the cost of performing these activities does not exceed the value created for the buyers, the firm receives a margin (Porter, 1985). Those activities that are a strength for a firm, are those that it can perform in a manner that is superior to competitors' performances, or those that the competitors simply cannot perform. Hence, when using the value chain as a mechanism for identifying the firm's strengths and weaknesses, it must be compared to competitors' value chains. Value chain analysis can be a useful tool for identifying the performed activities and the value created of a firm, even if the activities depicted by this value chain are not all included in the specific firm's structure (Gray et al., 2004).

*Primary* activities consist of supplier relationships (inbound logistics and operations) and buyer relationships (outbound logistics, marketing and sales, and service). Primary activities which are related to a set of relationships with suppliers, serve as a source of sustainable competitive advantage when special relationships are created with

suppliers that either reduce the cost of providing value to the customer or reduce the costs of creating value. Primary activities which are related to a set of relationships with buyers, serve as a source of sustainable competitive advantage when used to create a special relationship with the buyer that benefits the buyer either through additional value in the product or reduction in the buyer's costs of using the product. *Supporting* activities consist of the firm infrastructure, human resource management, technology development, and procurement, and often much of the performance in these areas is associated with intangible assets. *Margin* is the desired result of performing the value-creating activities. In addition, the customer is willing to pay a certain amount for the value the firm creates. Therefore, the smaller the cost of performing those particular activities relative to the value the customer is willing to pay, the greater the margin will be for the business (Gray et al., 2004).

Under the scope of SWOT analysis, those activities which are conducted within a firm's internal environment, shape the existing strengths and weaknesses of that firm. Activities that are valuable to customers and in which the firm excels relative to other competitors, create a competitive advantage for that firm. In this context, we will further investigate the aspects of distribution and sales channels and the degree of participation of farmers in the citrus supply chain, which influence the citrus farming in Greece.

## 4 CASE STUDY ON THE REGION OF ARTA

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The aim of this chapter is to describe the citrus sector in Arta, based both on quantitative and qualitative data derived from official sources providing relevant statistical information, and on information gathered during the conducted interviews. The chapter provides a description of the basic elements shaping citrus production in Arta, including its particularities.

The chapter is structured in four sections. The first section contains a brief description of geo-environmental characteristics of the prefecture of Arta. The next section provides quantitative data derived from official sources, shaping basic characteristics of citrus production in Arta. The third section provides the framework of the conducted interviews, as well as some of the quantitative data derived from these interviews. The last section provides a summary of the qualitative data which was obtained during the interviews.

### 4.1 DESCRIPTION OF THE PREFECTURE OF ARTA

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The prefecture of Arta belongs to the northwest part of Greece, which is the southeast part of the geographical region of Epirus. 18.6 % of the territory of Arta is flat , 11% is hilly and 70.4 % is mountainous. On the coast of the prefecture of Arta, and the western part of it, the climate is characterized as Mediterranean. Inside the prefecture the climate is continental, due to the large mountains (Arta's prefecture official site, 2013).

A broad coastal plain is formed at the southwest part of Arta's prefecture, which is the largest plain of Epirus. The plain is irrigated by the river Arahthos, as well as by the river Louros. Both rivers flow into Ambrakiko's bay. The Mediterranean climate of this lowland area of Arta is characterized by a mild cold season, plenty of sunshine, an average temperature of over 22 degrees and an annual rainfall of 1.100 millimetres (Arta's prefecture official site, 2013). Due to these characteristics, the microclimate in this area is highly favorable for cultivating both a high quality and large quantities of citrus fruits.

## 4.2 DESCRIPTION OF THE CITRUS SECTOR OF ARTA

Citrus production of Arta takes place in the plain of Arta. The total agricultural area of citrus plantations amounts to 65,658 stremma as recorded in 2008. Orange orchards occupy 89,5% of the total agricultural area of citrus plantations. Hence, orange cultivation is the most dominant among all citrus cultivations of the region. Mandarin orchards follow with 10% and lemon orchards with 0,5% (Table 8).

**Table 8. Areas of compact plantations by geographic region in 2008.**

(area: stremma = 1,000m<sup>2</sup> = 0.1hectare)

	Citrus trees			
Geographic region	Total	Orange trees	Lemon trees	Mandarin trees
<b>Arta</b>	65,658	58,768	313	6,533

Source: self-constructed data from EL.STAT.

Holdings applying a conventional citrus farming system own an average area of approximately 10 stremma of orchard (Table 9), while holdings applying an organic citrus farming system own an average area of approximately 48 stremma (Table 10).

**Table 9. Citrus Orchards applying Conventional Farming System in the region of Arta in 2007.**

(area: stremma = 1,000m<sup>2</sup> = 0.1hectare)

	Citrus trees	
geographic area	Holdings	Areas
<b>Arta</b>	<b>6,274</b>	<b>56,508.7</b>
up to 1.9 str.	462	530.8
2 - 4.9 str.	1,924	5,786.6
5 - 9.9 str.	2,047	13,844.0
10 - 19.9 str.	1,235	16,343.4
20 - 29.9 str.	388	9,198.1
30 - 39.9 str.	119	4,025.8
40 - 49.9 str.	31	1,412.3
50 - 69.9 str.	29	1,749.7
70 - 99.9 str.	20	1,728.7
100 - 199.9 str.	19	1,889.3
200 str. and more	0	0.0

Source: self-constructed data from EL.STAT.

**Table 10. Citrus Orchards applying Organic Farming System in the region of Arta in 2007.** (holdings fully completed the conversion period)  
(area: stremma = 1,000m<sup>2</sup> = 0.1hectare)

geographic area	Citrus trees	
	Holdings	Areas
<b>Arta</b>	<b>46</b>	<b>926.4</b>
up to 4.9 str.	0	0.0
5 - 9.9 str.	0	0.0
10 - 19.9 str.	9	97.2
20 - 29.9 str.	10	40.0
30 - 49.9 str.	9	158.8
50 - 79.9 str.	13	417.7
80 - 99.9 str.	1	5.0
100 - 149.9 str.	3	102.7
150 - 199.9 str.	1	105.0
200 str. and more	0	0.0

Source: self-constructed data from EL.STAT.

In 2007 the areas of organically cultivated citrus orchards in the region of Arta amounted to less than 2% of the conventionally cultivated areas (Table 9 & 10). Moreover, the organically cultivated orchards reduced by 59% from 2007 to 2009 (Table 11).

**Table 11. Citrus Orchards applying Organic Farming System in the region of Arta.** (holdings fully completed the conversion period) (area: stremma = 0.1hectare)

Year	Organic Citrus trees	
	Holdings	Areas
2007	46	926
2009	28	544

Source: self-constructed data from EL.STAT.

In 2009 the organically cultivated citrus orchards (including citrus orchards under conversion) in the region of Arta hardly exceeded 1% of the conventional ones (Table 12).

**Table 12. Areas of compact plantations by farming system in Arta in 2009.** (area: stremma = 1,000m<sup>2</sup> = 0.1hectare)

Year	Conventional Citrus trees		Organic Citrus trees Fully Converted		Organic Citrus trees Under Conversion	
	Holdings	Areas	Holdings	Areas	Holdings	Areas
2009	4,729	41,370.90	28	544.2	3	15.5

Source: self-constructed data from EL.STAT.

### 4.3 ACQUIRED DATA FROM INTERVIEWS

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Due to a lack of sufficient quantitative data from official sources, we conducted face-to-face semi-structured interviews with stakeholders involved in the citrus sector of the region of Arta. Although our primary intention was to contact with as many as possible different participants of the sector, this was not feasible due to the unorganized structure of this sector. Hence, the majority of the twenty-one interviewees consists of individual citrus farmers. The questionnaires used for conducting the interviews are illustrated at the appendix.

Out of the twenty one interviews conducted, nine were with owners of small holdings. Most of them men of ages ranging from 55 to 68 in one case. They gave a fairly consistent image of the daily practice and management of this type of non-financially sound exploitation. One of these small producers is still actively joining the cooperative of the farmers of the region. Five of the interviewees were owners of large, financially sound exploitations, out of which the largest is also the most successful organic farmer in the region. In addition, there were four more farmers who run a medium size organic farm as a commercial business, in two cases only partially organic (one of them has the rest of his orchards under conversion, while the other prefers to keep part of his orchards conventional as this provides him with more diverse product). Moreover, we interviewed the only organic trader who is active in the region of Arta, and a conventional trader who owns a medium size citrus holding at the same time. Finally, we interviewed a teacher of agricultural economics from the university of Arta, who also runs his own small citrus farm as a side activity. While there were of course many individual remarks, anecdotes, problems and complaints from each of the interviewees, the general image that came out was fairly consistent - apart of some exceptions and strong statements of one or two farmers. The information provided by the organic trader and the conventional trader were quite general and not very specific in terms of quantitative data. Nevertheless, between the lines, their accounts confirmed some remarks of the small and larger producers.

As the citrus sector in Arta consists of approximately 80% of small farms and 20% of commercial larger farms, the selection of interviewed farmers seems to be fairly representative from that perspective. On the other hand, the sample of my interviewees was picked based on my personal connections and abilities, and it is very small compared to the total number of existing farmers. The majority of the traders transacting business with the farmers of Arta originate from other regions of Greece, so it was not practicable to contact them. In addition to these interviews it would have been interesting to interview some official sources such as the Ministry of Agriculture, or someone from the agricultural research institute, but my contact with them didn't offer any useful results.

While gathering the necessary data for answering the research questions, my choice to do a case study on the region of Arta was not a coincidence. As my father originally comes from this region, and we still have family there, I am closely familiar with it. Our family owns some land in the region since many years, therefore we have some connections with various stakeholders of the local citrus community. This allowed me to initiate the interviews, and extract the necessary information which would enable me to answer my research questions.

The face-to-face semi-structured interviews that were conducted provided us with both quantitative and qualitative data which are mentioned in the following tables. There were of course deviations among the quantitative data that stakeholders provided us, but these deviations concerning the selling prices (Table 13 & 14) are related to bargaining power of producers towards the traders, which is directly influenced by factors such as size of holding, degree of accessibility of orchard, and product quality.

As will be shown in the next chapter, this information that resulted from the conducted interviews, while far from complete and severely lacking in any official statistical data, nevertheless provides an insight in the local dynamics of the citrus sector in the region of Arta. From this information we will extract a number of key factors which have been impeding the business as a whole, and through SWOT analysis we will give an overview of strengths, weaknesses, opportunities and threats in order to come to conclusions regarding the research questions posed at the start of this thesis.

**Table 13. Reported selling price per kilo for citrus fruits in year 2012-2013.**

	variety	Price per kilo
Orange varieties		
	Navalina	15-17 cents/kilo
	Merlin	12-14 cents/kilo
	Common	6-9 cents/kilo
Mandarin varieties		
	Clementine	25 cents/kilo
	Nova	27-29 cents/kilo

Source: self-constructed data from interviews

**Table 14. Reported harvesting cost per kilo for citrus fruits in year 2012-2013.**

	harvesting cost
orange fruits	4 cents/kilo
mandarin fruits	5 cents/kilo

Source: self-constructed data from interviews

**Table 15. Reported production and size of Conventional orange orchards in Arta.**

	CONVENTIONAL orchards		
	“non-financially sound exploitations”	“financially sound exploitations”	
	Small holdings	Medium holdings	Large holdings
size of holdings (ha)	less than 1.5	from 1.5 to 4.5	more than 4.5
average Production per hectare (tons)	50		
average Production per holding (tons)	less than 75	from 75 to 225	more than 225

Source: self-constructed data from interviews

By combining this classification, which is based on the size of holdings, with the available quantitative data of Table 9 for the year 2007, it follows that the financially sound exploitations constitute approximately 10% of the total number of holdings in Arta. Respectively, non-financially sound exploitations constitute approximately 90%.

**Table 16. Reported production and size of Organic orange orchards in Arta.**

	ORGANIC orchards		
	“non-financially sound exploitations”	“financially sound exploitations”	
	Small holdings	Medium holdings	Large holdings
size of holdings (ha)	less than 1.5	from 1.5 to 5	more than 5
average Production per hectare (tons)	40		
average Production per holding (tons)	less than 60	from 60 to 200	more than 200

Source: self-constructed data from interviews

By combining this classification, which is based on the size of holdings, with the available quantitative data of Table 10 for the year 2007, it follows that the financially sound exploitations constitute approximately 80% of the total number of holdings in Arta. Respectively, non-financially sound exploitations constitute approximately 20%.



#### 4.4 REPORTED INFORMATION FROM CONDUCTED INTERVIEWS

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Monoculture of oranges is not just a source of income for citrus farmers of Arta. It is furthermore a cultural conduct transferred from previous generations, which constitutes a way of life and an experiential relationship among citrus products and local people. The region of Arta has been connected over the years to citrus cultivation in various forms. When citrus production flourishes in the region, the local community flourishes as a whole, since citrus cultivation is directly correlated to the income and profile of many local residents.

From the interviews two things surfaced. Firstly, the declining viability of small holdings in the region. Citrus farmers of Arta used to enjoy a high social status, as the average area of about 1 hectare per holding used to be adequate to cover family needs in the past. This is no longer the case, due to a number of factors which have been negatively influencing the citrus business in the region of Arta as a whole. Nowadays, this average area proves to be insufficient in order to cover family needs. Producers owning this size of citrus holding are having difficulties to keep their business going, and this situation does not seem to be improving.

Secondly, it became apparent that there is basically two types of citrus businesses, each with its own business model. The one type applies to farmers who run their citrus business as their main occupation and a commercial business. This we call a *financially sound exploitation*. These farms are typically larger than 15 hectares (see Table 15) and require continuous effort on a daily basis, in order to secure the necessary turnover. The other type applies to smaller citrus businesses which are owned by non-farmers, usually the result of inheritance distribution. These non-farmers use their citrus business as a means of supplemental income, and cannot make a living out of it, as the business provides not enough turnover. This type we call *non-financially sound exploitation*. In these cases, the owners usually transfer funds from their main income into their farming income and vice versa, depending on financial needs.

This *non-financially sound exploitation* business model has worked over the past 30 years, but as several of the interviewed owners of small holdings have explained, profits have been minimized due to the rising production costs relative to the selling prices of the citrus products. In fact, the low profits dictate that these smaller holdings need to be operated by family labor if they want to survive at all. By doing a lot of the work themselves, production cost can be cut down significantly. A commonly seen formula is an elderly male in the family - young people show very little interest to enter this kind of business - who for many years has been running the citrus business almost on his own. He has through his life gained the essential knowledge and experience in tasks such as pruning, proper watering and fertilizing, etc. Harvesting is mostly done by labor crews of traders. The other family members pursue other careers.

The first type, commercial citrus business, is in several aspects opposite to the smaller non-commercial holdings. Harvests are bigger and consequently there is more income. Costs are larger but can be more easily justified in the light of larger production, where the actual percentage of cost compared to income is lower. Larger farms generally have their own necessary capital equipment, such as tractor, which negates the need to rent them, thus allowing streamlining of the production. Where the smaller farms in most cases leave the harvesting to the traders, larger farms tend to take care of this themselves with their own crews, which is not only cheaper but also allows them to

make sure the trees stay in healthy condition (i.e. don't get damaged), and that the harvested fruits are also in the best possible state.

One of the largest farmers interviewed, in addition to his more intensive and committed way of working, has completely shifted his production to organic production. While the smaller farmers say that organic production is not feasible for them, for larger farms the organic way of producing is an interesting opportunity. Organic production does require more careful planning and meticulous care for the trees and soil, and because of the fact that chemical fertilizers which increase the yields of the trees are not applied to organic farming, the resulting harvest of one hectare will be lower than is the case in a conventional production system (see table 16). The added value of good quality citrus fruits with an organic certification lies both in the niche-market quality of the product, and also higher sales prices. Organic citrus fruits will sell for on average of 30% higher price than the same fruits without organic certification. In case of a large production this makes for a worthwhile increase in income, even though there is the certification cost and other extra cost and effort involved in the organic production process. For the smaller holdings, the organic certification cost as well as the required increased effort and more structural tasks which are involved in organic farming, form an obstacle to making the transition.

In many cases, the owners of these smaller holdings have limited knowledge and skills regarding citrus farming, most of it based on their own experience as well as on some tips of other (usually older) farmers in the region. Their strategy has for many years consisted of dealing as little as possible with the actual farming itself, in order to cut down on production cost and save time. Most of the average farmers have been reluctant to deal systematically with management and operation of their business. As a result, the majority of these farmers, consciously or not, have been distancing themselves from citrus farming by lowering their effort to maintain or improve the quality of their products.

Some inspiring alternative to this can be seen with one relatively young and successful farmer in the plain of Arta. Even though his holding incorporates only 3.5 hectares, which categorizes it as a medium size holding, this farmer has been running his citrus business as a fulltime occupation for many years now, with sufficient income as a result. The key to his success lies partly in his commitment to the quality of his product, but also for a large part in cleverly integrated management, and excellent connections in the trade. Starting point for him is the fact that the microclimate in this area is very conducive for citrus fruits to grow into a high quality product. As to the commitment, contrary to the attitude of most owners of small holdings, he is continuously present at his fields, performing and supervising everyday tasks, making sure that the personnel working in the fields is well aware of the job. For the most part he hires permanent laborers which negates the need to instruct them every time anew. This results in a more streamlined production process with less damage to trees and fruits. On the side of production cost, he has been able to cut down on the cost significantly by using manure as a biological fertilizer instead of the commonly used chemical fertilizers. Fertilizing is necessary in order to replenish chemical components that are lost from the soil each year, but not to the extent that most of the average farmers do. Manure is easily found in the area and very cheap compared to even the simplest chemical fertilizers. In illustration, typically a sack of 40 kilos of a simple chemical fertilizer costs around 30 euro, while a truck full of manure of twelve cubic meters, corresponding approximately to 100 sacks of 40 kilos, costs 30 euro as well. So only by using manure instead of

chemical fertilizers, the production cost is lowered significantly. Furthermore he applies much less fertilizer than what is commonly done.

Most of the average farmers have a tendency to apply too much fertilizer in order to have bigger production, but the amount and way of fertilizing has not been based on experience or any serious research. Instead the farmers copy the behavior of other farmers in the vicinity, because 'this is how it is done'. The same goes for dealing with insects that can do a lot of damage to the harvest. Excessive spraying of both fertilizer and pesticides however does not do any actual good to the harvest, but instead pollutes the groundwater and forms a threat to public health, as some farmers with sufficient educational background reported.

On the other hand, there is clearly a lack of cooperation between neighboring farms in this regard, as some farms do not treat their orchards at all while others do it intensely. Insects and diseases from an untreated orchard are easily carried over to neighboring ones. This applies not only to orchards of the small holdings but even to those of the larger ones, as in many cases their fields are spread out over an area and mostly surrounded by fields of neighboring farms. Both in case of the larger farms and the small non-commercial ones, there is a surprising lack of cooperation on these matters.

In general, there is very little cooperation between farmers, as emerged from the interviews. All the interviewed farmers reported that although there is lack of cooperation among them, they wish there would be, so they could enjoy the benefit from joint efforts. There are too few producer teams, most farmers just tend to their own business and cannot take advantage of collaborations either when buying seeds, fertilizer, manpower, or in any way take advantage of each other's strengths, knowledge and joint interests. Regarding growing of new varieties, it is essential for farmers to know which new species can successfully be cultivated under local conditions, and which risks are involved with certain new species. Unfortunately there is no official data available in this regard on behalf of the Ministry of Rural Development, no central guidelines or policy planning. In fact there is no research institute in the region where such data might be developed. There is only an Agricultural Research Station to do with a broad range of agricultural matters in general, and according to testimonies of the interviewed farmers, it is hardly active at all and even less so on the subject of citrus cultivation. As a result, it occurs regularly that some farmers try out a new variety of citrus fruit, only to find out after a number of years of growing the new trees, that this specific variety does not agree with local climatic circumstances, or requires a different composition of the soil.

Of course, cooperation between farmers is less essential for the financially sound exploitations, as due to their size of business and self-sufficiency, they manage to take care of their own needs and tasks without requiring help from other farmers. Still cooperation can be advantageous to them. But specifically for the smaller non-financially sound exploitations, cooperation with a number of other such enterprises provides opportunities which can be beneficial to all involved producers.

An intriguing topic is that of various subsidies which have been available to the citrus business industry. Although primarily intended to stimulate citrus production, some unfavorable side-effects can be observed. For example, up to the end of 2009, a subsidy was given to producers delivering oranges destined for juicing. To both farmers and juicing companies this initially proved advantageous, as farmers were assured a decent price for their product regardless of the quality, while juicing companies were able to

acquire their source material at a fraction of the actual market price. For many of the non-farmers owning small orchards, this arrangement provided an effortless way to attain some supplementary income. As a consequence, a general shift occurred from striving to produce edible oranges of high quality to producing any varieties of oranges regardless of quality, with the sole aim of selling these for juicing. For the smaller size orchards, it proved to be more profitable to sell their oranges to the juicing companies, regardless of the varieties of fruits they were producing. Since hardly any quality demands were made regarding fruits for juicing, there was no need to continue a high level of maintenance and cultivating tasks. When the subsidy program was terminated at the end of 2009, a lot of orchards were in poor condition, and had become dependent on the subsidy. For many of these holdings it had become unfeasible to continue production without the subsidy, and so they abandoned their orchards.

In all fairness, it must be noted that the subsidy was also clearly allocated to several citrus producers who applied for it in order to make some easy money. In several of the interviews with some more committed farmers, we heard of fraudulent activities which they were aware of among other farmers and traders, such as denoting of higher quantities of delivered fruits for juicing, in order to gain more subsidy. Although no official records exist of this, it seems that the lack of inspection regarding the validity of application and allocation of this subsidy had allowed some citrus producers and orange processors to unrightfully take advantage of this subsidy.

Some similar situations can be observed after the five year subsidy program for organic farming which was started in 2005. This grant was aiming to stimulate organic production in several branches of Greek agriculture. Specifically for citrus fruits, olives, grapes and pomes fruits, each stremma (1 stremma = 1,000m<sup>2</sup> = 0.1hectare) which was converted to organic production would be awarded with 90 euro of subsidy. Interestingly, according to critiques, between 2005 and 2006 there was an increase of about 520% in organic farms in general (not only citrus), while on the other hand after the halting of this specific subsidy program, the number of organic farms radically decreased again. In case of citrus farms in Arta, it can also be seen in Table 11, a decrease of 59% from 2007 to 2009 in organic citrus farming. These figures clearly show that some citrus producers had been taking advantage of this arrangement in order to make some money. As some of the committed citrus farmers who were interviewed reported, since the last contracts of the 5 year programs had been finished, many of the producers that took advantage of the subsidy without truly being committed to the organic policies have abandoned the organic objective.

At the same time, the testimonies refer to the fact that existing distribution channels are highly inadequate, specifically in the case of organic citrus products. The cause for this can be found in fragmented production of organic products. In order for Arta's organic citrus products to reach the niche organic markets, organic producers should join forces in cooperatives or production teams, and also be supported by government policies other than subsidies. From our interviews, the greatest organic commercial citrus farmer informed us that in the region of Arta, there is only one trader active who deals in organic fruits and holds his own packing and storage facilities at the same time. This puts the trader in a strong bargaining position, and the organic producers in a weak one. In general the traders in the region have a strong position, as specially the small non-financially sound exploitations take such a passive approach that their prices are continuously forced down, which in turn influences bargaining position of the more committed farmers.

## 5 RESULTS

The aim of this chapter is to illustrate the particularities of the business environment of citrus farming in the region of Arta. We will use the qualitative and quantitative data that we have gathered, and apply them to the theoretical framework provided in the third chapter. Furthermore, by means of an operating cost analysis based on statistical data, we will extract some basic economic indicators. These will be used to make a comparison between organic and conventional citrus farming in the region. Finally we present three distinguished key-factors which impede the citrus sector of Arta as a whole, as well as the development of organic citrus farming.

The chapter is structured in three sections. The first section presents the qualitative results which were drawn from our case study, while the second section presents the quantitative results. The aforementioned key-factors are presented in the last section.

### 5.1 QUALITATIVE DATA FROM INTERVIEWS

The following table shows a general SWOT analysis for conventional citrus farms. This analysis applies for both financially sound and non-financially sound exploitations.

**Table 16. SWOT ANALYSIS illustration of CONVENTIONAL citrus orchards in Arta.**

Strengths	Weaknesses
<ul style="list-style-type: none"><li>microclimate of Arta is favorable for good quality of citrus fruits</li></ul>	<ul style="list-style-type: none"><li>poor product standardization &amp; limited promotion</li><li>volatile pricing &amp; inconsistent quality</li><li>availability &amp; cost of skilled labor</li></ul>
Opportunities	Threats
<ul style="list-style-type: none"><li>proximity (exports) to Bulgaria</li><li>use of the port of Preveza</li><li>formation of production teams</li></ul>	<ul style="list-style-type: none"><li>phytopathological problems</li><li>cash flow problems of the Greek market</li><li>imported products from low cost international competitors</li><li>technical research capability (ex: policy planning for new varieties that can cope on the soil and climatic data of the area, availability of quantitative data for citrus sector)</li><li>possession of substantial areas of non-farmers</li><li>dependency to subsidy funds</li></ul>

Source: self-constructed data from interviews

The following table provides additional SWOT analysis elements which only apply to non-financially sound exploitations.

**Table 17. SWOT ANALYSIS illustration of “non-financially sound exploitations” of CONVENTIONAL citrus orchards in Arta.**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>family labor</li> </ul>	<ul style="list-style-type: none"> <li>small economies of scale &amp; poor mechanization (ex: rental of tractor)</li> <li>limited knowledge &amp; skills</li> <li>passive supporting activities (ex: hire temporary workers)</li> <li>passive primary activities (ex: harvesting executed by traders)</li> <li>no water access (drilling)</li> <li>no anti-frost protection</li> <li>low productivity</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>forming of production teams</li> </ul>	<ul style="list-style-type: none"> <li>part-time producers</li> </ul>

Source: self-constructed data from interviews

**External environment of “non-financially sound exploitations” of Conventional citrus orchards in Arta.**

New entrants of farmers owning small citrus orchards are not considered to be a threat for the existing small producers. Firstly, due to small scale economies and insignificant capital requirements, new coming small producers do not face financial entry barriers. Secondly, due to small margins of these small exploitations and the conduct of non-farmers, new entrants are not going to bring new capacity and competition for traders and resources. This is because the area that can be cultivated under citrus farming is more or less already utilized and the new farmers entering citrus farming are interested in financially sound exploitations. Regarding substitute products, there are no products that appear to satisfy the same established commercial needs with citrus products.

Bargaining power of these producers is narrow, due to the low volume of their individual production. Small producers are not likely to raise prices, as their individual share of supplied fruits is insignificant compared to the total volume of citrus fruits supplied in the market. In addition, although they constitute approximately 90% of conventional citrus producers in the region, these small producers are not involved in the cooperative or any of the few existing production teams. As a result of their disinterest in cooperation, they reduce the bargaining power of themselves, the cooperative and the few existing production teams. Consequently, bargaining power of traders who transact business with small producers is relatively strong. The narrow bargaining power of small producers allows traders to force down prices and dictate the trade in the region of Arta.

The business environment within small producers is characterized by low exit barriers arising from investments in specialized equipment, slow rates of citrus sector growth, competitors who are roughly equal in size, and is dominated by the conduct of non-farmers.

The following table provides additional SWOT analysis elements which only apply to financially sound exploitations.

**Table 18. SWOT ANALYSIS illustration of “financially sound exploitations” of CONVENTIONAL citrus orchards in Arta.**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• medium/large economies of scale &amp; adequate mechanization</li> <li>• technological &amp; mechanical know-how</li> <li>• water access (drilling)</li> <li>• anti-frost protection</li> <li>• sufficient productivity &amp; sanitation</li> </ul>	<ul style="list-style-type: none"> <li>• passive attitude of small non-farmers</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• commercial producers</li> <li>• distribution channels destined to exports</li> </ul>	<ul style="list-style-type: none"> <li>• new entrants (in the short term)</li> </ul>

Source: self-constructed data from interviews

**External environment of “financially sound exploitations”  
of Conventional citrus orchards in Arta.**

New entrants are considered to be a threat for the case of the financially sound exploitations. This is mainly due to medium or large scale economies and capital requirements, which bring new capacity and competition for traders and resources. On the other hand, the area that can be cultivated under citrus farming is more or less already utilized. Hence, new medium and large farms can appear when a number of small holdings is being merged. Consequently, entrance of bigger farmers by main occupation is expanding the competitiveness of the whole citrus sector of the region. Regarding substitute products, there are no products that appear to satisfy the same established commercial needs with citrus products.

As a rule for the medium and large size holdings, the larger the volume of citrus production, the stronger the bargaining power of these producers. These producers are more capable to raise prices, as their individual share of supplied fruits is significant compared to the total demand of citrus fruits as requested by the local traders. Consequently, bargaining power of traders who transact business with medium and especially with large producers is relatively weak. Nevertheless, traders are likely to be still dictating the trade in the region of Arta, as small producers are plentiful and the citrus fruits are roughly undifferentiated. On the other hand, there are international markets requesting large quantities of the product. In order to take advantage of this, medium and large producers are required to cooperate.

The business environment within medium and large producers is characterized by high exit barriers arising from investments in specialized equipment, and slow rates of citrus sector growth.

The following table shows a general SWOT analysis for organic citrus farms.

**Table 19. SWOT ANALYSIS illustration of ORGANIC citrus orchards in Arta.**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• microclimate of Arta is favorable for good quality of citrus fruits</li> <li>• medium/large economies of scale &amp; adequate mechanization</li> <li>• technological &amp; mechanical know-how</li> <li>• water access (drilling)</li> <li>• anti-frost protection</li> <li>• sufficient sanitation</li> </ul>	<ul style="list-style-type: none"> <li>• poor product standardization &amp; limited promotion</li> <li>• volatile pricing</li> <li>• availability &amp; cost of skilled labor</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• distribution channels destined to exports</li> <li>• use of the port of Preveza</li> <li>• consumer focus on organic "healthy" products</li> <li>• formation of production teams</li> <li>• commercial producers</li> </ul>	<ul style="list-style-type: none"> <li>• phytopathological problems</li> <li>• cash flow problems of the Greek market</li> <li>• imported products from low cost competitors</li> <li>• technical research capability (ex: policy planning for new varieties that can cope on the soil and climatic data of the area, availability of quantitative data for citrus sector)</li> <li>• advanced age of farmers</li> <li>• deficient cooperation among farmers for dealing with "insects-enemies"</li> <li>• accessibility to distribution channels for organic citrus fruits</li> <li>• dependency to subsidy funds</li> </ul>

Source: self-constructed data from interviews

### **External environment of Organic citrus orchards in Arta.**

New entrants are considered to be an opportunity for the case of organic producers. The areas that are already converted under organic citrus farming still cover a very small share out of the total citrus orchards. Moreover, a larger volume of organic citrus production in the region of Arta would enhance the possibilities for establishing an organic citrus market in the region, which in turn would attract more traders than the existing single one. Hence, the entrance of new organic citrus farmers will expand the competitiveness of the organic citrus sector of the region. Regarding substitute products, there are no products that appear to satisfy the same established commercial needs with organic citrus products.

Bargaining power of the existing organic producers is narrow, as the existing volume of supplied organic citrus production is small. In addition, even this small number of organic farmers has not formed a cooperative, neither a production team. As a result, their bargaining power cannot be enhanced by the joint effects that a cooperative or a production team can offer. Moreover, there currently exists only one trader who transacts business with organic citrus producers of the region of Arta. Consequently, this trader is likely to be powerful, even more so, as he can also be supplied by organic citrus farmers from the surrounding regions.

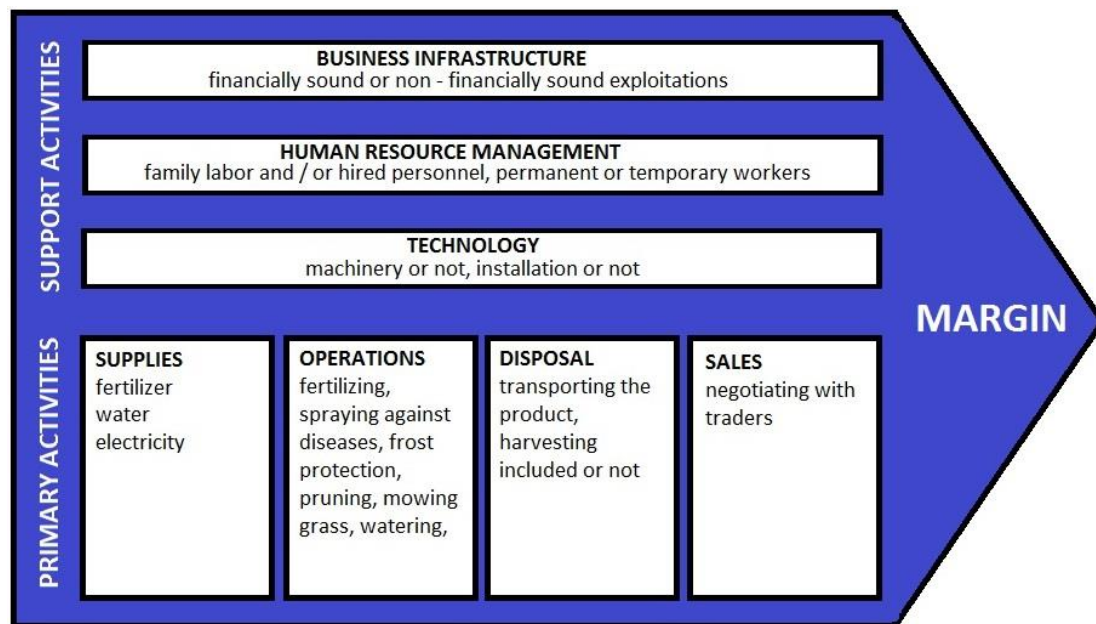


The business environment surrounding organic citrus producers is characterized by high exit barriers arising from investments in capital (such as building of fences around the orchards) and slow rates of citrus sector growth.

### **Internal environment of citrus businesses in Arta.**

The next figure illustrates the internal environment of the citrus businesses of Arta, based on the concept of Value Chain of Porter.

Figure 5.1. Value Chain of citrus businesses of Arta.



Source: self-constructed data from interviews

The above figure describes the possible set of primary and support activities which are adopted from citrus producers in Arta. Differentiations in the various elements of both primary and supporting activities, lead to the different profit margins that every individual citrus business of Arta succeeds. In the next section of this chapter, we attempt to quantify these activities, in order to approach the different margins which are created based on the type of farming chosen by each citrus producer.

## 5.2 QUANTITATIVE DATA FROM INTERVIEWS

In an attempt to approach the annual cost of production of conventional citrus farming in the region of Arta, we primarily approach the annual operating cost. This is because cost elements such as financial cost, but also the depreciation of fixed investments on capital equipment, vary significantly among farmers, depending on the type of cultivation chosen and their economic capabilities.

We define as operating cost the sum of costs of fertilizing, spraying for protecting trees from weather conditions and diseases, pruning, mowing grass for clearing the trees and creating compost or green manure, labor, insurance of production, water usage, electricity usage and organic certification.

**Table 20. Annual Operating Cost of Conventional citrus farming.**

Conventional citrus farming				
			S	M/L
1	<b>fertilizing</b>	2 kg per tree * 50 trees per stremma * 0.60 euro/kg	60	60
2	<b>spraying</b>	1) 5 euro/stremma	5	5
		2) 3 euro/stremma	3	3
		3) 14 euro/stremma	14	14
		4) 11 euro/stremma	11	11
3	<b>pruning</b>	(3 euro/tree * 50 trees per stremma) / 3 years	50	50
4	<b>cutting grass</b>	25 euro/stremma * 3 times per year	75	24
5	<b>labor</b>	1) 5 hours of labor per stremma * 4 euro/hour	20	20
		2) 7.5 euro/stremma * 3 times per year	22.5	12
6	<b>insurance</b>		15	15
7	<b>water usage</b>		7	7
8	<b>electricity usage</b>		8	8
<b>Average Operating Cost per stremma (euro)</b>			<b>290.5</b>	<b>229</b>

Source: self-constructed data from interviews

Compared to the medium and large holdings, the small holdings are confronted with an 27% approximately increase of average operating cost per stremma. The cause of this is outsourcing of cultivating tasks to third parties, which the small holdings apply as they do not possess the machinery which is needed for executing these tasks themselves. It should be noted that in our calculations we have not included the possible discounts that medium and large producers may obtain when buying fertilizers and medicines, as these discounts vary significantly.

Sales revenues are calculated as net revenues from selling the citrus fruits. Harvesting cost is charged to the trader as an established practice, except in the cases of large producers that hire out their own labor crews. Harvesting cost, as mentioned before, is 4 cents per kilo for orange fruits and 5 cents per kilo for mandarin fruits.

**Table 21. Sales Revenue of Conventional citrus fruits.**

	Conventional farming			
product	Orange		Mandarin	
variety	Navalina	Merlin	Clementine	Nova
Average Selling Price per kilo (euro)	0.16	0.13	0.25	0.28
Average Production per stremma (ton)	5	5	4	4
<b>Sales Revenue per stremma (euro)</b>	<b>800</b>	<b>650</b>	<b>1000</b>	<b>1120</b>

Source: self-constructed data from interviews

From the above table, it is easily concluded that mandarin has better economic returns per stremma than orange.

The following table calculates the profit margin based on the operating cost. It is further calculated for the basic varieties of citrus fruits produced in the plain of Arta and for both small and medium/large category of holdings. The assumption used is that the operating costs per stremma (as calculated in previous table) is the same for the basic varieties of oranges and mandarins, which is not far from reality according to what the interviewed farmers reported to us.

We consider it appropriate to reiterate that the operating cost in our approach does not equal the total production cost. In this case, the financial cost (borrowing costs) has not been calculated, since the financial needs are different for each producer. Basically, this financial cost concerns the medium and large producers who have invested in machinery. On the other hand, the same category of producers, achieves most of the time better selling prices.

**Table 22. Operating Profit Margin of Conventional citrus farming.**

	Conventional farming							
product	Orange				Mandarin			
variety	Navalina		Merlin		Clementine		Nova	
	S	M/L	S	M/L	S	M/L	S	M/L
Sales Revenue per stremma (euro)	800	800	650	650	1000	1000	1120	1120
Average Operating Cost per stremma (euro)	290.5	229.0	290.5	229.0	290.5	229.0	290.5	229.0
Operating Cost as percentage of sales (%)	36.31%	28.63%	44.69%	35.23%	29.05%	22.90%	25.94%	20.45%
<b>Operating Profit Margin (%)</b>	<b>63.69%</b>	<b>71.38%</b>	<b>55.31%</b>	<b>64.77%</b>	<b>70.95%</b>	<b>77.10%</b>	<b>74.06%</b>	<b>79.55%</b>

Source: self-constructed data from interviews

As expected, the operating profit margin is higher for the medium and large producers. For example, regarding the Merlin orange variety, medium and large producers have a margin of approximately 65% to reduce their selling prices without creating a loss for their business. Respectively, producers owning small citrus holdings have a margin of approximately 55%.

Regarding the product categories, it is obvious that the mandarin arboricultural crops enjoy higher profit rates. This fact has led many producers to shift from orange to mandarin production in recent years, and specially to the Nova variety which enjoys higher selling prices due to the typically exportable nature of it. Additionally, as many medium and large interviewed producers reported to us, they are trying to constrain their operating cost at 20% to 30% of their sales revenue.

Furthermore, we will attempt the analysis of the break-even point firstly in terms of the average selling price (given the production capacity of the orchard) and secondly in terms of the volume of production (given the average selling price). The model is simple, as we do not make use of composite cost elements that differentiate fixed from variable costs. Therefore, we do not further attempt to make a sensitivity analysis.

The first break-even point indicates how much the monetary value of sales could minimally be without having losses, by assuming stable production capacity of the citrus orchard for a given product category (orange or mandarin). The second break-even point reveals what could be the minimal level of production of the orchard without having losses, by assuming that the reported selling price remains constant. This second point is of particular value in periods of fruitlessness due to various causes, such as natural disasters, lack of proper trace elements found in ground, etc.

**Table 23. Break-even analysis of Conventional citrus farming.**

	Conventional farming							
Product	Orange				Mandarin			
Variety	Navalina		Merlin		Clementine		Nova	
	S	M/L	S	M/L	S	M/L	S	M/L
Average Selling Price per kilo (euro)	0.16	0.16	0.13	0.13	0.25	0.25	0.28	0.28
Average Production per stremma (ton)	5	5	5	5	4	4	4	4
Average Operating Cost per stremma (euro)	290.5	229	290.5	229	290.5	229	290.5	229
<b>Break-even point in terms of Average Selling Price (euro)</b>	<b>0.058</b>	<b>0.046</b>	<b>0.058</b>	<b>0.046</b>	<b>0.073</b>	<b>0.057</b>	<b>0.073</b>	<b>0.057</b>
<b>Break-even point in terms of Volume of Production (ton)</b>	<b>1.82</b>	<b>1.43</b>	<b>2.23</b>	<b>1.76</b>	<b>1.16</b>	<b>0.92</b>	<b>1.04</b>	<b>0.82</b>

Source: self-constructed data from interviews

The above table draws the following:

1. Break-even point in terms of the average selling price, on the basis of the production capacity of the orchard:

- The break-even point in terms of selling price per kilo is particularly low, which allows a large flexibility in price negotiations (assuming of course that the annual production is 5 tons per stremma for the orange and 4 tons per stremma for mandarin).
- For medium and large producers the breakeven point of selling price for the Navalina orange variety stands at 4.6 cents per kilo (approximately 3.5 times lower than its actual selling price) and the Nova mandarin variety stands at 5.7 cents per kilo (approximately 5 times lower than its actual selling price).
- For small producers the break even is comparatively higher, due to higher operating costs. Namely, for the Navalina orange variety it is about 3 times lower than its actual selling price, and for the Nova mandarin variety it is about 4 times lower than its actual selling price.

2. Break-even point in terms of the volume of production, on the basis of the average selling price:

- The break-even point in terms of volume of production, given the reported selling prices, is also at satisfactory levels. For example, for the category of medium and large producers, this breakeven point is 1.4 ton for the Navalina orange variety, when the average production capacity is 5 tons per stremma. Respectively, it is 0.80 ton (800 kilo) per stremma for the Nova mandarin variety, assuming an average production capacity of 4 ton (4000 kilo).
- Also this break-even point is significantly higher for small producers. For the Navalina orange variety it is 1.8 ton compared to 1.4 ton in case of medium and large producers.

Analogous to the above calculations of the annual operating cost of conventional citrus farming, we approach the annual operating cost of organic citrus farming in the next table. The cost of organic certification is added to cost elements that quantify the average operating cost.

**Table 24. Annual Operating Cost of Organic citrus farming.**

<b>Organic citrus farming</b>				
			<b>S</b>	<b>M/L</b>
1	<b>Fertilizing</b>	3 ton of manure per stremma every 2 years	12.5	10
2	<b>Spraying</b>	1) 5 euro/stremma	5	5
		2) 3 euro/stremma	3	3
		3) 6 euro/stremma * 2 times per year	12	12
3	<b>Pruning</b>	(3 euro/tree * 50 trees per stremma) / 3 years	50	50
4	<b>cutting grass</b>	25 euro/stremma * 3 times per year	75	24
5	<b>Labor</b>	1) 5 hours of labor per stremma* 4 euro/hour	20	20
		2) 7.5 euro/stremma * 3 times per year	22.5	12
6	<b>Insurance</b>		15	15
7	<b>water usage</b>		7	7
8	<b>electricity usage</b>		8	8
9	<b>certification</b>		18	8
<b>Average Operating Cost per stremma (euro)</b>			<b>248</b>	<b>174</b>

Source: self-constructed data from interviews

In the case of organic citrus farming, small holdings have approximately 43% higher operating cost per stremma than medium and large holdings. Regarding the type of farming, small holdings applying organic farming have about 17% higher cost than small holdings applying conventional farming, while medium and large organic holdings have about 32% higher cost compared to medium and large conventional holdings.

As emerged from the interviews, the market-related price of organic citrus fruits is approximately 30% higher than the equivalent price of conventionally grown citrus fruits.

**Table 25. Sales Revenue of Organic citrus fruits.**

	Organic farming			
product	Orange		Mandarin	
variety	Navalina	Merlin	Clementine	Nova
Average Selling Price per kilo (euro)	0.21	0.17	0.33	0.36
Average Production per stremma (ton)	4	4	3.2	3.2
<b>Sales Revenue per stremma (euro)</b>	<b>840</b>	<b>680</b>	<b>1056</b>	<b>1152</b>

Source: self-constructed data from interviews

For each different variety of oranges and mandarins, organic farming offers better economic returns than conventional farming. Although organic citrus production generates approximately 25% less yield than conventional production, organic citrus producers achieve approximately 30% higher selling prices for the equivalent products. As in the case of conventional farming, the above table shows that mandarin fruits have better economic returns per stremma than orange.

The following table calculates the corresponding profit margin based on the operating cost for the organic citrus farming.

**Table 26. Operating Profit Margin of Organic citrus farming.**

	Organic farming							
product	Orange				Mandarin			
variety	Navalina		Merlin		Clementine		Nova	
	S	M/L	S	M/L	S	M/L	S	M/L
Sales Revenue per stremma (euro)	840	840	680	680	1056	1056	1152	1152
Average Operating Cost per stremma (euro)	248	174	248	174	248	174	248	174
Operating Cost as percentage of sales (%)	29.52%	20.71%	36.47%	25.59%	23.48%	16.48%	21.53%	15.10%
<b>Operating Profit Margin (%)</b>	<b>70.48%</b>	<b>79.29%</b>	<b>63.53%</b>	<b>74.41%</b>	<b>76.52%</b>	<b>83.52%</b>	<b>78.47%</b>	<b>84.90%</b>

Source: self-constructed data from interviews



The following table calculates the corresponding break-even point both in terms of selling price and volume of production for organic citrus farming.

**Table 27. Break-even analysis of Organic citrus farming.**

	Organic farming							
product	Orange				Mandarin			
variety	Navalina		Merlin		Clementine		Nova	
	S	M/L	S	M/L	S	M/L	S	M/L
Average Selling Price per kilo (euro)	0.21	0.21	0.17	0.17	0.33	0.33	0.36	0.36
Average Production per stremma (ton)	4	4	4	4	3.2	3.2	3.2	3.2
Average Operating Cost per stremma (euro)	248	174	248	174	248	174	248	174
<b>Break-even point in terms of Average Selling Price (euro)</b>	<b>0.062</b>	<b>0.044</b>	<b>0.062</b>	<b>0.044</b>	<b>0.078</b>	<b>0.054</b>	<b>0.078</b>	<b>0.054</b>
<b>Break-even point in terms of Volume of Production (ton)</b>	<b>1.18</b>	<b>0.83</b>	<b>1.46</b>	<b>1.02</b>	<b>0.75</b>	<b>0.53</b>	<b>0.69</b>	<b>0.48</b>

Source: self-constructed data from interviews

In the preceding analysis we examined separately the reported quantitative data for the producers of conventional and organic citrus farming. Efforts were made to ensure economic data to be in line with reality in the region of Arta. For example, the average selling prices are based on prices recorded during the last 5 years, with only minor deviations from year to year. Assuredly, these prices concern the main volume of production and ignore exceptions of early and late varieties. Furthermore, the elements of the operating cost of production reflect the actual data that exists from this region in the relevant period. The operating cost elements as reported in previous tables (Table 20 & 24) are representative for the two major categories of farmers (small and medium/large). In the listed cost elements we have omitted cost elements that connect to cultivation practices which are nearly abandoned nowadays. For example, an important element of operating cost is mowing the orchard's grass in order to clean the ground's surface. Formerly, instead of mowing the grass, it was treated with strong chemical herbicides. Apart of killing the grass and weeds, these chemicals caused considerable damage to the environment and to the farmers' and consumers' health. The cost of using this strong chemical herbicides amounts to 4% of the cost of mowing the grass. The majority of farmers has by now abandoned this practice and shifted to mowing the grass instead. Since the use of herbicides is not so common anymore, we have left it out of our list.

Furthermore, in our analysis the findings are presented comparatively for organic and conventional producers. Distinctions are made between the main varieties of citrus fruits grown in the region of Arta (oranges and mandarins), further divided between

small and medium/large producers. The comparative presentation is made through key indicators of operating profit margin, cost with respect to the selling price and the break-even points both in terms of the volume of production and of the average selling price.

In any case, it is appropriate to reiterate that we do not refer to the total production cost, but only to the operating one. In the case that the financial cost and depreciation of mechanical equipment and other assets would be added, certainly these indicators would be formed at different levels.

**Table 28. Comparison of economic indicators between Conventional and Organic orange production.**

product	Orange							
variety	Navalina				Merlin			
	Small		Medium/Large		Small		Medium/Large	
	Conv.	Org.	Conv.	Org.	Conv.	Org.	Conv.	Org.
Operating Cost as percentage of sales (%)	36.31%	29.52%	28.63%	20.71%	44.69%	36.47%	35.23%	25.59%
Operating Profit Margin (%)	63.69%	70.48%	71.38%	79.29%	55.31%	63.53%	64.77%	74.41%
Break-even point in terms of Average Selling Price (euro)	0.058	0.062	0.046	0.044	0.058	0.062	0.046	0.044
Break-even point in terms of Volume of Production (ton)	1.82	1.18	1.43	0.83	2.23	1.46	1.76	1.02

Source: self-constructed data from interviews

**Table 29. Comparison of economic indicators between Conventional and Organic mandarin production.**

product	Mandarin							
variety	Clementine				Nova			
	Small		Medium/Large		Small		Medium/Large	
	Conv.	Org.	Conv.	Org.	Conv.	Org.	Conv.	Org.
Operating Cost as percentage of sales (%)	29.05%	23.48%	22.90%	16.48%	25.94%	21.53%	20.45%	15.10%
Operating Profit Margin (%)	70.95%	76.52%	77.10%	83.52%	74.06%	78.47%	79.55%	84.90%
Break-even point in terms of Average Selling Price (euro)	0.073	0.078	0.057	0.054	0.073	0.078	0.057	0.054
Break-even point in terms of Volume of Production (ton)	1.16	0.75	0.92	0.53	1.04	0.69	0.82	0.48

Source: self-constructed data from interviews

The comparative presentation of the results using the indicators set out above, show the following:

1. In all cases of different varieties of citrus fruits and different sizes of holdings, organic farmers are in better position than conventional ones. In particular,

- Operating cost of production as a percentage of sales is in all cases lower for the organic farmers. Indicatively mentioned as the lowest in Nova mandarin variety at 15.10% for organic versus 20.45% for conventional medium and large producers, and as the highest in Merlin orange variety at 36.47% for organic versus 44.69% for conventional small producers.
- Respectively, the formulation of operating profit margin is set at 84.90% for organic producers versus 79.95% for conventional producers of the Nova mandarin variety, and similarly at 63.53% versus 55.31% in case of the Merlin orange variety.
- The break-even point in terms of the average selling price is lower for organic farmers than it is for conventional farmers. In case of the Navalina orange variety, this break-even point is 4.4 cents for organic producers owning medium/large holdings, while the selling price is 21 cents . In contrast, this

break-even point of the same variety for conventional producers is 4.6 cents, while the selling price is 16 cents. This demonstrates a larger degree of flexibility for organic producers, since their potential to reduce the selling price without making a loss is up to 79.29% versus 71.38% for the conventional producers.

- The break-even point in terms of volume of production responds similarly. In all categories regarding the size of the holding and varieties, this breakeven point is significantly lower for organic producers than it is for conventional ones. Typical is the case of Nova mandarin variety, where the breakeven point is 0.48 ton (480 kilo) with potential of reducing the production up to 84.90% without having loss, whereas the estimated annual production is 3.2 ton. This is of particular importance in cases of exceptional fruitlessness, diseases, natural disasters, etc.

2. Moreover, in all varieties of oranges and mandarins the category of medium and large farmers shows better results. In particular,

- Operating cost of production as a percentage of sales in all citrus varieties is comparatively lower in the category of medium and large versus small producers.
- Operating profit margins are formed respectively. In all varieties, the operating profit margin of medium and large producers is comparatively higher.
- The breakeven point in terms of the average selling price for medium and large producers is comparatively lower than that of small producers. Thus, the potential of reduction of the selling price is formed at higher levels, providing a greater degree of flexibility for the medium and large producers.
- The break-even point in terms of volume of production responds similarly for all citrus varieties.

3. Another point that emerges while studying the data in this table, even though not relevant to the original frame of reference of this thesis, is the attractiveness of the mandarin product category and especially of the Nova variety. All reference indicators are comparatively better in terms of economic performance of this product. Indeed, during the last five years a tendency of farmers to switch from orange to mandarin production is observed in the region of Arta. This was also confirmed in the interviews with producers.

### 5.3 IMPEDING KEY-FACTORS

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During the interviews, many of the producers we spoke to expressed their concerns regarding viability of running a small citrus business. On the other hand, some of the quantitative data gathered during interviews and from official sources seems to be inconsistent with this impression. Nevertheless, from the qualitative data we have extracted a number of key factors which are at least threatening competitiveness of the sector. We will describe them one by one, for citrus farming in general and in addition specifically for organic farms. We will also refer to any discrepancies with the quantitative data where this is significant.

#### **KEY-FACTOR 1: Large number of “non-financially sound” exploitations**

As can be seen in Table 15 about 90% of the number of conventional citrus farms consists of small, non-financially sound exploitations. These small holdings face relatively high operating cost in relation to selling prices (Table 22). In order to reduce the annual operating cost, owners of these holdings minimize effort in cultivation and maintenance tasks. To some extent, family labor is applied (in order to keep these small businesses profitable), but in general a passive approach is practiced. In illustration, many producers let the traders come into the orchards to do the harvesting with their own laborers. For the producers the advantage of this is that they do not need to spend time in finding labor crews to do the harvesting. The disadvantage is that they distance themselves from the production process and while doing so they are weakening their bargaining position. This in turn has negatively affected the bargaining position of the larger holdings, which do depend on citrus production as their core businesses.

The above process as a whole and in parts has been reducing profits, which consecutively has led to receding commitment to the business among the farmers. Loss of specific knowledge and experience, and with it deterioration of the orchards and of the quality of the fruits are the outcome.

The large amount of these small holdings form also a key factor hampering development of organic farming in the area.

- First of all, organic citrus farming requires more systematic labor and more frequent cultivating tasks than conventional farming. Generally the small holdings are run by a single individual with minimal help from others, and they avoid systematic labor regarding their citrus farm. From this, it becomes clear that owners of small holdings are reluctant to shift to organic farming.
- Second, many owners of small holdings have an advanced age. They have relatively few years ahead of them to run their citrus business and they are generally not interested in making fundamental changes to their routines. Many such changes would be required, not only internally but also regarding their connections in the trade and distribution.
- Third, the owners of these small holdings are commonly of the opinion that organic farming yields lower profits than conventional farming. Here we must note that the quantitative data prove this opinion to be debatable at least, and so we will discuss it in chapter 6.
- Fourth is the fact that most of the owners of small holdings tend to copy each other's behavior, which means that when none or very few of them make the shift to organic farming, all the others feel 'there is probably a good reason for that'.

## **KEY-FACTOR 2: Effects and side effects of imposed policies**

Subsidies brought a temporary influx of money to citrus producers. The juicing subsidy was initially distributed to support small producers to keep their business going instead of abandoning it. The organic farming subsidy was distributed in order to stimulate producers to shift their production methods towards the new trend in agriculture. It appears however that these subsidies which were mentioned in the interviews suffered from a lack of governmental control.

Concerning the juicing subsidy, in many cases the producers taking advantage of the subsidy became dependent on it and abandoned their orchards after this subsidy was abolished. The trend of declining profitability has been discernible for many years, and it is well possible that the juicing subsidy for oranges has prolonged the life of a considerable number of small orchards that would otherwise have been abandoned sooner. Nevertheless, this specific subsidy seems to have been unable to give an impulse to the sector with positive effects on the long term. The cause to some extent is, that this subsidy provided no benefit for producing those products which are natural assets of citrus production in this region. Instead it provided a reward for producing lesser quality citrus products.

In case of the organic farming subsidy, during the period it was available for citrus fruits, many citrus producers attempted to shift towards organic cultivation of their orchards. Nevertheless, very soon after this subsidy was abolished, many of them gave up. It could be argued that without the subsidy, many would not have started organic farming in the first place, and that many might have stopped farming altogether if not for this additional money.

## **KEY-FACTOR 3: Limited distribution channels**

The existing citrus trade in the region of Arta has been largely shaped by the large number of non-financially sound exploitations. As these small holdings operate mostly on their own, without being united in producer teams or in the cooperative, they each individually have a weak bargaining position towards the traders. This effect is further augmented by the common practice of traders taking care of harvesting. Consequently the traders have a very strong bargaining position.

The existing distribution channels of citrus fruits of Arta are mainly connected to the domestic market of Greece. Due to economic recession which takes place in Greece nowadays, merchant dealers, central vegetable markets and supermarket chains face difficulty in paying the supplied fruits directly in cash. Hence, the existing distribution channels are insufficient to absorb supplied quantities of citrus fruits of the region at attractive prices for the producers, leading to suppression of the producer prices.

Given the insufficient existing distribution channels, connection to foreign markets constitutes an essential condition for further development of the citrus sector of the region of Arta. The growing market of Bulgaria creates a new destination for distributing local citrus fruits of Arta. Since Bulgaria entered the European Union, trading has become easier with this market. In addition, from a geographical point of view, Bulgaria is relatively close to the region of Arta. A separate promising opportunity for export is formed by proximity to port of Preveza, which lies approximately fifty kilometers away from the city of Arta. This port holds the appropriate infrastructure as required, and will allow transport of the local citrus fruits to foreign commercial ports at competitive rates.

## 6 GENERAL DISCUSSION AND CONCLUSIONS

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The most significant problem that emerged while dealing with the research questions, was the lack of sufficient quantitative data from official sources. Moreover, the acquired data from EUROSTAT and ELSTAT. did not cover recent years. Hence, right after gathering the existing data from official sources, a need emerged for collecting additional quantitative and qualitative data, in order to answer the initial research questions. The extracted information from the conducted face-to-face semi-structured interviews served as an insight in the local dynamics of the citrus sector in the region of Arta.

In the process of analyzing the collected quantitative data, we made some assumptions and created some average prices (as described in detail in the previous chapters) in order to process these data. We put an effort to assure these data to be in line with reality in the region of Arta. Nevertheless, these data ignore exceptions of early/late citrus varieties, cultivation practices which are nearly abandoned nowadays and cost elements which vary significantly among farmers. Moreover, they reflect the researched period of time and are representative for the two major categories of farmers we processed. In the case that the ignored specificities would have been taken into account, our economic indicators would have been formed at different levels. Consequently, these missing data that restrict the soundness of our conclusions, indicate relevant points for future research.

Critical economic, social and institutional factors determining the competitiveness of organic citrus production in relation with conventional production.

From the comparative analysis based on data resulting from our interviews, we have seen that organic citrus production can be more profitable than conventional citrus production. This applies definitely for the medium and large holdings, as the achieved operating profit margin is higher under organic farming. For small holdings the economic advantage is debatable, due to a couple of reasons. Firstly, our analysis is based on operating cost of production rather than total cost of production. Depending on the situation of specific orchards, there may be additional costs arising from fencing or planting buffer zones, and loss of productive area due to the presence of neighboring conventional orchards. From our acquired data it was not possible to calculate these costs, and as they will vary largely from one holding to the next, also the economic advantage of organic farming will vary. Secondly, there is still a minority of owners of small holdings that, in order to clear surface under the trees, apply chemical herbicides instead of mowing the grass. As chemical treatment is significantly cheaper than mowing, for these holdings the shift to organic production would include additional cost of mowing grass, which effectively turns the comparative analysis in their case in favor of conventional farming.

The seasonal rhythm of citrus production bears a socioeconomic impact on life and decision making of citrus producers of Arta. The citrus sector of the region is characterized by a large amount of small exploitations, a fact which is intertwined with the considerable percentage of producers using their citrus business as a supplemental source of income. Both of these characteristics are a result of an ongoing process of inheritance distribution. They have shaped the current structure of the sector, and engendered the passive attitude towards citrus farming that is commonly seen with the owners of the small holdings. An important consequence of this passive attitude is the common practice of harvesting by labor crews of the traders, which in turn causes the small producer's bargaining positions to weaken - which leads to more passivity. Among other reasons this self-reinforcing situation forms an obstacle to further development of organic production ways.

It is a fact that there has been a subsidy available for some years that stimulated organic citrus farming by bringing an influx of money to citrus producers. Nevertheless, this subsidy seems to have been unable to give an impulse to the organic citrus sector with positive effects on the long term. Therefore, it was not possible to enhance the competitiveness of organic citrus farming, as the initial number of entitled producers didn't manage to access the distribution channels which could absorb their production.



### Existing structure of the citrus sector in the region and its influence on the development of organic citrus production.

The citrus sector of Arta consists of a large amount of small, non-financially sound exploitations, of which only a few apply organic production ways, and a much smaller amount of medium and large size holdings. The non-financially sound exploitations are generally not inclined to shift to organic production, for several reasons. The more systematic nature of organic farming, the advanced age of several farmers, the discrepancy of producers' opinion about higher profit margins of organic farming with the numerical results of the comparative analysis and the tendency of the farmers to copy each other's behaviour, are the most pronounced reasons. Therefore, as small exploitations form such a large part of the sector, their negative attitude towards organic farming has a dominant effect.

In addition there is a lack of distribution channels, both in general and more specifically for organic citrus products. Currently organic citrus producers of Arta are forced to deal with the one single trader who is dealing with organic citrus products. This situation is not stimulating for conventional producers to shift to organic. Finally it must be noted that there is a serious lack of cooperation between both conventional and organic producers. Shifting to organic production could be much easier achievable by a number of producers joining forces.

### Key-factors determining the success of organic citrus farming compared to conventional citrus farming.

While we have seen mainly a number of causes and reasons which impede the development of organic citrus farming in our region, some positive conclusions also come to the foreground.

1. Medium and large holdings can be more profitable when applying organic production than when applying conventional production. This means that for anyone interested in citrus production as a viable business, organic production forms a very interesting opportunity.
2. The existing organic citrus farmers in the region welcome new entrants applying organic farming, as these strengthen the organic movement in general. On the other hand, organic citrus producers have not yet joined into producer teams or a cooperative. In order to improve their position in the national and international markets, cooperation is essential.
3. New distribution channels must be found in order to establish a healthy trade in organic products. As there is at the moment only one organic citrus trader active in the region, it is imperative that others will follow. Connection to international markets seems to provide the best opportunities, and this seems even more relevant due to the presence of the nearby port of Preveza.

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# APPENDIX

Questionnaire	
<ul style="list-style-type: none"> <li>❖ <b>Product:</b> Which are they?</li> <li>❖ <b>Process:</b> How do you treat them and when and how should they be improved.</li> <li>❖ <b>Customer:</b> To whom are you selling them?</li> <li>❖ <b>Distribution:</b> How do you deliver them?</li> <li>❖ <b>Finance:</b> What are the prices, costs and investments?</li> <li>❖ <b>Administration:</b> How do you manage your business?</li> </ul>	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• What advantages does your business have?</li> <li>• What do you do better than anyone else?</li> <li>• What unique or lowest-cost resources can you draw upon that others can't?</li> <li>• What do people in your market see as your strengths?</li> </ul>	<ul style="list-style-type: none"> <li>• What could you improve?</li> <li>• What should you avoid?</li> <li>• What are people involved in your sector likely to see as weaknesses?</li> <li>• What factors lose you sales?</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Which opportunities can you spot?</li> <li>• What opportunities are open to you?</li> <li>• What interesting trends are you aware of?</li> <li>• What trends could you take advantage of?</li> </ul>	<ul style="list-style-type: none"> <li>• What obstacles do you face?</li> <li>• What are your competitors doing?</li> <li>• Are quality standards or specifications for your job, products or services changing?</li> <li>• Is changing technology and government policies threatening your position?</li> </ul>
Political issues	Economic issues
<ul style="list-style-type: none"> <li>• government and trading policies</li> <li>• current legislation</li> <li>• lobbying</li> <li>• ecological/environmental issues</li> </ul>	<ul style="list-style-type: none"> <li>• home economy situation</li> <li>• distribution trends</li> <li>• market and trade cycles</li> <li>• seasonality/weather issues</li> </ul>
Social issues	Technological issues
<ul style="list-style-type: none"> <li>• lifestyle trends</li> <li>• ethical issues</li> <li>• consumer attitudes and opinions</li> <li>• major events and influences</li> </ul>	<ul style="list-style-type: none"> <li>• information and communications</li> <li>• research funding</li> <li>• associated/dependent technologies</li> <li>• replacement technology/solutions</li> </ul>

<b>Explanation of Conventional Annual Operating Cost table</b>	
<b>1. fertilizing</b>	
This task refers to additions of basic elements of the soil (mainly nitrogen, phosphorus and potassium). We assume fertile soils with appropriate PH. During the last three years, the average price of such compound fertilizers is 0.60 cents per kilo.	
<b>2. spraying</b>	
This task refers to the standard sprayings which are applied in conventional citrus cultivation: a)For protecting the trees from frost. It is a compound of copper which is applied after harvest. b)For protecting the trees from frost. It is a mixture of lime and copper (Bordeaux mixture) which coats the logs and is applied after harvest as well. c)For addressing diseases. It is an acaricide and fungicide homogenate which is applied during the summer. d)For addressing red spider and Mediterranean fly insects. It is applied during September.	
<b>3. pruning</b>	
Pruning takes place every 3 years. For most farmers, it is a task that is leased to skilled workers in pruning. Therefore, we do not include this task in the calculation of labor hours at the fifth element of the operating cost.	
<b>4. mowing grass</b>	
This task refers to cleaning the ground's surface. After mowing the grass, farmers decide to use it directly as green manure or for creating compost to fertilize the soil. The calculated cost for this task in the table concerns only small farmers. The cost of this task is approached at 8 euro/stremma * 3 times a year for the farmers who own the appropriate machinery for mowing grass (fuels, oils & consumable for the tractor). An alternative to mowing the grass, is the powerful herbicide "roundup" which costs 12 euro/stremma and is applied every 3 years, but is not applicable by the majority of the farmers anymore.	
<b>5. labor</b>	
This element of the operating cost refers to cost of the hours of labor paid to workers, excluding the corresponding hours for pruning and mowing the grass as these are already integrated in the calculation of the cost of these tasks. a)Calculated labor for fertilizing (when farmers do not make use of water lubrication) and for remaining maintenance tasks of the citrus orchard. b)Calculated labor for spraying (when there are no fixed spraying points). The cost of this task is approached at 4 euro/stremma * 3 times a year for the farmers who own the appropriate machinery for spraying.	
<b>6. insurance</b>	
This element refers to the cost of insurance of the production for compensation of possible natural disasters (frost, hail, etc.), which is done by the Greek Organization of Agricultural Insurance.	
<b>7. water usage</b>	
This element refers to the cost of water usage by the respective local organization for water management of Arta's prefecture.	
<b>8. electricity usage</b>	
This element refers to the cost of electricity usage as an approach based on the discounted rural electricity prices for use of drilling.	

<b>Explanation of Organic Annual Operating Cost table</b>	
<b>1. fertilizing</b>	
<p>This task refers to additions of basic elements of the soil (mainly nitrogen, phosphorus and potassium). We assume fertile soils with appropriate PH. A truck filled with manure dung (equal to 15 cubic meters of manure, which is approximately equivalent to 12 ton of manure) costs 100 euro. Thus, 3 ton of manure cost 25 euro. For medium and large farmers, the cost per truck is 80 euro. Thus, 3 tons of manure cost 20 euro for them.</p>	
<b>2. spraying</b>	
<p>This task refers to the standard sprayings which are applied in conventional citrus cultivation: a)For protecting the trees from frost. It is a compound of copper which is applied after harvest. b)For protecting the trees from frost. It is a mixture of lime and copper (Bordeaux mixture) which coats the logs and is applied after harvest as well. c)For addressing diseases. It is an acaricide and fungicide mixture of soap with industrial alcohol which is applied during the summer and early autumn and costs approximately 30 euro for making 1,000 liters for spraying 5 stremma.</p>	
<b>3. pruning</b>	
<p>Pruning takes place every 3 years. For most farmers, it is a task that is leased to skilled workers in pruning. Therefore, we do not include this task in the calculation of labor hours at the fifth element of the operating cost.</p>	
<b>4. mowing grass</b>	
<p>This task refers to cleaning the ground's surface. After mowing the grass, farmers decide to use it directly as green manure or for creating compost to fertilize the soil. The calculated cost for this task in the table concerns only small farmers. The cost of this task is approached at 8 euro/stremma * 3 times a year for the farmers who own the appropriate machinery for mowing grass (fuels, oils &amp; consumable for the tractor).</p>	
<b>5. labor</b>	
<p>This element of the operating cost refers to cost of the hours of labor paid to workers, excluding the corresponding hours for pruning and mowing the grass as these are already integrated in the calculation of the cost of these tasks. a)Calculated labor for fertilizing (when farmers do not make use of water lubrication) and for remaining maintenance tasks of the citrus orchard. b)Calculated labor for spraying (when there are no fixed spraying points). The cost of this task is approached at 4 euro/stremma * 3 times a year for the farmers who own the appropriate machinery for spraying.</p>	
<b>6. insurance</b>	
<p>This element refers to the cost of insurance of the production for compensation of possible natural disasters (frost, hail, etc.), which is done by the Greek Organization of Agricultural Insurance.</p>	
<b>7. water usage</b>	
<p>This element refers to the cost of water usage by the respective local organization for water management of Arta's prefecture.</p>	
<b>8. electricity usage</b>	
<p>This element refers to the cost of electricity usage as an approach based on the discounted rural electricity prices for use of drilling.</p>	
<b>9. certification</b>	
<p>This element refers to the acquirement of organic certification, which costs 200 euro per year and is furthermore scaled by the number of stremma. In particular, for orchards up to 50 stremma the certification cost increases by 5 euro per stremma. For orchards from 51 to 200 stremma the cost increases by 4 euro per stremma and for orchards of over 200 stremma the cost increases by 1.5 euro per stremma. Thus, we approached this cost for producers owning up to 15 stremma as <math>[200/15]+5=18</math> and for producers owning of over 51 stremma as <math>[200/51]+4=8</math>.</p>	