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Assessing the competitiveness and viability of tobacco in Greece and the potentials for further expansion

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EXECUTIVE SUMMARY

One of the most traditional and significant crops in the Greek agriculture economy, is Tobacco. Tobacco is of great significance, contributing to regional economy development, particularly in areas characterized as semi-mountainous with less fertile soils. Tobacco supports farm incomes and rural employment, and at the same time, offers various direct and indirect revenues to related activities around the tobacco cultivation and processing. The cultivation of tobacco the last decade was almost abandoned causing a devastating disarray in the tobacco areas, after the CAP decision to introduce decoupled payments and disconnect subsidies from production. The CAP change induced irreversible and devastating effects upon the development of several rural and less developed regions. Thousands of farmers stop cultivating tobacco and several processing industries ceased their activities, inducing the loss of many jobs and earnings, to farmers, workers and the economy.

The onset of the economic crisis (2010) brought spectacular shifts in the economy and in particular in agriculture. Thus, tobacco appears again to gain momentum and start to be cultivated again. Thus, the last five years a revival of oriental type (Basma and Katerini) tobacco cultivation is observed, mainly in areas of Macedonia and Thrace.

Within this context the current study aims to examine issues related to tobacco cultivation perspectives and future trends as Processing industries are interested to expand their activities and invest in new innovations. Processing industries are interested to know whether farmers are willing to stay in the specific tobacco areas and continue cultivating tobacco, in order to proceed to further investments, mainly regarding harvesting cost, which is very high in oriental type varieties.

Specifically, the study aims to **examine tobacco's viability and perspective (Basma and Katerini varieties) in Greece,** through the following aims:

1. to present a review outlook of the tobacco cultivation,
2. to identify the areas that oriental type tobacco is concentrated and is suitable for cultivation and expansion,

3. to perform a qualitative research, addressed to local farmers and stakeholders by field trips in the dominant areas (Komotini/Xanthi, Serres/Drama and Katerini/Elassona),
4. to present a comparison of tobacco production with other competitive crops through a cost analysis, and
5. to identify with a quantitative analysis the views of tobacco farmers regarding the willingness to continue the cultivation, taking into consideration issues such as the introduction of mechanical cultivation and harvesting.

Investigating the tobacco perspectives several sources of information have been used. Besides our own research a literature and data review was followed. Then, field trips to areas where tobacco is cultivated have been made. In those field trips discussions and interviews took place with tobacco farmers, stakeholders, administrators, local policy makers and entrepreneurs. Finally, a more extended survey followed to all potential areas selected with around one hundred questionnaires. The above data were synthesized, processed, analyzed and several insightful results derived, aiming to provide answers to the study's objectives:

1) A review outlook of the tobacco cultivation and identification of the areas that oriental type tobacco is concentrated and are suitable for cultivation and expansion

Observing information from historical and current data it can be seen that the tobacco production and process followed a more or less stable trend until the reform of 2003. During this period in Greece the policy makers decided to adopt fully decoupled (and not partial) payments for tobacco, a decision that proved destructive for the crop. Tobacco cultivation was almost abandoned, in 2009 only 26.776 tons were produce (from 187.396 in 1992). Basma and Katerini varieties continue to be cultivated only in specific areas of Macedonia and Thrace (Komotini/Xanthi, Katerini/Larissa and Serres/Drama, Thessaloniki). This directly affected the tobacco processing industry also, many companies ceased their activities with negative economic and social impacts (loss of incomes, exports and jobs).

Tobacco continue to be cultivated only in the regions of Eastern Macedonia, Thrace and Central Macedonia, specifically the **93%** of Oriental type varieties (48% and 45% respectively). Data indicate that 89% of the total national production of Oriental type tobacco is cultivated in six regional unities, Rodopi 34%, Xanthi 9%, Pieria 25%, Serres 13%, Thessaloniki 5% and Larissa

3%. The abovementioned areas continue cultivating tobacco even in the period were others areas stopped producing. Secondary and research data, along with stakeholders views, reveal that these areas are willing to continue cultivating tobacco, as they are suitable for the crop and they have the proper knowhow. **The majority of the respondents of the research states that they are willing to continue and expand the tobacco cultivation under new developments, such as mechanical harvesting, so they are overwhelmingly in favor of expanding the tobacco cultivation. Based on discussions with stakeholders there are strong indications that in the areas of Kastoria/Kozani, Thessaloniki and Thessaly (Larissa, Elassona) farmers are interested to engaged or expand tobacco cultivation.**

2) To perform a qualitative research, addressed to local farmers and stakeholders by field trips in the dominant areas to assess views about tobacco perspectives and encountered impediments

The discussions with stakeholders and farmers were very insightful, and from the discussions necessary information were collected, among others, about the perspectives of tobacco cultivation, the problems and views in specific issues such as the introduction of mechanical harvesting. The views of the stakeholders were coded in a SWOT analysis and presented in a comparative form for three different areas. **Results indicate that the stakeholders in the three areas strongly believe that the quality of their product is among the strong points of the crop; they rate it with very high points.** The same perception they have for their product reputation, and the superiority-suitability of the climate and soil conditions of their areas to cultivate tobacco. **In all the three major areas they are not completely satisfied with the yield magnitude, they believe that the crop can have fairly satisfactory returns and income. Among the most important weaknesses of the cultivation, according to farmers perceptions are the high harvesting labor cost and the small land areas they own and cultivate. Also they believe that legislation on taxes and insurance prevents the expansion of the cultivation**. The quality assurance of the product and generally any action towards the quality improvement of the production is viewed as desirable direction. Very good opportunities, for tobacco expansion, are considered the CAP measures, such as the young farmers establishment measure and the high demand for the oriental type varieties. It is also considered as a crop that offers a comparatively satisfactory complementary income. Mechanical harvesting is considered as a good opportunity in Serres/Drama, Katerini/Elassona

and Thessaloniki/Kastoria/Kozani while in Komotini opinions are more divided. The shift to alternative crops (grapes, kiwifruits) is viewed as better opportunity, though, the initial investment cost and the rate and time of return of the new investment prevent the shift (mainly in Katerini).

3) A comparison of tobacco production with other competitive crops via a cost analysis

The cost effectiveness of the tobacco cultivation compared to its competitive crops varies among the areas, mainly because same crop alternatives are not available everywhere. Regarding tobacco returns, results indicate marginal net returns in all areas. Though, this outcome changes and tobacco returns become profitable if we do not take into account the owned land cost (rent). As it can be seen another factor that affects significantly the production cost and the returns of the crop, is the harvesting cost. Based on the views of stakeholders and the available data for production cost, **results indicate that in Komotini/Xanthi area is hardly to find competitive alternative crops to tobacco**. Only cherries can provide better returns, though land is not suitable everywhere for cherry cultivation. Wheat and sunflower are used mainly for crop rotation where returns per dekar are very low compared to tobacco, thus in an area with very small farms (in dekars) the two crops cannot substitute tobacco. The cost structure and returns present more or less the same situation in Serres/Drama as tobacco remains the main choice, if we exclude tree crops such as almonds.

In Katerini the situation is totally different, kiwifruits and grapes are very strong alternatives to tobacco, with high returns. Based also on the SWOT analysis, the main reason that local farmers stay in tobacco, is the high initial investment cost to shift in the two alternatives and the long period for the investment payback. Nevertheless, promising area is in Elassona/Larissa especially in case of mechanization of harvesting.

4) A quantitative analysis to identify the views of tobacco farmers regarding the willingness to continue the cultivation, taking into consideration new developments such as the introduction of mechanical cultivation and harvesting

The quantitative analysis and the questionnaires were mainly designed to record issues related to tobacco cultivation (aims of the study) and especially to determine the farmers willingness to continue tobacco cultivation **under two distinct scenarios, the current condition**

and under mechanical harvesting. In particular, some critical questions in the survey were formulated in order to elicit data on respondents' views on the prospective change of mechanical harvesting and the special characteristics of each study area. Moreover, some questions regarding young farmers availability were also asked to tobacco growers.

Results of the quantitative research indicate that, although there is a general feeling in the society that tobacco growers are not satisfied with the tobacco cultivation, **most of the tobacco growers' (64%) are still willing to continue cultivating tobacco under existing conditions (Table 5.3.3.). Besides, respondents are also expressed overwhelmingly their willingness to continue the cultivation under mechanical harvesting conditions (Table 5.3.6.).** Almost in all research areas the tobacco growers' willingness to continue this cultivation is higher under the existing conditions. The areas where the tobacco growers' willingness to continue the cultivation is higher, under mechanical harvesting, are Katerini and Serres/Drama. Especially, in Katerini producers are disappointed and year per year replace tobacco cultivation by perennial crops, thus they see mechanical harvesting as a positive factor. **In Serres/Drama due to the structure of farms (big and not sloped) they see mechanical harvesting very positive; this opinion is much stronger in young farmers.** In Komotini/Xanthi area tobacco growers are not enthusiastic regarding the introduction of mechanical harvesting. They believe that other areas in Greece will enter in the tobacco cultivation as the crop will be more suitable for business style farms. This is the reason that a number of producers are not so positive in mechanical harvesting in Komotini and Xanthi.

Regarding the availability of work force (especially for harvesting) most of the respondents express problems mainly due to labor legislation (Table 5.3.1). Besides, tobacco growers believe that young people moved or stayed in their area (in all research areas) over the last years and this tendency will be maintained in the years to come (this was also seen by the demographic data, Table 2.7). It has been seen generally that tobacco growers are satisfied with producer prices and that are willing to continue cultivation under the current conditions and under changes such as mechanical harvesting. However, several respondents expressed negative response (43%) regarding the interest of young people for tobacco cultivation (Figure 5.3.1.). Finally, it's worth noting that only 6% of the producers are satisfied with the past producer price (Figure 5.3.2.) and they hope a better price will be achieved; the vast majority of tobacco growers desires significantly higher prices (increased by 30% or more). We can

interpret their response as a wish to have higher prices and moreover the question does not relate their answer with the willingness to continue the cultivation. Generally we can say that they find tobacco as a good cultivation and are willing to continue.

Generally from the analysis the following points can be underlined:

- Tobacco will continue to dominate as a main crop in the current areas where it is cultivated (Komotini/Xanthi, Serres/Drama) with a few impediments in Katerini area. However, it follows that tobacco started being cultivated in areas with know-how and will be expanded significantly, when mechanical harvesting will be introduced. Such areas could be included in Thessaly (Elassona), Kozani, Thessaloniki and Kavala.
- Introducing mechanical harvesting will boost the cultivation in larger farms and potentially to all areas where tobacco cultivation is known. This innovation could bring inter-farm and inter-area shifts but overall cultivation will remain and probably will further expanded.
- Policy regulations and legislation (taxes, insurance, labor fees) affect negatively the expansion of the crop and it must be revisited and be reformed.
- It seems that young people and farmers are willing to enter the crop production under improved cultivation conditions (mechanical harvesting) and as tobacco constitutes a crop that offers satisfactory returns with limited needs in initial investment needs and land size. Data regarding population changes and tobacco cultivation in the areas under study, indicate positive trends. For example in the area of Komotini/Xanthi the 28% of the population belongs to the dynamic age range between 30 and 49 years old while almost 40% of the population belongs to the promising age range 0-29 years indicating the potential of labor force in the area. In the rest of the areas' population is more or less stable, the only exemption is Serres/Drama where population leakages are observed. Data in tables 2.7 and 2.8 present the top 5 regional unities with Oriental type tobacco cultivation in comparison with population changes, for the period 2001-2014. As it can be seen, both Oriental type tobacco cultivation areas and population were increased in the specific areas, with only exemption Serres. Thus**, demographic data indicate a positive interest for tobacco cultivation in the specific areas, in the long run, as young people are engaged in the crop**.

- Regarding the viewpoints of tobacco growers about their kids' willingness to continue tobacco cultivation or not (Table 5.2.10) results show that 19% of them believe that their kids are willing to continue tobacco cultivation and 22% neither agree nor disagree. It is a significant share with positive view in continuing tobacco cultivation.
- The majority of the respondents believe that mechanical harvesting will be adopted by the farmers and will bring many benefits to them, to the local economies and it is not seen as a thread for the employment.
- Respondents expressed their strong willingness that tobacco cultivation will continue under existing conditions. Strong positive answers are coming from Xanthi (100%), Komotini (95%) and Kozani (57,1%); in Serres the views are divided and only in Katerini are negative.
- According to the respondents' answers the most important reason for the continuation are the: "Ownership of machinery/equipment" (62%), the "Guaranteed sale of production" (53%), "Because my kids are interested" (53%), the "Absence of alternatives" (52%) and the "Satisfactory income that offers" (52%), (table 5.3.4).
- The willingness to continue cultivating tobacco under mechanical harvesting is strongly positive in almost all areas. And the most important reasons that will continue tobacco cultivation under mechanical harvesting are: "Income increase" (57%), "Cultivation increase" (52%), "Limitation of hard work" (51%), "Suitable for old age farmers" (48%), "Absence of alternatives" (46%) and "Economic development of middle area" (35%) (table 5.3.7). On the other hand, among the reasons that respondents believe that will stop cultivation after mechanical harvesting are: "My land is not suitable for mechanical harvesting" (56%), "Tobacco cultivation will move to other areas" (53%), "The land in my area is not suitable for mechanical harvesting" (50%), "Concentration of cultivation in few big farmers" (49%), "Limits my bargaining power" (48%) and "Deterioration of quality" (46%) (table 5.3.8).

Based on the respondents views of the qualitative and quantitative research and the secondary data, it is believed that tobacco cultivation is considered, in the under study areas, a crop that can provide farmers with a satisfactory complementary income. Based on the land structure, climate and other farming conditions (cost structure) this income cannot be received by any other alternative crop, thus farmers will continue producing tobacco, and if new

developments emerge that will made their farming conditions better the cultivation will be expanded. Moreover, even they express their disappointment in issues such as the hardness of the job, the low prices etc, the farmers are willing to continue the cultivation.

1. Introduction

Tobacco crop has a long history for the Greek agriculture and economy. It is considered among the most traditional crops cultivated in the Greek land supporting farm incomes and employment and, at the same time, offering various direct and indirect revenues to local economies. Tobacco cultivation is of great significance in particular areas characterized as semi-mountainous with less fertile soils. Thus, tobacco cultivation supports the sustainability of those rural areas and their economic welfare.

Having in mind the above-mentioned elements apparently the role of tobacco cultivation in those regions plays a pivot and vital task. Thus, any policy decisions that affect directly or indirectly tobacco cultivation have impacts on the viability of the areas and the farmers engaged with the crop. Such a policy that affected significantly the areas specialized in tobacco cultivation, the last decade, was the CAP decision to decouple subsidies from production. The decision in 2005 to fully decouple subsidies induced significant impacts in the areas with specialization in tobacco cultivation. In specific, farmers abandoned the cultivation, since subsidies were not directly connected to production size. Farmers, though they were receiving the decoupled subsidies they didn't shift to other crops, as it was difficult to substitute tobacco cultivation with a crop with similar characteristics and benefits (Mattas et al., 2005; Fotopoulos et al., 1999; Mattas et al., 1999).

After the application of decoupled policy tobacco cultivation and processing were declined drastically. The policy changes induced irreversible and devastating effects upon the development of several rural less developed regions. Thousands of farmers stop cultivating tobacco and many processing industries ceased their activities, inducing the loss of many jobs and earnings, to farmers, workers and the country. Relevant statistics (see tables 2.1-2.3 and figures 2.1-2.3 below) indicate the sharp decrease in tobacco cultivated areas and production; the activity ceased all over the country and remained alive only in specific areas of Macedonia and Thrace.

A striking reverse of the abovementioned trend noticed after 2010 when Greece entered a prolonged economic crisis. During the economic crisis period unemployed people with rural origin returned back to their villages and engaged again with activities related to agriculture. One of the crops that attracted the interest of farmers was tobacco as it was a crop

that could support income and employment. The tobacco processing industries looking for oriental type tobacco varieties supported the revival of tobacco by technical advices. Thus, the last five years a revival of oriental type (Basma and Katerini) tobacco is observed in areas of Macedonia and Thrace, such as the regional unities of Komotini, Xanthi, Serres and Katerini where more than 90% of the production is concentrated.

Within this context the current study aims to examine issues related to tobacco cultivation perspectives and future trends. Processing industries are interested to expand their activities and invest in new innovations, though they are questioning whether farmers are willing to stay in the specific tobacco areas and continue cultivating tobacco. The most crucial problem that tobacco cultivation faces is the high production cost and specifically the harvesting cost which is about 30% of the total cost in the case of oriental type varieties. Reducing the harvesting cost, through the introduction of specific harvesting machines is a studied solution in order for the cultivation to become more attractive. Reducing substantially the production cost and increasing net earnings farmers will probably be able to face effectively price volatility and stick with the tobacco cultivation.

Sequentially, the study's basic objective is **to examine tobacco's viability and perspective (Basma and Katerini varieties) in Greece**. The viability depends on several factors and the most determinant for the future of tobacco cultivation are identified and studied in the current report. Thus, the study is focusing particularly on the following sub-objectives:

1. To have a backward review outlook of the tobacco cultivation and the main production elements related to tobacco perspectives. To study relevant issues in the literature for Oriental type tobacco cultivation regarding the varieties, the cultivated areas and production historically.
2. **To identify the areas that oriental type tobacco is concentrated and is suitable for cultivation and expansion.** The identification to be based on secondary information regarding historical data (time series) about the cultivation along with demographic trends.
3. To visit the abovementioned areas (**field research**) and discuss with the local farmers and stakeholders in the form of in depth interviews (Qualitative research) to assess views of the locals regarding tobacco cultivation problems and perspectives.

4. To present the **existing and potential competitiveness of the tobacco production in comparison with other available crops of the particular areas.** Thenceforth, the following two scenarios are presented and illustrated:

   Scenario 1: Future trends in tobacco cultivation under the current situation.

   Scenario 2: Future trends in tobacco cultivation after adopting mechanical harvesting

5. To identify the views and perceptions of producers and stakeholders via detailed **quantitative research** (field research) regarding the willingness to continue and increase the tobacco cultivation, taking into consideration specific problems and limitations (mechanical harvesting, young farmers interest).

Following the objectives and aim of the study, the manuscript is organized as follows: In the first section -introduction- a short description of the problem under examination and the aims of the study have been presented. In the second section on the base of historical data the significance and the current status of tobacco cultivation as well as the demographic characteristics of the studied areas are presented. In the third section a SWOT analysis based on a qualitative field research (viewpoint of stakeholders) is described. Then, a cost-effectiveness analysis of the tobacco cultivation in comparison with the main competitive crops in those areas is presented. In the fifth section, the results of the quantitative research, addressed to tobacco farmers, are presented, while in the final section the main conclusions are drawn.

2. A condensed outlook

2.1. Historical records and tobacco crop significance

Tobacco cultivation and processing has long recognized as one of the most traditional Greek agricultural products. Tobacco cultivation and tobacco processing constitute the sectors that offer satisfactory incomes and a significant number of jobs to rural Greek regions.

Tobacco cultivation commenced in the early of the 20th century and afterward flourished, highly appreciated by the farmers. This interrupted by the introduction of sequential CAP reforms. Relevant studies and statistics indicate that during the 1950s, 5% of the total agricultural land was cultivated with tobacco and more than 200.000 families earn part of their farm income from the crop. Additionally, about 40.000 people were employed by the processing companies. Many others were engaged in tobacco related activities directly or indirectly, such tobacco trade and exports, cigarettes sales etc. It is mentioned that during that period (1954) from the country's, 151 mn dollars, total exports the 50% were exclusively coming from tobacco exports (Mattas et al., 1997; Efstratoglou, 1994; Zografos, 1976).

The above data indicate tobacco economic importance, though many other reasons justify its social role. Infertile, semi-mountainous, no-suitable for other crops areas all over the country were not abandoned due to tobacco crop. A well fitted crop to Greek small size agriculture and less capital intensive and more labor intensive activity. Table 2.1 below, indicates the historical evolution of the production which looks to continue with an upward trend until 1992. In 1992 the MacSharry reform (EC Regulation no. 2075/92) took place aiming to reduce the cost of support to tobacco and limit the cases of fraud. With the 1992 reform a regime of production quotas was imposed causing severe reductions in the produced quantities (see table 2.1).

Table 2.1. Historical Tobacco Production in Greece (1833-2015)

Year	Production in tons
1833	331
1910	4,114
1923	33,116
1950	58,451
1970	94,810
1980	118,900
1990	120,101
1992	187,396
1996	133,751
2002	116,087
2008	28,247
2009	26,776
2010	29,949
2011	32,043
2012	34,250
2013	40,613
2014	40,940
2015	37,031
2016	37,213

Source: Vasiliades and Lolas (1996); Mattas et al. (1997); ELSTAT (2017).

The production process followed a more or less stable trend until the reforms of 2003. During this period a new reform took place introducing the measure of decoupled payments; in Greece the policy makers decided to adopt fully decoupled (and not partial) payments for tobacco, a decision that proved destructive for the crop. Tobacco cultivation was almost abandoned, in 2009 only 26.776 tons were produce. Basma and Katerini varieties continue to be cultivated only in specific areas of Macedonia and Thrace (Komotini, Katerini and Serres). The tobacco cultivation abandonment directly affected the tobacco processing industry; almost all companies ceased their activities with severe employment and income losses, especially in the areas where tobacco crop was concentrated. A dynamic sector with long history and tradition in the country, along with other indirectly related activities (cigarettes, kiosks, trading companies, exports, tax revenues, etc) severely affected with devastated impacts upon the rural economy (see Mattas et al., 2005).

The period after 2008 when the economic crisis and instability affected the Greek economy, the agro-food sector demonstrate a striking resilience reviving several sectors among

them tobacco as well. At the same time tobacco processing companies ignited the engine and start a new tobacco campaign.

According to the FAOSTAT (2017), during the last 60 years there is an important decrease in terms of tobacco area harvested in Greece. Especially during the last 10 years the cultivated land of tobacco (all types of tobacco, unmanufactured) has been almost stabilized with small fluctuations at lower levels (figure 2.1).

Figure 2.1. Historical Tobacco Area Harvested (ha) in Greece (1960-2016, FAOSTAT)

According to the same source (FAOSTAT, 2017), during the last 60 years there is a clear increasing trend of tobacco yields (hg/ha, where: 1 hg = 0,1 kg) in Greece. However, over the last 10 years the tobacco yields in Greece (all types of tobacco, unmanufactured) presents significant fluctuations and variations (figure 2.2).

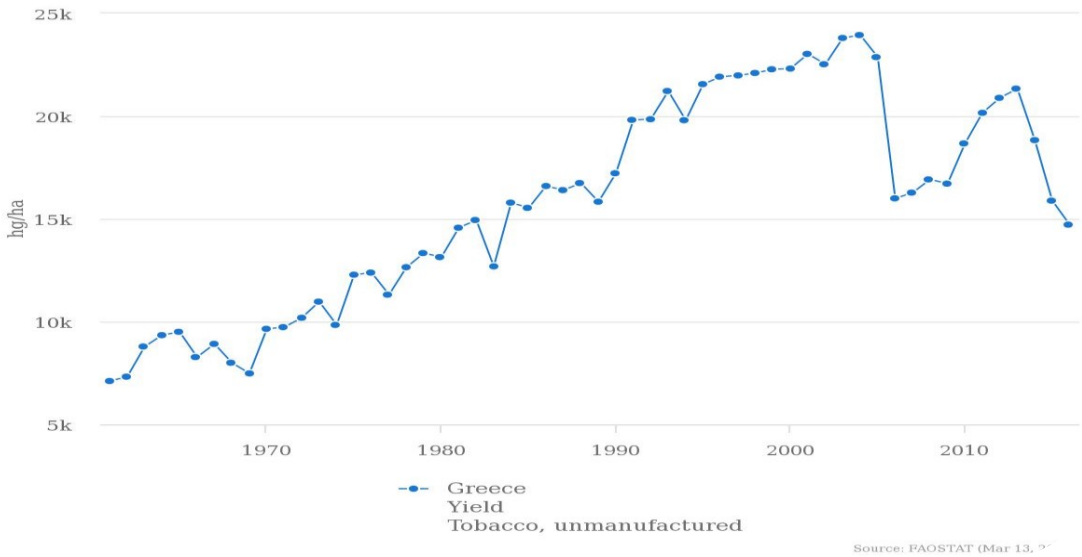

Figure 2.2. Historical Tobacco Yield (hg/ha) in Greece (1960-2016, FAOSTAT)

On the other hand (FAOSTAT, 2017), between 2005 and 2016 the tobacco Production Quantities in Greece (all types of tobacco, unmanufactured) has been almost stabilized (figure 2.3).

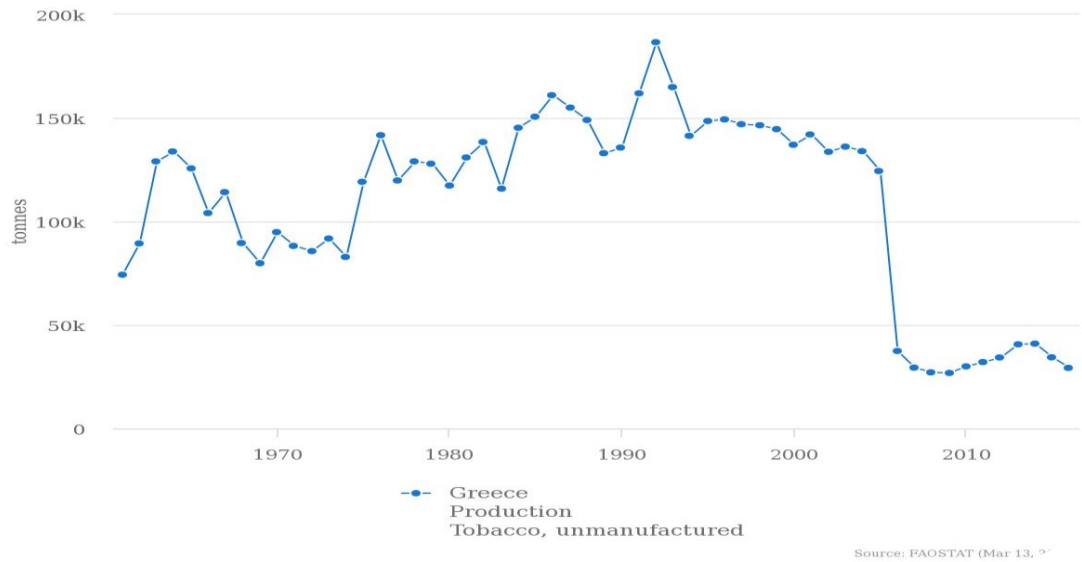

Figure 2.3. Historical Tobacco Production Quantity (tons) in Greece (1960-2016, FAOSTAT)

2.2. Up-to-date status

In the current section the tobacco cultivation status will be presented shortly, focusing on oriental type varieties (Basma and Katerini). Basic data (indicative time series) regarding quantities produced and cultivated areas per regional unity (prefecture) will presented. This is to identify the production trends, in the last years, and identify the areas that tobacco attracted the interest of farmers. The identification of these areas, is among the aims of the current assignment and will set the study-sample area for the qualitative and quantitative research, that follows.

2.2.1 Tobacco cultivation

In table 2.1 above an historical development of tobacco production (quantities) was presented, indicating important breaks related mainly to policy changes. In table 2.2, a detailed picture of tobacco cultivation is presented, indicating tobacco areas cultivated with Oriental (Basma and Katerini) and American (Virginia and Berley) type. The data cover the whole country and are presented per NUTS 2 region and regional unity. Three indicative years are shown for comparison purposes; the most recent available (2015 and 2011) and 2002 before the application of decoupled payments in the tobacco regime.

The data in table 2.2 indicate that the tobacco cultivation is highly concentrated in specific areas (Macedonia and Thrace regions). The total areas cultivated all over the country during 2015 were 169,623 dekars with oriental type varieties and only 29304 with American type varieties. A sharp reduction in cultivated areas since 2002 is observed, for both Oriental and American type varieties; the decrease is much sharper in American type varieties (Virginia and Burley). The data in table 2.2 and 2.3 for 2002 regarding Oriental type tobacco production and cultivation concerns a number of oriental type varieties apart from Basma and Katerini (KK Klassika, Elassona, Myrodata Agriniou, Tempelia, Mavra). Whereas, today only Basmas and Katerini are cultivated and all the other varieties are abandoned.

As also mentioned in the previous section an increase in the cultivated areas is observed for both types (see the increase from 2011 to 2015, in table 2.2). **After the sharp reduction of the cultivation, due to the adoption of fully decoupled payments regime,**

tobacco cultivation the last years reverts, particularly Oriental type varieties (Basmas and Katerini). Despite the reduction in the cultivated areas since 2002, the geographical distribution of the areas remained almost the same. In the regions of Eastern Macedonia and Thrace and Central Macedonia is cultivated the **93%** of Oriental type varieties (48% and 45% respectively). All the other regions of the country have minor contribution in tobacco cultivation. Observing more carefully the data of table 2.2, it can be seen that tobacco cultivation is even further concentrated in specific regional unities of the abovementioned two regions. Namely, 89% of the total national production of Oriental type tobacco is cultivated in the following regional unities, **Rodopi 34%, Xanthi 9%, Pieria 25%, Serres 13%,Thessaloniki 5% and Larissa 3%** (figure 2.4.)

Thus any discussions about tobacco cultivation examination should be concentrated in these areas. By examining these areas the results of the quantitative research will provide safe and representative results.

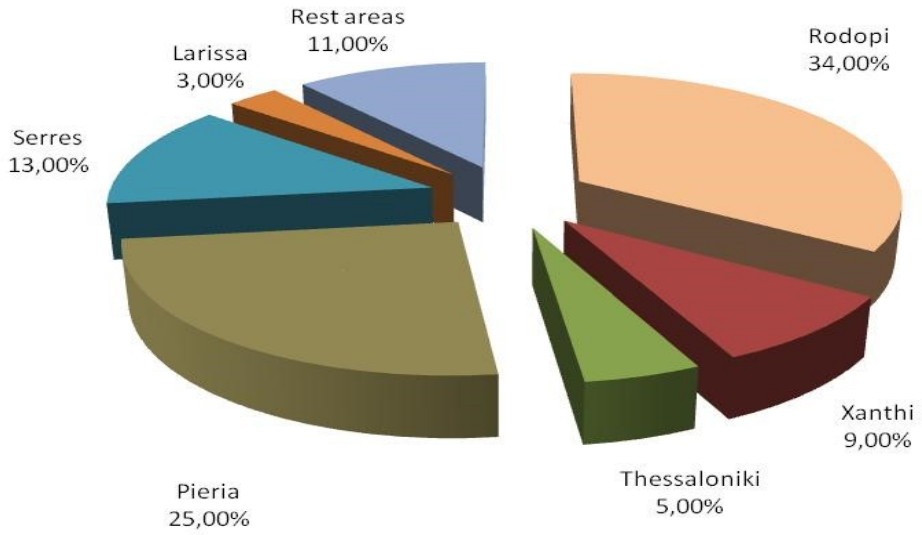

Figure 2.4. Tobacco cultivated land (ha) in Greece (2015, ELSTAT)

Table 2.2. Tobacco areas per Region (NUTS 2) and Regional Unities

	2015				2011				2002			
	Oriental type		Berley, Virginia		Oriental type		Berley, Virginia		Oriental type		Berley, Virginia	
	dekars		dekars		dekars		dekars		dekars		dekars	
Greece	**16962**	**100**	**2930**	**100**	**14411**	**100**	**1481**	**100**	**37398**	**100**	**15335**	**100**
E.M.T.	**81073**	**48%**	**1422**	**5%**	**70304**	**49%**	**2961**	**20%**	**11126**	**30%**	**2868**	**2%**
Rodopi	58113	**34%**	0	**0%**	48417	**34%**	1750	**12%**	67906	**18%**	1239	**1%**
Drama	2608	**2%**	92	**0%**	1227	**1%**	0	**0%**	3742	**1%**	414	**0%**
Evros	3699	**2%**	0	**0%**	1538	**1%**	1101	**7%**	4551	**1%**	170	**0%**
Thasos	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**
Kavala	974	**1%**	0	**0%**	554	**0%**	0	**0%**	5192	**1%**	0	**0%**
Xanthi	15679	**9%**	1330	**5%**	18568	**13%**	110	**1%**	29872	**8%**	1045	**1%**
Central	**76605**	**45%**	**4198**	**14%**	**64248**	**45%**	**1941**	**13%**	**16854**	**45%**	**42922**	**28%**
Thessaloni	8199	**5%**	1228	**4%**	2384	**2%**	854	**6%**	17305	**5%**	4682	**3%**
Imathia	815	**0%**	2300	**8%**	1622	**1%**	70	**0%**	9084	**2%**	4665	**3%**
Kilkis	2749	**2%**	248	**1%**	508	**0%**	944	**6%**	8719	**2%**	10308	**7%**
Pella	570	**0%**	404	**1%**	170	**0%**	0	**0%**	12018	**3%**	23081	**15%**
Pieria	41863	**25%**	0	**0%**	43699	**30%**	3	**0%**	74948	**20%**	7	**0%**
Serres	22376	**13%**	18	**0%**	15836	**11%**	70	**0%**	45058	**12%**	58	**0%**
Chalkidiki	33	**0%**	0	**0%**	29	**0%**	0	**0%**	1408	**0%**	121	**0%**
West Mac.	**5396**	**3%**	0	**0%**	**3023**	**2%**	**259**	**2%**	**28558**	**8%**	**0**	**0%**
Kozani	3388	**2%**	0	**0%**	1418	**1%**	259	**2%**	15475	**4%**	0	**0%**
Grevena	1470	**1%**	0	**0%**	985	**1%**	0	**0%**	9826	**3%**	0	**0%**
Kastoria	530	**0%**	0	**0%**	559	**0%**	0	**0%**	1837	**0%**	0	**0%**
Florina	8	**0%**	0	**0%**	61	**0%**	0	**0%**	1420	**0%**	0	**0%**
Epirus	**16**	**0%**	**1**	**0%**	**20**	**0%**	**0**	**0%**	**1794**	**0%**	**171**	**0%**
Thessally	**5081**	**3%**	**2009**	**69%**	**4942**	**3%**	**8085**	**55%**	**24526**	**7%**	**25503**	**17%**
Larissa	4804	**3%**	1294	**4%**	4778	**3%**	1306	**9%**	21080	**6%**	1514	**1%**
Karditsa	0	**0%**	1416	**48%**	10	**0%**	2749	**19%**	2040	**1%**	15632	**10%**
	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	37	**0%**
Sporades	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**
Trikala	277	**0%**	4642	**16%**	154	**0%**	4030	**27%**	1406	**0%**	8320	**5%**
Central	**73**	**0%**	**3030**	**10%**	**1220**	**1%**	**1141**	**8%**	**1432**	**0%**	**37398**	**24%**
Pthiotida	73	**0%**	2480	**8%**	1220	**1%**	820	**6%**	1292	**0%**	34551	**23%**
Ionian	0	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Western	**1379**	**1%**	**555**	**2%**	**361**	**0%**	**428**	**3%**	**34049**	**9%**	**43837**	**29%**
Achaia	0	**0%**	0	**0%**	34	**0%**	0	**0%**	0	**0%**	0	**0%**
Etolia Akarr	1379	**1%**	555	**2%**	327	**0%**	428	**3%**	34049	**9%**	43837	**29%**
Ilia	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**
Peloponne	0	**0%**	0	**0%**	**0**	**0%**	**0**	**0%**	**3820**	**1%**	**656**	**0%**
Attica	0	**0%**	0	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Northern	0	**0%**	0	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Southern	0	**0%**	0	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Crete	0	**0%**	0	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**

Source: ELSTAT, various years

Table 2.3, presents in the same way as table 2.2, the quantities produced (in tons) per region and regional unity. As it can be seen, the decrease in quantities produced, since 2002, is as sharp as in the case of cultivated areas shown in table 2.2. The production distribution per region and regional unity follows exactly the same patterns as in the case of cultivated areas. The same regional unities produce Oriental type of tobacco. Thus, 83% of the total national production of Oriental type tobacco is produced in five regional unities, Rodopi 24%, Xanthi 10%, Pieria 30%, Serres 14%, and Thessaloniki 5%. A difference here, compared with the cultivated areas, can be seen in the case of Rodopi and Katerini. In the case of Rodopi the share of quantities produced is less than the share of cultivated areas, whereas the opposite happens in the case of Katerini. This is because Basmas variety has lower per dekar yield than Katerini variety.

Table 2.3 Tobacco production per Region (NUTS 2) and Regional Unities

	2015				2011				2002			
	Oriental type		Berley, Virginia		Oriental type		Berley, Virginia		Oriental type		Berley, Virginia	
	tons		tons		tons		tons		tons		tons	
Greece Total	**26736**	**100%**	**10296**	**100%**	**26991**	**100%**	**5052**	**100%**	**63781**	**100%**	**52306**	**100%**
EMT	**10396**	**39%**	**444**	**4%**	**9642**	**36%**	**386**	**8%**	**13404**	**21%**	**864**	**2%**
Rodopi	6479	**24%**	0	**0%**	6772	**25%**	241	**5%**	8400	**13%**	381	**1%**
Drama	688	**3%**	24.65	**0%**	311	**1%**	0	**0%**	611	**1%**	110	**0%**
Evros	399	**1%**	0	**0%**	211	**1%**	121	**2%**	407	**1%**	55	**0%**
Thasos	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**
Kavala	217	**1%**	0	**0%**	109	**0%**	0	**0%**	783	**1%**	0	**0%**
Xanthi	2613	**10%**	419	**4%**	2238	**8%**	23	**0%**	3203	**5%**	319	**1%**
CM	**13933**	**52%**	**1233**	**12%**	**15187**	**56%**	**1033**	**20%**	**30266**	**47%**	**15746**	**30%**
Thessaloniki	1238	**5%**	324	**3%**	391	**1%**	152	**3%**	2263	**4%**	1490	**3%**
Imathia	192	**1%**	779	**8%**	379	**1%**	28	**1%**	1830	**3%**	1776	**3%**
Kilkis	524	**2%**	49.6	**0%**	102	**0%**	840	**17%**	1468	**2%**	2987	**6%**
Pella	103	**0%**	76.18	**1%**	32	**0%**	0	**0%**	2197	**3%**	9444	**18%**
Pieria	8112	**30%**	0	**0%**	11087	**41%**	1	**0%**	15228	**24%**	4	**0%**
Serres	3757	**14%**	3.78	**0%**	3188	**12%**	12	**0%**	7052	**11%**	15	**0%**
Chalkidiki	7	**0%**	0	**0%**	7	**0%**	0	**0%**	228	**0%**	31	**0%**
WM	**865**	**3%**	0	**0%**	**634**	**2%**	**29**	**1%**	**4458**	**7%**	**0**	**0%**
Kozani	546	**2%**	0	**0%**	294	**1%**	29	**1%**	2558	**4%**	0	**0%**
Grevena	252	**1%**	0	**0%**	198	**1%**	0	**0%**	1407	**2%**	0	**0%**
Kastoria	65	**0%**	0	**0%**	124	**0%**	0	**0%**	214	**0%**	0	**0%**
Florina	2	**0%**	0	**0%**	18	**0%**	0	**0%**	279	**0%**	0	**0%**
Epirus	3	**0%**	**0**	**0%**	**1**	**0%**	**0**	**0%**	**543**	**1%**	**59**	**0%**
Thessally	**1228**	**5%**	**7493**	**73%**	**1180**	**4%**	**2845**	**56%**	**5509**	**9%**	**7227**	**14%**
Larissa	1174	**4%**	424	**4%**	1130	**4%**	447	**9%**	4751	**7%**	486	**1%**
Karditsa	0	**0%**	5411	**53%**	4	**0%**	1005	**20%**	441	**1%**	4661	**9%**
Magnesia	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	9	**0%**
Sporades	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**
Trikala	54	**0%**	1658	**16%**	46	**0%**	1393	**28%**	317	**0%**	2071	**4%**

Central	**16**	**0%**	**994**	**10%**	**207**	**1%**	**586**	**12%**	**365**	**1%**	**12253**	**23%**
Pthiotida	16	**0%**	839	**8%**	207	**1%**	458	**9%**	331	**1%**	11270	**22%**
Ionian Islands	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Western	**296**	**1%**	**132**	**1%**	**141**	**1%**	**175**	**3%**	**7847**	**12%**	**15910**	**30%**
Achaia	0	**0%**	0	**0%**	10	**0%**	0	**0%**	0	**0%**	0	**0%**
Etolia	296	**1%**	132	**1%**	131	**0%**	175	**3%**	7847	**12%**	15910	**30%**
Ilia	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**	0	**0%**
Peloponnese	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**1389**	**2%**	**247**	**0%**
Attica	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Northern	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Southern	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Crete	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**

Source: ELSTAT, various years

The increase of cultivated areas observed the last years it can also be seen in the quantities (tons) produced. It seems that during the period of economic instability a number of people return back to rural areas and start dealing with agriculture again. One of the crops that attracted people is tobacco; a notable increase in cultivated areas it can be seen the last years. As shown by the time series data (tables 2.2 and 2.3), the cultivation of "Basma" and "Katerini" varieties is highly concentrated in specific areas of the country. Explicitly, about 90% of the cultivation is concentrated in six regional unities; Rodopi, Xanthi, Serres, Pieria, Thessaloniki and Larissa.

Following statistics sampling rules, the use of the abovementioned five regional unities (prefectures) as a sample to perform a survey consists a reliable one. The five regional unities over-represent the population and thus any survey can provide safe results and conclusions. Thus, the quantitative (field research) study decided to be performed in the above mentioned regional unities and the specific areas that tobacco is cultivated. Both, the socioeconomic and soil-climate analysis will be performed in these areas.

2.2.2 Tobacco production in the European Union

The 2003 reform affected tobacco cultivation in all EU tobacco producing countries, cultivated areas and quantities produced were substantially decreased. According to EC (2015), tobacco cultivation is grown in 12 EU countries, in 100.000 ha with 60.000 producers engaged in the crop. Italy, Spain, Greece, Bulgaria and Poland are the most important producing about 85% of the total EU production. EU covers less than 3% of world's production and processing industries import 400.000 tons annually mainly from the markets of Africa and America.

Table 2.4. Tobacco cultivated areas in EU (2014, in ha)

	GROUP I	GROUP II	GROUP III	GROUP IV	GROUP V	TOTAL	in %
BELGIUM		6	38			44	*0,0%*
BULGARIA	2 756	566			10 472	13 794	*15%*
GERMANY	1 679		100			1 779	*2%*
GREECE	1 881	50			14 920	16 851	*19%*
SPAIN	8 679	1 215	121	0		10 015	*11%*
FRANCE	2 791	1 330	10			4 131	*5%*
ITALY	11 860	4 226	637	1 525		18 248	*20%*
HUNGARY	3 210	1 499				4 709	*5%*
POLAND	10 765	3 939	264	327		15 295	*17%*
PORTUGAL		44				44	*0,05%*
ROMANIA						1 080	*1%*
CROATIA	4 327	569				4 896	*5%*
TOTAL	47 948	13 444	1 170	1 852	25 392	90 886	
in %	*53%*	*15%*	*1%*	*2%*	*28%*		

Source: EC (2015)

In table 2.4 the tobacco cultivated areas per variety group and country, in 2014, are presented. As it can be seen most areas are cultivated with varieties of group I and II, very few areas are cultivated with group III and IV; group V (sun-cured) includes the oriental type varieties and accounts the 28% of the total tobacco area. Oriental type varieties are cultivated only in Greece and Bulgaria, 19% and 15% of the EU areas, respectively.

Table 2.5. Tobacco production in the EU (2014, in tons)

	GROUP I	GROUP II *(light air-c.)*	GROUP III *(dark air-c.)*	GROUP IV *(fire-c.)*	GROUP V *(sun-c.)*	TOTAL	*in %*
BELGIUM		10	100			110	*0,05%*
BULGARIA	8 150	4 250			16 280	28 680	*13%*
GERMANY	4 500		220			4 720	*2%*
GREECE	7 800	200			25 700	33 700	*16%*
SPAIN	28 573	3 347	312	0		32 232	*15%*
FRANCE	5 822	3 340	28			9 190	*4%*
ITALY	33 022	17 190	1 558	2 154		53 924	*25%*
HUNGARY	6 946	2 743				9 689	*5%*
POLAND	21 800	8 630	643	840		31 913	*15%*
PORTUGAL		100				100	*0,05%*
ROMANIA							*0,0%*
CROATIA	7 971	1 136				9 107	*4.3%*
TOTAL	124 584	40 946	2 861	2 994	41 980	213 365	
in %	*58*	*19*	*1%*	*1%*	*20*		

Source: EC (2015)

In table 2.5, the quantities produced in tons are illustrated; more than 200.000 were produced in 2014, with oriental type varieties (group V) to account the 20% of the total EU production. The 25.700 and 16.280 tons were produced by Greece and Bulgaria respectively (figure 2.5).

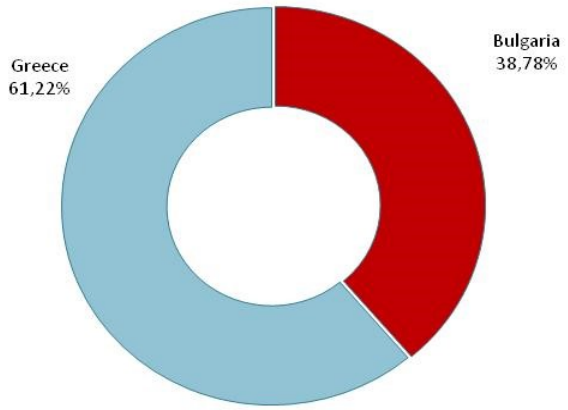

Figure 2.5. Tobacco production (tons) in EU (2014, EC)

2.2.3 Demographic characteristics of the areas under study

In order to strengthen the analysis in the specific areas, further data and information were extracted and analyzed, regarding demographic characteristics. Specifically, demographic data concerning population changes are presented. Additionally, data about the participation of farmers in the "young farmers" program will provide an indication that young people are willing to be settled in the areas and be engaged in rural activities.

The availability of labor force and potential farmers, especially young people, in the selected areas of the study consist an a priori condition to assure that tobacco cultivation will continue in the long run and new growers will be attracted under specific conditions. The continuation, expansion and viability of tobacco cultivation is one of the basic queries in current study. For this purpose, demographic data from ELSTAT were collected indicating the demographic trends the last decades. A summary of the data shown in table 2.6 (see Appendix), indicates that in the areas under study population has face significant leakages. Unfortunately, the last year that detailed available data exists is in 2011 as such data are collected every ten years. This will be controlled somehow in the survey by posing demographic questions to stakeholders as well.

Table 2.6 presents the Greek population changes from year 2001 to 2011. According to the ELSTAT (Official Hellenic Statistical Authority) the population is divided into four general age categories/classes (0-29, 30-49, 50-69 and >70 years). The last column of this table shows the percentage difference of each class for each regional unit. Red boxes depict the population

groups showing a decrease (from 2001 to 2011) whereas, in contrast, blue boxes show a rise. The following figures 2.6-2.11 represent graphically the changes of the population for the major regional units, as explained above.

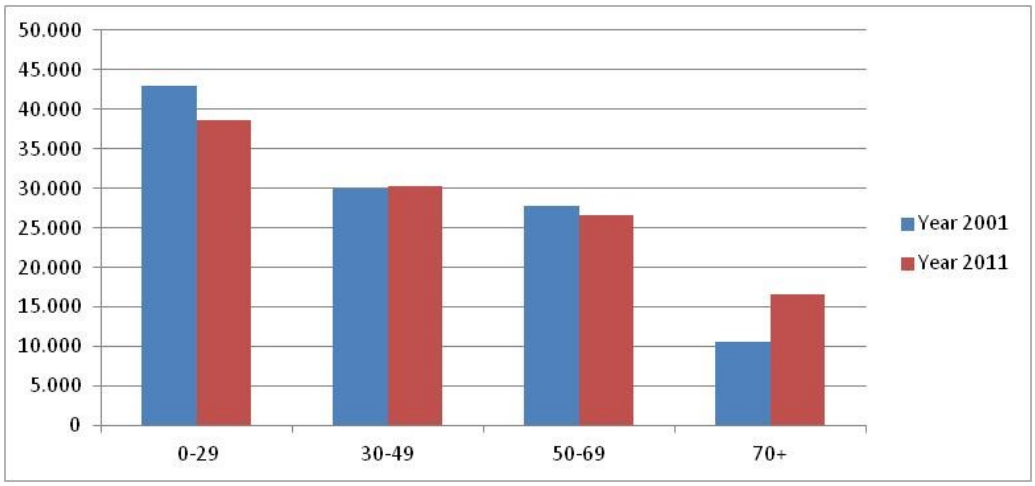

Figure 2.6. Regional Unit of Rodopi - Population change per age classes (2001-2011)

Population of the Regional Unit of Rodopi presents an increase (0.72%) from 2001 to 2011. However, this increase is mainly related to the ages over 70 as for all others there is a decrease or stagnation. A very important number is that around 27% of the population of the regional unit of Rodopi belongs to the dynamic age range between 30 and 49 years old. Besides almost 35% of the population belongs to the promising age range 0-29 years indicating the potential of labor force in the regional unit.

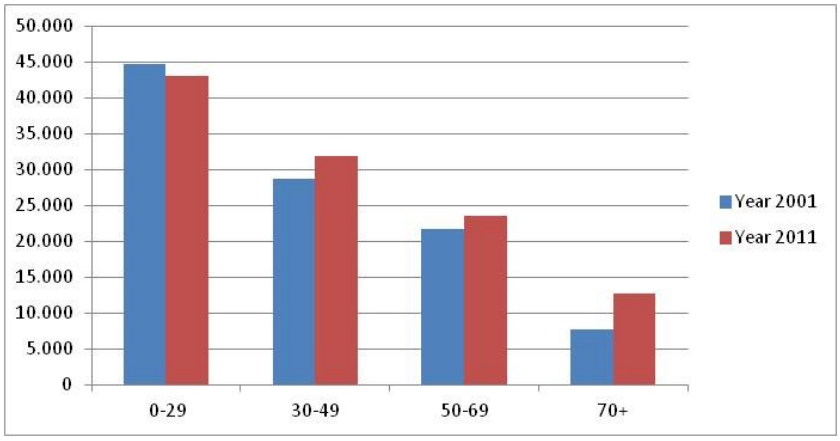

Figure 2.7. Regional Unit of Xanthi - Population change per age classes (2001-2011)

Population of the Regional Unit of Xanthi presents an important increase (7,43%) from 2001 to 2011. This increase is related to almost all age classes (except 0-29 years). **It's also**

important that around 28% of the population of the regional unit of Xanthi belongs to the dynamic age range between 30 and 49 years old, while almost 40% of the population belongs to the promising age range 0-29 years indicating the potential of labor force in the regional unit.

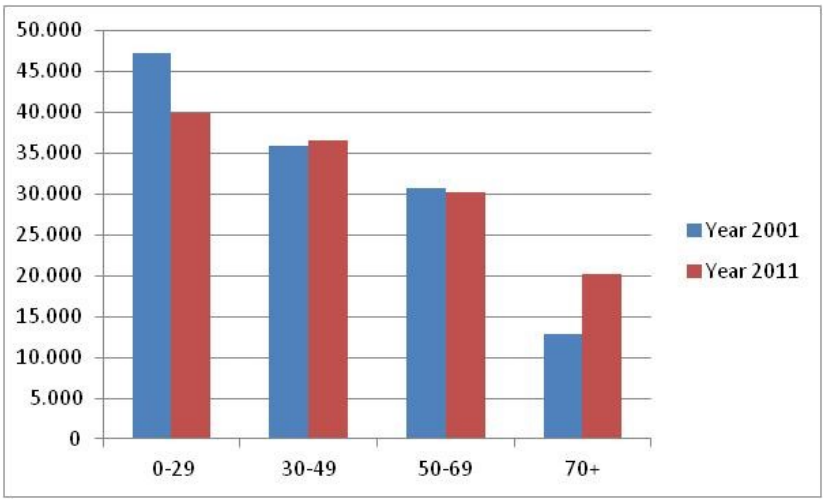

Figure 2.8. Regional Unit of Pieria - Population change per age classes (2001-2011)

Population of the Regional Unit of Pieria presents an almost marginal increase (0,23%) from 2001 to 2011. This increase is related to the age classes 30-49 and over 70. Around 28% of the population of the regional unit of Pieria belongs to the dynamic age range between 30 and 49 years old while more than 30% of the population belongs to the promising age range 0-29 years indicating also the potential of labor force in the regional unit.

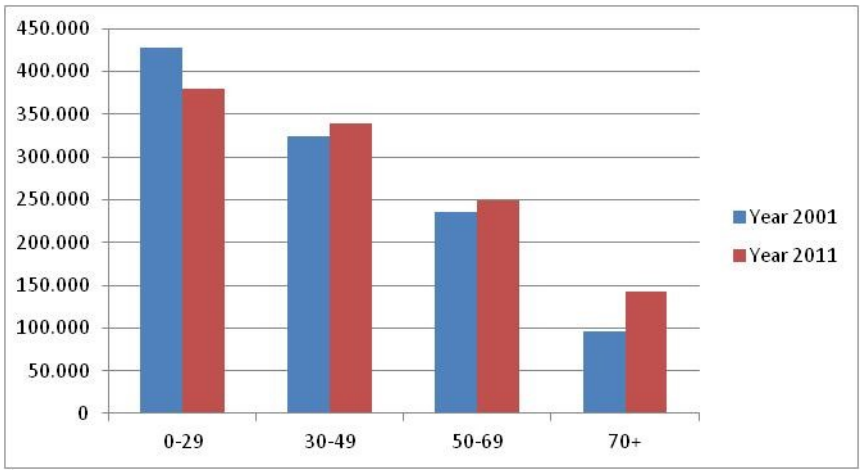

Figure 2.9. Regional Unit of Thessaloniki - Population change per age classes (2001-2011)

Population of the Regional Unit of Thessaloniki presents an increase (2,39%) from 2001 to 2011. This increase is related to the ages over 30. More than 30% of the population of the regional unit of Thessaloniki belongs to the dynamic age range between 30 and 49 years old while almost 34% of the population belongs to the promising age range 0-29 years indicating the potential of labor force in the regional unit.

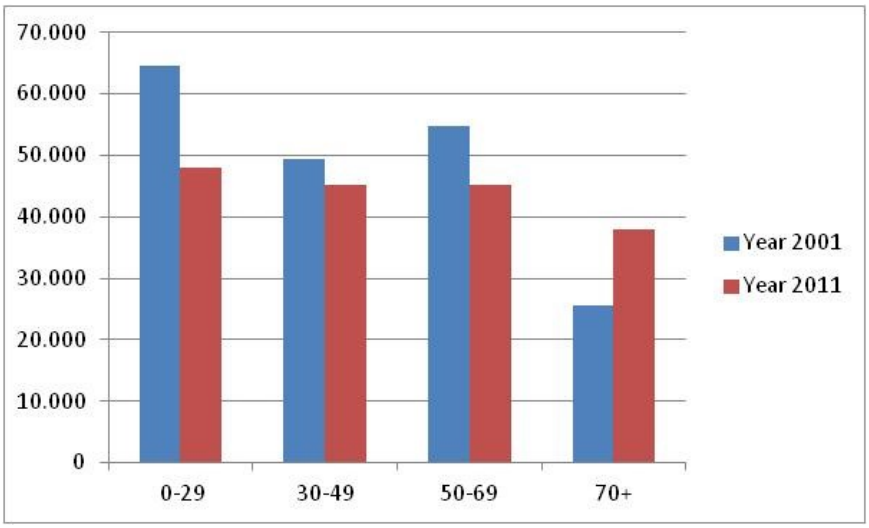

Figure 2.10. Regional Unit of Serres - Population change per age classes (2001-2011)

Population of the Regional Unit of Serres presents a significant decrease (10,23%) from 2001 to 2011. This decrease is related to the ages up to 69 years old. Unlike the above mentioned regional unities only 25% of the population of the regional unit of Serres belongs to the dynamic age range between 30 and 49 years old and only 27% of the population belongs to the promising age range 0-29 years indicating also negative trends.

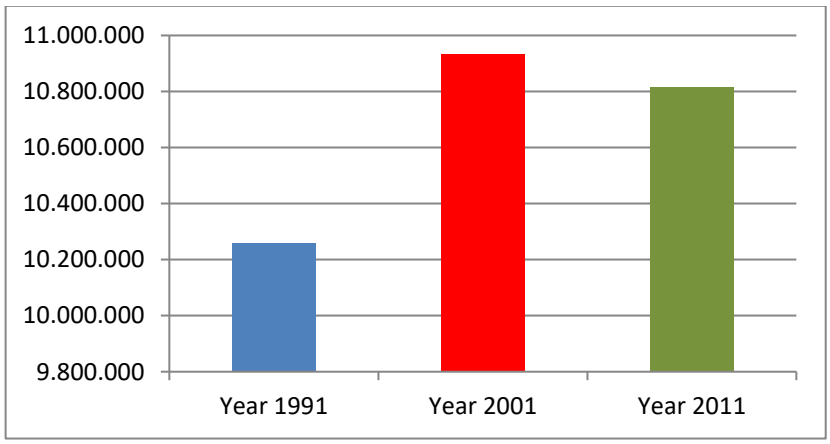

Figure 2.11. Whole Greece - Population change (1991-2011)

Regarding the whole population of Greece, there was a significant increase (6.57%), from 1991 to 2001, and later a smaller decrease (1,08%), from 2001 to 2011. Having a look at all regional units it seems that the regional unit of Thessaloniki, where the group of 30-49 demonstrates potential, can support better the tobacco cultivation.

2.2.4 Young Farmers Data

In order to further strengthen the selection of the specific areas, we tried to find data regarding the population changes at different age ranges. The data provided by ELSTAT refer to five regional unities for the period 2001-2011 (census) indicating the potential of labor force in the area. Table 2.7 and 2.8 below present the top 5 regional unities in Oriental type tobacco cultivation in comparison with population changes, for the period 2001-2014. As it can be seen, Oriental type tobacco cultivation areas were increased in the specific areas (the 5 regional unities) since 2002.

Moreover, it is important to see that for the same period in the specific 5 areas the population has also increased. The only exemption is the area of Serres, where leakages of population are observed. The population increase concerns not only the total population but also the ages of 30-49; the most productive and efficient ages in agricultural activities.

Table 2.7. Population changes (2001-2011) per Regional Unities

Regional Unit	Year 2011	Year 2001	Change (population)	Change (%)	Trend
Rodopi (all)	112.039	111.237	802	0,72%	▲
Rodopi (30-49 years)	30.299	30.012	287	0,96%	▲
Xanthi (all)	112.222	102.959	8.263	7,43%	▲▲▲
Xanthi (30-49 years)	31.978	28.716	3.262	11,36%	▲▲▲▲
Thessaloniki (all)	1.110.551	1.084.001	26.550	2,39%	▲▲
Thessaloniki (30-49 years)	339.586	324.253	15.333	4,73%	▲▲
Serres (all)	176.430	194.483	-18.053	-10,23%	▼▼▼▼
Serres (30-49 years)	45.224	49.475	-4.251	-8,59%	▼▼▼
Pieria (all)	126.698	126.412	286	0,23%	▲
Pieria (30-49 years)	36.460	35.793	667	1,86%	▲▲

▲ <1% increase, ▲▲ 1%-5% increase, ▲▲▲ 5%-10% increase & ▲▲▲▲ >10% increase

▼▼▼ 5%-10% decrease & ▼▼▼▼ >10% decrease

Source: ELSTAT, 2001 & 2011

Table 2.8. Tobacco cultivation - Oriental type (top 5 Regional Unities)

	2014				2011				2002			
	Oriental type		Berley, Virginia		Oriental type		Berley, Virginia		Oriental type		Berley, Virginia	
	dekars		dekars		dekars		dekars		dekars		dekars	
Greece Total	**189103**	**100%**	**28290**	**100%**	**144118**	**100%**	**14815**	**100%**	**373982**	**100%**	**153355**	**100%**
Region of EMT	**85005**	**45%**	**1545**	**5%**	**70304**	**49%**	**2961**	**20%**	**111263**	**30%**	**2868**	**2%**
Rodopi	60554	**32%**	0	**0%**	48417	**34%**	1750	**12%**	67906	**18%**	1239	**1%**
Xanthi	17594	**9%**	1195	**4%**	18568	**13%**	110	**1%**	29872	**8%**	1045	**1%**
Region of CM	**91018**	**48%**	**2913**	**10%**	**64248**	**45%**	**1941**	**13%**	**168540**	**45%**	**42922**	**28%**
Thessaloniki	8763	**5%**	1472	**5%**	2384	**2%**	854	**6%**	17305	**5%**	4682	**3%**
Pieria	51187	**27%**	0	**0%**	43699	**30%**	3	**0%**	74948	**20%**	7	**0%**
Serres	24720	**13%**	0	**0%**	15836	**11%**	70	**0%**	45058	**12%**	58	**0%**

Source: ELSTAT, 2014

3. Qualitative Research (contact with tobacco stakeholders)

In order to examine the future viability and sustainability of tobacco production in Greece, and specifically in the studied regions, visits were organized in the most important regional unities. The visits were organized based on basic principles of a qualitative research, in the form of in-depth interviews. During our field research we had discussions with tobacco producers and relevant stakeholders. Visit (September, 2017) was organized in Komotini, at the "Tobacco Growers Cooperative of Thrace", where we had a discussion with the president of the cooperative and other stakeholders. Visits (October, 2017) were also organized in Katerini area and the cooperative "SPEKO Vrontous" and in Serres area at the Tobacco Cooperative "Emmanuel Pappas". In these visits interviews and discussions took place with several also farmers, policy makers and entrepreneurs.

The visit and the discussions were very insightful, and from the discussions necessary information were collected regarding the perspectives of tobacco cultivation, the problems and views in specific issues such as the introduction of mechanical harvesting; the production chain (from cultivation to sale); the land that is cultivated and its characteristics; the people (farmers characteristics) that are engaged in the cultivation; changes that occur since the introduction of decoupled payments (change in CAP), etc. Also the discussions provided important information for scheduling further steps of the study's research; the visits form a pilot study.

The views of the stakeholders were coded in a SWOT analysis and presented below in comparative form, among the three different areas. The qualitative research provided answers to specific questions regarding farmers' perceptions for the future of tobacco production, but also consists of the basic source of information to design the quantitative research that follows.

Table 3.1. Results of the Qualitative Research in the tobacco cultivation areas (SWOT analysis STRENGTHS)

STRENGTHS of tobacco cultivation for farmers	**Mean Score** *(1=strongly disagree and 10=strongly agree)*		
	Komotini	**Serres**	**Katerini**
Labor availability for harvesting (workers)	5	2	3
Product quality	10	9	9
Low land rent	6	7	6
Microclimate	9	9	8
Soil quality	10	8	8
Product reputation	10	9	10
Farmers know-how	9	7	8
High yield (kg/dekar)	5	6	6
Producer price	7	6	5
Low initial investment cost (machinery and equipment)	8	8	7
Satisfactory income	9	7	6
Group of farmers	9	7	7

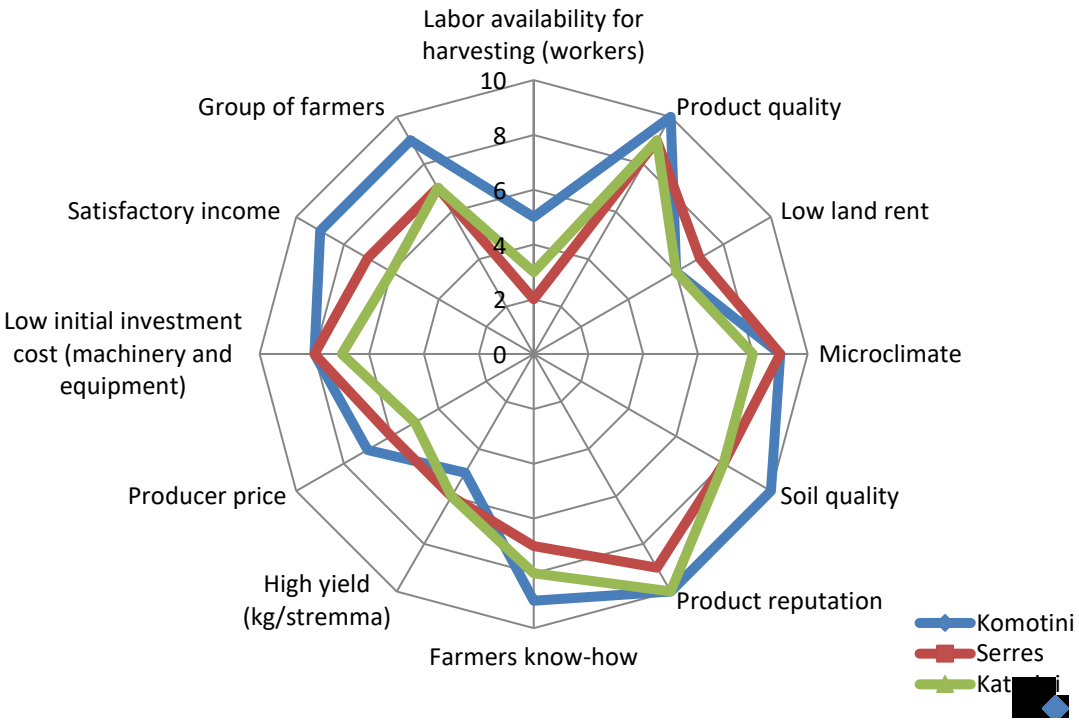

Figure 3.1. Comparative presentation of the STRENGTHS in the tobacco cultivation areas

Based on the discussions important conclusions were emerged. Initially, in table 3.1 the strengths of tobacco cultivation for producers are presented, for the three under study areas. **As it can be seen, the stakeholders in the three areas strongly believe that the quality of their**

product is among the strong points of the crop; they rate it with very high points. The same perception they have for their product reputation, and the superiority-suitability of the climate and soil conditions of their areas to cultivate tobacco. Though, in all the three areas they are not satisfied with the yield of the product, it is not considered among the critical characteristics of the crop. In all areas they believe that the crop can have fairly satisfactory returns, providing them with a complementary reasonable income, despite the fact that they consider the producer prices non-satisfactory. In Serres and Katerini areas farmers face problems finding the necessary workers due to labor legislation impediment. The role of the group of farmers is determinant for the future of tobacco and it can be strengthen further. Finally, in all areas they believe that tobacco cultivation is a crop that does not require a high initial investment cost to enter in the activity, though, they strongly believe that knowledge and experience are very important factors and indirectly this means by impairing the cost side new farmers can enter the tobacco production. Graph 3.1 shows the above-mentioned results in a comparative form for the three regions.

Table 3.2. Results of the Qualitative Research in the tobacco cultivation areas (SWOT analysis WEAKNESSES)

WEAKNESSES of tobacco cultivation for farmers	**Mean Score** *(1=strongly disagree and 10=strongly agree)*		
	Komotini	**Serres**	**Katerini**
High harvesting cost	10	10	10
High production cost	8	8	7
Land structure (slopes, scattered, infertile and semi	9	7	8
Bank restrictions (capital control)	6	10	8
Legislation problems for hired workers	5	9	9
Old age workers	7	8	8
Small size farms	8	8	10
Low producer price	7	7	8
Labor from neighboring countries	3	8	8
Low income	4	7	9
Unstable yield (kg/str)	4	5	5
Difficulties in estimating and controlling production cost	6	7	7

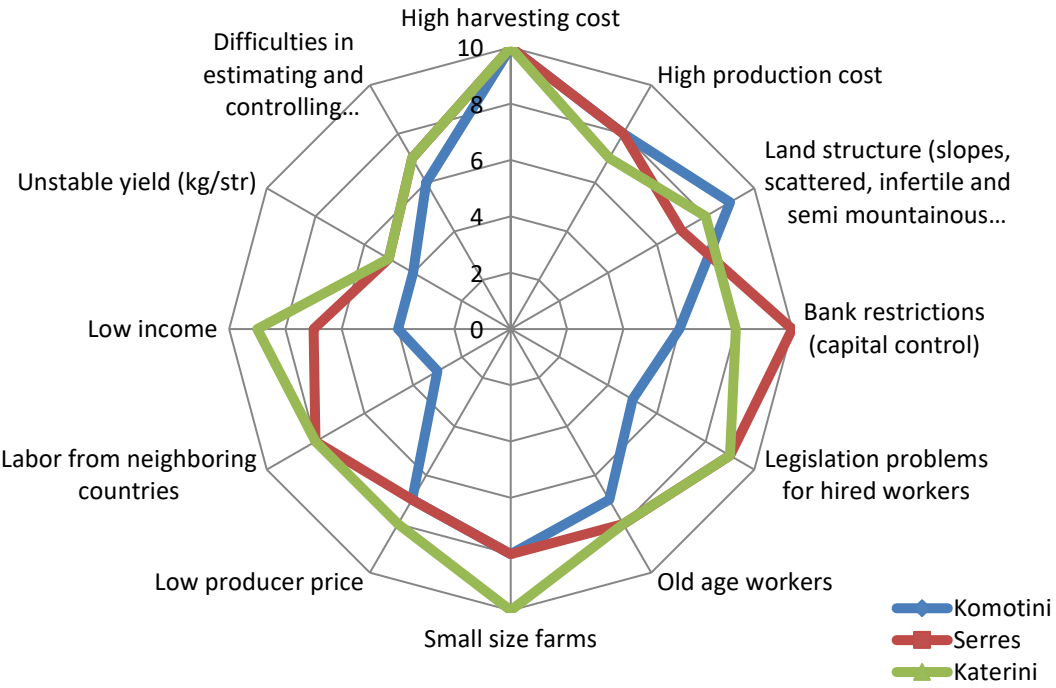

Figure 3.2. Comparative presentation of the WEEKNESSES in the tobacco cultivation areas

Table 3.2 presents the weak points of tobacco cultivation, based on the results of the SWOT analysis. Among the most important weaknesses of the cultivation, according to farmers perceptions are the **high harvesting labor cost and the small farms they own and cultivate**. Generally, it is known that tobacco harvesting is a labor intensive and hard activity; the land cultivated with tobacco are mostly small plots scattered in different points of the same area. Banks restrictions and capital controls were seen as important weaknesses that create problems in the areas of Katerini and Serres (as they use non-family work), though not in Komotini. Producers had the same view about the needs for non-family workers from neighboring countries; for Katerini and Serres it is a problem while not in Komotini.

Also legislation on taxes and insurance prevents the expansion of the cultivation. Finally, in all three areas the yield (kg per dekar) is considered adequate, while in Katerini and Serres the gained income from the crop is considered as an important weak point.

Table 3.3. Results of the Qualitative Research in the tobacco cultivation areas (SWOT analysis OPPORTUNITIES)

OPPORTUNITIES of tobacco cultivation for farmers	**Mean Score** *(1=strongly disagree and 10=strongly agree)*		
	Komotini	**Serres**	**Katerini**
Suitable cultivation for small size farms	9	6	7
Suitable cultivation for complementary income	9	8	8
Not abandoning of land	9	7	7
Non formal leaders (among producers)	6	8	8
Shift to alternative crops (high initial investment cost & return)	5	7	9
Certification (integrated cultivation)	9	8	10
Contracting farming	9	6	7
Mechanical Harvesting	5	8	8
Subsidies for new farmers (CAP measures)	9	8	8
Local industries for tobacco	9	8	8
Traditional culture (memories/force of habit)	10	7	8
Ownership of equipment	9	8	9
Demand for tobacco	9	8	8

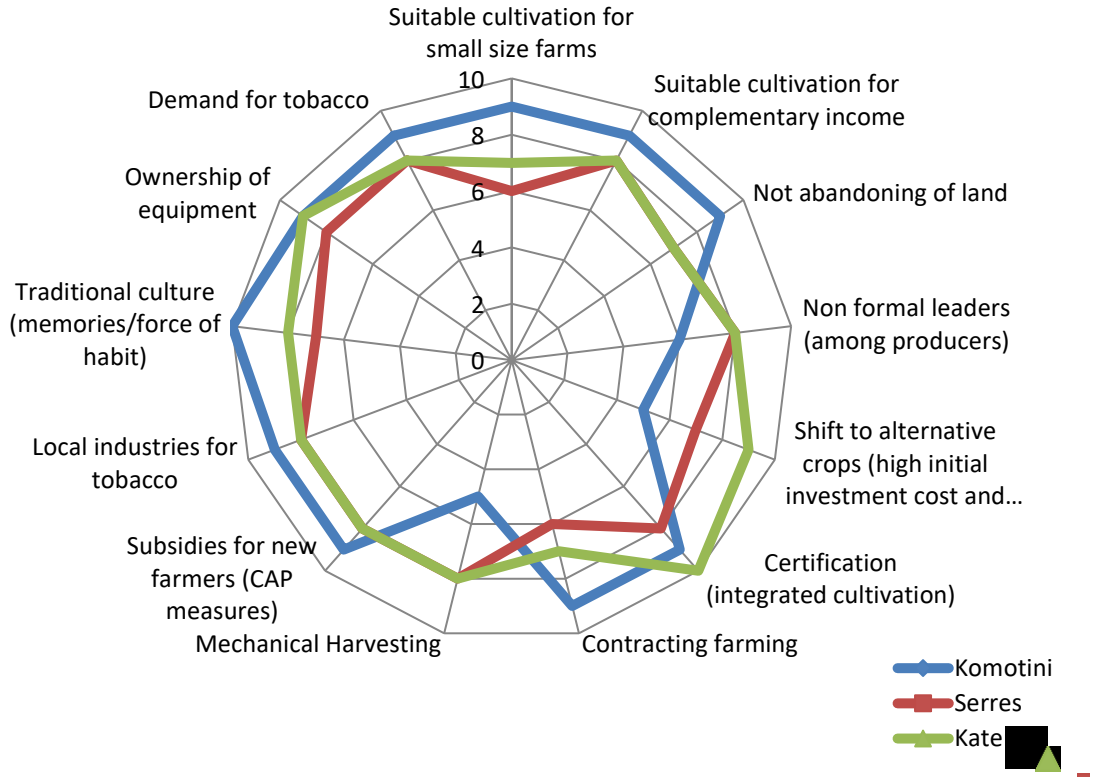

Figure 3.3. Comparative presentation of the OPPORTUNITIES in the tobacco cultivation areas

The opportunities of tobacco cultivation as viewed by the producers are shown in table 3.3 and graph 3.3, in comparative form for the three studied areas. **The quality assurance of the product and generally any actions towards the quality improvement of the production are seen in all areas as good opportunities**. **Very good opportunities, again in all areas, are considered the CAP measures, such as the young farmers establishment measure and the high demand for the oriental type varieties**. It is also considered **as a crop that offers a comparatively satisfactory complementary income**. The **long experience and tradition** in the cultivation and the ownership of basic infrastructure and machinery are **considered good opportunities**. Contracting agriculture and relevant action are seen as opportunities by farmers to safeguard their incomes, mostly in Katerini and Serres and less in Komotini. **Mechanical harvesting is considered as a good opportunity in Serres (where Harvesting Machine for Orientals project is in place) while in Komotini opinions are more traditional**. The shift to alternative crops, more competitive, is seen as good opportunity, though, the initial investment cost and the rate and time of return of the new investment prevent the shift. This happens especially in Katerini where there are alternatives (grapes and kiwi) and Serres; though in Komotini it is considered that there are no alternatives.

Table 3.4. Results of the Qualitative Research in the tobacco cultivation areas (SWOT analysis THREATS)

THREATS of tobacco cultivation for farmers	**Mean Score** *(1=strongly disagree and 10=strongly agree)*		
	Komotini	**Serres**	**Katerini**
Competitive cultivations availability	2	4	8
Mechanical Harvesting (jobs to be lost, concentration of production in big farms)	9	4	5
Migration of young people (lack of youth)	5	6	7
Agricultural policy (CAP eg. decoupling)	10	9	9
Taxation	9	9	9
Health issues related to smoking	9	9	9
Other neighboring producing countries	9	8	6
Farmer loans (eg to shift to an alternative crop)	7	8	10
Number of processing companies	6	7	7
Oil price	8	9	9
Scattered land	6	8	8
Economic instability	7	8	8

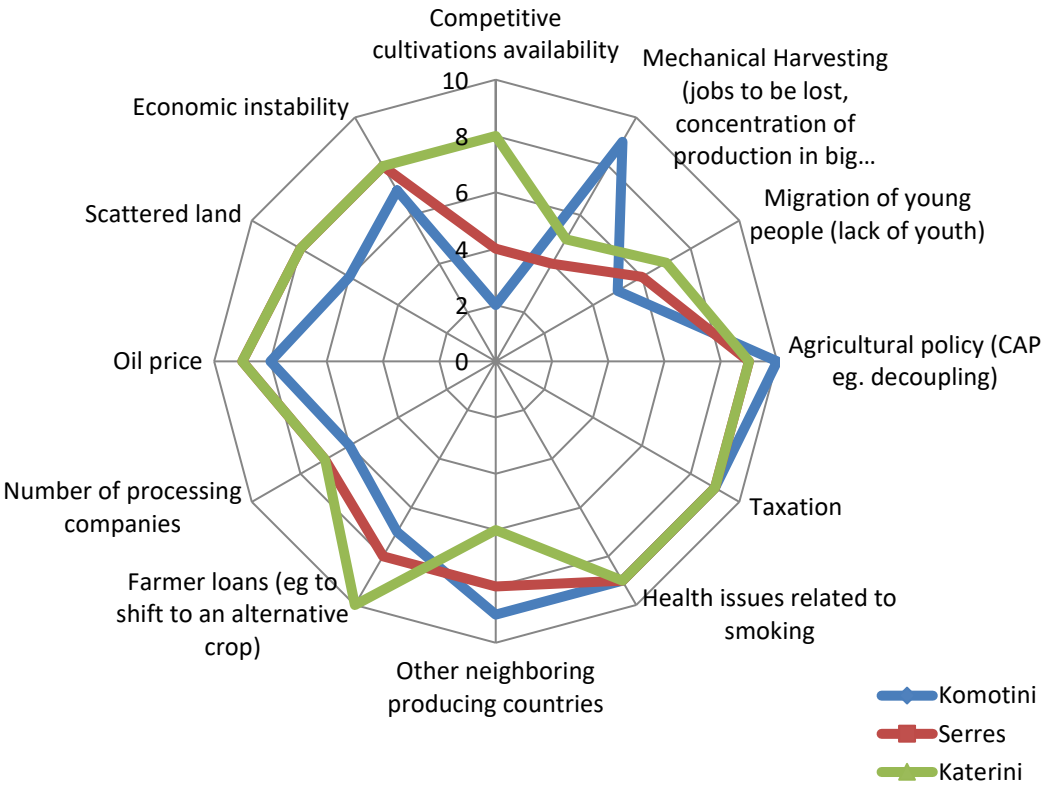

Figure 3.4. Comparative presentation of the THREATS in the tobacco cultivation areas

Finally, in table 3.4 and graph 3.4 the threats that confronts tobacco cultivation are shown. The mechanical harvesting is seen as a serious threat from the producers in Komotini, because they believe that jobs will be lost and the production will be concentrated in big tobacco producing farms. This view is lees believed in Katerini area while mechanical harvesting is not seen as a threat in Serres. In all three areas high taxation policy; references to the health issues related to tobacco-cigarettes; oil prices and changes in farm policies (eg CAP decoupling), are perceived as important threats for tobacco cultivation. Alternative competitive crops do not exist in Thrace and Serres areas, while in Katerini area that exist, there is lack of financial support (loans or subsidies). Threats but minor are considered the economic crisis, the migration and the number of processing companies.

4. Cost effectiveness analysis

This section presents the cost effectiveness of the tobacco cultivation compared to its alternative competitive crops (in each area). The required data collected, for the year 2017, using mainly survey data from the qualitative field research and accounting monitoring of several Greek farms, gathered by the Department of Agricultural Economics, School of Agriculture, Forestry and Environmental Sciences, Aristotle University of Thessaloniki (ABAF, 2017). For the purposes of this analysis a representative farm of 1 dekar was selected while also two scenarios were developed for the areas of: a) Komotini and Xanthi b) Serres and Drama and c) Katerini and Elassona:

- Scenario 1: future trends of the tobacco cultivation under the current status.
- Scenario 2: future perspectives adopting mechanical harvesting of the tobacco cultivation under the current status.

4.1. Cost effectiveness of the tobacco cultivation under the current status

Table 4.1.1 presents the costs and the benefits, as well as the net revenues (income and profit) and the benefit/cost ratios, for the three selected tobacco scenarios (Komotini/Xanthi, Serres/Drama & Katerini/Elassona).

Table 4.1.1. Farm-economics of tobacco cultivation in different areas (Comparative Analysis / per dekar) under the current status

	Komotini/ Xanthi	**Serres/ Drama**	**Katerini/ Elassona**
Cost (expenses - €/dekar)			
Rent	37	39	57
Tobacco seedlings	40	45	60
Field preparation (sprinkling, milling etc.)	32	40	50
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	66	78	108
Harvest (Wages)	135	170	209
Bundling - Moisture - Weighing (Wages)	46	49	51
Machine Maintenance – Consumables (+depreciations)	187	187	220
Others (OSDE, ELGA, Group)	28	29	30
Total costs (€/dekar)	**571**	**637**	**785**
Return (revenues)			
Producer price (€/kg)	5,13	5,05	4,37
Yield (kg/dekar)	165	185	235
Gross Production Value (€/dekar)	846	934	1.026
Production cost (€/kg)	3,46	3,44	3,34
Net profit (€/kg)	1,66	1,60	1,02
Gross Income (€/dekar)	**846**	**934**	**1026**
Net Income (Profit) (€/dekar)	***275***	***297***	***241***
Benefit/Cost Ratio	***1,48***	***1,46***	***1,30***
Ranking (based on the benefit/cost ratio)	*(1)*	*(2)*	*(3)*

According to the estimations of Table 4.1.1 the tobacco production cost ranged from 571 to 785 €/dekar, while the estimated gross income ranged from 846 to 1.026 €/dekar. Similarly, net income was positive in all scenarios ranged from 241 to 297 €/dekar. Estimated benefit/cost ratio ranged from 1,30 to 1,48 €/dekar. **The above estimates refer to non-owned farmlands, while in case of owned ones a rent of 37-57 €/dekar can be delisted ensuring higher incomes. It's worth mention that the cost of harvest is a very important part of the production cost by participating in it against 135-209 €/dekar.** Figure 4.1.1 presents graphically the percentage increase of total production costs from harvest cost in each area. Especially in the areas of Komotini and Xanthi, where the tobacco cultivation is more traditional, harvest is mainly done by family members themselves and therefore this cost is not paid as production cost but it is counted as self-employment. In the rest areas, Katerini/Elassona and Serres/Drama, the harvest is mainly done by foreign workers burdening the production cost by 25.4% and 27.5% respectively.

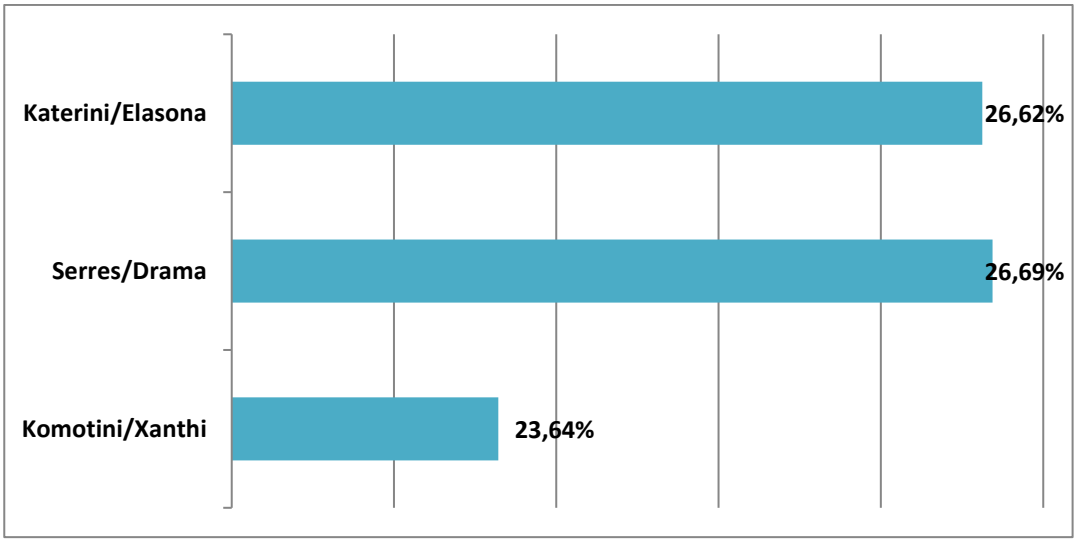

Figure 4.1.1. Increase of total production costs from harvest (percentage)

The Cost-Effectiveness results of tobacco cultivation in Komotini and Xanthi compared to its competitive crops, assuming similar farming conditions, are presented in the Table 4.1.2

while Figure 4.1.2 presents graphically the net profits (per dekar) of several competitive to tobacco crops in Komotini and Xanthi.

Table 4.1.2. Comparative Analysis of competitive to tobacco crops in Komotini and Xanthi (per dekar) under the current status

	Tobacco Komotini/ Xanthi	Sunflower irrigated	Sunflower dry	Maize	Cherries*	Cotton	Wheat
Cost (expenses -							
Rent	37	37	37	37	37	37	37
Tobacco seedlings	40	-	-	-	-	-	-
Field preparation (sprinkling, milling etc.)	32	45	32	148	10	120	68
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	66	16	16	25	25	25	20
Harvest (Wages)	135	10	10	15	90	35	13
Bundling - Moisture - Weighing (Wages)	46	-	-	-		-	-
Machine Maintenance – Consumables (+depreciations)	187	10	10	20	10	20	20
Others (OSDE, ELGA, Group)	28	35	35	30	35	35	35
Total costs (€/dekar)	**571**	**153**	**140**	**275**	**207**	**272**	**193**
Return (revenues)							
Producer price (€/kg)	5,13	0,35	0,35	0,16	1,60	0,40	0,25
Yield (kg/dekar)	165	350	225	1,200	500	330	650
Gross Production Value (€/dekar)	846	122,5	78,25	190	800	132	162,5
Production cost (€/kg)	3,46	0,44	0,62	229,17	0,41	0,82	0,30
Net profit (€/kg)	1,66	-0,09	-0,27	-229,01	1,19	-0,42	-0,05
Gross Income (€/dekar)	**846**	**122.5**	**78.25**	**190**	**800**	**132**	**162,5**
Net Income (Profit)	**275**	**-30,5**	**-61,75**	**-85**	**593**	**-140**	**-30,5**
Benefit/Cost Ratio	**1,482**	**0,801**	**0,559**	**0,691**	**3,864**	**0,485**	**0,842**
Ranking	*(2)*	(4)	(6)	(5)	(1)	(7)	(3)

- *Not included the installation and opportunity cost*

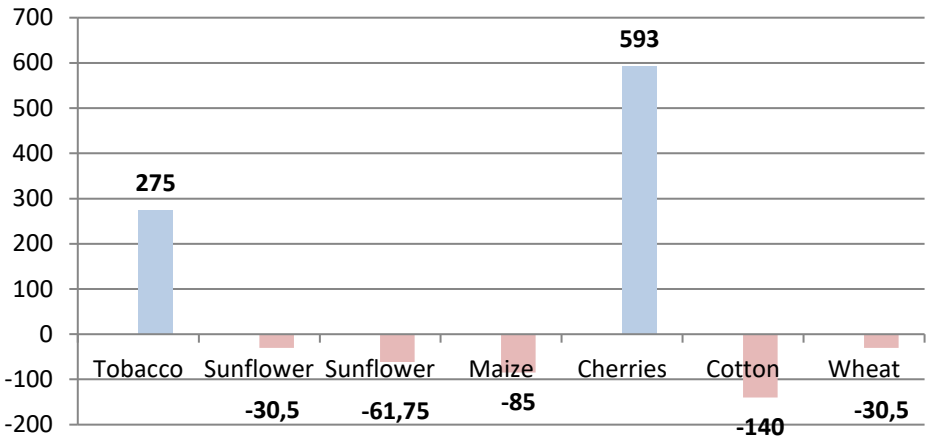

Figure 4.1.2. Net profits (per dekar) of several competitive to tobacco crops in Komotini and Xanthi under the current status

The Cost-Effectiveness results of tobacco cultivation in Serres and Drama compared to its competitive crops, assuming similar farming conditions, are presented in the Table 4.1.3 while Figure 4.1.3 presents graphically the net profits (per dekar) of several competitive to tobacco crops in Serres and Drama.

Table 4.3. Comparative Analysis of competitive to tobacco crops in Serres and Drama (per dekar) under the current status

	Tobacco Serres	Sunflower irrigated	Sunflower dry	Alfalfa	Maize	Almonds *	Cotton	Wheat
Cost (expenses -								
Rent	39	39	39	39	39	39	39	39
Tobacco seedlings	45	-	-	-	-	-	-	-
Field preparation (sprinkling, milling etc.)	40	45	32	65	148	10	120	68
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	78	16	16	30	25	25	25	20
Harvest (Wages)	170	10	10	10	15	50	35	13
Bundling - Moisture - Weighing (Wages)	49	-	-		-		-	-
Machine Maintenance – Consumables (+depreciations)	187	10	10	10	20	10	20	20
Others (OSDE, ELGA, Group)	29	35	35	30	30	35	35	35
Total costs (€/dekar)	**637**	**155**	**142**	**184**	**277**	**169**	**274**	**195**
Return (revenues)								
Producer price (€/kg)	5,05	0,35	0,35	0,17	0,16	2,50	0,40	0,25

Yield (kg/dekar)	185	350	225	1,500	1,200	280	330	650
Gross Production Value (€/dekar)	934	122.5	78.25	255	190	700	132	162.5
Production cost (€/kg)	3,44	0,44	0,63	0,12	230,83	0,60	0,83	0,30
Net profit (€/kg)	1,60	-0,09	-0,28	0,05	-230,67	1,90	-0,43	-0,05
Gross Income (€/dekar)	**934**	**122,5**	**78,25**	**255**	**190**	**700**	**132**	**162,5**
Net Income (Profit)	***297***	**-32,5**	**-63,75**	**71**	**-87**	**531**	**-142**	**-32,5**
Benefit/Cost Ratio	***1,467***	**0,790**	**0,551**	**1,386**	**0,686**	**4,142**	**0,482**	**0,833**
Ranking	*(2)*	(5)	(7)	(3)	(6)	(1)	(8)	(4)

- *Not included the installation and opportunity cost*

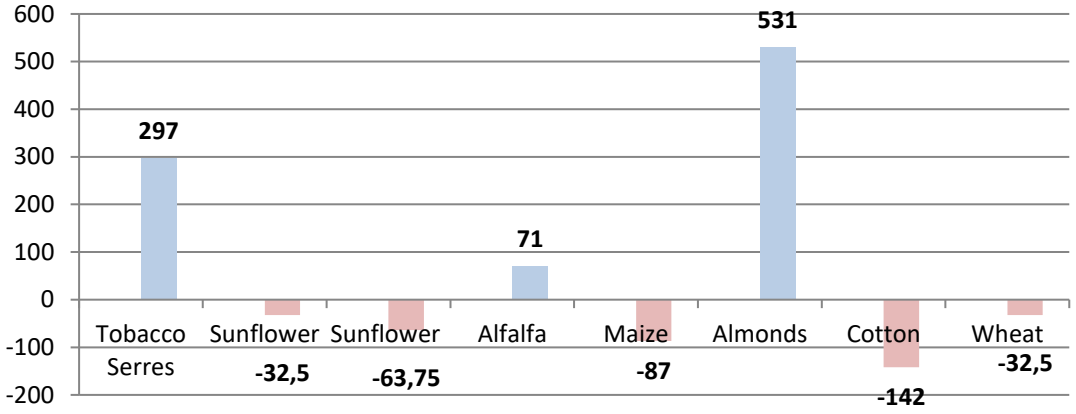

Figure 4.3. Net profits (per dekar) of several competitive to tobacco crops in Serres & Drama under the current status

The Cost-Effectiveness results of tobacco cultivation in Katerini and Elassona compared to its competitive crops, assuming similar farming conditions, are presented in the Table 4.1.4 while Figure 4.1.4 presents graphically the net profits (per dekar) of several competitive to tobacco crops in Katerini and Elassona.

Table 4.1.4. Comparative Analysis of competitive to tobacco crops in Katerini & Elassona (per dekar) under the current status

	Tobacco Katerini/ Elassona	**Kiwifruits**	**Crimson Grapes**
Cost (expenses - €/dekar)			
Rent	57	350	350
Tobacco seedlings	60	-	-
Field preparation (sprinkling, milling etc.)	50	45	55
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	108	380	750
Harvest (Wages)	209	100	150
Bundling - Moisture - Weighing (Wages)	51	-	-

Machine Maintenance – Consumables (+depreciations)	220	75	75
Others (OSDE, ELGA, Group)	30	55	55
Total costs (€/dekar)	**785**	**1.005**	**1.435**
Return (revenues)			
Producer price (€/kg)	4,37	0,60	1,20
Yield (kg/dekar)	235	4.500	3,500
Gross Production Value (€/dekar)	1.026	2.700	4.200
Production cost (€/kg)	3,34	0,23	0,41
Net profit (€/kg)	1,02	0,37	0,79
Gross Income (€/dekar)	**1.026**	**2.700**	**4.200**
Net Income (Profit)- (€/dekar)	***241***	***1.695***	***2.765***
Benefit/Cost Ratio	***1,308***	***2.686***	***1.940***
Ranking	*(3)*	*(1)*	*(2)*

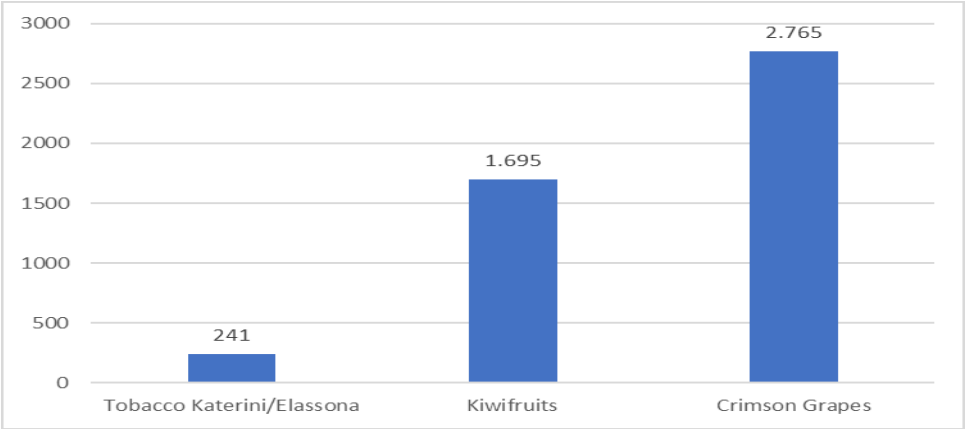

Figure 4.1.4. Net profits (per dekar) of several competitive to tobacco crops in Katerini and Elassona under the current status

Concluding, based on the cost-Effectiveness results of tobacco cultivation compared to their competitive crops respectively some particularly important elements are extracted.

- Firstly, tobacco in Komotini and Xanthi is a very traditional cultivation characterized by very small mean size (<10 dekars) and self-employment (especially at harvest). It offers a satisfactory income especially due to self-employment, as a payment for the family work. On the other hand only cherries offer positive net profits, among the competitive to tobacco crops in Komotini/Xanthi, but need significant initial installation capital. That's why tobacco is an important crop in the area and it will remain the same.
- Tobacco in Katerini and Elassona has undergone a very strong competition from other crops (especially from kiwifruits and crimson grapes). There is a strong tendency for

tobacco to be replaced by kiwifruits or crimson grapes and tobacco growers are declining significantly year per year. Certainly there are areas that can continue the cultivation if a more effort will be undertaken.

- Finally, tobacco in Serres and Drama has two major competitors (almonds and alfalfa), but field availability, tobacco cultivation as supplementary work and the prospect of mechanical harvesting are some very important factors to keep farmers in the area and continue growing tobacco. In addition, if some cost restructuring is made, tobacco can be further expanded.

4.2. Cost effectiveness of the tobacco cultivation under mechanical harvesting and influence of producer price

Table 4.2.1 presents the costs and the benefits, as well as the net revenues (income and profit) and the benefit/cost ratios, for the three selected tobacco scenarios (Komotini/Xanthi, Serres/Drama & Katerini/Elassona) under mechanical harvesting.

Since 2017, harvesting machine for oriental tobacco has been upgraded and harvesting is carried out in two rows, instead of one. Thus, cost for mechanical harvesting is 278 € per dekar. Manual harvesting is 415 € per dekar, therefore, a 30-40 % reduction is noticed.

For the purpose of this analysis an 60% reduction of harvesting cost has been considered due to the mechanical process.

Table 4.2.1. Farm-economics of tobacco cultivation in different areas (Comparative Analysis / per dekar) under mechanical harvesting

	Komotini/ Xanthi	**Serres/ Drama**	**Katerini/ Elassona**
Cost (expenses - €/dekar)			
Rent	37	39	57
Tobacco seedlings	40	45	60
Field preparation (sprinkling, milling etc.)	32	40	50
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	66	78	108
Harvest (Wages)	54	68	83
Bundling - Moisture - Weighing (Wages)	46	49	51
Machine Maintenance – Consumables (+depreciations)	187	187	220
Others (OSDE, ELGA, Group)	28	29	30
Total costs (€/dekar)	**490**	**535**	**659**
Return (revenues)			
Producer price (€/kg)	5,13	5,05	4,37
Yield (kg/dekar)	165	185	235
Gross Production Value (€/dekar)	846	989	1.029
Production cost (€/kg)	3,46	2,83	2,97
Net profit (€/kg)	2,16	2,15	1,56

Gross Income (€/dekar)	**846**	**934**	**1.026**
Net Income (Profit) (€/dekar)	***356***	***399***	***367***
Benefit/Cost Ratio	***1,727***	***1,746***	***1,558***
Ranking (based on the benefit/cost ratio)	*(2)*	*(1)*	*(3)*

According to the estimations of Table 4.2.1 the tobacco production cost under mechanical harvesting ranged from 490 to 659 €/dekar, while the estimated gross income ranged from 846 to 1.026 €/dekar. Similarly, net income was positive in all scenarios ranged from 356to 399 €/dekar. Estimated benefit/cost ratio ranged from 1,558 to 1,746 €/dekar. **The above estimates refer to non-owned farmlands, while in case of owned ones a rent of 37-57 €/dekar can be delisted ensuring higher incomes.**

The Cost-Effectiveness results of tobacco cultivation under mechanical harvesting in Komotini and Xanthi compared to its competitive crops, assuming similar farming conditions, are presented in the Table 4.2.2 while Figure 4.2.1 presents graphically the net profits (per dekar) of several competitive to tobacco crops in Komotini and Xanthi.

Table 4.2.2. Comparative Analysis of competitive to tobacco crops in Komotini and Xanthi under mechanical harvesting (per dekar)

	Tobacco Komotini/ Xanthi	Sunflower irrigated	Sunflower dry	Maize	Cherries *	Cotton	Wheat
Cost (expenses -							
Rent	37	37	37	37	37	37	37
Tobacco seedlings	40	-	-	-	-	-	-
Field preparation (sprinkling, milling etc.)	32	45	32	148	10	120	68
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	66	16	16	25	25	25	20
Harvest (Wages)	54	10	10	15	90	35	13
Bundling - Moisture - Weighing (Wages)	46	-	-	-		-	-
Machine Maintenance – Consumables (+depreciations)	187	10	10	20	10	20	20
Others (OSDE, ELGA, Group)	28	35	35	30	35	35	35
Total costs (€/dekar)	**490**	**153**	**140**	**275**	**207**	**272**	**193**
Return (revenues)							
Producer price (€/kg)	5,13	0,35	0,35	0,16	1,60	0,40	0,25
Yield (kg/dekar)	165	350	225	1,200	500	330	650
Gross Production Value (€/dekar)	846	122,5	78,25	190	800	132	162,5
Production cost (€/kg)	3,46	0,44	0,62	229,17	0,41	0,82	0,30
Net profit (€/kg)	2,16	-0,09	-0,27	-229,01	1,19	-0,42	-0,05

Gross Income (€/dekar)	**846**	**122.5**	**78.25**	**190**	**800**	**132**	**162,5**
Net Income (Profit)	**356**	**-30,5**	**-61,75**	**-85**	**593**	**-140**	**-30,5**
Benefit/Cost Ratio	**1,727**	**0,801**	**0,559**	**0,691**	**3,864**	**0,485**	**0,842**
Ranking	*(2)*	(4)	(6)	(5)	(1)	(7)	(3)

- *Not included the installation and opportunity cost*

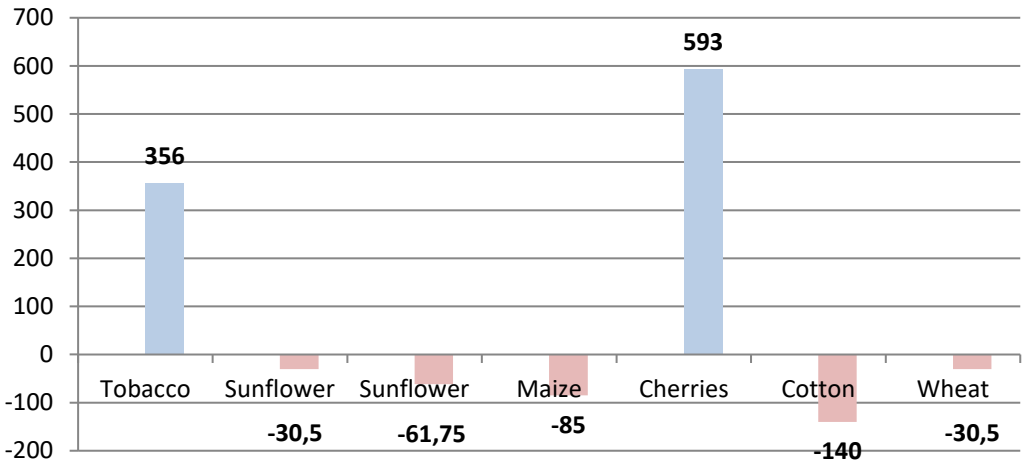

Figure 4.2.1. Net profits (per dekar) of several competitive to tobacco crops in Komotini and Xanthi under mechanical harvesting

The Cost-Effectiveness results of tobacco cultivation under mechanical harvesting in Serres and Drama compared to its competitive crops, assuming similar farming conditions, are presented in the Table 4.2.3 while Figure 4.2.2 presents graphically the net profits (per dekar) of several competitive to tobacco crops in Serres and Drama under mechanical harvesting under mechanical harvesting.

Table 4.2.3. Comparative Analysis of competitive to tobacco crops in Serres and Drama (per dekar) under mechanical harvesting

	Tobacco Serres	**Sunflower irrigated**	**Sunflower dry**	**Alfalfa**	**Maize**	**Almonds '**	**Cotton**	**Wheat**
Cost (expenses -								
Rent	39	39	39	39	39	39	39	39
Tobacco seedlings	45	-	-	-	-	-	-	-
Field preparation (sprinkling, milling etc.)	40	45	32	65	148	10	120	68
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	78	16	16	30	25	25	25	20
Harvest (Wages)	68	10	10	10	15	50	35	13

Bundling - Moisture - Weighing (Wages)	49	-	-		-		-	-
Machine Maintenance – Consumables (+depreciations)	187	10	10	10	20	10	20	20
Others (OSDE, ELGA, Group)	29	35	35	30	30	35	35	35
Total costs (€/dekar)	**535**	**155**	**142**	**184**	**277**	**169**	**274**	**195**
Return (revenues)								
Producer price (€/kg)	5,05	0,35	0,35	0,17	0,16	2,50	0,40	0,25
Yield (kg/dekar)	185	350	225	1,500	1,200	280	330	650
Gross Production Value (€/dekar)	989	122.5	78.25	255	190	700	132	162.5
Production cost (€/kg)	2,83	0,44	0,63	0,12	230,83	0,60	0,83	0,30
Net profit (€/kg)	2,15	-0,09	-0,28	0,05	-230,67	1,90	-0,43	-0,05
Gross Income (€/dekar)	**934**	**122,5**	**78,25**	**255**	**190**	**700**	**132**	**162,5**
Net Income (Profit)	**399**	**-32,5**	**-63,75**	**71**	**-87**	**531**	**-142**	**-32,5**
Benefit/Cost Ratio	**1,746**	**0,790**	**0,551**	**1,386**	**0,686**	**4,142**	**0,482**	**0,833**
Ranking	*(2)*	(5)	(7)	(3)	(6)	(1)	(8)	(4)

- *Not included the installation and opportunity cost*

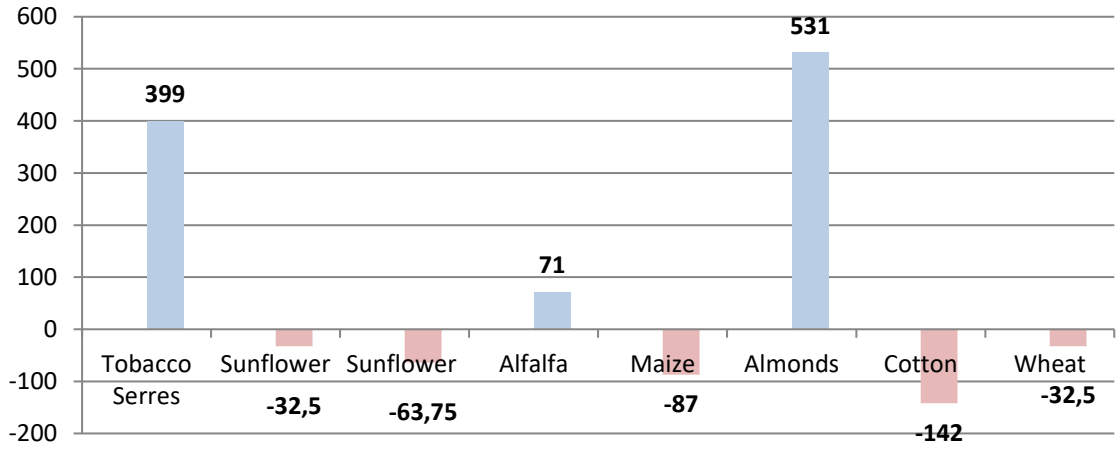

Figure 4.3. Net profits (per dekar) of several competitive to tobacco crops in Serres & Drama under mechanical harvesting

The Cost-Effectiveness results of tobacco cultivation, under mechanical harvesting, in Katerini and Elassona compared to its competitive crops, assuming similar farming conditions, are presented in the Table 4.2.4 while Figure 4.2.3 presents graphically the net profits (per dekar) of several competitive to tobacco crops in Katerini and Elassona under mechanical harvesting.

Table 4.2.4. Comparative Analysis of competitive to tobacco crops in Katerini & Elassona (per dekar) under mechanical harvesting

	Tobacco Katerini/ Elassona	Kiwifruits *	Crimson Grapes *
Cost (expenses - €/dekar)			
Rent	57	350	350
Tobacco seedlings	60	-	-
Field preparation (sprinkling, milling etc.)	50	45	55
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	108	380	750
Harvest (Wages)	83	100	150
Bundling - Moisture - Weighing (Wages)	51	-	-
Machine Maintenance – Consumables (+depreciations)	220	75	75
Others (OSDE, ELGA, Group)	30	55	55
Total costs (€/dekar)	**659**	**1.005**	**1.435**
Return (revenues)			
Producer price (€/kg)	4,37	0,60	1,20
Yield (kg/dekar)	235	4.500	3.500
Gross Production Value (€/dekar)	1.029	2.700	4.200
Production cost (€/kg)	2,97	0,23	0,41
Net profit (€/kg)	1,56	0,37	0,79
Gross Income (€/dekar)	**1.026**	**2.700**	**4.200**
Net Income (Profit)- (€/dekar)	**367**	***1.695***	***2.765***
Benefit/Cost Ratio	**1,558**	***2.686***	***1.940***
Ranking	*(3)*	*(1)*	*(2)*

- *Not included the installation and opportunity cost*

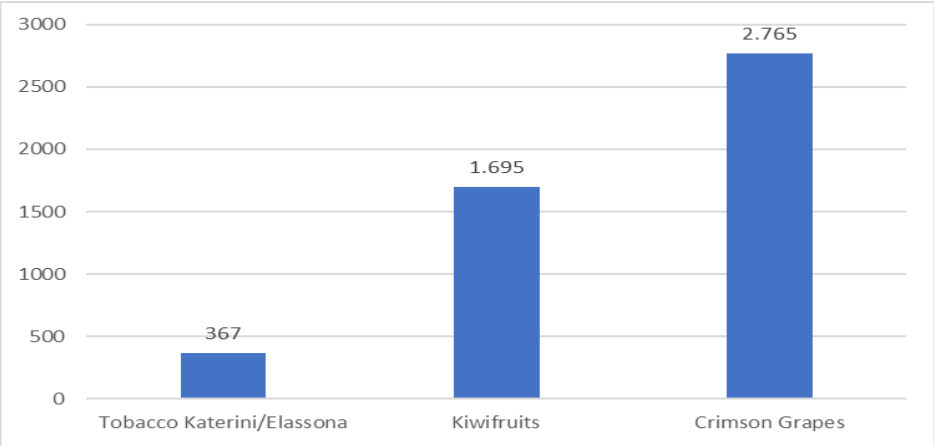

Figure 4.2.3. Net profits (per dekar) of several competitive to tobacco crops in Katerini and Elassona under mechanical harvesting

Concluding, based on the cost-Effectiveness results of tobacco cultivation, under mechanical harvesting, compared to the current status (Figure 4.2.4.) a very important conclusion can be extracted. Mechanical harvesting contributes significantly to the cost

reduction of tobacco by restricting the harvesting cost by almost 60%. this reduction, in production cost, creates new dynamics as it derives significant profit margins which affect the producer price. Figure 4.2.4 presents graphically the influence of producer price (€ per kgr) under current status and mechanical harvesting. According to this figure, the producer price under mechanical harvesting could be reduced by 0,50-0,55 Euros per kg without changing the net profit of the producers.

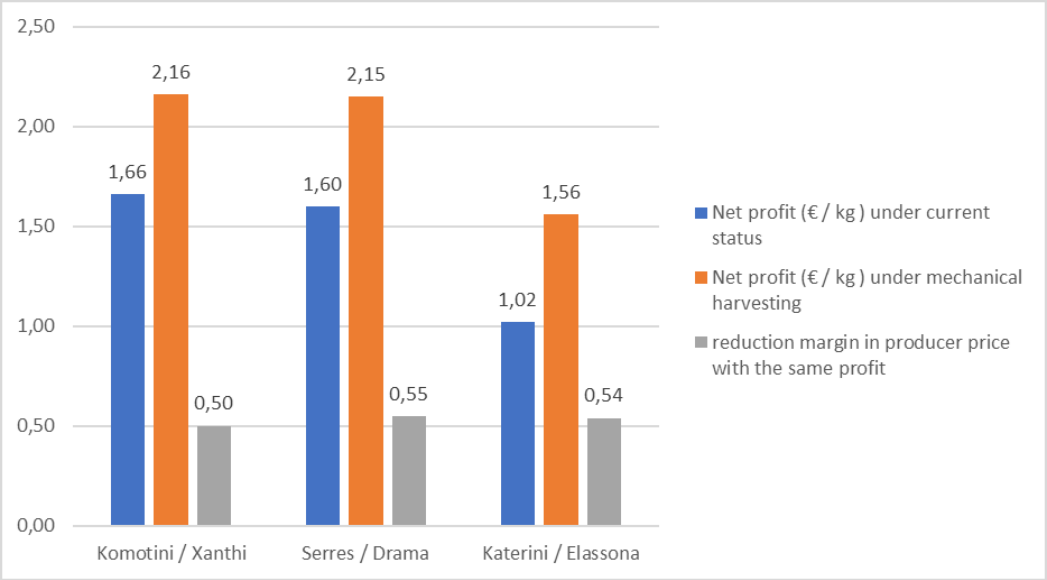

Figure 4.2.4. Influence of producer price (€ per kg) under current status and mechanical harvesting

5. Quantitative Research (survey section)

Following the qualitative research, and the experience gained from it, a questionnaire for a quantitative research was developed. Data were collected through a personal response questionnaire survey. Initially, all questionnaires were mailed out in batches of 10-20 to a specific contact person in each study area (April 2018). In the following week, after which a batch of questionnaires was mailed, respondents were contacted by personal interview and asked if they would like to participate. By May 2018, 100 responses from tobacco farmers had been received out of 150 questionnaires sent; an overall response rate of 66,7%, and assembled into a database. From a technical-architectural point of view, the design process of the questionnaire is divided into four levels of functionality, aiming to answer the current study research questions-aims (Figure 5.1).

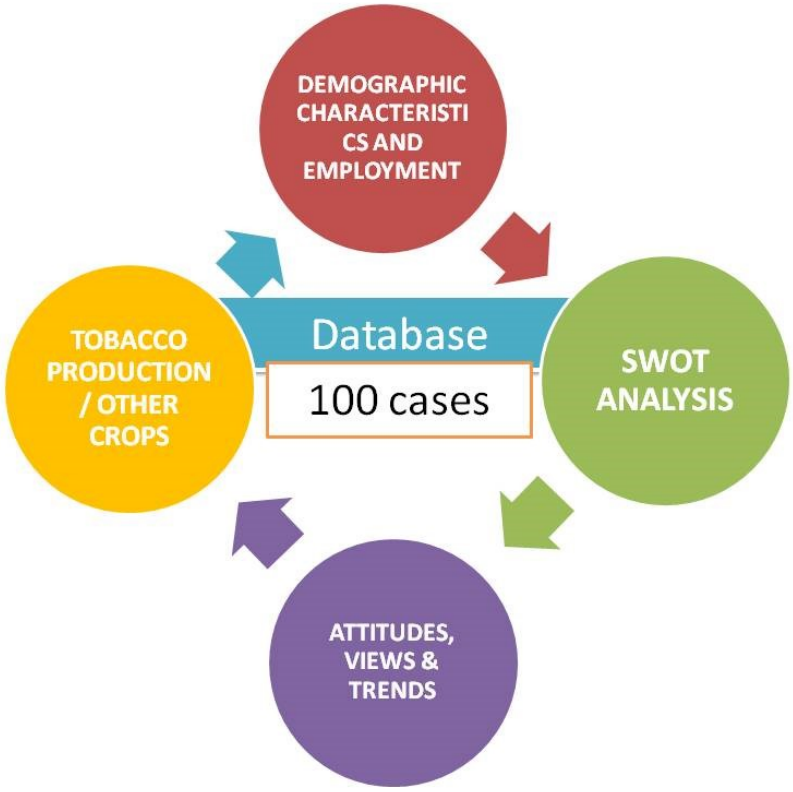

Figure 5.1. Database functionality

These four levels consist of:

(a) the section that provides information about personal or demographic characteristics of the respondents, including 10 questions or 19 variables

(b) the section that provides information on tobacco production and other crops, including production cost and technical details [10 questions or 66 variables]

(c) attitudes, views and trends, including the innovations level in their farms and mechanical harvesting, farmers' willingness to continue tobacco cultivation, reasons to continue (or stop) tobacco cultivation and general questions about existence of young people in their areas [10 questions or 67 variables] and finally

(d) questions regarding SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) [4 questions or 49 variables].

The questionnaire was mainly designed to record issues related to tobacco cultivation and especially to determine the farmers willingness to continue tobacco cultivation under the certain condition and under mechanical harvesting. In particular, some critical questions in the survey were formulated in order to elicit data on respondents' views on the prospective change of mechanical harvesting and the special characteristics of each study area. Moreover, some questions regarding young farmers availability were also asked to respondents. In addition, in order to encourage participation and minimize the cognitive burden on respondents, most questions were framed in Likert scale intervals.

Most of the questionnaires have been collected in the tobacco areas. However, very interesting potentials have been also found in the areas of Kastoria/Kozani and for this reason questionnaires were also collected from these areas. Especially in the areas of Kastoria there is a very dynamic group of producers (the last 3 years), which is doubled each year. In addition, there is land availability for crop expansion, there are young interested people in the area and the land is suitable for mechanical harvesting.

5.1. Results

5.1.1. Demographic characteristics and employment

This section includes the analysis of the first part of the questionnaire for tobacco growers. In particular, it presents the socioeconomic characteristics of the sample and summary statistics of the employment variables. In the following figure 5.1.1. the sample distribution among the several research areas has been presented. Considering that an attempt was made for each area to be represented equally in the research sample the sample distribution is quite satisfactory. The majority of the respondents are located in Xanthi (25%) while 21% of them are located in Katerini/Elassona, 20% in Komotini, 20% in Serres/Drama and finally the rest 14% are located in other areas (Thessaloniki, Kastoria or Neapoli Kozanis).

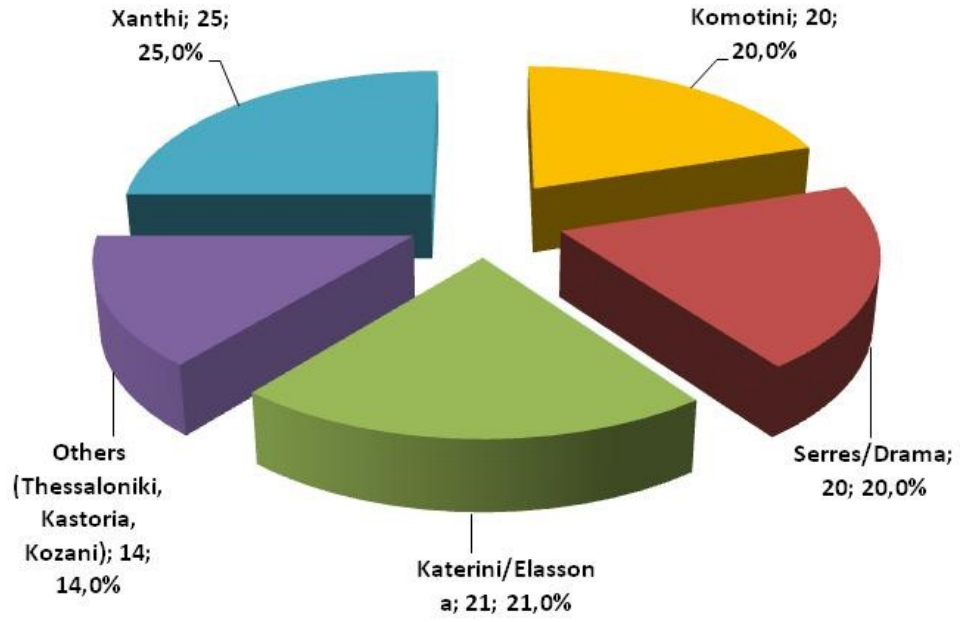

Figure 5.1.1. Area

Figure 5.1.2. presents graphically the sex percentage amongst the respondents in the research area. In the whole sample most of the respondents are male (79%). In particular, 90.0% of them in Komotini are male, 85,7% in Katerini/Elassona, 80,0% in Xanthi, 71,4% in Thessaloniki/Kastoria/Kozani and finally 65,0% in Serres/Drama are male respectively. This can be justified as mostly farm managing is male-oriented.

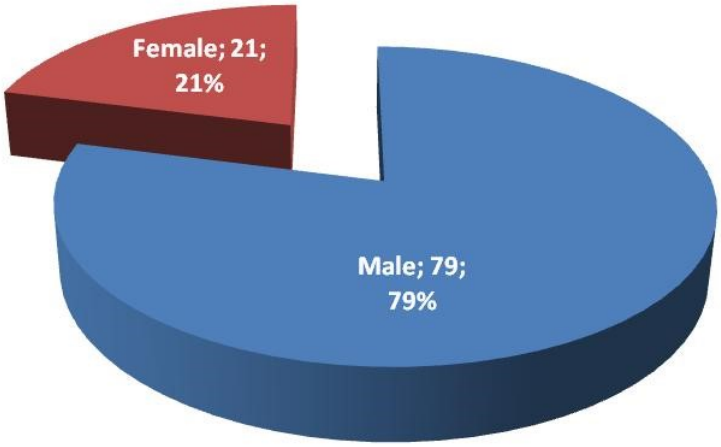

Figure 5.1.2. Sex

Table 5.1.1. presents the mean age of the respondents in the research area. In the whole sample the mean age of the farmers is 47,31 years old. The younger respondents are located in Katerini/Elassona (mean age: 43,95 years) while the older are located in Thessaloniki/Kastoria/Kozani (mean age: 51,14 years). Considering that the mean farmers age in Greece is about 43 years old (for the year 2017) it is conceivable that tobacco growers are relatively old.

Table 5.1.1. Age

Area	Mean age	Min age	Max age	Standard Deviation
Komotini	45,50	28	74	13,62
Katerini/Elassona	**43,95**	27	55	9,4
Serres/Drama	48,65	29	64	12,14
Thessaloniki/Kastoria/Kozani	**51,14**	39	63	8,69
Xanthi	48,36	32	68	10,83
Whole sample	**47,31**	**27**	**74**	**11,22**

Table 5.1.2. presents the marital status of the respondents. Most of them (77%) are married, 19% are single while 4% are in a permanent relation or under a cohabitation

agreement. The share of married respondents is also particularly large and probably it is related with their high mean age.

Table 5.1.2. Marital status

Marital status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	19	19,0	19,0	19,0
	Married	77	77,0	77,0	96,0
	Permanent relation/Cohabitation agreement	4	4,0	4,0	100,0
	Total	100	100,0	100,0	

Regarding the family members, Table 5.1.3. presents the number of adult family members and Table 5.1.4. presents the number of children. An interesting finding is the large number of adults in the same household. In particular, 43% of the households have 4 or more adult members.

Table 5.1.3. Adult number of family members

Adult No of family members (in the same household)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	14	14,0	14,0	14,0
	2	33	33,0	33,0	47,0
	3	10	10,0	10,0	57,0
	4	27	27,0	27,0	84,0
	5	8	8,0	8,0	92,0
	6	8	8,0	8,0	100,0
	Total	100	100,0	100,0	

In the following Table 5.1.4. it is observed that the families have very few children something that is consistent with the above mentioned observation. In particular, each married respondent has 0,82 children average.

Table 5.1.4. Under age number of family members

Under-age No of family members (in the same household)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	62	62,0	62,0	62,0
	1	17	17,0	17,0	79,0
	2	13	13,0	13,0	92,0
	3	8	8,0	8,0	100,0
	Total	100	100,0	100,0	

Regarding the educational level of the respondents (Table 5.1.5.) it is worth noting that most of them (67%) have finished the lyceum, while 22% of them have received technical education and 7% higher education.

Table 5.1.5. Educational level

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary school	11	11,0	11,0	11,0
	Secondary	22	22,0	22,0	33,0
	Lyceum	38	38,0	38,0	71,0
	Technical education	22	22,0	22,0	93,0
	Higher education	7	7,0	7,0	100,0
	Total	100	100,0	100,0	

Table 5.1.6. presents the percentage of respondents who received training related to agriculture. It's worth noting that only 17% of them have received unofficial agricultural training sometime in their lives. This training was most often implemented in an Agricultural Training Center (KE.G.E.) and is not related to tobacco cultivation. This training usually referred to new technologies, information technology, rural life or farm management issues.

Table 5.1.6. Training related to agriculture

Training related to agriculture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	83	83,0	83,0	83,0
	Yes	17	17,0	17,0	100,0
	Total	100	100,0	100,0	

Table 5.1.7. presents the mean household income of the respondents per research area. It's worth noting that the higher household incomes are observed in Katerini/Elassona and afterwards in Serres/Drama and Thessaloniki/Kastoria/Kozani. On the other hand the lower incomes observed in Xanthi and Komotini. Regarding the household income from tobacco cultivation it's usually about 50% to 70% of the total household income (mean: 62,6%) while the extra household income from other agricultural crops is more or less 20% more (mean: 17,6%). The non-farm income is almost 20% of the total household income (average).

Table 5.1.7. Household income

Area	Mean household income	Mean income from agriculture	Mean income from tobacco
Komotini	6.235	5.435	4.382
Xanthi	16.975	12.125	7.911
Serres/Drama	24.809	19.476	11.666
Thessaloniki/Kastoria/Kozani	23.857	12.857	13.857
Katerini/Elassona	39.200	36.180	29.380
Whole sample	22.992	18.447	14.388

Table 5.1.8. presents the farming experience of respondents, expressed by a) their years of being farmers, b) their years of being tobacco growers and c) their non-farming employment. According to the data of this table it's obvious that tobacco growers in the study areas have a very important farming experience (more than 20 years) in general agricultural activities and in tobacco cultivation in specific. Besides, most of them (88%) are full time farmers while the rest 12% were employees (public or private) or builders.

Table 5.1.8. Farming experience

Area	Years of being farmer	Years of being tobacco grower	Full time farmer (%)
Komotini	28.6	26.8	100%
Katerini/Elassona	24.0	21.0	100%
Serres/Drama	23.8	23.8	47.6
Thessaloniki/Kastoria/Kozani	25.1	17.5	100%
Xanthi	29.1	27.0	88%
Whole sample	26.2	23.2	86%

5.1.2. Tobacco production / other crops

This section provides information on tobacco production and other crops, including production cost and technical details. Table 5.2.1. presents the total land of tobacco cultivation and other crops. The mean farm in Thessaloniki/Kastoria/Kozani is the biggest (about 110 dekars) and afterwards in Katerini/Elassona (92,5 dekars), in Serres/Drama (60,64 dekars), in Xanthi (20,67 dekars) while the smaller mean farm is in Komotini with 10,85 dekars (average).

Table 5.2.1. Total dekars of tobacco and other crops

Area	Total dekars of tobacco and other crops	Min land	Max land	Standard Deviation
Komotini	10,85	5	20	4,56
Katerini/Elassona	92,50	15	200	61,48
Xanthi	20,67	10	40	10,73
Thessaloniki/Kastoria/Kozani	110,00	20	400	125,39
Serres/Drama	60,64	0	180	49,14
Whole sample	**55,57**	**5**	**400**	**69,92**

Table 5.2.2. presents the total owned land for tobacco cultivation and other crops. The mean owned land in Katerini/Elassona is the biggest (49,25 dekars) and afterwards in Serres/Drama (41,40 dekars), in Thessaloniki/Kastoria/Kozani (32,86 dekars), in Xanthi (14,57 dekars) while the smaller mean owned farm is in Komotini with 6,20 dekars (average).

Table 5.2.2. Total dekars of owned land

Area	Total dekars of owned land	Min land	Max land	Standard Deviation
Komotini	6,20	0	20	5,41
Katerini/Elassona	49,25	0	150	45,11
Xanthi	14,57	10	30	6,40
Thessaloniki/Kastoria/Kozani	32,86	0	80	37,09
Serres/Drama	41,80	0	180	40,76
Whole sample	29,20	0	80	35,45

Table 5.2.3. presents the total rented land for tobacco cultivation and other crops. The mean rented land in Thessaloniki/Kastoria/Kozani is the biggest (77,04 dekars) and afterwards in Katerini (43,25 dekars), in Serres/Drama (20,88 dekars), in Xanthi (6,10 dekars) while the smaller mean rented farm is in Komotini with 4,65 dekars (average).

Table 5.2.3. Total dekars of rented land

Area	Total dekars of rented land	Min land	Max land	Standard Deviation
Komotini	4,65	0	20	6,12
Katerini/Elassona	43,25	0	100	37,84
Xanthi	6,10	0	15	6,04
Thessaloniki/Kastoria/Kozani	77,04	0	340	116,88
Serres	20,88	0	100	24,58
Whole sample	26,94	0	340	53,31

Table 5.2.4. presents the value for land rent in euros per dekar for each research area. The mean rent in Serres/Drama is the highest (56,67 euros per dekar) and afterwards in Katerini/Elassona (43,25 euros per dekar), in Xanthi (27,59 dekars), in Komotini (26,80 euros per dekar) while the smaller rent is in Thessaloniki/Kastoria/Kozani with 18 euros per dekar (average).

Table 5.2.4. Euros / dekar of rented land

Area	Euros / dekar	Min	Max	Standard Deviation
Komotini	26,80	0	120	35,21
Katerini/Elassona	43,25	0	90	37,84
Serres/Drama	56,67	0	100	50,33
Thessaloniki/Kastoria/Kozani	18,00	15	20	2,58
Xanthi	27,59	0	20	32,51
Whole sample	32,66	0	120	36,68

Figure 5.2.1. presents the distribution of tobacco growers depending on the tobacco variety that cultivate. Most of them cultivate “Basmas” (68%) and afterwards “Katerini” (23%), “Virginia” (6%) while the rest 3% cultivates “both Basmas and Virginia” varieties.

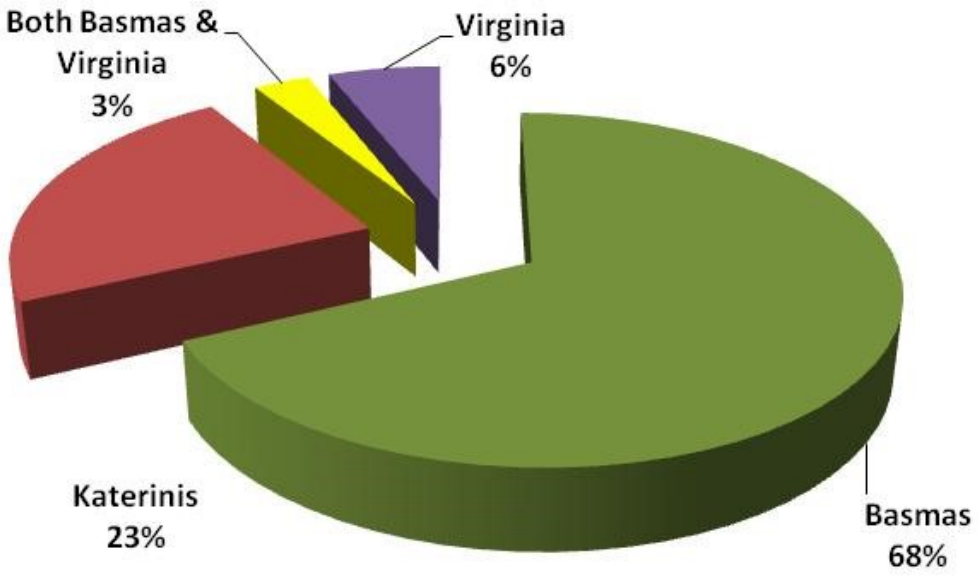

Figure 5.2.1. Tobacco varieties

Table 5.2.5. presents the distribution of respondents according to the number of their cultivated dekars. According to their responses 23% of them cultivates with tobacco 10 or less dekars, 50% of them cultivates 10-30 dekars while the rest 27% cultivates more than 30 dekars. It’s worth noting that 4% of them cultivates 100 or more dekars.

Table 5.2.5. Tobacco farm size (no of dekars)

No of stremmas (tobacco)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6	4	4,0	4,1	4,1
	9	3	3,0	3,1	7,2
	10	16	16,0	16,5	23,7
	11	2	2,0	2,1	25,8
	12	2	2,0	2,1	27,8
	15	2	2,0	2,1	29,9
	20	18	18,0	18,6	48,5
	21	2	2,0	2,1	50,5
	25	14	14,0	14,4	64,9
	30	16	16,0	16,5	81,4
	40	2	2,0	2,1	83,5
	50	6	6,0	6,2	89,7
	60	2	2,0	2,1	91,8
	80	4	4,0	4,1	95,9
	100	2	2,0	2,1	97,9
	140	2	2,0	2,1	100,0
	Total	97	97,0	100,0	
Missing	System	3	3,0		
Total		100	100,0		

The following Table 5.2.6. presents the respondents answers on tobacco yields. According to their viewpoints tobacco cultivation produces higher yields in Katerini/Elassona (215,88 ± 50,88 kg./dekar) and afterwards in Serres/Drama (189,29 ± 18,66 kg./ dekar On the contrary smaller yields have been produced in Komotini (175,75 ± 56,85 kg./ dekar), in Xanthi (175,00 ± 55,97 kg./str.) and in Thessaloniki/Kastoria/Kozani (155,71 ± 19,11 kg./str.) .

Table 5.2.6. Tobacco yields

Area	Yield (kg/str.)	Min Yield	Max Yield	Standard Deviation
Komotini	175,75	100	295	56,85
Katerini/Elassona	215,88	90	300	50,88
Serres/Drama	189,29	150	300	18,66
Thessaloniki/Kastoria/Kozani	155,71	120	180	19,11
Xanthi	175,00	100	295	55,97
Whole sample	191,13	90	300	69,4

The most important crops used in crop rotation in the study areas are: a) wheat (24%) and b) cereals (21%). Very few tobacco growers used sunflower (3%), legumes (2%) and vetch (2%) while the rest 48% of the respondents do not use crop rotation or do not answer to this question.

Table 5.2.7. Crops used in crop rotation

Other crop used in crop rotation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		48	48,0	48,0	48,0
	cereals	21	21,0	21,0	69,0
	legumes	2	2,0	2,0	71,0
	sunflower	3	3,0	3,0	74,0
	vetch	2	2,0	2,0	76,0
	wheat	24	24,0	24,0	100,0
	Total	100	100,0	100,0	

Other crops competitive to tobacco in the study areas are: cotton (8%), grapes/vines (5%), almonds (3%), sunflower 3%), apples (2%), cherries (2%), kiwifruits (2%), legumes (2%) and nuts (2%). In particular in Komotini some tobacco growers also cultivate cherries, in Xanthi cotton, legumes and sunflower, in Katerini/Elassona kiwifruits and grapes/vines, in Thessaloniki/Kastoria/Kozani apples and nuts and in Serres/Drama almonds. Besides the above have been also mentioned a very few dekars of clover, lentils, wheat and maize.

Table 5.2.8. Other crops completive to tobacco

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		71	71,0	71,0	71,0
	almonds	3	3,0	3,0	74,0
	apples	2	2,0	2,0	76,0
	cherries	2	2,0	2,0	78,0
	cotton	8	8,0	8,0	86,0
	kiwifruits	2	2,0	2,0	88,0
	legumes	2	2,0	2,0	90,0
	Nuts	2	2,0	2,0	92,0
	sunflower	3	3,0	3,0	95,0
	vines	5	5,0	5,0	100,0
	Total	100	100,0	100,0	

Regarding the number of workers for tobacco cultivation in the tobacco farms of Komotini, work (average) 4,15 family members and 0,79 non-family members. In Xanthi work 3,48 and 1,43 family and non-family members respectively, in Serres/Drama 3,00 and 5,26 family and non-family members respectively, in Katerini/Elassona 2,64 and 2,36 family and non-family members respectively and in Thessaloniki/Kastoria/Kozani 1,86 and 3,14 family and non-family members respectively (Table 5.2.9.).

Table 5.2.9. Workers for Tobacco cultivation (means)

Area	Family members (incl. head)	Non-family members	Min	Max
Komotini	4,15	0,79	0	2
Katerini/Elassona	2,64	2,36	0	5
Xanthi	3,48	1,43	0	3
Thessaloniki/Kastoria/Kozani	1,86	3,14	0	6
Serres/Drama	3,00	5,26	0	15
Whole sample	2,92	3,56	0	15

Table 5.2.10 presents the viewpoints of tobacco growers in regards of their kids' willingness to continue tobacco cultivation or not. **It's worth noting that 19% of them believe that their kids are willing to continue tobacco cultivation and 22% neither agree nor disagree; a noteworthy share with positive view in continuing tobacco cultivation**.

Table 5.2.10. Do your kids want to continue tobacco cultivation?

Do your kids want to continue tobacco cultivation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	19	19,0	19,6	19,6
	Neither agree nor disagree	22	22,0	22,7	42,3
	Disagree	18	18,0	18,6	60,8
	Strongly disagree	14	14,0	14,4	75,3
	Have no kids	24	24,0	24,7	100,0
	Total	97	97,0	100,0	
Missing	System	3	3,0		
Total		100	100,0		

Examining the responses per area it can be seen that respondents in Komotini, Serres/Drama and Xanthi are those that agree that their kids want to continue tobacco cultivation (mean Likert value: 2,24, 2,45 and 2,37 respectively). Tobacco growers in Katerini/Elassona (mean Likert value: 2,90) and Thessaloniki/Kastoria/Kozani (mean Likert value: 2,57) neither agree nor disagree (Table 5.2.11). Comparing the results with the previous table 5.2.10 where the views of the whole sample were presented, respondents were relatively positive for their kids to continue tobacco cultivation. It seems that the negative views of the respondents in Komotini and Xanthi area influence the average views of the whole sample.

Table 5.2.11. Do your kids want to continue tobacco cultivation?

Area	Mean value	Likert scale	Standard Deviation
Komotini	2,24	*Agree*	1,46
Katerini/Elassona	2,90	*Neither agree nor disagree*	0,86
Serres/Drama	2,45	*Agree*	1,04
Thessaloniki/Kastoria/Kozani	2,57	*Neither agree nor disagree*	1,65
Xanthi	2,37	*Agree*	1,58
Whole sample	2,47	*Agree*	1,47

The expressed cost for non-family work (cost of harvesting) is higher in Thessaloniki/Kastoria/Kozani (mean cost: 31 ± 2,10 euros/8 hours) and afterwards in Serres/Drama (mean cost: 21,90 ± 12,69 euros/8 hours), in Katerini/Elassona (mean cost: 21,41 ± 10,40 euros/8 hours), in Xanthi (mean cost: 20,40 ± 8,79 euros/8 hours) and finally in Komotini (mean cost: 19,56 ± 9,7 euros/8 hours)

Table 5.2.12. Cost of non-family work (euros/8 hours)

Area	Cost/8 hours (euros)	Min	Max	Standard Deviation
Komotini	19,56	0	25	9,70
Katerini/Elassona	21,41	0	30	10,40
Serres/Drama	21,90	0	30	12,69
Thessaloniki/Kastoria/Kozani	31,00	30	35	2,10
Xanthi	20,40	0	24	8,79
Whole sample	22,08	0	35	10,32

Table 5.2.13 presents the level of tobacco growers' agreement/disagreement with some tobacco cultivation problems. Their viewpoints has been expressed in a 5-point Likert scale, where 1=strongly agree and 5=strongly disagree. Last column of this table includes the mean Likert score. According to this scale, the smaller the number the more respondents agree while based on this score, a ranking of these statements can be also done. From this table it's worth noting that the most important problems for the tobacco growers are hierarchical the a) difficulty at sales of the product (mean: 2,82) and b) infertile land (mean: 3,06). **As it can also be seen here the majority of the respondents strongly disagree that their kids are not interested to continue tobacco cultivation.**

Table 5.2.13. Level of agreement/disagreement with the below tobacco cultivation problems

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*	*Mean Likert score*
Q.19α: Sale of the product	14%	43%	3%	27%	13%	**2,82**
Q.19β: Diseases	-	47%	5%	32%	16%	3,17
Q.19γ: Hard job	21%	30%	-	8%	41%	3,18
Q.19δ: Small owned land	21%	2%	8%	12%	24%	3,13
Q.19ε: Infertile land	13%	24%	26%	18%	19%	**3,06**
Q.19στ: Low yield-incomes	13%	21%	16%	11%	-	3,42
Q.19ζ: Low producer prices	17%	28%	6%	8%	41%	3,28
Q.19η: Low subsidies	21%	22%	6%	8%	43%	3,30
Q.19θ: Kids not interested to continue	23%	21%	17%	8%	31%	**3,19**
Q.19ι: Production in neighboring countries	10%	24%	25%	14%	28%	3,26

Table 5.2.14 presents the most recent producer prices have been received by tobacco growers (year 2017). It's worth noting that higher prices have been received in Katerini/Elassona (4,97 ± 0,26) and afterwards in Thessaloniki/Kastoria/Kozani (4,64 ± 0,09), in Komotini (4,56 ± 0,73), in Xanthi (4,55 ± 0,81) and finally in Serres/Drama (4,17 ± 0,17). Based on the results appeared in table 5.2.13, the majority of the respondents strongly disagree (41%) that producer prices are low; **it seems that generally producers are satisfied with current prices.**

Table 5.2.14. Most recent tobacco producer price

Area	Price (euros)	Min	Max	Standard Deviation
Komotini	5,17	4,3	5,5	0,73
Katerini/Elassona	4,37	4,0	4,5	0,26
Serres/Drama	5,05	4,3	5,5	0,17
Thessaloniki/Kastoria/Kozani	4,64	4,2	5,2	0,09
Xanthi	4,92	4,2	5,4	0,81
Whole sample	4,83	4,0	5,5	0,59

According to the results of the following Table 5.2.15. respondents characterize their land a) scattered and small with large distance among cultivated parcels (53%), b) sloped (63%), c) not irrigated (69%) and d) difficult to be accessed by large agricultural machinery (52%). However, the most scattered and small lands with large distances among cultivated parcels have been mentioned in Katerini/Elassona (95%) while in Serres/Drama no such thing has been observed. The most sloped lands have been mentioned in Serres/Drama (90,5%) while in Thessaloniki/Kastoria/Kozani no sloped land has been mentioned. Irrigated lands have been mentioned only in Xanthi and Komotini with 8% and 5% respectively. Finally, lands easy to be accessed by large agricultural machinery have been mentioned in Katerini/Elassona (45%), in Xanthi (44%) and Komotini (35%).

Table 5.2.15. How would you characterize your land for tobacco cultivation?

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Whole sample					
Q.21α: Scattered/ small with distance among them	25%	28%	7%	11%	29%
Q.22β: Sloped	36%	27%	20%	5%	12%
Q.21γ: Irrigated	-	3%	24%	34%	35%
Q.21δ: Easy to be accessed by large agricultural machinery.	13%	14%	19%	21%	31%
Komotini					
Q.21α: Scattered/ small with distance among them	20%	30%	5%	15%	30%
Q.22β: Sloped	25%	35%	5%	10%	25%
Q.21γ: Irrigated	-	5%	30%	50%	10%
Q.21δ: Easy to be accessed by large agricultural machinery.	25%	10%	10%	25%	30%
Katerini/Elassona					
Q.21α: Scattered/ small with distance among them	60%	35%	-	5%	-
Q.22β: Sloped	35%	50%	15%	-	-
Q.21γ: Irrigated	-	-	30%	40%	30%

Q.21δ: Easy to be accessed by large agricultural machinery.	-	45%	45%	10%	-
Serres/Drama					
Q.21α: Scattered/ small with distance among them	-	-	9,5%	14,3%	76,2%
Q.22β: Sloped	90,5%	-	9,5%	-	
Q.21γ: Irrigated	-	-	-	14,3%	85,7%
Q.21δ: Easy to be accessed by large agricultural machinery.	-	-	-	14,3%	85,7%
Thessaloniki/Kastoria/Kozani					
Q.21α: Scattered/ small with distance among them	28,6%	57,1%	14,3%	-	-
Q.22β: Sloped	-	14,3%	85,7%	-	-
Q.21γ: Irrigated	-	-	14,3%	14,3%	57,1%
Q.21δ: Easy to be accessed by large agricultural machinery.	-	-	42,9%	42,9%	-
Xanthi					
Q.21α: Scattered/ small with distance among them	20%	28%	8%	16%	28%
Q.22β: Sloped	20%	32%	8%	12%	28%
Q.21γ: Irrigated	-	8%	40%	44%	4%
Q.21δ: Easy to be accessed by large agricultural machinery.	32%	12%	8%	20%	28%

5.1.3. Attitudes, views and trends

This section provides tobacco growers' attitudes, views and trends, including the innovations level in their farms and mechanical harvesting, farmers' willingness to continue tobacco cultivation, reasons to continue (or stop) tobacco cultivation and general questions about existence of young people in their areas.

5.1.3.1 Views regarding the availability of work in tobacco cultivated areas

The first question of this section includes some statements regarding the availability of work. Respondents asked to state their level of agreement or disagreement in the typical 5-point Likert scale (Table 5.3.1.). According to the results some important observations have been emerged:

1. Respondents state that family workers are not enough to satisfy the needs of the farm as they say that are not satisfied with the AVAILABILITY OF FAMILY WORK (58%).
2. Respondents ARE NOT satisfied with either the AVAILABILITY OF NON-FAMILY WORK (62%); for various reasons non-family work cannot meet the needs of the respondents.

3. Respondents ARE NOT satisfied with the WAGES OF NON-FAMILY WORKERS (50%); they probably consider the cost of non-family work high.
4. **Respondents believe that YOUNG PEOPLE INCREASED in their area over the last years (51%).**
5. **Respondents believe that YOUNG PEOPLE WILL INCREASE the following years in their area (47%).**
6. **Respondents believe that young people like to DEAL WITH TOBACCO CULTIVATION (47%). Statements 4-6 strongly indicate that young farmers are interested for tobacco cultivation and will increase in the future in their areas.**
7. Respondents believe that for the young people the LAND OWNERSHIP AND THE POSSESSION OF MACHINERY IS NOT A SATISFACTORY MOTIVATION to deal with tobacco cultivation (44%)
8. Respondents believe that for the young people the ABILITY OF TOBACCO TO PROVIDE A SATISFACTORY INCOME IS NOT ENOUGH to deal with tobacco cultivation (44%), though they believe that the ABILITY OF TOBACCO TO PROVIDE A COMPLEMENTARY INCOME IS A SATISFACTORY MOTIVATION to deal with tobacco cultivation (55%)
9. Respondents believe that young people WANT TO DEAL WITH TOBACCO CULTIVATION BECAUSE THERE ARE NO ALTERNATIVES (61%).
10. **Respondents STRONGLY BELIEVE that IF MECHANICAL HARVESTING WILL INTRODUCED (the job easier) then YOUNG PEOPLE WILL DEAL WITH TOBACCO CULTIVATION (47%).**

Table 5.3.1. Availability of work

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.22α: I'm satisfied with the availability of work from my family	7%	24%	11%	**37%**	**21%**
Q.22β: I'm satisfied with the availability of non-family workers		13%	12%	**33%**	**29%**
Q.22γ: I'm satisfied with the wages of non-family workers	3%	11%	23%	**39%**	**11%**
Q.22δ: Young people increased in my area the last years.	**9%**	**42%**	4%	17%	28%
Q.22ε: I believe that young people will increase the following years in my area.	**7%**	**40%**	11%	28%	14%
Q.22στ: Young people like to deal with tobacco cultivation.	**17%**	**30%**	6%	27%	17%

Q.22ζ: Young people of my area stay home and do not migrate in urban areas.	6%	21%	21%	**38%**	**14%**
Q.22η: Young people have returned to the region due to economic crisis	7%	24%	13%	**39%**	**17%**
Q.22θ: Young people will deal with agriculture the next years	7%	23%	22%	**28%**	**20%**
Q.22ι: Young people will deal with tobacco cultivation the next years	15%	24%	20%	**21%**	**20%**
Q.22κ: Young people will deal with tobacco cultivation because they have the land and machinery	9%	27%	20%	**33%**	**11%**
Q.22λ: Young people will deal with tobacco cultivation because the crop provides a satisfactory income	18%	21%	17%	**33%**	**11%**
Q.22μ: Young people will deal with tobacco cultivation because the crop provides them a complementary income (income from other activities also).	9%	16%	32%	**26%**	**17%**
Q.22ν: Young people want to deal with tobacco cultivation because there are no alternatives	6%	23%	32%	**27%**	**12%**
Q.22ξ: If mechanical harvesting will introduced (the job easier) then young people will deal with tobacco cultivation.	**18%**	**29%**	22%	13%	18%

5.1.3.2 Views regarding mechanical harvesting in tobacco cultivated areas

Table 5.3.2. presents Likert type responses to some statements regarding the innovation level in farms and mechanical harvesting. Respondents asked to mention their level of agreement or disagreement in the typical 5-point Likert scale (Table 5.3.1.). According to the results some important observations have been emerged:

1. Respondents state that ARE NOT using CONTEMPORARY MACHINERY in agricultural activities (46%)
2. Respondents ARE NOT interested to deal with ORGANIC FARMING (47%)
3. Respondents ARE NOT engaged in INTEGRATED MANAGEMENT SYSTEMS (57%)
4. Respondents ARE NOT interested in ADOPTING INNOVATIVE CROPS (47%)
5. **Respondents believe that MECHANICAL HARVESTING WILL ENHANCE TOBACCO CULTIVATION in their area (53%)**
6. **Respondents believe that MECHANICAL HARVESTING WILL ENHANCE THEIR INCOME (61%)**

7. **Respondents believe that MECHANICAL HARVESTING WILL ENHANCE THE ECONOMY of their area (59%)**
8. **Respondents DO NOT believe that MECHANICAL HARVESTING is a THREAD FOR THE EMPLOYMENT In their area (64%)**
9. Respondents believe that MECHANICAL HARVESTING will be a MOTIVE FOR EXPANDING TOBACCO CULTIVATION in their area (52%)
10. Respondents believe that MECHANICAL HARVESTING will introduce IMPORTANT POSITIVE CHANGES in tobacco cultivation in their area (47%)

All the above statements of the respondents believe that mechanical harvesting will be adopted by the farmers and will bring many benefits to them, to the local economies and it is not seen as a thread for the employment.

Table 5.3.2. Innovation level in farms and mechanical harvesting

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.23α: I'm using contemporary machinery in agricultural activities	3%	32%	19%	**34%**	**12%**
Q.23β: I'm interested to deal with organic farming.	6%	28%	19%	**33%**	**14%**
Q.23γ: I'm engaged in Integrated management systems	9%	28%	6%	**39%**	**18%**
Q.23δ: I'm interested in adopting innovative crops	6%	36%	11%	**40%**	**7%**
Q.23ε: I believe that mechanical harvesting will enhance tobacco cultivation in my area.	**21%**	**32%**	18%	15%	14%
Q.23στ: I believe that mechanical harvesting will enhance my income	**24%**	**37%**	12%	13%	14%
Q.23ζ: I believe that mechanical harvesting will enhance the economy of my area	**15%**	**44%**	14%	13%	14%
Q.23η: I believe that mechanical harvesting is a thread for the employment in my area	9%	14%	13%	**49%**	**15%**
Q.23θ: I believe that mechanical harvesting will be a motive for expanding tobacco cultivation in my area	**20%**	**32%**	19%	13%	16%
Q.23ι: I believe that mechanical harvesting will introduce important positive changes in tobacco cultivation in my area	**13%**	**34%**	20%	16%	14%

5.1.3.3 Views regarding the continuation of tobacco cultivation

Table 5.3.3. presents using Likert type responses the tobacco growers' willingness to continue cultivating tobacco under existing conditions. It's worth noting that **most of the respondents expressed positive answers**, especially in Xanthi (100%), Komotini (95%) and Thessaloniki/Kastoria/Kozani (57,1%). On the contrary tobacco growers in Katerini/Elassona are strongly negative (65%) while tobacco growers in Serres/Drama are totally divided (38.1%).

Table 5.3.3. Willingness to continue cultivating tobacco under existing conditions

Area	Strongly Agree or Agree	Strongly Disagree or Disagree
Komotini	**95,0%**	5,0%
Katerini/Elassona	20,0%	**65,0%**
Serres/Drama	**38,1%**	**38,1%**
Thessaloniki/Kastoria/Kozani	**57,1%**	-
Xanthi	**100,0%**	-
Whole sample	**64,0%**	11,0%

Table 5.3.4. presents, using Likert type responses, the reasons to continue tobacco cultivation under the current conditions. According to the respondents' answers the most important reason is the "Ownership of machinery /equipment" (62%) and afterwards the "Guaranteed sale of production" (53%), "Because my kids are interested" (53%), "Absence of alternatives" (52%), "Satisfactory income" (52%), "Soil suitability / microclimate" (46%), "Knowledge / experience" (44%), "Family tradition" (44%), "Offers stable employment" (41%) and finally "In order my kids to have job in the future" (38%).

Table 5.3.4. Reasons to continue tobacco cultivation under the current conditions

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*	*Rank*
Q.25α: Family tradition	**22%**	**22%**	12%	**21%**	**23%**	**8 (44%)**
Q.25β: Absence of alternatives	**29%**	**23%**	6%	14%	28%	**4 (52%)**
Q.25γ: Satisfactory income	**28%**	**24%**	21%	12%	15%	**5 (52%)**
Q.25δ: Because my kids are interested	**24%**	**19%**	16%	20%	21%	**3 (53%)**
Q.25ε: Offers stable employment	**20%**	**21%**	19%	25%	15%	**9 (41%)**
Q.25στ: Ownership of machinery /equipment	**18%**	**34%**	8%	25%	15%	**1 (62%)**
Q.25ζ: Knowledge / experience	**29%**	**15%**	19%	20%	17%	**7 (44%)**

Q.25η: Soil suitability / microclimate	**24%**	**22%**	17%	18%	19%	**6 (46%)**
Q.25θ: Guaranteed sale of production	**31%**	**22%**	5%	23%	19%	**2 (53%)**
Q.25ι: In order my kids to have job in the future	21%	17%	18%	**27%**	**17%**	**10 (38%)**

Table 5.3.5. presents, using Likert type responses, the reasons to stop tobacco cultivation under the current conditions. According to the respondents' answers the most important reason to stop tobacco cultivation is "Due to high age" (64%) and afterwards "the hard nature of work" (54%), "No subsidies" (50%), "Other crops with better outcomes" (49%) , "No persons for succession" (49%), "Low producer prices" (48%), "No satisfactory income" (43%) and finally "Due to health reasons" (42%) .

Table 5.3.5. Reasons to STOP tobacco cultivation under the current conditions

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*	*Rank*
Q.26α: Due to high age	**32%**	**32%**	5%	14%	17%	**1 (64%)**
Q.26β: No persons for succession	**29%**	**20%**	12%	22%	17%	**4 (49%)**
Q.26γ: No satisfactory income	21%	22%	13%	**15%**	**29%**	**7 (43%)**
Q.26δ: Hard work	**34%**	**20%**	-	14%	32%	**2 (54%)**
Q.26ε: Due to health reasons	**25%**	**17%**	17%	19%	22%	**8 (42%)**
Q.26στ: Other crops with better outcomes	**20%**	**29%**	18%	14%	19%	**5 (49%)**
Q.26ζ: No subsidies	**37%**	**13%**	3%	15%	32%	**3 (50%)**
Q.26στ: Low producer prices	30%	18%	-	**10%**	**42%**	**6 (48%)**

Table 5.3.6. presents using Likert type responses the tobacco growers' willingness to continue cultivating tobacco **under mechanical harvesting. It's worth noting that most of the respondents expressed positive answers, especially in Xanthi (100%), Katerini/Elassona (80%) and Komotini (70%).** On the contrary tobacco growers in Serres/Drama are strongly negative (61,9%) while tobacco growers in Thessaloniki/Kastoria/Kozani expressed some concerns (58,6%).

Table 5.3.6. Willingness to continue cultivating tobacco under mechanical harvesting

Area	Strongly Agree or Agree	Strongly Disagree or Disagree
Komotini	70,0% **(95,0%)**	- **(5,0%)**
Katerini/Elassona	**80,0%** (20,0%)	- **65,0%**
Serres/Drama	28,5% **(38,1%)**	**61,9%** (38,1%)
Thessaloniki/Kastoria/Kozani	41,4% **(57,1%)**	- (-)
Xanthi	80,0% **(100,0%)**	- (-)
Whole sample	**62,0%** (64,0%)	**13,0%** (11,0%)

Percentages in parenthesis represent their willingness to continue cultivating tobacco under existing conditions

Table 5.3.7. presents, using Likert type responses, the reasons to continue tobacco cultivation under mechanical harvesting. According to the respondents' answers the most important reason is the "Income increase" (57%) and afterwards "Cultivation increase" (52%), "Limitation of hard work" (51%), "Suitable for old age farmers" (48%), "Absence of alternatives" (46%), "Economic development of my area" (35%), "International trend" (35%), "My kids want mechanical harvesting (young farmers)" (32%), "Suitability of my land for mechanical harvesting" (26%) and finally "Creation of no-agricultural new jobs" (21%).

Table 5.3.7. Reasons to continue tobacco cultivation under mechanical harvesting conditions

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*	*Rank*
Q.28α: Income increase	**35%**	**22%**	19%	8%	16%	**1 (57%)**
Q.28β: Limitation of hard work	**30%**	**21%**	14%	19%	16%	**3 (51%)**
Q.28γ: Employment increase	**8%**	**24%**	37%	14%	17%	**9 (32%)**
Q.28δ: Cultivation increase	**22%**	**30%**	24%	8%	16%	**2 (52%)**
Q.28ε: Suitable for old farmers	**22%**	**26%**	17%	16%	16%	**4 (48%)**
Q.28στ: Suitability of my land for mechanical harvesting	11%	15%	41%	**20%**	**13%**	**10 (26%)**
Q.28ζ: Absence of alternatives	**18%**	**28%**	23%	18%	13%	**5 (46%)**
Q.28η: Economic development of my area	**15%**	**20%**	41%	13%	11%	**6 (35%)**
Q.28θ: Creation of no-agricultural new jobs	11%	10%	55%	**11%**	**13%**	**11 (21%)**
Q.28ι: My kids want mechanical harvesting (young farmers)	**23%**	**10%**	31%	**19%**	**14%**	**8 (33%)**
Q.28κ: international trend	**5%**	**30%**	43%	13%	9%	**7 (35%)**

Respondents' viewpoints regarding the interest of young people for tobacco cultivation have been presented graphically in the following Figure 5.3.1. As it can be seen only 7% of the respondents strongly disagree and 17% disagree; the majority of the respondents neither agree

nor disagree (32%) and a another significant share strongly agree (13%) and agree (28%). The results show that apart from a specific share that is not positive for the continuation of tobacco cultivation, the majority believe in the future of the crop along with interest from young people.

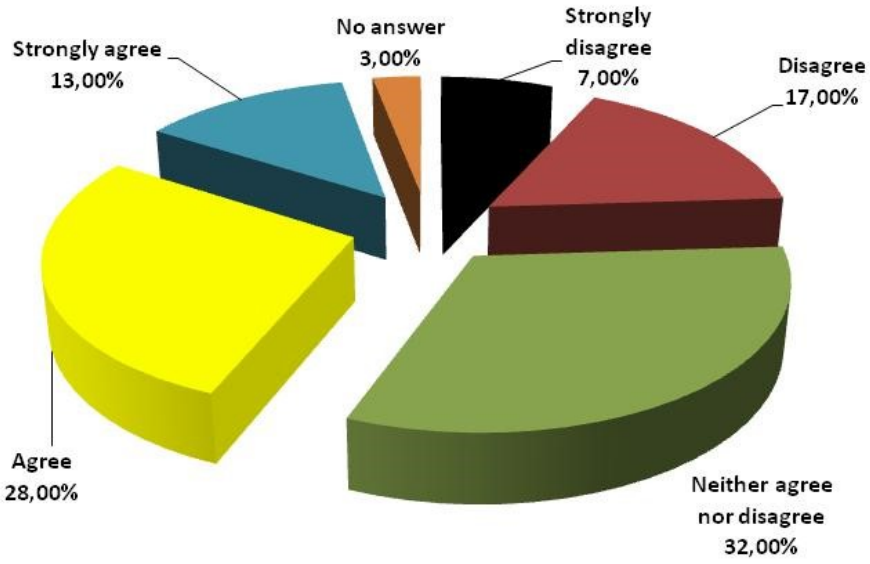

Figure 5.3.1. Do you believe that there is interest for tobacco cultivation from young people and that cultivation will continue in the future?

Last question of this section asks what is the minimum producer price that tobacco growers would accept under the current conditions? Figure 5.3.2. presents graphically the responses. It's worth noting that only 2% of the producers are willing to accept the current producer price while 4% of them are willing to accept reduced prices (until 20%). However, the vast majority of tobacco growers desire higher prices. Observing the views of the respondents it can be seen that the majority desire higher prices; despite that it has been seen in previous questions of the study that tobacco growers are satisfied with producer prices and that are willing to continue cultivation under the current conditions and under changes such as mechanical harvesting. We can interpret their response as a wish to have higher prices and moreover the question does not relate their answer with the willingness to continue the cultivation.

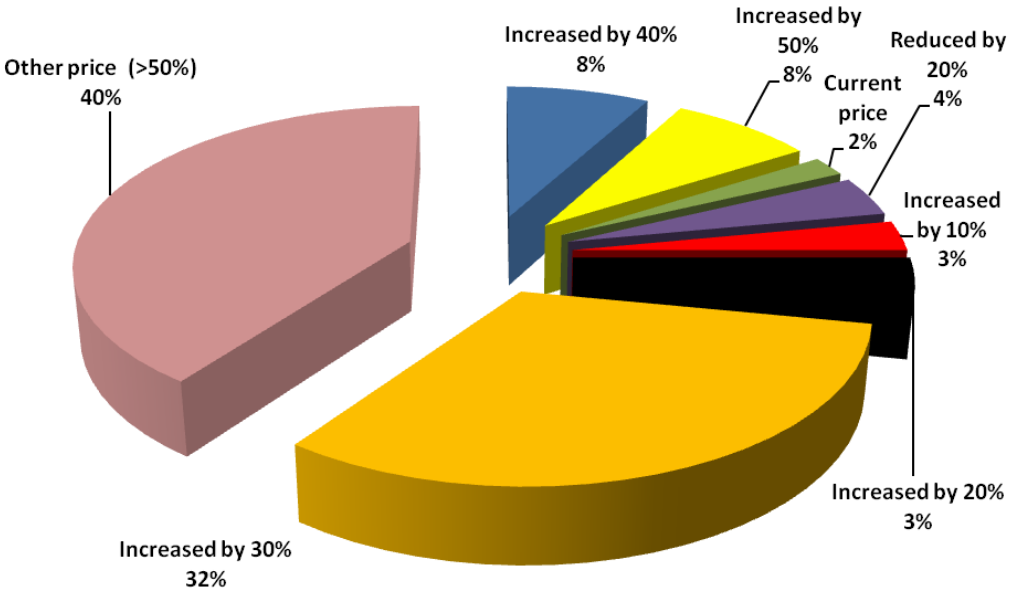

Figure 5.3.2. What is the minimum producer price that you would accept under the current conditions?

5.1.4. S.W.O.T. Analysis

This section includes four multivariable questions regarding SWOT analysis (Strengths, Weaknesses, Opportunities and Threats). Table 5.4.1. presents the main strengths of tobacco cultivation. According to the mean Likert scores (where 1=strongly disagree and 5=strongly agree) per area it's worth noting that the most important strength in Komotini is the "cooperative power" (4,50), in Katerini/Elassona the "product reputation" (4,75), in Serres/Drama the "product quality" (4,76), in Thessaloniki/Kastoria/Kozani the "low initial investment cots" (4,00) and finally in Xanthi the "farmers' know-how" and "satisfactory income" (4,00).

Table 5.4.1. Strengths (tobacco growers' viewpoint, mean Likert scores)

CODE	STRENGTHS	Komotini	Katerini/ Elassona	Serres/ Drama	Others	Xanthi
Q32α	Labor availability for harvesting (non family)	2,25	1,90	1,76	3,57	2,96
Q32β	Product quality	4,30	4,05	4,76	1,71	3,84
Q32γ	Low land rent	3,30	2,40	1,67	3,14	3,20
Q32δ	Microclimate	4,35	3,90	4,38	2,00	3,96
Q32ε	Soil quality	4,35	3,20	4,29	2,57	3,96
Q32στ	Product reputation	4,40	4,75	4,14	2,57	3,92
Q32ζ	Farmers know-how	4,15	3,75	3,52	1,71	4,00
Q32η	High yield (kg/dekar)	2,30	2,85	1,76	2,43	3,00
Q32θ	Producer price	3,40	2,95	1,00	3,14	3,24
Q32ι	Low initial investment cost (machinery and equipment)	3,30	2,85	1,38	4,00	3,00
Q32κ	Satisfactory income	4,20	2,95	1,00	2,43	4,00
Q32λ	Cooperative power/Group of farmers	4,50	2,05	3,48	2,29	3,98

In the following Figure 5.4.1. it's clear that tobacco producers in Komotini and Xanthi expressed the most positive views on the strengths of tobacco farming (larger area on the spider's chart).

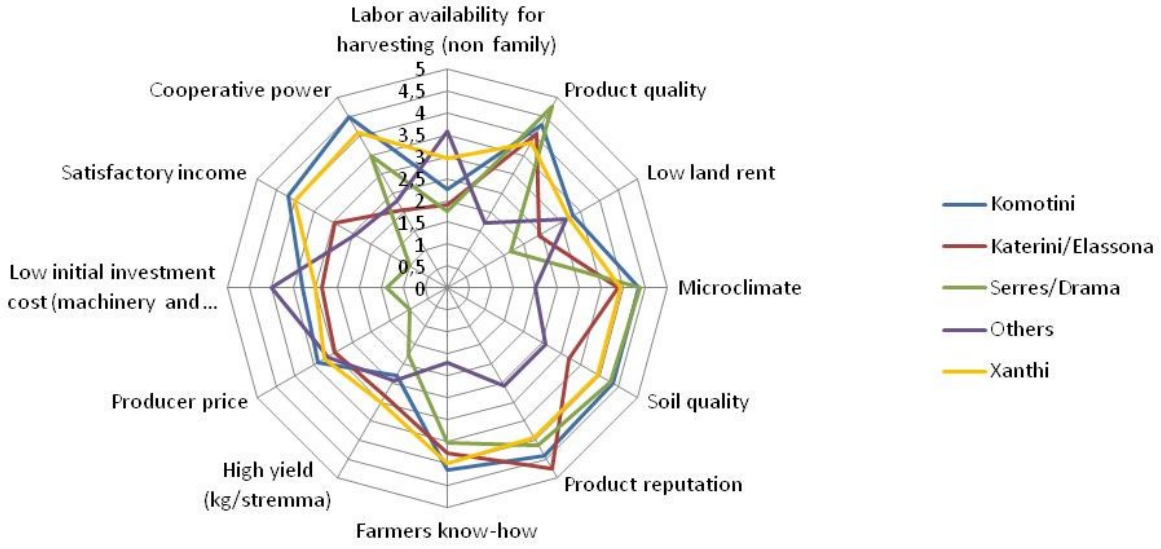

Figure 5.4.1. Strengths (tobacco growers' viewpoint, mean Likert scores)

Table 5.4.2. presents the main weaknesses of tobacco cultivation. According to the mean Likert scores per area (where 1=strongly disagree and 5=strongly agree) it's worth noting that the most important weakness in Komotini is the "High harvesting cost" (4,85), in Katerini/Elassona the "Bank restrictions (capital control)" (4,65), in Serres/Drama the "Low producer price" (4,95) and finally in Thessaloniki/Kastoria/Kozani and Xanthi the "Difficulties in estimating and controlling production cost" (3,57 and 3,59 respectively).

Table 5.4.2. Weaknesses (tobacco growers' viewpoint, mean Likert scores)

CODE	WEAKNESSES	Komotini	Katerini/ Elassona	Serres/ Drama	Others	Xanthi
Q33α	High harvesting cost	4,85	4,35	4,62	1,86	4,64
Q33β	High production cost	3,80	3,65	3,81	1,86	3,68
Q33γ	Land structure (slopes, scattered, infertile and semi mountainous land)	4,10	2,85	3,19	2,71	3,04
Q33δ	Bank restrictions (capital control)	3,00	4,65	4,71	1,71	3,20
Q33ε	Bureaucracy problems for non family work	2,32	3,90	3,71	2,43	2,92
Q33στ	Old age workers	3,35	2,50	3,52	2,14	2,96
Q33ζ	Small size farms	3,45	2,20	4,29	1,86	3,28
Q33η	Low producer price	3,50	2,05	4,95	1,57	3,08
Q33θ	Labor from neighboring countries	1,40	2,50	4,71	2,14	3,04
Q33ι	Low income	1,35	2,20	2,98	2,43	3,00
Q33κ	Unstable yield (kg/str)	2,25	1,65	1,95	2,14	2,88
Q33λ	Difficulties in estimating and controlling production cost	3,35	2,10	2,95	3,57	3,04

In the following Figure 5.4.2. it's very clear that tobacco producers in Serres/Drama expressed the most negative views on the weaknesses of tobacco farming (larger area on the spider's chart).

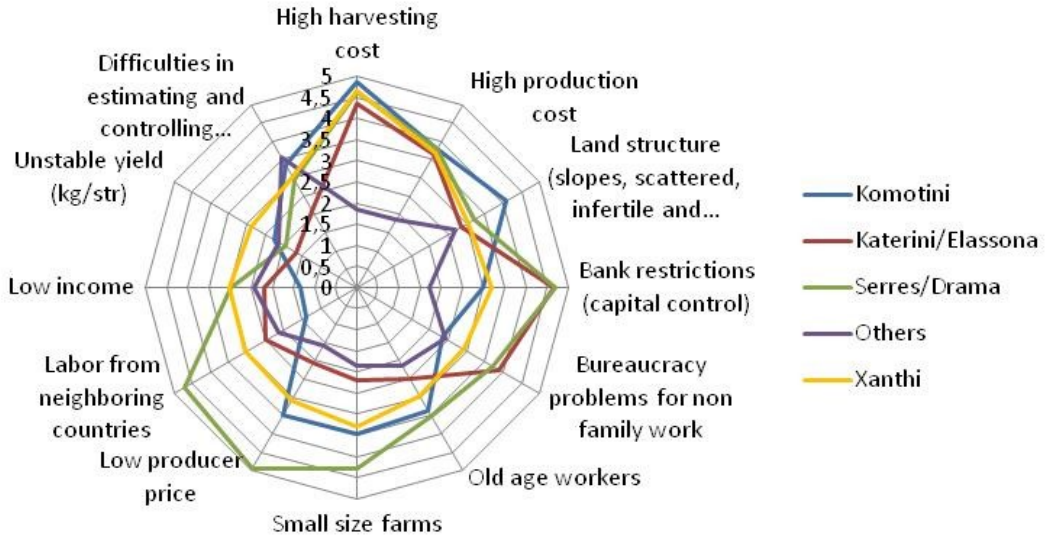

Figure 5.4.2. Weaknesses (tobacco growers' viewpoint, mean Likert scores)

Table 5.4.3. presents the main opportunities of tobacco cultivation. According to the mean Likert scores per area (where 1=strongly disagree and 5=strongly agree) it's worth noting that the most important opportunity in Komotini is the "Traditional culture (memories/force of habit)" (4,80), in Katerini/Elassona the "Certification (biological/integrated)" (4,85), in Serres/Drama the "Ownership of equipment" (3,90), in Thessaloniki/Kastoria/Kozani the "Non typical opinion leadership" (2,57) and finally in Xanthi the "Non typical opinion leadership" (3,0).

Table 5.4.3. Opportunities (tobacco growers' viewpoint, mean Likert scores)

CODE	OPPORTUNITIES	Komotini	Katerini/ Elassona	Serres/ Drama	Others	Xanthi
Q34α	Suitable cultivation for small size farms	4,20	2,80	2,38	2,29	2,96
Q34β	Suitable cultivation for complementary income	4,40	2,15	3,33	2,14	3,16
Q34γ	Not abandoning of land	4,40	2,20	3,76	2,00	3,08
Q34δ	Non typical opinion leadership	3,20	2,55	2,00	2,57	3,20
Q34ε	Shift to alternative crops (high initial investment cost and return)	3,25	4,65	2,29	2,43	3,16
Q34στ	Certification (biological/integrated)	3,40	4,85	3,86	1,86	3,08
Q34ζ	Contracting farming	3,40	2,15	3,00	1,57	3,08
Q34η	Mechanical Harvesting	2,10	2,00	2,52	2,43	2,92
Q34θ	Subsidies for new farmers (CAP measures)	3,30	2,30	3,57	1,86	3,08
Q34ι	Tobacco industries investments	3,35	2,15	3,43	1,57	3,08
Q34κ	Traditional culture (memories/force of habit)	4,80	2,05	3,76	1,57	3,16
Q34λ	Ownership of equipment	4,45	4,50	3,90	1,71	3,08
Q34μ	Demand for tobacco	4,45	2,05	3,29	2,29	3,12

In the following Figure 5.4.3. it's very clear that tobacco producers in Komotini expressed the most positive views on the opportunities of tobacco farming (larger area on the spider's chart).

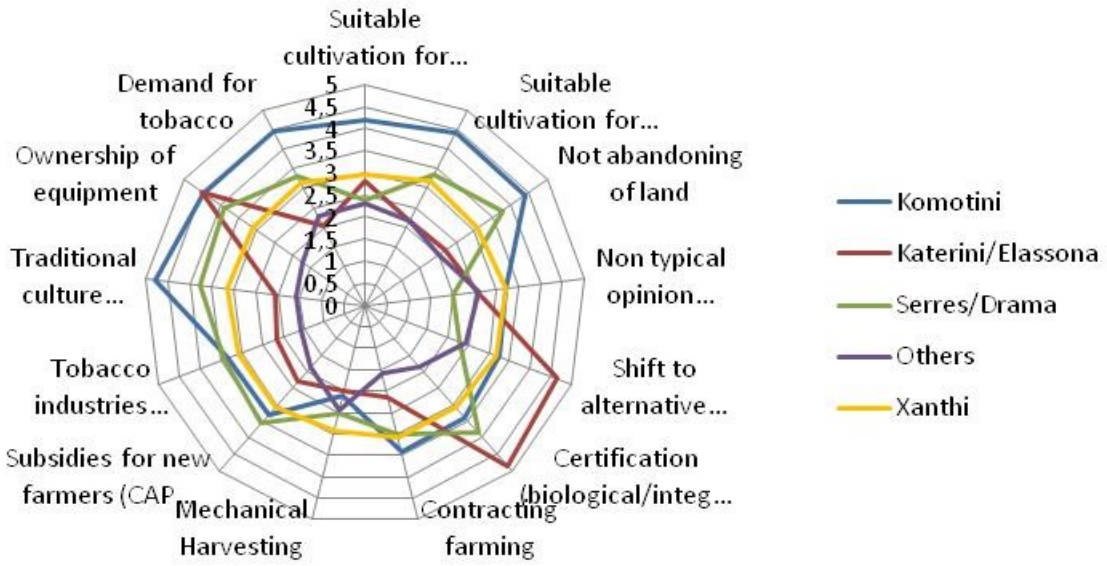

Figure 5.4.3. Opportunities (tobacco growers' viewpoint, mean Likert scores)

Table 5.4.4. presents the main threats of tobacco cultivation. According to the mean Likert scores per area (where 1=strongly disagree and 5=strongly agree) it's worth noting that the most important threat in Komotini, Katerini, Serres and Xanthi is the "Health issues related to smoking" (3,70, 3,60, 5,00 and 3,36 respectively) while in Kastoria is the "Competitive cultivations availability" and "Taxation" (both 2,86).

Table 5.4.4. Threats (tobacco growers' viewpoint, mean Likert scores)

CODE	THREATS	Komotini	Katerini	Serres	Kastoria	Xanthi
Q35α	Competitive cultivations availability	1,25	2,88	1,86	2,86	3,32
Q35β	Mechanical Harvesting (jobs to be lost, concentration of production in big farms)	3,85	2,25	1,67	2,14	2,84
Q35γ	Migration of young people (lack of youth)	2,30	3,00	1,95	1,43	2,92
Q35δ	Agricultural policy (CAP eg. decoupling)	4,75	2,45	3,62	1,43	3,16
Q35ε	Taxation	4,45	1,80	5,00	2,86	2,96
Q35στ	Health issues related to smoking	4,20	3,60	5,00	2,14	3,36
Q35ζ	Other neighboring producing countries	4,15	2,80	4,38	2,43	3,20
Q35η	Farmer loans (eg to shift to an alternative crop)	3,55	5,00	4,14	2,43	3,28
Q35θ	Number of processing units	2,55	2,90	3,90	1,57	3,32
Q35ι	Oil price	3,55	4,10	4,86	1,86	3,20
Q35κ	Scattered land	2,55	2,50	4,81	1,57	3,24
Q35λ	Economic instability	3,50	2,20	4,86	1,29	3,08

In the following Figure 5.4.4. it's very clear that tobacco producers in Serres expressed the most negative views on the threats of tobacco farming (larger area on the spider's chart).

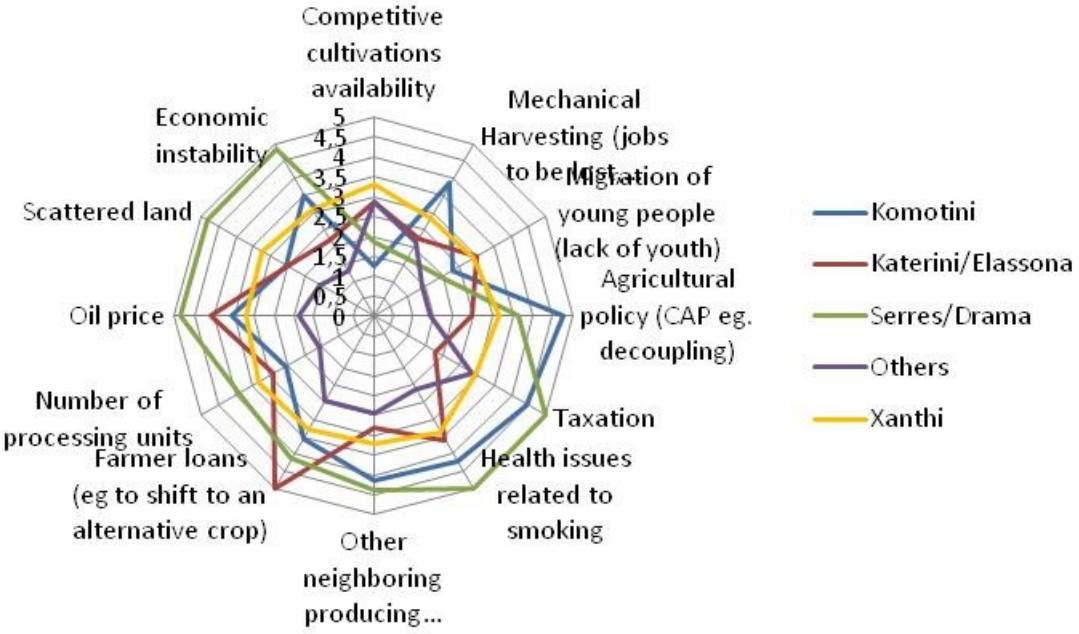

Figure 5.4.4. Threats (tobacco growers' viewpoint, mean Likert scores)

6. Conclusions (areas where tobacco crop can be extended)

From the above analysis it is clear that **the tobacco cultivation is very important for the growers in all areas which currently cultivate it**. In the study areas **it seems no alternative crops exist and only perennials and trees can be considered as competitive in terms of gained income.** The above analysis showed that **arable crops present a very small gross profit per hectare while tree plantations require high initial installation costs, no returns in the short run and suffer high price volatility**. **Tobacco cultivation appears a very good choice, with a satisfactory household income (by accounting the self-employment is getting more attractive), suitable for small size farms or offering complementary income** . More specifically:

- **In Thrace Komotini/Xanthi** there are no important alternative crops, especially in the tobacco areas. Small fields, microclimate, availability of work, cultivation experience and strong co-operation contribute to the continuation of tobacco cultivation. Recently, some young people have returned back to agriculture and are engaged in tobacco cultivation. Personal and family work contribute to a satisfactory household income. In a case of mechanical harvesting crops will shift to plane areas and probably can be expanded.
- **In Serres/Drama area** the alternative crops are predominantly perennials (almonds) but among arable crops tobacco remains the major choice. Perennial trees require high investments and face structural and climate risks, moreover returns of the investment are not available immediately as with the annual crops and thus farmers cannot burden the cost of the investment and the price volatility risk.
- **In Katerini/Elassona** the alternative crops are predominantly trees and offer significant incomes. Tobacco growers in Katerini would like to replace tobacco growing with crimson grapes or kiwifruits but the high installation cost is a disincentive factor. Thessaly and areas like Elassona will compensate for losses in Katerini.
- **In Xanthi** the tobacco-growing situation is similar to that of Komotini, except that tobacco growers cultivate larger farms and use more non-family work. Also they are more receptive of the mechanization of tobacco.
- **In Kozani/Kastoria** there is a relatively new and very dynamic cooperation (producers' group) of tobacco growers which year per year doubles its members. The tobacco growers are very active and show great interest in their cultivation as they try to reach organic production. It's worthwhile to pay close attention to this small producer group.

During the discussion with the tobacco growers (quantitative research) as well as during the contact with tobacco stakeholders (qualitative research) some areas where tobacco cultivation can be extended have been mentioned. The main criteria for selecting these areas are the following: a) available land suitable for tobacco cultivation, b) cultivation with competitive crops that could be replaced by tobacco and c) relatively flat land that can be accessed by large agricultural machinery. The mentioned areas are the following:

- **In Kastoria** there are significant possibilities for tobacco extension in the following areas: Asproklisia, Amoudara, Agia Kiriaki, Mesopotamia, Inoi, Dipotamia and Ptergia
- **In Serres** there are significant possibilities for tobacco extension in the following areas: Toumpa, Strimoniko, Dafnoudi, Kastanousa, Mesorachi, Nea Zichni, Neo Souli, Chriso, Visaltia and Chimaros
- **In Xanthi** there are some possibilities for small scale tobacco extension in the following areas: Magiko, Avdira, Neochori, Stavrochori, Selero, Gorgona, Vaniano, Kimmeria, Alma, Dekarcho, Sounio, Sminthi, Miki, Simantra, Filia, Timpano, Komnina and Oreon**.**
- **In Komotini** tobacco cultivation cannot be extended as there are too many small-scale tobacco growers and there are not enough available fields.
- **In Katerini** there is no desire for crop expansion, and despite the relatively good economic results, most tobacco growers are eager to move to the tree-growing crops that offer higher income.

Overall, the provided information show that under the current conditions all the areas in Komotini, Xanthi, Kavala, Drama, Serres, Thessaloniki will continue tobacco cultivation and in the mechanisation scenario the respondents demonstrated a very positive attitude.

The introduction of mechanical harvesting is seen in almost all areas as a positive development, and if feasible, it could revitalize the cultivation shifting it to larger farms and more business oriented farmers. All the above regions will be engaged in the intensive tobacco production and only small Komotini farmers expressed fear that the major tobacco production might move towards other regions.

Higher prices and further mechanization of tobacco production will attract several other Greek regions that traditionally have involved in tobacco. Such regions could Kastoria/Kozani, areas in the Thessaly plane (Elassona/Tyrnavos etc). Certainly higher prices and mechanical harvesting will turn a new page in the tobacco cultivation as new farm-entrepreneurs can be involved and produce tobacco in a more competitive way.

Concluding, tobacco cultivation is a **very suitable crop for** the study areas. Especially in case of combining with personal or family harvesting work tobacco offers a satisfactory income. **Commercial interest is high and demand is satisfactory**. On the other hand, **mechanical harvesting will significantly reduce the production cost** (by almost 30%-40%) and **create attractive conditions**. With the new developments in tobacco cultivation, results of the research and discussions with the stakeholders indicate that some new areas will also be attracted to tobacco cultivation.

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Appendix

Table 2.6. Population changes (2001-2011) per age class

Area (Age classes)	Year 2001	Year 2011	Change (%)
Greece	**10.934.097**	**10.816.286**	**-1,08%**
Rodopi	**111.237**	**112.039**	**0,72%**
0-29	42.889	38.537	**-10,15%**
30-49	30.012	30.299	**0,96%**
50-69	27.746	26.659	**-3,92%**
70+	10.590	16.544	**56,22%**
Dramma	**102.184**	**98.287**	**-3,96%**
0-29	35.853	28.888	**-19,43%**
30-49	27.536	26.673	**-3,13%**
50-69	25.965	22.918	**-11,74%**
70+	12.830	19.808	**54,39%**
Evros	**149.283**	**147.947**	**-0,90%**
0-29	56.790	48.530	**-14,54%**
30-49	37.315	38.479	**3,12%**
50-69	36.519	34.443	**-5,68%**
70+	18.659	26.495	**42,00%**
Kavala	**141.499**	**124.917**	**-13,27%**
0-29	49.371	37.704	**-23,63%**
30-49	38.661	35.236	**-8,86%**
50-69	36.158	29.638	**-18,03%**
70+	17.309	22.339	**29,06%**
Xanthi	**102.959**	**111.222**	**7,43%**
0-29	44.735	43.007	**-3,86%**
30-49	28.716	31.978	**11,36%**
50-69	21.752	23.489	**7,99%**
70+	7.756	12.748	**64,36%**
Thessaloniki	**1.084.001**	**1.110.551**	**2,39%**
0-29	428.099	379.908	**-11,26%**
30-49	324.253	339.586	**4,73%**
50-69	236.263	248.626	**5,23%**
70+	95.386	142.431	**49,32%**
Imathia	**142.471**	**140.611**	**-1,32%**
0-29	52.649	44.027	**-16,38%**
30-49	39.212	39.497	**0,73%**
50-69	36.273	34.472	**-4,97%**
70+	14.337	22.615	**57,74%**
Kilkis	**86.424**	**80.419**	**-7,47%**
0-29	30.285	23.923	**-21,01%**
30-49	22.541	21.565	**-4,33%**
50-69	23.343	17.904	**-23,30%**
70+	10.255	17.027	**66,04%**
Pella	**143.957**	**139.680**	**-3,06%**
0-29	51.610	42.389	**-17,87%**
30-49	40.578	39.699	**-2,17%**
50-69	36.263	33.082	**-8,77%**
70+	15.506	24.510	**58,07%**
Pieria	**126.412**	**126.698**	**0,23%**
0-29	47.201	39.825	**-15,63%**
30-49	35.793	36.460	**1,86%**

50-69	30.620	30.220	**-1,31%**
70+	12.798	20.193	**57,78%**
Serres	**194.483**	**176.430**	**-10,23%**
0-29	64.517	47.999	**-25,60%**
30-49	49.475	45.224	**-8,59%**
50-69	54.832	45.184	**-17,60%**
70+	25.659	38.023	**48,19%**
Chalkidiki (Incl. Agion Oros)	**96.849**	**107.719**	**10,09%**
0-29	35.584	33.426	**-6,06%**
30-49	26.657	31.783	**19,23%**
50-69	24.252	26.245	**8,22%**
70+	10.356	16.265	**57,06%**
Kozani	**153.939**	**150.196**	**-2,49%**
0-29	58.042	47.874	**-17,52%**
30-49	44.387	43.028	**-3,06%**
50-69	34.367	34.991	**1,82%**
70+	17.143	24.303	**41,77%**
Grevenna	**32.567**	**31.757**	**-2,55%**
0-29	9.935	8.600	**-13,44%**
30-49	8.155	7.978	**-2,17%**
50-69	9.233	7.642	**-17,23%**
70+	5.244	7.537	**43,73%**
Kastoria	**53.702**	**50.322**	**-6,72%**
0-29	19.576	14.973	**-23,51%**
30-49	16.056	14.500	**-9,69%**
50-69	12.084	12.529	**3,68%**
70+	5.986	8.320	**38,99%**
Florina	**54.109**	**51.414**	**-5,24%**
0-29	20.782	17.096	**-17,74%**
30-49	14.733	14.170	**-3,82%**
50-69	12.065	11.507	**-4,62%**
70+	6.529	8.641	**32,35%**
Ioannina	**161.027**	**167.901**	**4,09%**
0-29	58.889	54.456	**-7,53%**
30-49	42.670	45.304	**6,17%**
50-69	37.862	40.091	**5,89%**
70+	21.606	28.050	**29,83%**
Arta	**73.620**	**67.877**	**-8,46%**
0-29	23.653	18.579	**-21,45%**
30-49	18.708	16.845	**-9,96%**
50-69	20.002	18.012	**-9,95%**
70+	11.257	14.441	**28,28%**
Thesprotia	**43.601**	**43.587**	**-0,03%**
0-29	15.332	12.647	**-17,51%**
30-49	11.594	11.376	**-1,88%**
50-69	10.492	11.312	**7,82%**
70+	6.183	8.252	**33,46%**
Preveza	**58.144**	**57.491**	**-1,14%**
0-29	20.071	16.727	**-16,66%**
30-49	15.660	15.116	**-3,47%**
50-69	14.946	15.263	**2,12%**
70+	7.467	10.385	**39,08%**

Larisa	**282.156**	**284.325**	**0,76%**
0-29	106.669	93.703	**-12,16%**
30-49	78.247	81.763	**4,49%**
50-69	67.367	65.814	**-2,31%**
70+	29.873	43.045	**44,09%**
Karditsa	**120.265**	**113.544**	**-5,92%**
0-29	39.862	31.951	**-19,85%**
30-49	30.219	29.387	**-2,75%**
50-69	32.464	28.865	**-11,09%**
70+	17.720	23.341	**31,72%**
Magnisia	**205.005**	**190.010**	**-7,89%**
0-29	75.260	62.309	**-17,21%**
30-49	57.763	53.506	**-7,37%**
50-69	48.658	45.291	**-6,92%**
70+	23.324	28.904	**23,92%**
Sporades	**13.212**	**131.085**	**4,25%**
0-29	44.151	36.640	**-17,01%**
30-49	34.421	35.105	**1,99%**
50-69	36.235	34.055	**-6,02%**
70+	17.882	25.285	**41,40%**
Fthiotida	**169.542**	**158.231**	**-7,15%**
0-29	59.478	47.146	**-20,73%**
30-49	45.786	43.792	**-4,36%**
50-69	42.040	38.060	**-9,47%**
70+	22.238	29.233	**31,46%**
Voiotia	**123.913**	**117.920**	**-5,08%**
0-29	45.975	37.920	**-17,52%**
30-49	35.237	36.013	**2,20%**
50-69	28.190	26.632	**-5,53%**
70+	14.511	17.355	**19,60%**
Evoia	**207.305**	**210.815**	**1,66%**
0-29	75.835	65.669	**-13,41%**
30-49	57.339	61.787	**7,76%**
50-69	48.970	49.848	**1,79%**
70+	25.161	33.511	**33,19%**
Evritania	**19.518**	**20.081**	**2,80%**
0-29	6.266	5.010	**-20,04%**
30-49	4.818	4.588	**-4,77%**
50-69	4.938	5.284	**7,01%**
70+	3.496	5.199	**48,71%**
Fokida	**37.866**	**40.343**	**6,14%**
0-29	12.061	10.793	**-10,51%**
30-49	9.531	10.521	**10,39%**
50-69	9.633	10.279	**6,71%**
70+	6.641	8.750	**31,76%**
Kerkira	**111.081**	**104.371**	**-6,43%**
0-29	37.860	30.215	**-20,19%**
30-49	32.042	30.215	**-5,70%**
50-69	26.157	26.895	**2,82%**
70+	15.022	17.046	**13,47%**
Zakinthos	**38.883**	**40.759**	**4,60%**
0-29	14.593	13.307	**-8,81%**

30-49	11.602	12.460	**7,40%**
50-69	8.032	9.154	**13,97%**
70+	4.656	5.838	**25,39%**
Ithaki	**3.212**	**3.231**	**0,59%**
0-29	845	786	**-6,98%**
30-49	936	905	**-3,31%**
50-69	835	844	**1,08%**
70+	623	696	**11,72%**
Kefalinia	**37.756**	**35.801**	**-5,46%**
0-29	12.668	11.127	**-12,16%**
30-49	10.292	10.205	**-0,85%**
50-69	8.876	8.105	**-8,69%**
70+	5.920	6.364	**7,50%**
Lefkada	**21.888**	**23.693**	**7,62%**
0-29	6.764	6.991	**3,36%**
30-49	5.825	6.566	**12,72%**
50-69	5.375	5.570	**3,63%**
70+	3.924	4.566	**16,36%**
Axaia	**318.928**	**309.694**	**-2,98%**
0-29	129.201	111.786	**-13,48%**
30-49	89.805	88.686	**-1,25%**
50-69	66.658	67.551	**1,34%**
70+	33.264	41.671	**25,27%**
Aitoloakarnania	**219.092**	**210.802**	**-3,93%**
0-29	82.907	68.554	**-17,31%**
30-49	57.748	56.784	**-1,67%**
50-69	63.195	49.861	**-21,10%**
70+	15.242	35.603	**133,58%**
Ilia	**183.521**	**159.300**	**-15,20%**
0-29	67.617	49.965	**-26,11%**
30-49	50.421	43.903	**-12,93%**
50-69	41.855	38.042	**-9,11%**
70+	23.628	27.390	**15,92%**
Arkadia	**91.326**	**86.685**	**-5,35%**
0-29	30.126	24.949	**-17,18%**
30-49	23.695	23.352	**-1,45%**
50-69	21.190	20.521	**-3,16%**
70+	16.315	17.863	**9,49%**
Argolida	**102.392**	**97.044**	**-5,51%**
0-29	36.776	28.929	**-21,34%**
30-49	29.515	28.756	**-2,57%**
50-69	23.533	23.478	**-0,23%**
70+	12.568	15.881	**26,36%**
Korinthia	**144.527**	**145.082**	**0,38%**
0-29	51.879	44.985	**-13,29%**
30-49	40.882	41.689	**1,97%**
50-69	34.242	35.319	**3,15%**
70+	17.524	23.089	**31,76%**
Lakonia	**92.811**	**89.138**	**-4,12%**
0-29	30.545	25.847	**-15,38%**
30-49	24.599	24.339	**-1,06%**
50-69	22.189	20.922	**-5,71%**

70+	15.478	18.030	**16,49%**
Messinia	**166.566**	**159.954**	**-4,13%**
0-29	56.727	47.621	**-16,05%**
30-49	44.703	44.290	**-0,92%**
50-69	39.724	38.360	**-3,43%**
70+	25.412	29.683	**16,81%**
Lesvos	**108.288**	**86.436**	**-25,28%**
0-29	40.083	27.584	**-31,18%**
30-49	26.441	23.378	**-11,58%**
50-69	25.024	19.877	**-20,57%**
70+	16.740	15.597	**-6,83%**
Samos	**43.841**	**32.977**	**-32,94%**
0-29	16.050	11.147	**-30,55%**
30-49	10.917	8.868	**-18,77%**
50-69	10.162	7.371	**-27,47%**
70+	6.712	5.591	**-16,70%**
Chios	**53.106**	**52.674**	**-0,82%**
0-29	19.864	17.519	**-11,81%**
30-49	13.540	14.555	**7,50%**
50-69	12.228	12.124	**-0,85%**
70+	7.474	8.476	**13,41%**
Iraklion	**291.225**	**305.490**	**4,67%**
0-29	119.555	110.414	**-7,65%**
30-49	81.156	92.300	**13,73%**
50-69	60.637	64.126	**5,75%**
70+	29.877	38.650	**29,36%**
Lasithi	**7.867**	**75.381**	**-0,49%**
0-29	26.933	23.591	**-12,41%**
30-49	20.496	21.483	**4,82%**
50-69	17.268	17.146	**-0,71%**
70+	11.039	13.161	**19,22%**
Rethimno	**78.957**	**85.609**	**7,77%**
0-29	33.860	33.529	**-0,98%**
30-49	20.780	24.617	**18,46%**
50-69	15.024	16.584	**10,38%**
70+	9.293	10.879	**17,07%**
Chania	**148.450**	**156.585**	**5,20%**
0-29	57.712	53.454	**-7,38%**
30-49	43.461	47.862	**10,13%**
50-69	30.342	34.541	**13,84%**
70+	16.935	20.728	**22,40%**

Source: ELSTAT, 2001-2011

[Areas with > 10,000 dekars cultivated land with Orientals, year 2015, see Table 2.2]

[Areas with > 2,000 dekars cultivated land with Orientals, year 2015, see Table 2.2]

QUESTIONNAIRE FOR TOBACCO FARMERS

PART ONE: DEMOGRAPHIC CHARACTERISTICS AND EMPLOYMENT

Q.1: Sex/Gender:

Male [1] ☐	*Female* [2] ☐

Q.2: Year of birth: .....

Q.3: Marital status:

Single	[1] ☐	*Divorced*	[4] ☐
Married	[2] ☐	*Widowed*	[5] ☐
Permanent relation/Cohabitation agreement	[3] ☐		

Q.4: No of family members *(in the same household)*

Adults: ..... *Under-age (< 18 ετών):* .....

Q.5: Education Level

Primary school	[1] ☐	*Technical education*	[4] ☐
Secondary	[2] ☐	*Higher education*	[5] ☐
Lyceum	[3] ☐	M.Sc. / Ph.D.	[6] ☐

- Training related to agriculture (what exactly and from where?):
  ……

  ……

Q.6: Household income (in Euros)

Total: …… From agriculture ……. From tobacco crop: …….

Q.7: What is the first word you think when you hear the following:

Agriculture / crops	
Tobacco cultivation	
Expansion of Tobacco cultivation	
Employment of young people in Tobacco cultivation	
Mechanical harvesting of tobacco	

Q.8: Years of being farmer: .....

Q.9: Years of being tobacco grower: .....

Q.10: Are you full or part time farmer?

Full time	[1] ☐	*Part time*	[2]☐

If (2) then what is your primary/main activity?……

PART TWO: TOBACCO PRODUCTION / OTHER CROPS

Q.11: Agricultural land ()

Total dekars of tobacco and other crops: …… **Owned** …..…… **Rented**……

If rented: euros / dekar ……..

Q.12: Tobacco varieties, areas and yields

Variety: …….....…… (dek): …… (Yield in kg/dek): ……

Variety: …….....…… (dek): …… (Yield in kg/dek): ……

Variety: …….....…… (dek): …… (Yield in kg/dek): ……

Q.13: Other crops used in crop rotation

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Q.14: Other crops COMPETITIVE to tobacco

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Crop: …….....…… (dek): …… (Yield in kg/dek): ……

Q.15: Workers for tobacco cultivation:

1. The farmer	
2. Other members of the family / how many	
3. Non-family workers / how many	

Q.16: Do your kids want to continue tobacco cultivation?

Strongly Agree	[1] ☐	*Disagree*	[4] ☐
Agree	[2] ☐	*Strongly disagree*	[5] ☐
Neither agree nor disagree	[3] ☐	*Have no kids*	[6] ☐

Q.17: Cost of no-family work: Euro/ 8 hours: .....

Q.18: Production cost:

Cost categories	***Euros / dekar***
Rent	
Tobacco seedlings	
Field preparation (sprinkling, milling etc.)	
Crop care (plowing, fertilization, herbicides, fungicides, insecticides etc.)	
Harvest (Wages)	
Bundling - Moisture - Weighing (Wages)	
Machine Maintenance – Consumables (+depreciations)	
Others (OSDE, ELGA, Group)	

Q.19: Declare the degree of agreement/disagreement with the below tobacco cultivation problems.

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*	*Mean Likert score*
Q.19α: Sale of the product						
Q.19β: Diseases						
Q.19γ: Hard job						
Q.19δ: Small owned land						
Q.19ε: Infertile land						
Q.19στ: Low yield-incomes						
Q.19ζ: Low producer prices						
Q.19η: Low subsidies						
Q.19θ: Kids not interested to continue						
Q.19ι: Production in neighboring countries						

Q.20: What was the most recent producer price (of tobacco) you received (€/kg)?
……..

Q.21: How would you characterize your land for tobacco cultivation?

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.21α: Scattered/ small with distance among them					
Q.22β: Sloped					
Q.21γ: Irrigated					
Q.21δ: Easy to be accessed by large agricultural machinery.					

PART THREE: ATTITUDES, VIEWS & TRENDS

Q.22: Declare the degree of agreement/disagreement for the following statements regarding the availability of work.

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.22α: I'm satisfied with the availability of work from my family					
Q.22β: I'm satisfied with the availability of non-family workers					
Q.22γ: I'm satisfied with the wages of non-family workers					
Q.22δ: Young people increased in my area the last years.					
Q.22ε: I believe that young people will increase the following years in my area.					
Q.22στ: Young people like to deal with tobacco cultivation.					
Q.22ζ: Young people of my area stay home and do not migrate in urban areas.					
Q.22η: Young people have returned to the area due to economic crisis					

Q.22θ: Young people will deal with agriculture the next years					
Q.22ι: Young people will deal with tobacco cultivation the next years					
Q.22κ: Young people will deal with tobacco cultivation because they have the land and machinery					
Q.22λ: Young people will deal with tobacco cultivation because the crop provides a satisfactory income					
Q.22μ: Young people will deal with tobacco cultivation because the crop provides them a complementary income (income from other activities also).					
Q.22ν: Young people want to deal with tobacco cultivation because there are no alternatives					
Q.22ξ: If mechanical harvesting will introduced (the job easier) then young people will deal with tobacco cultivation.					

Q.23: Declare the degree of agreement/disagreement for the following statements regarding the innovations level in your farm and mechanical harvesting:

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.23α: I'm using contemporary machinery in agricultural activities					
Q.23β: I'm interested to deal with organic farming.					

Q.23γ: I'm engaged in Integrated management systems

Q.23δ: I'm interested in adopting innovative crops

Q.23ε: I believe that mechanical harvesting will enhance tobacco cultivation in my area.

Q.23στ: I believe that mechanical harvesting will enhance my income

Q.23ζ: I believe that mechanical harvesting will enhance the economy of my area

Q.23η: I believe that mechanical harvesting is a thread for the employment in my area

Q.23θ: I believe that mechanical harvesting will be a motive for expanding tobacco cultivation in my area

Q.23ι: I believe that mechanical harvesting will introduce important positive changes in tobacco cultivation in my area

Q.24: Are you willing to continue cultivating tobacco under existing conditions?

Strongly Agree	[1] ☐	*Disagree*	[4] ☐
Agree	[2] ☐	*Strongly disagree*	[5] ☐
Neither agree nor disagree	[3] ☐	*Do not know/ do not answer*	[6] ☐

Q.25: Reasons to continue tobacco cultivation under the current conditions:

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.25α: Family tradition					

Q.25β: Absence of alternatives

Q.25γ: Satisfactory income

Q.25δ: Because my kids are interested

Q.25ε: Offers stable employment

Q.25στ: Ownership of machinery /equipment

Q.25ζ: Knowledge / experience

Q.25η: Soil suitability / microclimate

Q.25θ: Guaranteed sale of production

Q.25ι: In order my kids to have job in the future

Q.26: Reasons to STOP tobacco cultivation under the current conditions:

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.26α: Due to high age					
Q.26β: No persons for succession					
Q.26γ: No satisfactory income					
Q.26δ: Hard work					
Q.26ε: Due to health reasons					
Q.26στ: Other crops with better outcomes					
Q.26ζ: No subsidies					
Q.26στ: Low producer prices					

Q.27: Will you continue the tobacco cultivation under mechanical harvesting conditions;

Strongly Agree	[1] ☐	*Disagree*	[4] ☐
Agree	[2] ☐	*Strongly disagree*	[5] ☐
Neither agree nor disagree	[3] ☐	*Do not know/ do not answer*	[6] ☐

Q.28: Reasons to continue tobacco cultivation under mechanical harvesting conditions

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.28α: Income increase					
Q.28β: Limitation of hard work					
Q.28γ: Employment increase					
Q.28δ: Cultivation increase					
Q.28ε: Suitable for old farmers					
Q.28στ: Suitability of my land for mechanical harvesting					
Q.28ζ: Absence of alternatives					
Q.28η: Economic development of my area					
Q.28θ: Creation of no-agricultural new jobs					
Q.28ι: My kids want mechanical harvesting (young farmers)					
Q.28κ: Is imposed (international trend)					

Q.29: Reasons to STOP tobacco cultivation under mechanical harvesting conditions:

Statements	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q.29α: Concentration of cultivation in few big farmers					

Q.29β: Limit the dependence for labor (reduction in employment)

Q.29γ: Income reduction

Q.29δ: My land is not suitable for mechanical harvesting (small plots with rocks)

Q.29ε: Limits my bargaining power

Q.29στ: The land in my area is not suitable for mechanical harvesting

Q.29ζ: Leads to non-development of my area

Q.29η: Tobacco cultivation will move to other (plane) areas

Q.29θ: Deterioration of quality

Q.30: Do you believe that there is interest for tobacco cultivation from young people and that cultivation will continue in the future?

Strongly Agree	[1] ☐	*Disagree*	[4] ☐
Agree	[2] ☐	*Strongly disagree*	[5] ☐
Neither agree nor disagree	[3] ☐	*Do not know/ do not answer*	[6] ☐

Q.31: What is the minimum producer price that you would accept under the current conditions?

Current producer price	[1] ☐	Increased by 10%	[5] ☐
Reduced by 30%	[2] ☐	Increased by 20%	[6] ☐
Reduced by 20%	[3] ☐	Increased by 30%	[7] ☐
Reduced by 10%	[4] ☐	Other price: ……	[8] ☐

PART FOUR: SWOT ANALYSIS

Q.32: STRENGTHS of tobacco cultivation for farmers.

	STRENGTHS	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q32α	Labor availability for harvesting (non family)					
Q32β	Product quality					
Q32γ	Low land rent					
Q32δ	Microclimate					
Q32ε	Soil quality					
Q32στ	Product reputation					
Q32ζ	Farmers know-how					
Q32η	High yield (kg/dekar)					
Q32θ	Producer price					
Q32ι	Low initial investment cost (machinery and equipment)					
Q32κ	Satisfactory income					
Q32λ	Cooperative power					

Q.33: WEAKNESSES of tobacco cultivation for farmers

	WEAKNESSES of tobacco cultivation for farmers	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q33α	High harvesting cost					
Q33β	High production cost					
Q33γ	Land structure (slopes, scattered, infertile and semi mountainous land)					

Q33δ	Bank restrictions (capital control)					
Q33ε	Bureaucracy problems for non family work					
Q33στ	Old age workers					
Q33ζ	Small size farms					
Q33η	Low producer price					
Q33θ	Labor from neighboring countries					
Q33ι	Low income					
Q33κ	Unstable yield (kg/dek)					
Q33λ	Difficulties in estimating and controlling production cost					

Q.34: OPPORTUNITIES of tobacco cultivation for farmers

	OPPORTUNITIES	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q34α	Suitable cultivation for small size farms					
Q34β	Suitable cultivation for complementary income					
Q34γ	Not abandoning of land					
Q34δ	Non typical opinion leadership					
Q34ε	Shift to alternative crops (high initial investment cost and return)					
Q34στ	Certification (biological/integrated)					
Q34ζ	Contracting farming					
Q34η	Mechanical Harvesting					
Q34θ	Subsidies for new farmers (CAP measures)					
Q34ι	Tobacco industries investments					
Q34κ	Traditional culture (memories/force of habit)					
Q34λ	Ownership of equipment					
Q34μ	Demand for tobacco					

Q.35: THREATS of tobacco cultivation for farmers

	THREATS	*Strongly Agree*	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*
Q35α	Competitive cultivations availability					
Q35β	Mechanical Harvesting (jobs to be lost, concentration of production in big farms)					

Q35γ	Migration of young people (lack of youth)					
Q35δ	Agricultural policy (CAP eg. decoupling)					
Q35ε	Taxation					
Q35στ	Health issues related to smoking					
Q35ζ	Other neighboring producing countries					
Q35η	Farmer loans (eg to shift to an alternative crop)					
Q35θ	Number of processing units					
Q35ι	Oil price					
Q35κ	Scattered land					
Q35λ	Economic instability					

Thanks for your cooperation. The information are confidential and will only be used for scientific purposes.

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