MSc. Thesis

The influence of absenteeism on the Turkish hazelnut sector

A study about the influence on agricultural policies, productivity of agricultural land, and output of the hazelnut sector in Turkey

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Abstract

With agricultural policies the Turkish government wants to decrease the hazelnut production area and total output of the sector. The purpose of this study was to investigate the influence of absenteeism among hazelnut farmers on the low effectiveness of current agricultural policies, low productivity in and high output of the hazelnut sector in Turkey. Qualitative and quantitative data is collected in Samsun province. Structured and semi-structured interviews are conducted. Economic behaviour models and investment decision models are used for analysis. The analysis is twofold; farmers' constraints of making use of the policies and different income generating activities of the farmers are compared. Because of fixed costs and irreversibility of investments in tree crops, tree crop farmers are less reactive to trends in the market. The hazelnut crop was found to be less profitable then other crops in the research area. Though the government policies include (financial) incentives, it is found that little farmers uproot their hazelnut orchards and invest in other crops. The analysis suggests that the main reason is that the financial constraints for resident farmers and labour constraints for absentee farmers for investment are not met. Different from the past, the Turkish government currently does not intervene in the market with support prices and buying excess stocks. If the government continues this policy it is argued to diminish total output of hazelnuts. Due to lower profitability of productivity increasing activities, productivity of hazelnut orchards will decrease. Only if farmers are able to bear the investment, the second reaction is suggested to be uprooting and starting with production of other crops. The last conclusion is that because of excess stocks in the market the government currently has no incentive to stimulate improved productivity.

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Abbreviations

ASCU	Agricultural Sales Co-operatives Union
Da	Decares
DFIF	Support and Price Stabilisation Fund
ETTP	Expected Total Physical Product
HASCU	Hazelnut Agricultural Sales Co-operatives Union (Fıskobırlık)
Hrs	Hours
Kg	Kilogram
LFPR	Labour Force Participation Rate
MOA	Ministry of Food, Agriculture and Livestock
MOAS	Ministry of Food, Agriculture and Livestock in Samsun
MPP	Marginal Physical Product
SEE	State Economic Enterprise
SPO	State Planning Organisation
TL	Turkish Lira
TMO	Toprak Mahsulleri Ofisi'nin
TTP	Total physical product
TÜIK	Turkish Statistical Institute

Turkish Translations

Agricultural Chambers	Ziraat Odası
Area Based Income Support	Alan Bazlı Gelir Desteği
Area Based Support Payment	Alan Bazlı Destekleme Ödemesi
Cold storage	Soğuk Hava Deposu
Compensation Payment	Telafi Edici Ödeme
Direct Income Support	Doğrudan Gelir Desteği (DGD)
Support and Price Stabilisation Fund	Destekleme ve Fıyat Istıkrar Fonundan

Contents

Chapter 1 Introduction

When people think of hazelnuts, they think of Turkey. Approximately 75 percent of all hazelnuts worldwide are produced in the country. But while total production is high, productivity is low compared to other production areas. Traditionally the Turkish government has a lot of influence in the sector. Also, many farmers combine their hazelnut production with other income gaining activities. A considerable part of the hazelnut farmers can be referred to as 'absentee farmers' and do not live close to their orchards. The government currently wants farmers to uproot their hazelnut orchards on good quality agricultural land, but uptake and thus effectiveness among farmers is low. In this thesis the question is raised what the relationship is between the characteristics of the sector, the low uptake of the uprooting policy and the high total production and low productivity found. It specifically addresses the influence of absenteeism by asking the following question:

"Does the high prevalence of absenteeism provide an explanation for the effectiveness of current agricultural policies, the existence of low productivity of agricultural land and high output of hazelnuts in Turkey?"

This introduction provides information about Turkey's position as hazelnut producing county in the world, and introduces the characteristics of the sector in Turkey. How Turkey gained this position is briefly introduced by discussing the agricultural policies related to hazelnut production. Furthermore, this chapter introduces other 'forces' explaining the current situation in the Turkish agricultural sector, such as the large emigration flow during the '1960s. Lastly, the farmers being the topic of this thesis -the absentee hazelnut farmers-, and their position in hazelnut production are introduced.

1.1 Turkey as Hazelnut Producing Country

In Turkey, the production of hazelnuts is concentrated in the Black Sea region. In many regions in the Eastern part of the Black Sea region hazelnut is the most important crop and is widely grown[i]. Total production varies considerably between years, as can be seen in Figure 1.

Approximately 75 percent of all hazelnuts are produced in Turkey. Estimations of hazelnut grow areas vary between 640.000 and 690.000 hectares. Between 1970 and 2000, the production area and output of hazelnuts doubled. An estimated area of 173.000 to 176.000 hectares is not licensed by the government, meaning that the orchards are established in areas which are appointed as non-hazelnut areas, meant to grow other crops. "The reasons for expansion have been the following: high state-set support prices, relative ease of production which allows absentee landlords to stay in production, higher yields in the 2nd Standard Region which allowed these farmers to benefit from price subsidies even more, lack of suitable crops to replace hazelnut on steep slopes, and forest regulation that allows horticultural production in areas that lost forestry characteristics" (Lundell et al., 2004):53).

The Turkish production area is divided into three Standard Regions for hazelnut production. The 1st Standard Region is the traditional production region, where slopes and ecology generally do not allow economic production of other crops than hazelnut (Lundell et al., 2004):53). In some (eastern) provinces the whole area is part of this category. In Samsun province only areas with more than 6% slope are part of this category. The 2nd Standard Region includes the better quality lands; more fertile

and flatter lowlands (GAIN, 2009):8, (Lundell et al., 2004), (Gönenç et al., 2006). There is also the 3rd Standard Region which is scattered around the country and has developed for local consumption. It covers only % 0.6-%0.9 of the total hazelnut area" (Lundell et al., 2004):53).

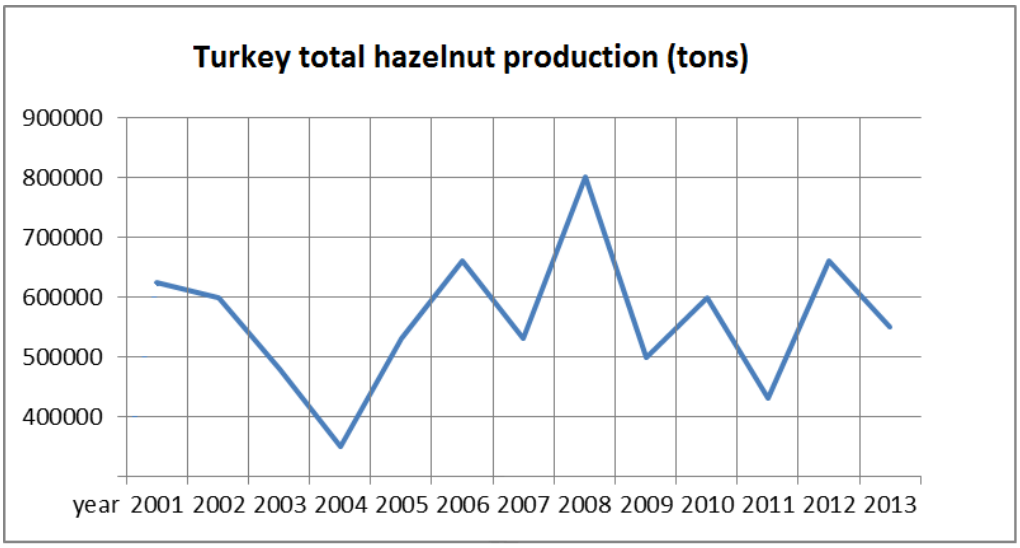


Figure 1: Total hazelnut production in Turkey (in tons)

Currently Turkey faces a large production area and overproduction of hazelnuts, which has been covered by the government for years by buying the excessive stock[ii]. Therefore, the farmers felt relatively little of the issues related to overproduction.

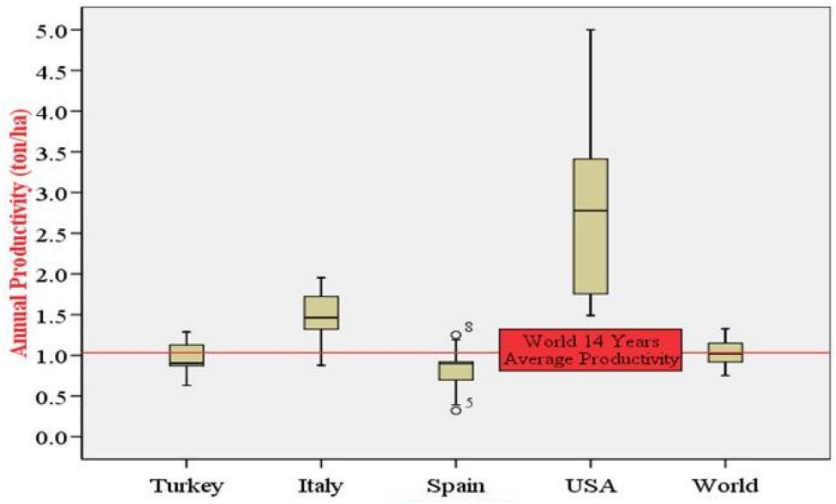


Figure 2: Global country productivity comparison in **Box-Whisker diagram (Tulum, 2009)[iii].**

Though there is overproduction of hazelnuts in Turkey, *productivity* is generally very low. Yields vary considerably from the other production countries. "Average yield in Turkey is 600-1000 kg per hectare, in Italy 2000-3000 kg and in the USA 1700-2500 kg" (Hütz-Adams & Firtina, 2012):7). Turkey's hazelnut yield is slightly higher than 1.0 ton/ha, which is 40 percent of the average yield in the United States, and 50 percent of Italy's average yield (Lundell et al., 2004:54). Figure 2 shows the productivity comparison between different countries; the world average is closely linked to the Turkish data as Turkey produces a big share of total quantity produced in the world.

Reasons for the low yields in Turkey are the prevalence of old and underproductive shrubs, too close planting, bad soil conditions, soil erosion, limited availability of necessary inputs and care (Lundell et al., 2004:54, (Hütz-Adams & Firtina, 2012:7).

1.2 Hazelnut Related Agricultural Policies in Turkey

The Turkish hazelnut sector has a long history of government support, the major policies which have been in place are: price support and input subsidies, direct income support, restrictions on planted area combined with payments for alternative crops, and high border protection (Burrell & Kurzweil, 2007), (Yavuz, Birinci, Peker, & Atsan, 2003), (Kayalak & Özçelik, 2012). For more information on the historical policies and trends in the sector please be referred to Appendix A.

1.2.1 Price support and input subsidies

In 1964 the government started to support prices to encourage hazelnut production, raise producers' incomes and prevent soil erosion as outcome of production (Secer, 2008). Output (hazelnut) price support and input subsidies for fertilizers and pesticides were provided, which ended up is a vicious circle. "Excessive high support prices spurred output growth, which has put significant downward pressure on world market prices. This increased the political pressure to maintain high support prices and significant state purchases (roughly 150,000 tons annually which are never released into the market), which have cost the government over $2 billion over the past ten years" (Lundell et al., 2004):51). Currently the government has officially stopped with this policy. Turkey still has a monopoly position in the hazelnut sector, the prices in the world market are strongly linked to the fluctuations in the Turkish sector. This has the advantage that prices follow Turkey's output; which can level profits for Turkish farmers. The price policies has distorted this balance, the combination of a monopoly position and excessive production is inefficient. Though being in a monopoly position, Turkey is not free from competition. Though still marginal, there are trends that buyers develop hazelnut orchards in other countries in order to become less dependent on the Turkish market. Also, for some manufactured products almonds are competing with hazelnuts.

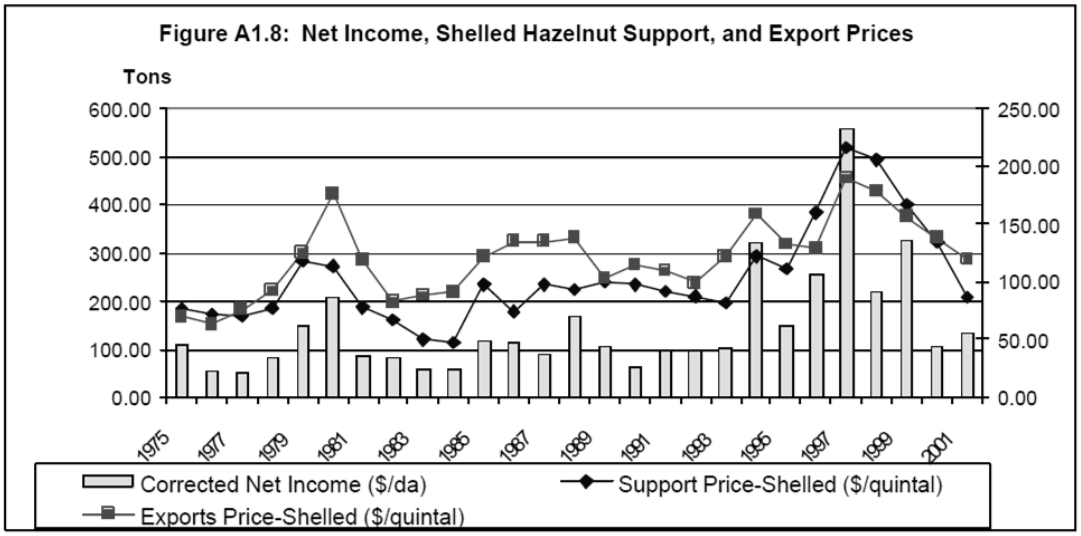
1.2.2 Direct Income Support

In 1999 the World Bank and International Monetary Fund put pressure on Turkey to reduce the government intervention on hazelnut prices. In 2000 the large agricultural policy reform program called 'ARİP' (Agriculture Reform Implementation Project) was introduced. Instead of price support, now direct income support was provided; not product based but area based. Until this date, there were and are no rules about the destination of the money. As will be shown later, the payments can be a great share of farmers' hazelnut incomes.

1.2.3 Restrictions on Planted Area & Payments for Alternative Crops

"As a result of the undesired increase in hazelnut plantations particularly in the fertile flat lowlands of Çarşamba, Bafra, Terme, and Sakarya during the early 1980s, the Hazelnut Law (No. 2844) was enacted in 1983" (Lundell et al., 2004). The regulation contained that hazelnut plantation were restricted to 13 provinces, to ensure that production of hazelnut was limited to the 1st Standard Zone, with introduction of new orchards only with official government permission (Lundell et al., 2004), (Gönenç et al., 2006). The policy was meant to control the accumulation of hazelnut stock (oversupply) and to create hazelnut sales revenue to farmers based on world market demand,

instead of on government subsidies (Lundell et al., 2004), by "reducing the comparative profitability of hazelnut, inducing farmers to switch to other crops" (Lundell et al., 2004). In 2001 the list of allowed production areas was updated. Also, another decree was introduced, that included payments to farmers in illegal areas for uprooting existing hazelnut trees and switching to alternative crops (Lundell et al., 2004). Despite this regulation and compensation payments, hazelnut production continued in forbidden areas (Yavuz et al., 2003):2, (Secer, 2008):1557).



Source: Paper presented for Conference called "Turkiye'de Uygulanan Findik Politikalari ve Findigin Gelecegi" by Bozoglu, M. "Turkiye'nin Findik Politikasi ve Reform Arayislari" , ARIP Project Implementation Plan and Own Calculations

Figure 3: Support - and export prices and Net Income calculations, Source: World Bank, 2004:58

1.3 Migrating Farmers in the Turkish Black Sea region

For many (small scale) farmers the income from the hazelnut harvest is often only an additional income next to their main income source (Gönenç, et al. (2006:21). Apart from the harvesting period these farmers can and do not spend much time in their orchard. In the research area[1] it is found that these farmers are one group whose orchards do not reach maximum productivity levels. Some of them live in other cities in Turkey such as Ankara or Istanbul, while others settled in other countries. The migration background and some figures on these absentee farmers are provided here.

1.3.1 Migration from Turkey

Turkey is among the world's leading labour-sending nations, with 3.5 million 'Turkish-born persons' living abroad in 2006, most of them in Germany (Escobar, Hailbronner, Martin, & Meza, 2006):707-708). Most of the Turkish emigrants originate from Central Anatolia and Black Sea regions (the research area) (Adaman & Kaya, 2012):8). After guest worker programs ended, workers stayed abroad and family members joined. Many of them still own land in Turkey, and return every year. For more background information please see Appendix B.

1.3.2 Migration in Turkey

Not only emigration has occurred, but also migration within the country. This paragraph provides data about this trend and underlying factors. Latest information and definitions used can be found in Appendix C. Picture 1 shows the regional divisions and Table 1 provides the migration data for the

[1] The research area is defined in chapter 2.

period from 1975 to 2000 and is based on data of all 82 provinces. The provinces are ordered; the more out-migration, the lower they are ranked. In the Table the top destination provinces are shown (numbered 1-10) and the provinces in the Black Sea area. Samsun is the most north-eastern province of the Western Black Sea region and in 1995-2000 had a rate of net migration of -45.5%.

Table 1: Net migration and rate of net migration by province. Source: TÜIK

			Net migration				Rate of net migration (‰)			
Order number	Province	Region	1975-1980	1980-1985	1985-1990	1995-2000	1975-1980	1980-1985	1985-1990	1995-2000
1	Tekirdağ	Western Marmara	4 849	3 438	17 907	51 335	16.5	10.3	46.7	96.8
2	Muğla	Aegean	1 659	3 058	15 998	42 921	4.3	7.0	32.9	70.2
3	Antalya	Mediterranean	17 142	25 339	82 737	90 457	26.5	32.8	89.7	64.3
4	Bilecik	Eastern Marmara	- 394	1 095	3 009	10 105	-3.0	7.9	19.6	57.9
5	İstanbul	İstanbul	288 653	297 598	656 677	407 448	73.4	60.5	107.6	46.1
6	Bursa	Eastern Marmara	58 720	47 434	83 641	85 325	61.0	41.1	61.6	45.1
7	İzmir	Aegean	119 896	82 173	146 208	120 375	73.7	41.9	63.8	39.9
8	Isparta	Mediterranean	- 2 792	- 5 148	- 6 495	13 869	-9.3	-15.4	-17.0	30.7
9	Çanakkale	Western Marmara	- 1 408	- 1 834	- 2 042	11 491	-4.0	-4.9	-5.2	27.4
10	Ankara	Central Anatolia	49 499	36 631	69 511	90 884	20.6	13.0	24.9	25.6
31	Trabzon	Eastern Black Sea	- 17 143	- 25 496	- 51 495	- 9 977	-26.2	-35.6	-67.9	-11.1
32	Giresun	Eastern Black Sea	- 17 523	- 19 955	- 34 828	- 5 849	-40.6	-43.4	-73.9	-12.1
40	Rize	Eastern Black Sea	- 8 624	- 11 257	- 28 726	- 7 473	-26.1	-32.6	-84.0	-21.9
61	Ordu	Eastern Black Sea	- 20 668	- 24 230	- 42 910	- 36 958	-32.3	-34.5	-54.6	-44.7
64	Samsun	Western Black Sea	- 11 144	- 13 709	- 31 222	- 51 644	-12.6	-13.8	-29.1	-45.5
74	Artvin	Eastern Black Sea	- 12 687	- 10 855	- 20 372	- 11 560	-61.2	-51.1	-98.6	-63.6
79	Sinop	Western Black Sea	- 7 944	- 9 777	- 22 569	- 16 387	-32.6	-38.4	-88.7	-75.7

In order to place the migration decisions into perspective its context is provided here. Several factors can be used to explain the migration flows within Turkey. The first factors discussed are employment and labour force participation rates. Secondly inequality is discussed, followed by characteristics of agriculture and lastly post migration investments.

Employment and labour force participation rates are the first factor being discussed. Together with two other regions the eastern Black Sea region forms the proportionately largest out-migration regions. While the other out migration areas have the lowest Labour Force Participation Rate (LFPR) and employment rate in Turkey, the eastern Black Sea region has the one of the highest LFPR and one of the lowest unemployment rate in Turkey, with 58.2% and 6.1% respectively (Adaman & Kaya, 2012):10). In the Eastern Black Sea region agricultural employment constitutes 54% of employment, and female workforce use in agriculture is high; which explains the low unemployment rate. “These, however, are usually self-employed subsistence farmers” (Adaman & Kaya, 2012):16).

Inequality is another factor explaining the Turkish migration trends. According to Oskam et al., Turkey’s income distribution is relatively unequal and this persists over time. Inter-household disparities due to regional location, sector of employment and the educational & employment status provide the main explanations. Regional income distribution is also very unequal and is largely determined by urban-rural and west-east differences (Oskam, Longworth, & Yildiz, 2005):23-24).

Picture 1: Map of Turkey and NUTS 1 Level Regions. Source: (Adaman & Kaya, 2012:61)

Not only differences in income, but also productivity differences between provinces are growing over time (Worldbank, 2000):11), resulting in increasing regional inequality at province level. As a result, Turkish provinces are diverging: richer provinces are getting richer, while poor countries are falling further behind. According to (SPO, 2000):23-24), the main driving forces are fast structural change as a result of migration from rural to urban areas, and the increasing capital use mainly in Western Turkey (Oskam et al., 2005):21). Here migration is both the reason and the outcome; a circle of influence can be observed. Appendix D includes an overview of GDP per capita for several cities in Turkey. Though some exceptions occur (such as Adana), the map shows overlap with the map of Turkey; the more to the right in the figure, the more the city is located in the (south) east.

Though nearly all Turkey's development plans have focused on reducing regional development disparities, many have not reached their goals (SPO, 2001):73). "Regional income inequalities arise mainly because of differences in types of economic activities pursued, together with differences in productivity between sectors. For instance, poorer regions generally have bigger share of their resources employed in agriculture, where productivity is usually lower (Worldbank, 2000):12). It is clear that improving the productivity of agriculture would improve the situation of underdeveloped regions" (Oskam et al., 2005):20).

Small plots & low productivity of agricultural lands can both be reasons for and outcomes of migration. Being the central theme of this thesis, it will be discussed more in depth in the coming chapters. A large number of farms in Turkey are small, with less than 5 hectares of land, and lack the capital for expansion (Temel, 2005):48). Concerning hazelnut orchards; most eastern producers have small orchards of around one to 2.5 hectares, and use hazelnut production for supplementary income, while western producers have larger orchards (10-15 hectares) (Longworth, 2005):70-71). One of the reasons for the small farms in Turkey is the land fragmentation which fits in the inheritance traditions. "The absence or poor functioning of land institutions [is one of the] factors behind this fragmentation. Among the institutions blamed are inheritance and property laws, commercial laws in the rural context, the arrangements for leasing and distributing state land to farmers, land use policies, and the complex structure of agricultural infrastructure organisations" (Temel, 2005):39-41). The second reason posed is the farmers' "emotional attachment to their land is also a factor contributing to fragmentation; such attachment is likely to make farmers reluctant to accept new tenure arrangements, even if these arrangements are economically beneficial" (Temel, 2005):39-41).

The changed preferences of returned migrants are a fourth factor explaining the migration flow in Turkey. Martin has described this as follows: “the most concrete negative effect of migration may be the inequality fostered by the preferences of many migrants to invest at least part of their savings in urban areas. Almost all successful returned migrants bought apartments in a nearby urban area, and several mayors noted that before emigration broadened horizons, local people who obtained additional money tended to invest locally. Although Turkey has been urbanising since the 1960s, migration clearly increased the lure of urban areas as preferred places to live and invest, further spurring rural to urban migration” (1991):53).

1.4 Characterisation of Absentee Farmers in Turkey

After explaining the background of the situation in previous subchapters, this subchapter focuses on the farmers who are the topic of this research; the absentee farmers. In the research area, different officials of the local governments have estimated the percentage of absentee farmers to be up to 50% of the total number of hazelnut farmers. Unfortunately no official data were present. As no official numbers are present, the influence of the absentee farmers on the market situation in the total hazelnut sector cannot be determined. But, the influence of absenteeism on farm decisions, productivity, and policy adoption of individual farms can be studied; which is done in this research. These insights are used as possible explanations for wider trends in the hazelnut sector.

But, why can absenteeism make a difference? Firstly, farmers who are not present are less able to apply inputs to the orchards, in order to increase yields. Also, they are themselves not able to physically observe diseases or other unfavourable circumstances, or to quickly react on them. Lastly, absenteeism is not beneficial for marketing the product, as farmers are less able to quickly react on changing market circumstances, such as the prices which are very variable in the hazelnut market. The question is how this situation influences the situation on the farm, and how farmers react to this. In literature many cases are found of absent landlords, farmers who own farm land, but do not spend much of their time on on-farm activities. In many cases these farmers make use of farm managers (who can make farm decisions and can do maintenance work)[iv]. This behaviour is not much found in the research area; instead of making use of labour input of other persons, the farmers prefer to use little inputs and to manage their farms by extensive systems. This means that labour input is not provided on a regular but on an occasional basis.

1.5 Conceptualization of Absentee Farmers

1.5.1 Migration, Absenteeism & Off-site farming

In the research area absentee farmers can be found that combine farming with other types of gaining income far away from the place of the farm. If this observation is compared with literature, it can be found that this was conceived as a rather abnormal way of farming; most often farmers are seen as strongly linked to the location and farm (Cheshire, Willing, & Skrbiš, 2013):1). Some researchers have focused attention on migratory trends among farming and rural populations[v], however, what is rarely considered to date is that mobility has become a regular and routine component of farm life, rather than being ‘disruptive of the fixed and settled status quo’ (Halfacree & Rivera, 2012):94), Cheshire, Willing & Skrbiš (2013):3). Bakewell (Bakewell, 2008):1351) has described the same trend in literature linking migration and development. Though migration is not always seen as a negative thing anymore[vi], the current view of a vicious circle in which migration contributes to development

"operates on the assumption that the normal and desired state for human beings is to be sedentary" (Bakewell, 2008):1350). This study will not address the impact of migration other than on agricultural production land. For example, the occurrence of a 'brain drain' or the impact of remittances[vii] on the country of origin or on migrants' families will not be discussed.

Absentee farmers in Turkey are partly connected to place and farming. They are not fully connected, because most of the year they are not physically present at the place where their farm is located. They are not completely disconnected, as they still have some land which is used for farming. Therefore absentee farmers are conceptualized as follows: people who own and cultivate agricultural land, but who are not able to be physically present year round. The number of agricultural activities executed is not included, as this can show considerable variation between absentee farmers. Also, these activities can be performed by others (for example hired workers) and thus absenteeism does not have to influence output. The last part contains ability to be present instead of presence because many crops do not request agricultural activity during the whole year. When only looking at presence it would be very difficult to make a distinction between those farmers who are not able to visit their farms on regular basis, and those who are able but do not do it because the crops grown do not require this investment. Similar to the article of Ishemo, Semple, and Thomas-Hope (2006), both farmers who live abroad or elsewhere in the country are here referred to as absent farmers.

1.5.2 Characterizing the Turkish hazelnut farmers beyond Migration

In order to understand the absentee farmers not only their migration characteristics have to be described, but also their other characteristics. It was found impossible and irrelevant for the construction of the economic decision making models to answer the question whether farmers in the research area should be referred to as peasants or commercial family farmers (based on definitions in literature). Therefore this section only compares the farmers in the research area with peasant literature in order to get a better understanding of the hazelnut farmers.

Concerning engagement in markets, Crabtree concludes that peasants have to be viewed as 'an integral part of the overall economic system' (Crabtree, 2002):13). Ellis points out peasants work in imperfect markets and commercial family farmers work in 'fully developed product and factor markets' (Ellis, 1993):10). These can exist next to each other because market failure is *household* specific instead of commodity specific. This means that some farmers in an area can observe market failures, while others do not (Dejanvry, Fafchamps, & Sadoulet, 1991):1401).

Both peasants and commercial family farmers can be engaged in cash crop production or derive a significant share of farm consumption from non-farm income earning activities (Ellis, 1993):9), as farmers in the research area do. This links with the last part of the definition of peasants; the engagement in input and output markets, which is only partial. Partial engagement can probably be best explained by the logics used in the article of Dejanvry et al. (1991): farmers can decide whether they use their land for growing food or cash crops, depending on the attractiveness of the crop. In times that growing cash crops is not very lucrative, farmers can step out of the market and grow crops for own consumption. This system is not much found in the research area, as farmers growing tree crops are less flexible in following the market. But, they do show their partial engagement in the market in another way; by having multiple sources on income. The potential importance of off-farm income activities is noticed both by (Holden, 1993):243-244) and (Ellis, 1993):4).

It can be concluded that on some points the situation in the Turkish hazelnut area fits the description of markets where peasants are said to find themselves in, while on other points the markets seemed to have developed further towards competitive and developed markets. Some factors are discussed here; credit-, inputs-, technology and information-, land markets and presence of price information. The credit and land markets seem to fit the peasant market situation best; farmers mostly get credit from traders. Also, some have to sell their hazelnuts directly after the harvest because of money needs, while prices are low. Getting land by inheritance is far more common than open market transactions. Entry and exit are possible, but are not most common. Inputs are much available from different sources, information on new technologies is provided by government extension officers. Information on prices are widely available. Stock markets are present in different villages and farmers have different selling option with own prices and systems. On these points the overall sector seems to fit the market of commercial family farms better.

1.6 Literature Analysis Relationship Migration and Agriculture

In this subchapter the current literature on the relation of absenteeism and farm decisions & productivity is described. As no literature is found on absentee farmers in Turkey, this analysis is based on researches in other parts of the world, such as the Caribbean and India. Economic studies on labour migration come together in the New Economics of Labour Migration[2]. This research starts from the point where the decision of (labour) migration is already made by farmers and thus does not make use of these studies. Some articles are found on the influence of absenteeism, among which (Bakker and van Doorn (2009); Kung, Wu, and Wu (2012); Theobald (2001)), though for different fields of study. Much of the literature focuses on absent landlords, who often have labour agreements for their farms such as maintenance contracts[viii]. Mbonile (2003) studied the effects of absenteeism in Tanzania but unfortunately did not calculate financial effects. Saxena (1992), though referring to 'off-site' farmers, studied the decisions made and underlying motivations in relation to growing Eucalyptus trees in India. Though not providing a definition of 'off-site' farmers, from the text it can be understood that these farmers often have increased off-farm investment options, after which less energy can be spend on farm activities.

Ishemo et al. (2006) study the relationship between the endurance of small scale farming as a result of household migration decisions in Jamaica. The difference with this research is that the area they studied is mainly characterized by return migration, making it less applicable to this research. Their literature study on the impact of population mobility on agriculture can provide some additional insights in discussions in literature. It shows that there are two main perspectives on this topic.

Ishemo et al. (2006) summarise that the first perspective focuses on the negative aspects of migration. Writers from this perspective have argued that migration results in reduction in the size of community labour forces. This, in turn, affects the productive capacity of those remaining behind, resulting in poorly maintained land and gradual deterioration of the agricultural infrastructure. Money obtained from remittances is used to purchase food rather than cultivating it (2006):318), thus food self-sufficiency is decreased. Whether this is good or bad is a subjective notion, though. Opposing views are that migration can have positive outcomes for agriculture as well. (Thomas-Hope

[2] For an introduction please see (Stark & Bloom, 1985).

(1993)) has found this in the Caribbean households. She noted that the capital received makes a major positive contribution to development because incomes are used to support local production as well as consumption. Nevertheless, she noted that negative impacts are experienced in situations where there is persistent dependency on external funds, or where absenteeism occurs for an extended period of time. In both situations, agricultural lands become idle and this undermines agriculture and the development process in local communities" (Ishemo et al., 2006): 318-319). Pastor (1985) also noted that the impacts of migration on agriculture are location specific, differing from country to country and from area to area within a single country" (Ishemo et al., 2006):319). From this finding it is concluded that not only the studied factors (migration and agricultural decisions and productivity) should be studied, but also other trends or factors in the hazelnut sector. Therefore the relationship with agricultural policies in Turkey is studied as well.

Saxena offers a characterization of farmers growing Eucalyptus trees in Uttar Pradesh, India. Here a tree planting stimulation project was extremely well adopted in regions characterized by commercialised agriculture and risen of agricultural productivity. "These changes impelled landowners to adopt strategies which saved family labour and supervision time in cultivation. Many 'off-site' farmers, and such 'on-site' farmers who had a high ratio of owned land to male members in the family, resorted to tree farming (...)this paper argues that woodlot planting of eucalyptus emerged as an attractive option for landowners facing management and labour problems in western U.P., as tree farming allowed saving in family labour time and permitted greater flexibility in the timing of operations" (Saxena, 1992):159). As this article only includes one type of tree crop, which is also no fruits bearing crop, the conclusions cannot be compared in the comparison of fruit crops in the research area.

1.7 Chapter outline

In Chapter 2 the methodology of this research can be found. Chapter 3 contains the conceptual framework used for this thesis. In Chapter 4 a comparison is made between intensive and extensive agricultural practices. Characteristics of the hazelnut crop and related production methods are elaborated upon. This chapter concludes with a description of how absentee farmers would have to manage their farms in order to reach high productivity levels. Chapter 5 compares the different income options of hazelnut farmers. Chapter 6 contents the current (agricultural) policies related to hazelnut production. The impact of agricultural policies on both absentee and resident farmers is discussed. Also, the influence of absenteeism on the effectiveness of current policies is studied. In Chapter 7 the discussion of this research is provided. Chapter 8 closes with the conclusion.

Chapter 2 Methodology

In this chapter the methodology of this research is discussed. The first subchapter describes the methods selected and underlying motivations. Subchapter 2 describes how data was collected. The last subchapter provides an introduction to the research area.

2.1 Research Methods

In this research a combination of methods is used in order to answer the research question. By using these methods, relationships between trends in the hazelnut sector and decisions of individual farms can be understood.

(1) Absentee farmers' decisions are analyzed by using an economic production models. The models are used to explain the economic side of the decisions made by absentee farmers. With these models expectations about decisions and reactions to policies or market conditions are developed.

(2) Production methods and productivity are compared with outcomes of a specific group of resident hazelnut farmers in Keşap who are reaching high production outcomes. This is done in order to understand what it would take absentee hazelnut farmers to reach high hazelnut output/yield levels. As no productivity data were collected specifically for absentee farmers, it is not possible to compare their productivity levels to averages in the area. Instead, considerations can be made by comparing information on production averages with a very productive hazelnut production group in the neighbouring hazelnut production areas. This is done under the assumption that absentee farmers have yield being lower or equal than resident farmers in the research area.

(3) The hazelnut crop investment is compared with other investment possibilities for the farmers in order to put the current decisions into perspective. Other options are determined and their attractiveness to absentee farmers are discussed.

(4) The decisions and characteristics of the absentee farmers are compared with policies affecting Turkish hazelnut farmers with the same purpose of the third method: in order to put the decisions into perspectives. By including historical policies, the background of the situation can be understood and used to improve the understanding of the current situation and effects of current policies.

During the research no data was collected on risk attitudes. Therefore, no precise assumptions could be made concerning the attitudes towards risk in the research area[ix]. Therefore it is decided to follow the methodology used by Holden (1993). "In the absence of such studies, the observed behaviour in the more general studies and that found in the studies of peasants' attitudes towards risk elsewhere, was made use of" (Holden, 1993):252).

2.2 Data Collection

Data is collected by three methods; a literature study, semi-structured interviews with government officials and extension officers and structured interviews with farmers.

The literature study is executed for two reasons. The part of the literature study done before data collection in the research area is performed in order to prepare the research; to collect background data, comparable cases and theoretical background. After data collection, a second and more

elaborative literature is used to compare the situation found in Turkey with literature on the topic. This part provides the main conclusions of the research.

Semi-structured interviews are performed with government officials and extension officers. This part of data collection focused on collecting background data and data on the various investment options. Three different groups are interviewed; local officers of the Ministry of Agriculture to collect data on production averages of different crops in the region, prices of these crops through years and information on current agricultural policies. In addition, this group was asked for characterizing the farmers in the area. Extension officers and producer group representatives were interviewed about market incentives and marketing channels of different crops and about risk and uncertainty of growing the crops in the research area. Lastly, university researchers were interviewed to receive information about the hazelnut sector in general. The benefit of semi-structured interviews is that one can probe for in-depth details, because there is room for clarification, for example about implicit assumptions from the respondent (Drever, 1995) or researcher.

Structured interviews are performed with farmers on time allocated to different crops. This part of the research is executed to measure the attractiveness of different crops (investments) to farmers under the conditions found in the research area. Some crops can be profitable to grow under one condition, while not being attractive at all to grow under other conditions. With this method, it is assured that the outcomes of the investment options fit the conditions in the research area. Data is collected on the investments that have to be made on different crops, time that has to be spent and other factors influencing crop preferences. The different tree crops are represented in order to be able to compare the attractiveness of these crops to farmers. Due to time limits annual crops were not included. Two methods were used for reaching the farmers. The first method was using the contacts of the local department of the Ministry of Agriculture in Çarşamba and Terme. The advantage of this method is that farmers are willing to cooperate; a drawback is that the respondents can be less representative for the whole research population because the group having good contact with the government can be different from the whole farmer population. The second method was visiting the weekly markets in Terme and Çarşamba, where many farmers come together. These occasions were used to collect information with short questionnaires. The advantages are the number of farmers reached and the fact that there is less selection (no invitations), potentially providing a more representative image of the whole farmer population. The advantage of using structured interviews is that the data can be compared as all respondents have replied to the same questions.

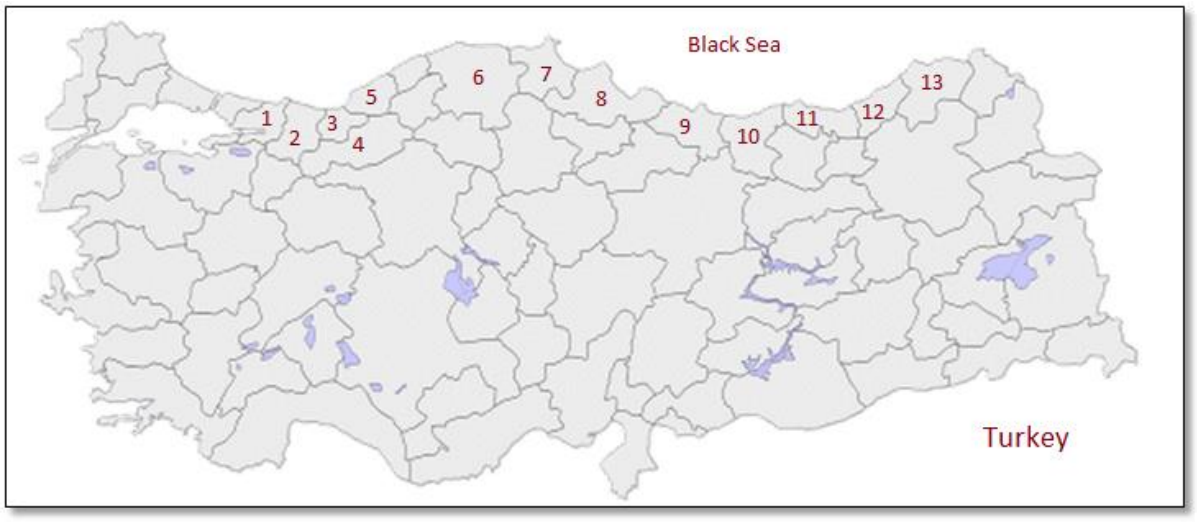
2.3 Research Area

This subchapter introduces the research area and explains why this area is selected.

Approximately 60% of the Turkish hazelnuts are grown in the Eastern Black Sea region (in regions 9-13 on Picture 2 below). Ordu and Giresun are the main production regions here. As the research was executed in cooperation with Mr. Kılıç, Associate Professor at the Ondokuz Mayıs University in Samsun, Samsun was selected as the research base. The province of Samsun is indicated with (8.) on the map (see Picture 2), and is located right next to Ordu province.

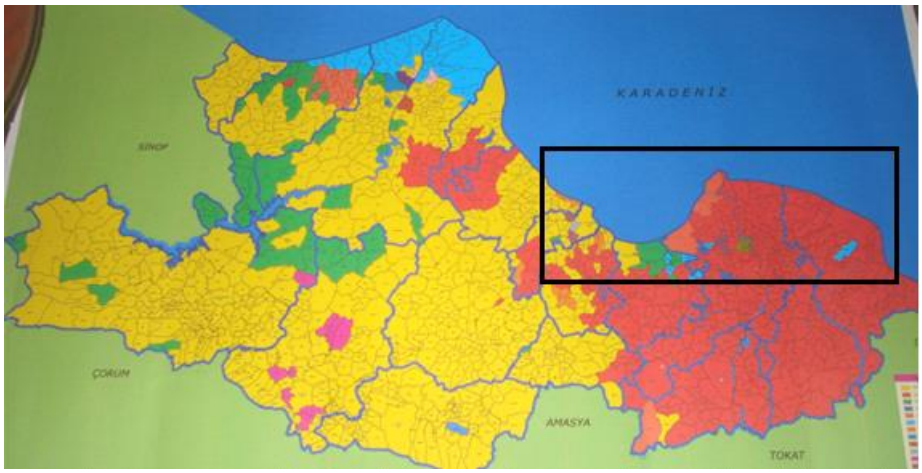
In the area of Samsun, the following regions are defined as areas where hazelnuts may be produced on land with a slope of 6% or higher[x]: Çarşamba, Terme, Ayvacık, Salıpazarı, Ondokuzmayıs, Tekkeköy, Alaçam, Yakakent, Ilkadım, Bafra, Asarcık, Canik and Atakum (Resmi-gazete-27856, 2011).

In the South-eastern part of the province the area looks very much like Ordu and Giresun province, with steep hills and almost only hazelnuts grown. The North-eastern part on the other hand is very distinctive in the Black Sea area, because the hills do not directly start at the seashore but start with a plain area. This area is referred to as the Çarşamba plains.



Picture 2: Map of Turkey with hazelnut producing provinces; 1 = Kocaeli, 2= Sakarya, 3 = Düzce, 4=Bolu, 5=Zonguldak, 6= Kastamonu, 7=Sinop, 8= Samsun, 9= Ordu, 10=Giresun, 11=Trabzon, 12=Rize, 13=Artvin

In the Eastern side of Samsun province, bordering Ordu, are the Çarşamba plains & Terme region (located east of the Çarşamba plains). As can be seen on Picture 3 below, hazelnuts (pictured in red) are mostly produced on the Çarşamba plains, Terme region and the more southern areas in the Eastern part of Samsun province and Ondokuzmayıs, North West of Samsun city. The Çarşamba plains and Terme (in black box) are selected as research area because previous research has been done here and can be used for this thesis. The second reason is logistics; the farmers in this region are easier to reach from Samsun city than those in Ondokuzmayıs and south of Çarşamba and Terme.



Picture 3: "Samsun ili ürün dağılım haritası" (Samsun province production distribution map) (MOAS, 2013a)[xi]

Chapter 3 Conceptual Framework

In this chapter a model is constructed by which the economic behaviour shown by (absentee) farmers in the research area can be explained. As is shown in Chapter 1, farmers and markets in the research area sometimes fit the definitions of peasants and sometimes they do not. The economic behaviour model is largely based on models explaining peasants' behaviour. Therefore the question is raised whether it is problematic that the farmers in the research area do not fully fit in the definition of peasants. It is concluded that for the model this does not have much implications as many assumptions focus on the market situation fitting the situation in the research area, for example on land of labour markets.

3.1 Neoclassical economic theory of farm production

"[The neoclassical economic theory of farm production] begins with the farmer as an individual decision maker concerned with questions such as how much labour to devote to the cultivation of each crop, whether or not to use purchased inputs, which crops to grow in which fields, and so on. It thus centres on the idea that farmers can *vary* the level and kind of farm inputs and outputs" (Ellis, 1993):17). The theory includes three points of possible variation which are all relationships between farm inputs and outputs: the so-called factor-production relationship (output levels corresponding to different levels of variable inputs), the factor-factor relationship (showing the way the farmer combines its inputs in order to create a specific output), and the product-product relationship (reflecting the cropping decision with a given set of inputs) (Ellis, 1993):17-18).

Some parts theory addressed by Ellis (1993):18) make the theory less usable for explaining peasants' behaviour. The first one is that the theory solely focuses on short term profit maximisation and therefore ignores the consumption decisions of farmers. Secondly, there is no room for different goals within a household; the theory starts from one decision maker. Thirdly, it is assumed that markets work optimally. The most important aspect for this research is that non-farm (income) activities are not included. The model focuses on the optimal farm situation, while this is not the goal of many Turkish farmers. Allocation of inputs is therefore solely focused on the farm, while this is unworkable when farmers also want to allocate their resources to other sources of income or also have other goals in life than solely farm optimisation, as will be discussed later. The theory does explain well how the resources put aside for the farm income can be used optimally.

To stress the importance of the first point the following citation is used: "H.N. Barnum and L. Squire (1979) (...) showed that the signs of the response elasticities for own consumption of farm production, consumption of market goods and consumption of leisure all changed when consumption was examined alone, compared to when the production and consumption parts of the model were allowed to interact. This was a useful analysis because it demonstrated the importance of considering the production and consumption aspects of farm-household behaviour simultaneously" (Low, 1986):31).

3.2 Chayanov's farm household model & related theories

One economist who created a model including goals from the consumption side of the household was the Russian agricultural economist Alexander V. Chayanov. His model focuses on household utility maximisation (see Figure 4). The assumption that farm household members have negative feelings about farm work underlies the model; therefore the farmers are referred to as drudgery-averse farmers. Thus the farm household members make a trade-off between income creation by working on the farm and work-avoidance by which no income is created ((Ellis, 1993):109, Holden p.244-245, Low, 1986:28). Or as Ellis (1993):109) puts it: between the utility of income and the disutility of work. Considering the assumptions underlying the model, the model does not fit the situation in the research area. Namely, one of the underlying assumptions is the absence of a labour market (Ellis, 1993):110). Thus, there is no potential to rent out labour (and thus creating off-farm income as absentee farmers do) or to hire in labour (for example while living somewhere else). The situation in the research area requires the inclusion of a labour market.

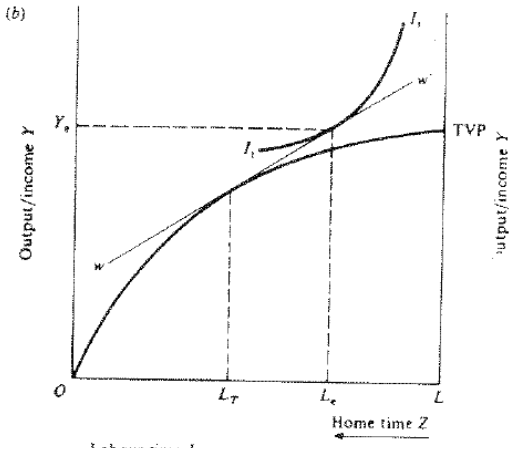


Figure 4 Chayanov farm household model with hiring-out labour adjustment included, retrieved from (Ellis, 1993):124)

Ellis has included a labour market, after which the agricultural income and labour needs can be compared with off-farm income sources. The better the off-farm options, the lower the preparedness to commit inputs to farm production. Though the current model clearly pictures a probably very large reason for low investment rates into farms in the research area, it is probably too simple to explain all trends in hazelnut production. As put forward by many authors, there is no one to one relationship between inputs and outputs, as well as this is not the case between output and utility. There are different influencing factors such as risks in factor markets and output markets. Therefore other models are discussed here, too.

Other authors who adjusted the theory often combined the theory with new home economics, which was developed in the late sixties by Becker (1965) among others. New home economics does not focus on optimizing utility by buying products only, also time needed to process these products in consumed product. Or as Ellis (1993):126) puts it: "it is not the carrots, potatoes, and beans which yield utility, but the vegetable soup made from them which possesses utility-giving attributes". This time factor is an interesting feature of this model. Now not only the appeal of the end-products influences the decision, but also the question how creating the consumption products can be combined with output creation in the most optimal way. The theory has many overlapping features with Chayanov's theory. But, because it mainly compares creating income with creating final consumption products, instead of comparing different sources of (farm and off-farm) income this theory is not most suiting to this research.

Several theories have a stronger market perspective, all having their strong and weak points in explaining the situation in the research area. One example is the subjective equilibrium theory of the farm household of Nakajima (1986) which suited the analysis of various types of farm management[xii]. The Nakajima model is argued to be "only applicable once specialization in market production has

developed to the extent that wage labour or cash cropping provides a more rewarding means of acquiring the essentials of life than self-sufficient production" (Low, 1986)31-32). Because of the large share of cash crop production and absentee farmers who prefer to do wage labour this seems to be the case in the research area. Though the model of Low (1986) includes some strong aspects such as risk, it is not used because it is less applicable to cash crop producers[xiii].

In the Nakajima model all farm production is sold. In this case of many farmers in the research area this assumption is not problematic. In later versions of the model own consumption was incorporated, for example by Krishna(1970) and H.N. Barnum and L. Squire (1979) (Low, 1986):32). Barnum and Squire use the assumption that first own consumption needs are met first, after which the rest of the produce is sold, therefore not making a distinction between a selling and buying price. Low argues that this assumption can be problematic in the situation of deficit (food) producers who purchase a part of their food requirements. By introducing a difference between the selling and purchasing price, the motivation of producing the own food becomes more visible, as the (higher) purchase price does not have to be paid. This reasoning is not included in the Barnum Squire model. The additional of Low surely is an improvement to the model of Barnum Squire. Though, for this research the Barnum Squire assumption (or: method) is not problematic, as farmers in the research mainly produce pure cash crops such as hazelnuts and fruits. Of course farmers can consume some of their harvest, but the products are not used as staple food solving consumption requirements.

In both the models of Nakajima (1986) and H.N. Barnum and L. Squire (1979) land area is fixed at the household level (as opposed to the Low model), thus resulting in diminishing returns to labour. This assumption suits the situation in the research area. In the research area land is often received through inheritance, and thus stays within the family. Orchards were found for sale in the research area, but farmers often have capital constraints troubling buying new land. Potential new farm land (fallow and nature) is scarce, which seems to be less the case in the area as described by Low (1986) and Holden (1993). The latter will be introduced now.

Uncertainty and behaviour towards risk are ignored in the H.N. Barnum and L. Squire (1979) model. As hazelnut yields show high yearly variations and some other crops are relatively new in the area, risk is understood to play an important role in farming decisions in the research area. Therefore, on this point the model does not fit the situation in the research area best. The Holden (1993) model includes interesting aspects which are considered an improvement for the (H.N. Barnum & L. Squire) model in relation to the situation in the research area. This model extends the before mentioned models[xiv] by the inclusion of risk/uncertainty and seasonality (Holden, 1993):246). The Holden model includes a distinction between (household) production[xv] and maintenance activities, for the last group of activities risk and uncertainty can be ignored due to the 'relatively immediate utility' (Holden, 1993):246). One aspect of the model which is particularly interesting is the inclusion of *expected* production and *expected* marginal production. "The expected utility of expected marginal production then represents what the household trades off against the marginal disutility of labour. Implicit in the utility function are time preferences and preferences towards risk/uncertainty" (Holden, 1993):246-247). In the case of hazelnut production, a lot of variation in yields between years and production areas occurs, due to the dependency on weather conditions. As labour input decisions cannot be made in short time periods (for example because there is no day labour market available providing secure income), these decisions have to be made based on expectations of

output instead of clear projections. Also the nature of agriculture paves the way for this way of decision making. For example in the case of hazelnut production, farmers can decide to spend time on winter pruning, increasing yields per shrub. If the whole harvest fails due to late frost (occurring in spring), it might have been more profitable to spend this time on other income generating activities.

Another feature of the Holden model making it interesting for the analysis of farmers' decisions in this study is the inclusion of *seasonality*. "The inclusion of seasonality in the model implies that there will be a new subjective equilibrium in every time interval" (Holden, 1993):247). Each period with homogeneous conditions can be considered one time interval[xvi].

3.3 Model Used For this Study

The household is used as the unit of analysis, as most farms found in the research area can be referred to as family farms. In this way production and consumption decisions are combined, differentiating peasants from firm enterprises. Secondly, focusing on the household instead of on the farm provides room for looking at the optimal total income for the household instead of only taking farm income into consideration. Lastly, there is room for individual motives from people within the household. This makes the decisions 'more human'; households do not only want to maximize profits (for example), but also want to improve the quality of life; for example by spending time and money on leisure, or money on luxury goods instead of only on food and farm inputs. As there are many family farmers in the research area, the definition fits on this point. In the model used for this thesis, 'home work' (see Figure 5) includes homework, leisure, and off-farm employment.

Though the Low (1986) and Holden (1993) models include some very good features for this research, the situation on which they are based are too different from the situation in the research area. In their research areas the share of production for home consumption was much larger, and the land market was very different as there was less scarcity. This differs the situation for farmers in such an extent that it was decided not to use these models here. Both the Nakajima (1986) model and the H.N. Barnum and L. Squire (1979) model show great overlap with the situation found in the research area. As the H.N. Barnum and L. Squire (1979) model contains updates on the Nakajima (1986) model, such as the possibility to use the produce for home consumption, it was decided to use this model. The additions of risks and seasonality as found in Holden will be included in the model here.

In this thesis, the expected output and output risks are not included by looking at the attitudes of respondents towards risk but by looking at the risk profile of the crops. Some crops' output depend more on external conditions such as weather conditions than others. By including the expected output, we can see what behaviour the household shows when the expected output is actually reached, but also what happens when outputs turn out much lower or much higher than expected. In the H.N. Barnum and L. Squire (1979) model the total physical product curve is used. This curve shows the production function of farm product output for increasing levels of input use (Ellis, 1993):19), in this case labour. In this research, this curve is changed into the expected total physical product (ETTP) curve, as is pictured in Figure 5.

In agricultural production often seasonality occurs. This seasonality is linked to when activities have to be performed and how much labour intensity they require. This is included by using the model for individual activities and an analysis of the intensity in Chapter 4.

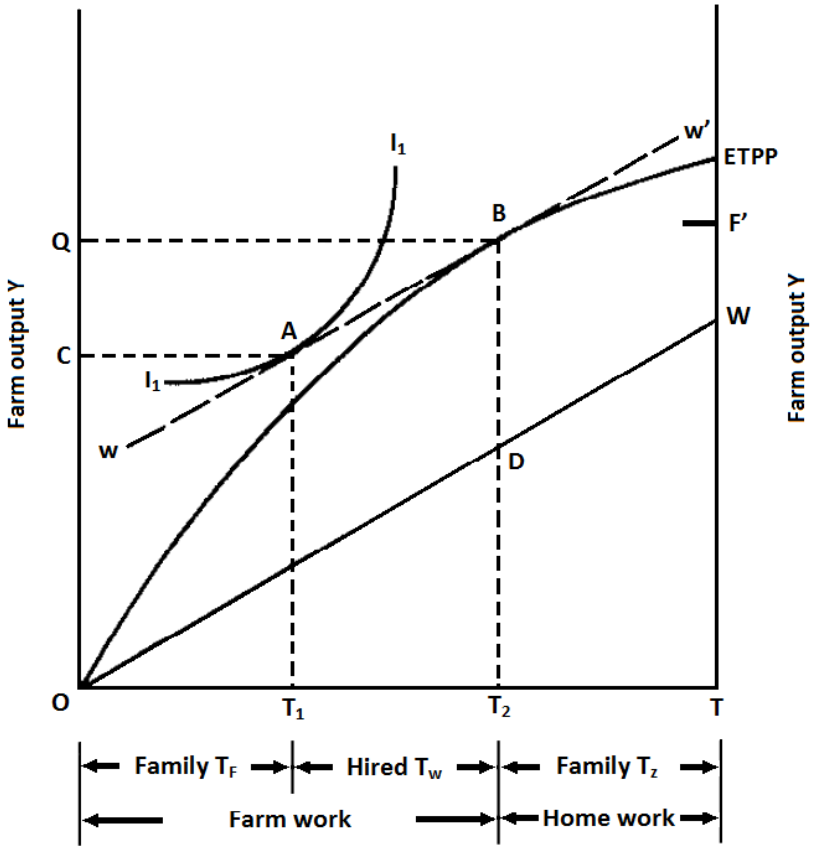


Figure 5: Part of the Barnum-Squire farm household model. Retrieved from Ellis, 1993:133 and adjusted

Additional information on the models can be found in Appendix E.

3.4 Input and output relationships

3.4.1 Product-product relationship

The theories not always make an explicit division between pure cash crops and crops which are used both for own consumption and selling at the market. In the research area pure cash crops are the majority of products produced. The model shown in Figure 5 still fits this situation. Only, one more step of activities has been added; instead of directly consuming the farm products (either with or without use of home time), the earnings of selling the cash crop are used for buying food products. Therefore the question turned into spending time on farm- or on off-farm incomes (thus into a decision between several sources of income) instead of only between self-producing or buying products. The implications for the farmers' decisions are as follows. Still farmers can face incomplete or changing markets, but farmers cannot easily shift between buying their needs or becoming more self-sufficient (they stay dependent on income). Due to the natural characteristics of the cash crops in the area (being perennial crops), investments decision cannot *easily* be reversed; the structures cannot be passed over too lightly. Therefore farmers cannot easily shift between income sources without losing resources. This insight brings us to the next aspect of the model: the product-product relationship. The idea of this relationship is that different sources of income compete for the available inputs. Farm income competes with off-farm income for labour. At the same time different types of farm incomes compete with each other, such as different crops. "For example, different

annual or perennial crops grown in pure stands compete with each other for a fixed resource of a given quality of land. Two crops which ripen in the same month of the year would compete at harvest time for a fixed labour resource, and so on"(Ellis, 1993):33). Leisure and maintenance activities additionally compete for time with the activities requiring labour. The optimal economical choice between activities is based on the ratio of output prices (Ellis, 1993): 35).

Actually, the models described above mainly focus on this relationship; finding the most interesting combination of income, leisure and maintenance activities, with a given factor labour (time) available. On farms this decision is not only made for the input labour, but also for other inputs which are introduced in the next subchapter. As the input labour is the most distinctive input when it concerns absentee farmers, this economic model used is based on this input. In the following chapters other inputs are also discussed if relevant.

3.4.2 Factor-factor relationship

The factor-factor relationship discussed here follows the same principle as the product-product relationship. It looks at the optimal combination of inputs producing a fixed level of outputs. The underlying idea is that any production function which is based on two or more inputs "contains the possibility that a given level of output could be produced with more than one combination of input" (Ellis, 1993):29). Before the features of the factor-factor relationship of relevance for this research are provided, a short introduction to the main resources in economic thinking is provided.

- **Land.** Humans can only be defined as farmers if they have access to the resource land. "An important attribute of peasants worldwide is the significance of non-market criteria in the allocation of land. In many peasant societies families have complex traditional rights of access to land which prevail over and constrain the operation of freehold land markets. (...) In peasant society land is more than just another factor of production which has its price" (Ellis, 1993):8). This characterization fits the situation in the research area.
- **Labour.** "It is widely agreed that strong reliance on family labour is a defining economic characteristic of peasants. (...) This feature does not rule out the use of hired labour in say, peak periods of harvesting; nor the sale by members of the farm household of their own labour outside the farm on an *ad hoc* basis; indeed for some peasant families this may be essential for survival. The predominance of family labour in production also has an effect on the working of labour markets in peasant communities, since various subjective criteria peculiar to individual households are likely to influence both the supply and demand for wage labour in the wider market" (Ellis, 1993):8).
- **Capital.** "Command over capital and its accumulation is a central attribute of capitalist production, as also is the notion of a rate of return on capital in the form of profit" (Ellis, 1993):9). This is difficult to link with household production because both production and consumption occurs. Also inputs can be used both purposes. "The absence of a systematic category of rate of return to capital in such cases further distinguishes peasant households from capitalist enterprises" (Ellis, 1993):9).

From this subchapter it should be clear that famers can make different decisions concerning how to use their input factors. The main difference between absentee farmers and other farmers is how they make use of their resources; how they allocate them between different income generating

activities. Absentee farmers have decided to spend their labour on off-farm incomes. Thereafter farmers have two options for increasing their yields if they would want to; (1) get their resource labour by other means, for example by hiring labour, or (2) by increasing the use of other inputs. These options will be discussed further in the next chapter.

A second important understanding is that farmers do not have room for a 100% free decision concerning all their inputs. The reason is that not all inputs suit all income generating activities. For example the use of the factor land is relatively inflexible, especially when they cultivate tree crops. Of course, they can decide to let their land lie fallow, but in this way they receive no benefits from this resource at all. Therefore the insight that not all "not all outputs necessarily compete for all resources" (Ellis, 1993):33) is important for this thesis.

3.5 Consequences of Investment

The theoretical framework suits the question which activities the farmers decide to perform and how much time they want to spend on it. What it does not include is the question whether farmers are willing to invest in starting up new activities. This subchapter focuses on this topic and is based on the theory as used by Ruth Vargas Hill who has studied the investment and abandonment decision of Ugandan coffee farmers. Her study is distinctive from other studies on investing in tree crops because the models allows for uncertainty and irreversibility (Hill, 2010):1067).

The rationale of the article is introduced now. "The article applies models of irreversible investment under uncertainty to understand the investment and abandonment behaviour of poor rural households. It considers a household's decision to invest in or abandon a relatively profitable production activity in which it is already engaged" (Hill, 2010):1065). The article is based on the idea that "the decision to invest in or out of a production activity has long-term implications for a household's income and consumption fortunes" (Hill, 2010):1065). The Hill article focuses on coffee-farming households in Uganda, which has shown much overlap with hazelnut production in the research area. Hill describes that coffee plants also yield little until their third year and thereafter stay productive for thirty to forty years, making it an investment decision. Also, the crop is relatively profitable, but investing in the crop is risky. The reasons for the riskiness are different between the two crops; for coffee Hill stresses the price volatility and the tree's susceptibility to disease. As the world market price of hazelnuts is much linked to the Turkish production, this factor provides less risk to the Turkish farmers than the coffee producers in Uganda. Also, where prices in the hazelnut market show yearly fluctuations, the price changes in the coffee sector seem to be over a longer period as the next paragraph shows. Diseases also bring risks to the hazelnut farmers, next to the weather conditions (which are of most influence).

Option to delay

An interesting aspect of the article is the introduction of the 'incentive to delay'. According to Hill, the option value to waiting "is present whenever there is any degree of irreversibility" (Hill, 2010) :1067). As Abel and Eberly (1994) have noticed, the case of coffee (and hazelnut) investment can be better described as "one of costly reversibility rather than strict irreversibility" (Hill, 2010):1067). Both investment and abandonment carry an option value. In case of abandonment; after trees are abandoned, the option to (dis)invest later is lost. "The tree has no value when it is removed (there is no second hand market for coffee trees) and there is no way to recoup the opportunity cost of land

being tied up with no output until the trees bear fruit." (Hill, 2010)(1066) Therefore, investing and abandoning both are irreversible decisions, to some extent. The third option is that the farmer makes use of its option to wait and thus does not decide between investing and abandoning at this moment. The following citation of Hill shows much overlap with the situation found in the research area: "Many Ugandan coffee farmers work with extremely old coffee trees. The majority of farmed coffee trees are approximately forty years old, and some trees are still being farmed at seventy years of age. Anecdotal evidence suggests that households do not cut down trees when the price of coffee falls, but rather keep them in case the price rises again. In these cases, little labour is applied to the trees, and sometimes the trees are not harvested" (Hill, 2010)(1066). After waiting both other options are present still, this is not the case after abandonment and a waste of the inputs of investment.

Model

Figure 6 shows how the model works. The two lines show the optimal capital stock (the number of trees in the orchard). In the case of point A, the capital stock is in between the lines, therefore no investment or abandonment occurs. At point B, the capital stock is increased and thus investment occurs. At point C the capital stock is decreased, meaning that trees are uprooted. The model is used to describe policy implications; this is discussed in chapter 6.

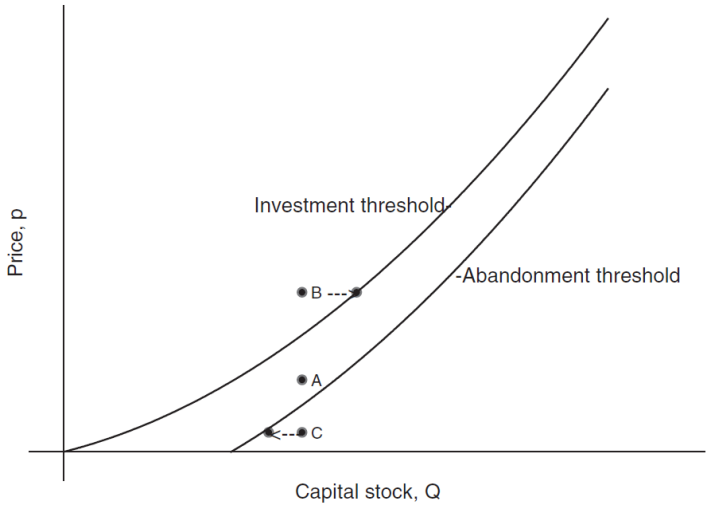


Figure 6: "Investment and abandonment thresholds for investment decisions made under uncertainty". Source: (Hill, 2010)

Liquidity constraints can work as a threshold making it impossible for farmers to start with new crops. If farmers decide to grow a new crop, it depends on the crop how long it takes before the first income is received. In the case of arable crops, the first income can be received after the harvest, which can take place already after one cropping period. In the case of replanting tree crops, a longer time is needed before income is restored. For apple and kiwi it takes 3 to 4 years before the trees become productive and for peach even 6 years. Thereafter it takes some years before the crops are in their most productive years. In this period, there is no or only a small amount of income received from the land. If farmers cannot miss the income during these years they are not able to change their crops, even if they were willing to.

Not only capital can work as a constraint, but also the required labour input. The shrubs on the original orchard have to be uprooted, the area has to be prepared for the new crop and the new crop has to be planted. Next to that it offers costs to the farmer, it is not physically light work. There are many old people farming in the region, for which it can be difficult to start a new orchard (Demirsoy et al., 18-9-2013).

Chapter 4 – Intensive vs. Extensive Hazelnut production

In this chapter a comparison is made between the agricultural practices of intensive and extensive production. The first part provides an introduction to the hazelnut crop and the production areas. The agricultural practices required for maintenance and the way absentee farmers (can) perform these are discussed. The second part links the conceptual model with the agricultural practices. Part three focuses on optimal production and the question how absentee farmers would have to manage their orchards in order to reach optimal production.

4.1 Characteristics of Hazelnut Production

4.1.1 General introduction to the crop

The hazelnut is a perennial plant with a two-year production cycle[xvii], and can be harvested every year. This means that both development of new flowers and the development of nuts occur in the same year. Hazel starts bearing after 3-4 years, and reaches maximum production between 15 and 25 years of age. Productivity stays relatively high until the age of 40-50 ((Poincelot, 2004):804, (Hütz-Adams & Firtina, 2012):4). Biennial bearing occurs: the production of a heavy crop one year followed by a light or no crop the next. Hazelnut yield depends on different factors. Three conditions mainly influence the harvest: (1) weather conditions, (2) farming systems, (3) quality of shrubs, cultivar.

Total yearly production of hazelnuts is highly fluctuating; it greatly depends on weather conditions. For example, in 2008 production was on a record level of 1.1 million tons, the year after it shrunk to 663,000 tons with a negligible change in size of production area ((Hütz-Adams & Firtina, 2012):7, (Gönenç et al., 2006):20). Pollination happens in the second year at the end of the winter. Early pollination is dangerous because late frost can damage the pistils. This limits commercial production to areas near large bodies of water with less extreme weather conditions ((Poincelot, 2004):804). Secondly, low temperature during the growing season is harmful ((Wertheim & Goedegebure, 1988):22-23).

On average, orchards are located at 675m above sea level. The optimal location is between 250-1000m above sea level. The gradient of the slopes is generally between 6% and 30% (Hütz-Adams & Firtina, 2012):5). In the research area, orchards in flat areas are present near the coast. Here the orchards are generally younger and better structured than in the original production areas. In extreme cases, the orchards are located in highly sloped areas with trees not planted in straight lines, making it very hard to use mechanization. Yields are higher in new orchards (where shrubs are in their productive years) and in orchards in which considerable input use occurs. Respondents have indicated that the middle region (from low, middle, and high areas) is the best area to grow hazelnuts ((Öztürk, 16-9-2013), (Demirsoy et al., 18-9-2013)).

Hazelnut production often occurs on relatively small farms in Turkey, the average hazelnut farm size is 1.34 hectares. Mostly in the eastern production area small orchards are found, while some central and western farmers have 10-15 ha orchards ((Hütz-Adams & Firtina, 2012):7). Table 2 shows differences in farm sizes in acres; with 0.98-2.47 acres in Turkey, 12.35-24.7 acres in Italy and 37.05-74.1 acres in the USA.

Plantations are usually family-owned farms. According to the survey results of the study done by Demir, farmer families consist of 3 working age members that can and are willing to go to hazelnut

fields on average. Of these family members, about 58% has secondary employment (Demir, 2007:10).

Table 2: Farm sizes in different countries. Source: Demir (2007)

Country	Turkey	Italy	USA	Spain	France
Farm size	0.98-2.47	12.35-24.7	37.05-74.1	4.94-9.88	17.29-24.7

An orchard of one decare (1000 m2) has approximately 40-50 shrubs (Öztürk, 16-9-2013). Table 3 shows production data of Samsun province. As can be seen, the average production was approximately 100 kg per decare. Two other observations can be made from Table 3, (1) there is a lot of variation between regions; for example 2013 was a bad year for the coastal areas Terme and Çarşamba, while the more inland production regions had good yields. Ondokuz Mayıs is a relatively new production area, with hardly any old and thus underproductive orchards. Therefore average yield is higher in this area. (2) Biannual fluctuations are very present in the hazelnut production in the research area. In Figure 7 the data from Table 3 are pictured.

Table 3: Yield (KG per decare) in different production areas in Samsun Province (MOAS, 2013a)

	2007	2008	2009	2010	2011	2012	2013	**Average**
Salıpazarı	80	116	75	120	86	123	128	104
Ayvacık	70	164	79	135	80	90	100	102,6
Terme	75	154	74	55	110	90	60	88,3
Çarşamba	67	150	95	101	95	150	75	104,7
Ondokuz Mayıs	95	132	160	166	106	160	150	138,4
Average	77,4	143,2	96,6	115,4	95,4	122,6	102,6	107,6

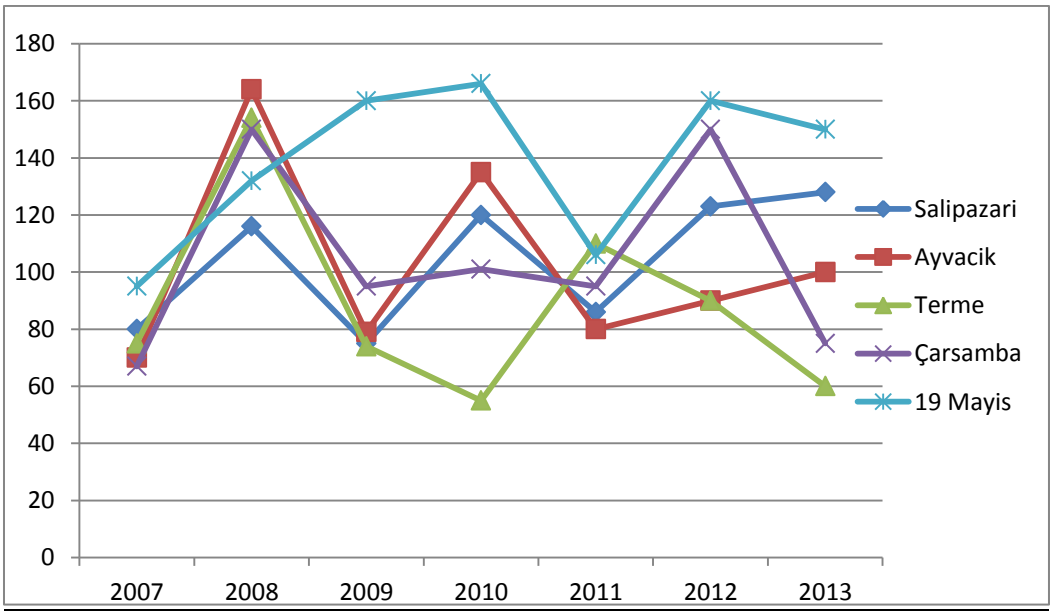


Figure 7: Yield (kg per decare) in different production areas in Samsun Province (based on Table 3)

Table 4: Income (yield*price) from hazelnut production in research area

		2007	2008	2009	2010	2011	2012	2013	**Average**
Average price (TL/kg)		4,08	3,23	4,31	4,27	6,34	4,57	6,01	**4,69**
Income (TL/da)	Salıpazarı	326,74	374,23	323,42	511,92	545,17	561,90	769,54	487,56
	Ayvacık	285,90	529,09	340,67	575,91	507,13	411,15	601,20	464,44
	Terme	306,32	496,83	319,11	234,63	697,31	411,15	360,72	403,72
	Çarsamba	273,65	483,92	409,67	430,87	602,22	685,24	450,90	476,64
	19 Mayıs	388,01	425,85	689,97	708,16	671,95	730,93	901,80	645,24
	Average	316,12	461,98	416,57	492,30	604,75	560,07	616,83	**495,52**

4.1.2 Agricultural Practices

In this subchapter the agricultural practices involved with hazelnut production are discussed. Not all agricultural practices are always required in order to be able to harvest, but do lead to increased yields. Hazelnuts require relatively little effort to cultivate and inputs are low (Serttas, 2009)):3). Table 5 shows a categorization of farm activities. This categorization is introduced in order to understand why activities are (not) performed. In the columns a division is made between activities which have to be performed in a specific period or moment and activities which do not. In the rows the labour intensive and extensive activities are distinguished.

Table 5: Categorization of hazelnut related agricultural practices in research area.

	Moment of performance	
	Moment-specific	Moment-unspecific
Labour extensive	Irrigation, fertilizing, post-harvest practices	Disease prevention
Labour intensive	Harvest, disease cure	Pruning

Moment-specific, Labour extensive

The first category discussed here includes most activities; irrigation, fertilizing, and post-harvest categories. These activities only have to be or can be executed on a specific moment in year, and are labour extensive. This means that the farmers have to be on their farm on specific moments, which can be difficult to meet for absentee farmers. But, being labour extensive, not much labour per decare is required.

Due to the rainfall in the Black Sea area, no irrigation is required for growing hazelnuts. Few farmers have irrigation schemes. If present, they can mostly be found on the large farms. In higher located orchards, it would not be possible due to the high slopes. This causes problems in years with hot summers and little rain. In these periods farmers in low areas can free water from open canals. If irrigation occurs, it is during such periods. Often irrigating is only a matter of opening and closing the gates (Öztürk, 16-9-2013). For this reason irrigation does not require a lot of time, but it does require physical presence. If it occurs, it is during summer.

Concerning fertilizers, farmers get financial support for having soil samples and fertilizer needs calculated by the government (Demirsoy et al., 18-9-2013). Usage is based on calculated needs, varying per year and orchard, and the recommendation does not have to be followed. Therefore, providing exact data on fertilizer use is not possible. At large and intensively cultivated farms,

fertilizers are used more. It is estimated that fertilizers are not used in big amounts on small farms, due to financial constraints. When fertilizing occurs, it happens approximately 2 times a year, in general between the end of March and the end of May, when the crop needs the nutrients for its growth (Südwind, 2012:7). Absentee farmers often only visit the orchards during the harvest time, troubling the application of fertilizers.

Post-harvest practices occurring on the farm after the harvest mainly concern drying, husking, storing and marketing of the nuts. After the harvest, the nuts can be sundried or dried mechanically. Sun drying mainly occurs at the farm. After some drying, machinery ('patoz') is used to remove the outer husk. Farmers hire the machine. After husking, the hazelnuts are dried again for some more days. Hazelnuts can be kept for a long time when dried and stored properly, up to three years. If the farmer sells the nuts, they sometimes transport the nuts themselves, sometimes they are picked up. Traders come if the farmer calls them. Though activities do not require a lot of labour they take days and require presence.

Moment-specific, Labour intensive

The second category also covers activities which have to or can be executed on a specific moment in year. The difference with the first category is that this category also requires intensive labour input. In the research area machinery is used little, meaning that many activities are performed by hand. Disease and pest related activities are split into different categories, of which disease cure is categorized here.

Several diseases and insect pests occur in the research area, these change through time. For example the (hazel)nut weevil was a problem before, but because of good prevention this is not an issue anymore (Öztürk, 16-9-2013). Currently the most spread diseases are the shot-hole borer[xviii] and the common cockchafer[xix]. As is discussed later these diseases can cause considerable yield losses. In order to catch the shot-hole borer, in spring time pesticides has to be provided (2 times with 15-20 days in between), in July-August sticky glue has to be used to catch the adults. The complete tree has to be sprayed and if it has rained it has to be repeated. If shrubs or branches are infected, they have to be removed from the orchard and often to be burned as well. Thereafter much labour input is needed; it is a precise job as healthy productive branches should not be cut. The common cockchafer must be treated with chemicals in September and October, after three or more larvae are found on 1m2. When diseases are not cured, complete orchards can be harmed. Therefore, absenteeism is especially problematic on this point. Resident family members or hired labourers can perform the job.

In Turkey, mainly manual harvesting occurs. Manual harvesting can be done in two ways: picking the hazelnuts from the plant or by piling and gathering the fallen hazelnuts. The first option is mostly found in Turkey. The steep slope in many production areas form the constraint for introducing machines. Previously, harvesting was a family business. Migration created shortage of labour force and from the '90's seasonal labourers arrived in the hazelnut harvest. An estimated 42% of the harvest is done by seasonal labourers. There are substantial regional differences and no precise statistics available (Hütz-Adams & Firtina, 2012):15). Most absentee farmers return to their orchards during the harvest period and combine their labour with hiring in additional labour.

Moment-unspecific, Labour extensive

The only activity which is categorized as moment-unspecific and labour extensive is disease prevention. The main issue with absenteeism is that in order to observe diseases and pests in the orchard regular visits have to take place.

Moment-unspecific, Labour intensive

One activity is categorized as moment-unspecific and labour intensive; pruning. To optimize the harvest, the shrubs have to be pruned yearly Hütz-Adams & Firtina, 2012):4). Optimally, shrubs have 5-6-7 branches. In reality shrubs are seen with 20 branches, giving low yields. "Shrubs are never totally uprooted, if a branch is too old or sick it is cut" (Öztürk, 16-9-2013). Cutting all the branches in one time is too harmful for shrubs, it is better to spread this over years, for example by cutting two branches each year (Demirsoy et al., 18-9-2013). Therefore, pruning practices have to be managed carefully making it an time intensive activities. Winter pruning and summer pruning can be done, winter pruning being the most important one. It can be executed in a couple of months in the winter season. Absentee farmers can prune right after the harvest, meaning they do not have to plan an additional trip for it.

4.2 Decision to perform farm activities

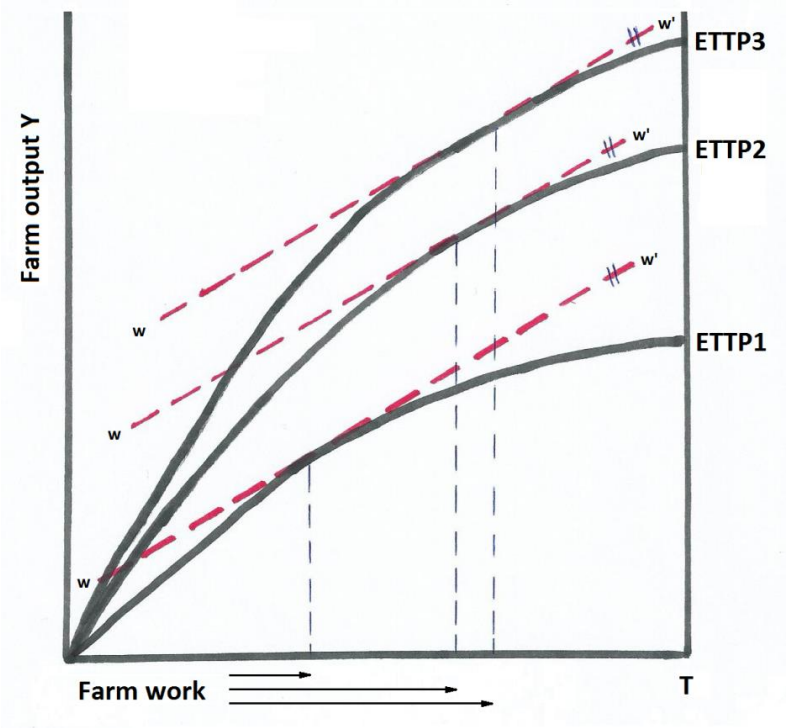
When deciding to perform a farm activity or not, the farmer has to take some attributes of the activity and external circumstances into consideration. The decision options are summarized in Table 6 below. Two different activities are used for comparison; activities which influence output a lot and those which do only little. Also two circumstances are distinguished; good and bad off-farm income opportunities in the labour market. In this table both explaining features can be understood as extremes of a scale. Again, the assumption is that the expectation of the level of risk is included in the expected production and in the expected wage.

Table 6: Farm activity performance decision options. Source: author

	Activity 1 – high additional output	Activity 2 – low additional output
Good off-farm income opportunities	Steep production function, steep ww' line	No steep production function, steep ww'line
Bad off-farm income opportunities	Steep production function, no steep ww'line	No steep production function, no steep ww'line

Figure 8 shows the scale of additional output gained from performing an activity. The ww' line is not adjusted, meaning that off-farm income opportunities are kept equal. Though on the scale various options are possible, only three exemplifying options are provided. An important understanding is that every activity can have different outcomes under different environmental conditions. For example, in a dry area irrigation can be an activity gaining a lot of additional output from the land. However, in an area with sufficient rainfall irrigation is not very necessary and can only create low additional output from the land. The examples of activities and their output improvements are based on the situation found in the research area;

Figure 8: Adjusted Barnum Squire model with 3 different activities. Source: based on Figure 5 with adjustments by author



- Activity (ETTP2) is not changed from the Barnum Squire model, and shows activities which are of considerable interest to the farmer (to the point where the marginal product of farm activities is equal to the one of off-farm income). Examples are activities which can increase yields considerably, such as winter pruning or providing fertilizers and pesticides.
- Compared to other sources of income, activity ETTP1 is of least interest. It touches the ww' line on a point that little time is spent on the activity, meaning that the activity is often less beneficial than off-farm income activities. A good example in the research area is irrigation; due to the weather conditions executing this activity cannot increase yields further and thus spending time on it will only result in a small increase in income.
- Activity (ETTP3) is very beneficial, it is beneficial for farmers to spend time on this activity. Executing this activity increases output to such an extent that the additional profit divided by the hours spent on the activity are higher than what the farmer could have earned in the wage labour market. Probably the best example in the research area is the harvest, for which farmers return to their land.

The respondents of the Ziraat Odası and Mr. Öztürk (16-9-2013) were asked to provides estimates of the impact of several agricultural activities on output. This paragraph solely includes their estimates. Concerning pruning it is estimated that with correct pruning harvest can be 30-35% higher than without. Concerning fertilizers, Mr. Öztürk (16-9-2013)estimated that without fertilizer use hazelnut production would be 30-40% lower than it is now. Additionally the nuts would be of lesser quality. With only half of the current fertilizer use he expected a 15-20% change. The employees of the Ziraat Odası provided somewhat different estimations: without any fertilizer use a decrease of 10-20% in the first year, and a decrease of 30-40% in the following years. With only half of the current fertilizer use they expected that yields would decrease with 5-10% in the first year and in the second year: 15-20%. Both estimated that because of the good soils in the area the yields would stabilize afterwards

again. Estimates of the impact of diseases & pests related activities (on shot-hole borer and common cockchafer) are as follows. Yield losses were estimated to be 20-30% after infection, because shrubs have to be removed. Without prevention and on-time cure, the shot-hole borer has the most impact; losses can reach to 30-50% of harvest. With on-time cure, common cockchafer -related losses are between 5%-10%. The common cockchafer is most problematic with cure, as it comes back year after year. As considerable output increases are established these activities would probably be classified as ETTP2 or ETTP3 activities by the farmers, depending on their wage lines.

Concluding, this model explains which activities are performed by the farmer and are which not. Farmers do not only decide whether to spend time on an activity, but also how much time and when they do this. This is discussed now.

When is the moment that it is not interesting anymore for a farmer to prune (for example), and how is this determined? The time spend on the activity can be understood from Figure 8. This paragraph explains how it is established. In the presence of good labour opportunities the labour spend on an activity is where the marginal physical product (MPP, or the slope of the ETPP line) is equal to the ww' line. If there are no other activities[xx], the farmers are expected to make a different decision; namely to spend inputs (here: labour) on the activity until the point where the MPP=0. At this point the highest possible output is reached (other inputs kept equal), and after this point additional inputs even decreases output. This is the case because the Barnum Squire model assumes fixed land market. The picture is only drawn until the point that MVP=0, because spending more time on the activity is irrational. Two factors have to be understood additionally:

- The first factor is how easily activities can be combined with different activities. Some activities compete because of comparable resource needs in the same period, while others can be combined very well. Therefore activities cannot be allocated in the groups (ETPP1, ETPP2, ETPP3) solely based on the observation whether they are performed or not. For example, the harvest is a questionable activity; would absentee farmers also return to their orchards for the harvest is it would not overlap with the school holidays of their children? The activities can be compared by their financial outcomes, and these outcomes can thus answer this question.
- Differences between peak / low seasons are included in the analysis in paragraph 4.1.2. (moment specificity), but not included in model because the model shows how much time is spent on an activity, not when this is done. Though it might be expected, the occurrence of a peak season is not related to the profitability of an activity. It only has influence on the planning of the farm activities, not on the question whether the activity is performed or not. Activities with a peak season cannot be planned flexibly, while activities without peak season can be planned flexibly. Seasonality is thus not included here by using different models for different periods in the year, as only single activities are discussed.

If some activities cannot be combined because of a limiting resource this decreases the farmers' income possibilities. But, as is included in the conceptual framework, output can be created with different combinations of inputs. This idea is worked out further in the next subchapter.

4.3 Optimal production outcomes

In this third part of the chapter the production practices and levels are compared between the average producers in Samsun area and a farmer group which is reaching very high yields by applying an intensive production system. This is done in order to understand what it would take absentee farmers to reach high production levels. This understanding can be used in Chapter 6, where agricultural policy measures are related to absentee farmers. The underlying assumption is that absentee farmers produce less or equally intensively as other farmers in the research area.

4.3.1 Practices creating high output

In this section farm management of a producer group[xxi] reaching very high yields are discussed. If not stated differently, all information is received in an interview with Mr. Şahin (7-10-2013) who is the president of the producer group. The group was established in 2006, since then the group has grown year by year. Currently, 110 farmers are part of the group, together producing hazelnuts on 3500 decares (=350 hectares). The total numbers of farmers in the area is 6300+ farmers. Weather conditions are comparable with the research area, soils conditions are even argued to be better in the Samsun production area. Therefore it is assumed that the yields reached by this group would also be possible in the research area.

In this production region –Giresun- Keşap - yields were on average 80 kg per decare between 2005-2013. In the first year some farmers had yields of 50 kg per decare. The current average lies around 200 kg per decare (with shell), but in this case the meaning of averages is ambiguous. Not all farmers joined the group at the same moment, therefore all farmers are in different phases. Because of this, some farmers have higher yields than others. Therefore the group looks at production outcomes linked to the number of years farmers have adopted the principles. It takes at least 3 years to improve the soil, trees, after these years production is estimated at 100 kg per decare. Thereafter it takes another three years before the current production levels are reached. Approximately thirty farmers have been member from the start, they now reach production averages of 300 kg per decare. Also in this area weather conditions are of considerable influence on output levels, they are estimated to influence yields with (+ or -) 20%. Again, providing estimations is difficult in this situation because of the rising yields.

At start the production costs were 5 TL per kg, currently the production costs fluctuate around 3 TL per kg. Approximately 80% is labour costs, for example to hired labour for fertilizing, pruning and the harvest. The prices the group receives are approximately 10% higher than the market price of that time. If 6TL in the sector, they get 6,60 TL.

The main thing the group members changed was the time spent in the orchard. These farmers spend much more time in the orchards, while other farmers do not. Per year, the group members minimally work hundred days in an orchard of ten decares. Some rough estimates are collected on the influence of different activities on yield improvements. This varies between orchards based on the conditions of the orchard, the climatic circumstances and the quality in which the activity is performed. The percentages should be understood as follows: if farmers do the activities correctly, the activities influence output like this. By far the highest percentage is from pruning: 60%. Thereafter come soil improving activities and disease prevention and cure with 10-20%. The last activities of influences are sprout control (3-5%), weed management (3-5%) and the post-harvest

drying activity (5%). Changing irrigation, harvest, storing and cleaning (husking) activities are not expected to create differences.

Next to labour input, the age of orchards is another important factor explaining low yields. The average age of orchards in the area is fifty years. In comparison, this is the maximum age at which the economic life of the orchard is ended in many hazelnut producing areas in the world. This is a big issue in Turkey, replanting is needed in many orchards. The highest yields are reached when trees/shrubs are between 15-35 years.

Also absentee farmers are part of the farmer group. For many other farmers the crop is also not the main job. Approximately 80% of the farmer group members live in the area, 20% in Istanbul or other cities. This last group just comes for the harvest. The rest of the activities is done by hired labour.

4.3.2 Absentee farmers reaching high output levels

This subchapter discusses what absentee farmers would have to do to reach the output levels introduced in subchapter 4.3.1. It also considers the consequences of the activities.

The first question is if absentee farmers could reach the production levels reached by the farmer group in Keşap. The first reaction would be 'yes' as there are also members of this producer group who are absent farmers. The absent farmers in Keşap solve their labour requirements by using hired labour. The following calculations show whether this is profitable as well in the research area.

Table 7: Labour spent on hazelnut crop (in # hours & 8-hour days) in the research area

Total		
Pruning & Sucker control	# hrs / da	9.46
Weed control	# hrs / da	1.57
Soil management	# hrs / da	1.77
Disease control	# hrs / da	0.36
Post-Harvest Activities	# hrs / da	1.07
Total (excluding harvest)	**# hrs / da**	**14.24**
Harvest	# hrs / da	30.64
Total (including harvest)	**# hrs / da**	**44.88**
Total (including harvest)	**# days/ da**	**5.61**[xxii]

Table 8: Calculations of hired labour potential in the research area [adjusted]

		Samsun		Keşap – Average	Keşap - Top	
Income						
(1a) Average production	*(kg/da)*	107.6[xxiii]	107.6	*200*	*300*	
(1b) Income per kg	*(TL/kg)*	4.69	4.69	5.16[xxiv]	5.16	
(1c) Income per decare	*(TL/da)*	**504.64**	**504.64**	**1031.80**	**1547.70**	(1a) x (1b)
Costs (calculation Keşap)						
(2a) Production Costs	*(TL/kg)*	-	-	3	3[xxv]	
(2b) Labour Costs (80%)	*(TL/kg)*	-	-	2.4	2.4	(2a) x 0.8
(2c) Other input costs (20%)	*(TL/kg)*	-	-	0.6	0.6	(2a) x 0.2
(2d) Production Costs	*(TL/da)*	-	-	**600**	**900**	(1a) x (2a)
Costs (calculation Samsun)						
(3a) Labour costs	*(days/da)*	5.61	5.61	-	-	
(3b) Costs external labour	*(TL/day)*	*45*	*50*	-	-	
(3c) Labour costs (80%)[xxvi]	*(TL/da)*	252.43	280.48	-	-	(3a) x (3b)
(3d) Other input costs (20%)	*(TL/da)*	63.11	70.12	-	-	(3c) x .25
(3e) Production costs	*(TL/da)*	**315.54**	**350.60**	-	-	(3c)+(3d)
Profit						
(4a) Income per decare	*(TL/da)*	504.64	504.64	1031.80	1547.70	(1c)
(4b) Costs per decare	*(TL/da)*	315.54	350.60	600	900	(2d) & (3e)
(4c) Profit per decare	*(TL/da)*	**189.10**	**154.04**	**431.8**	**647.7**	(4b) - (4a)
(5a) Average size orchard[xxvii]	*(da)*	27.46	27.46	31.82	31.82	
(5b) Profit per orchard	*(TL)*	**5,193.61**	**4,230.71**	**13,739.88**	**20,609.81**	(5a) x (4c)

It is found that farmer respondents in the research area spend on average 5,61 labour days per decare (da) in their orchards, performed by own and hired labour (see Table 7). This is almost half of the number of days the Keşap farmer group sees as a minimum requirement. Table 8 shows the calculations comparing the production in the research area and Keşap. The data on Samsun are based on the assumption that all labour is hired and thus requiring considerable costs as the absentee farmers in Keşap have. In Keşap double the labour input used, and profits are two times higher or more (see Table 8, 'profit per decare').

From Table 7 it can be understood that if farmers in Samsun would spend approximately five more days per decare on working in their orchards, this could earn between 240 and 500 TL per decare. Taking 50 TL as the price of labour, this would costs 250 TL per decare. In the first years the farmer will break even with the additional labour input, after some years (six in the Keşap case) high profits will be reached. The activity performed (pruning is most important) and the quality of the performance are of high importance here.

This raises the question why the (absentee) farmers in the research area do not follow the agricultural practices which are performed by the farmers of the Keşap farmer group. Potential answers are raised in literature.

The first potential reason is that absentee farmers have to hire labour in order to perform the activities and that this brings some difficulties. As is case in various situations, wage labour in agriculture is linked to incentive problems. While focusing on supervision of agricultural production teams, Lin stresses the following aspect of agriculture in relation to monitoring: "Because of agriculture's sequential nature and spatial dimensions, monitoring labour effort in agricultural production is extremely difficult and very costly" (Lin, 1988):S199). According to Alchian and Demsetz (1972) the incentive to work is based on the 'metering of effort'[xxviii]. This means that effort has to be measured and (financially) valued as such. In their study on the 'behavioural and material determinants of production relations in agriculture', Binswanger and Rosenzweig (1986)[xxix] provide the additional understanding on motivation of labourers by explaining which factors influence motivation to work and metering. The first point they put forward is that of asymmetric information, which is linked to measuring the effort. Information about the quality of the work performed can be costly to acquire for farmers who do not reside close to the farm. Secondly, different workers have different motives for (not) providing information: "High quality workers will want employers to have accurate information about worker quality, while inferior workers would prefer that employers not have information about worker quality" (Binswanger & Rosenzweig, 1986):507).

Not only information plays a role, but also the incentive to work; assigned payment or apportion aspect. "When information is costly and asymmetrically distributed, incentives problems arise. A daily paid labourer has no incentive to work hard, unless supervised closely via direct observation of his effort or via inspection of his output. Incentives to work may be improved by providing share contracts or piece rates. Since the worker receives only a share of the full marginal product, he will still not work as hard as an owner-cultivator unless effort can be monitored in some way, and/or he can be penalised in terms of loss of future contracts" (Binswanger & Rosenzweig, 1986):507).

The activities not only have to be performed, their necessity also has to be observed. Most activities have to be performed annually, such as the harvest and post-harvest activities. But, there are also activities which only have to be performed when needed, such as the cure of diseases. As can be seen in Table 7, this activity requires only little time. But, as physical presence is required performing this activity is impossible to perform by absentee farmers. For absentee farmers it is impossible to do this themselves, therefore it can best be performed by family (the benefit from output) or neighbouring resident farmer (they benefit if area is free from diseases and pests).

Another potential reason next to the difficulties linked to finding labour to perform the activities is the riskiness of investing in the land and risk aversion attitude of most people. Binswanger and Rosenzweig have linked this with insurance, assuming that most individuals are willing to reduce their exposure to risks (Binswanger & Rosenzweig, 1986):508). Their reasoning is that in the absence of insurance, this can be done by making use of 'insurance substitutes'. The insurance substitutes come in various forms; they "may include the holding of reserves, diversification of prospects, conservative or 'excessive' input levels, investment in 'credit-worthiness' and social ties" (Binswanger

& Rosenzweig, 1986):508). Following this line of reasoning, keeping the orchard in an underproductive state could be explained as being an insurance substitute as it can be compared with keeping conservative input levels. In a situation with a lot of variation of output, as is found in the research area, keeping the inputs down means that at least losses are not large (while at the same time income is not large as well). If it is found that absentee farmers have considerable means (resources) to safeguard oneself against risks this reason is not relevant. This is assumed in this thesis, but as it is not proven empirically this option is kept open here.

The last potential reason is (combined) experience. Experience and the presence of clustered knowledge can explain why currently farmers in Keşap reach higher productivity levels than farmers in Samsun. Clusters are discussed much in literature and for various actors in the market economy. Bathelt, Malmberg, and Maskell (2004) explain that knowledge creation (among others) can best be seen "as the result of interactive processes where actors possessing different types of knowledge and competencies come together and exchange information with the aim to solve some –technical, organizational, commercial or intellectual- problems" (Bathelt et al., 2004):32). This is found in Keşap, where the farmers work together and with knowledge institutions. "Overall, the shared knowledge basis enables cluster firms to continuously combine and re-combine similar and non-similar resources to produce new knowledge and innovations. This stimulates economic specialization within the cluster and results in the development of localized capabilities are available to cluster firms" (Bathelt et al., 2004):37). This is observed in Keşap, where quality of the product is improved and specialization had occurred as some of the farmers are now managing the group and agricultural engineers are present.

Next to reaching the Keşap productivity levels by making use of hired labour, it could theoretically also be possible to do this by making use of other inputs, as has been introduced with the factor-factor relationship in the theoretical framework. This section does not put forward data-based conclusions, but ideas which can shed new light on the agricultural policies discussed in chapter 6.

The first factor discussed is land. Increasing the land used by the absent farmer in order to make the land more profitable seems like a strange line of reasoning. But, in the research area farmers often only own small orchards. As has been shown, profits per decare can be strongly increased. But, if this income is only a small portion of total income, is it worth spending the effort on different income sources? This is not the case if there are fixed costs involved, such as travelling costs in the case of income sources in different places such as is the case with absentee farmers. The income can thus be more interesting if there is more income involved. As will be shown in the next chapter, increasing the land or the output per decare can require a considerable investment, both time and capital-wise. Orchards are old, and therefore increasing yields on the long term requires a big investment, for example uprooting and starting anew. These constraints are discussed by Hill (2010):1074). She stressed that in the presence of liquidity constraints, "there may be some heterogeneity in the observed investment behaviour across households with different levels of wealth, because richer households are more able to respond to positive price shocks and, similarly, to replace capital lost" (Hill, 2010):1074). This is also observed by Saxena (1992): "The western U.P. farmers had a long experience of growing cash crops like sugarcane and potato, which generated enough surplus, and therefore they had more confidence in innovating with another cash crop, like eucalyptus". In this situation the absentee farmers could even invest more in their land than resident farmers, because

they make more use of off-farm incomes and thus have more (financial) space to invest. Then again this raises the question why these farmers do not invest, and how the government could stimulate them to do so. This is discussed in chapter 6.

The second input which farmers can vary with is the resource capital. Spending the capital on hiring labour is not included here, as that falls under increasing the labour use. Capital can also be used to increase the use as other inputs, such as fertilizers or pesticides. As was discussed in chapter 4.3.1, the largest changes are reached with correct pruning. This can only be influenced by increasing the capital levels to some extent; for example by buying good quality tools. As the hazelnut crop does not require much irrigation and constructions, additional capital can increase yields but to a lesser extent than labour.

This chapter is concluded with the idea that farmers grow hazelnuts because it is possible to do this in an extensive manner. It could be possible that farmers who prefer to produce intensively prefer other crops such as annual crops or fruit. These and other options farmers have are discussed in the next chapter.

Chapter 5 Alternative Income Sources

This chapter discusses the (alternative) income sources that the farmers have in the region. As introduced in Chapter 1 the Turkish government stimulates farmers to uproot their hazelnut orchards and to start with the production of other crops. Subchapter 1 shows the division of crops in the research area. This chapter further studies the underlying reasons for this behaviour by examining the different income options in subchapter 5.2.

5.1 Crop division

In Samsun province hazelnut production is only allowed on land with a slope of 6% or higher[xxx]. In the total Samsun province, field crops such as maize, rice, sunflower and gains are most present. Fruits and nuts are grown on 23.9% of the total agricultural land. When taking a closer to the fruits and nuts grown in the area, the hazelnut crop is the most cultivated crop (covering 96% of the area). The fruit and nut orchards are mostly found in the Eastern part of the province. This can be found in Tables 9 and 10 and Picture 3.

Table 9: Division of crops in Samsun Province. Source: (MOAS, INCLUDE)

Crop	Decares	% of Total
Fruit & Nuts Total	919.749	23.9%
Vegetables Total	458.439	11.9%
Field Crops Total	2.467.832	64.2%
Total Agricultural Land	**3.846.020**	**100.0%**

Table 10: Division of fruit & nut crops in Samsun Province Source: (MOAS, INCLUDE)

Crop	Decares	% of Total
Apple	5.381	0.58
Cherry	1.724	0.19
Hazelnut	883.410	96.05
Kiwi	1.494	0.16
Peach	14.890	1.62
Walnut	11.648	1.27
Strawberry, plum, fig, persimmon, medlar, pomme granate and quince	1.202	0.13
Fruit & Nuts Total	**919.749**	**100.0%**

5.2 Analysis Alternative Income Options

In order to understand why many farmers prefer hazelnuts over other crops the characteristics of other investment options are discussed now. The options discussed are off-farm incomes, selling the land and producing the apple, kiwi and peach crops. Several aspects are compared; the marketing chains, income possibilities, production risks, establishment costs of new structures, and labour requirements.

5.2.1 Off-farm income

Off-farm incomes and tree crop production have some differing characteristics which can be attractive for humans in search of income. There is too much variation in the off-farm income levels, therefore they are not compared but only the characterizing aspects of off-farm income.

Wage labour is in many cases more flexible than tree crop production. Many jobs can be performed at different locations (such as different cities), and people can change their job if they find more

attractive opportunities. Once tree crops are placed on land they cannot easily be replaced. Because of this characteristic the farmers is bounded to the place, which can be seen as a disadvantage.

Another advantage of wage labour is that capital inflows occur on a regular basis, often every month. In agriculture the inflows only start after the harvest, late after investments in inputs have been made and paid. If the harvest cannot be stored (such as fruits and vegetables in the research area because of the absence of cooling houses at farms) it is only one moment; right after harvest when the crop is sold. As hazelnut can be stored for a longer period farmers can spread the capital inflow over a longer period. This provides another benefit: the farmers can wait for better prices.

Benefits from agriculture are dependent both on fluctuations in the economy and on climatic fluctuations. These influence output and prices. In the case of the hazelnut crop, there are years with very high total output and years with very low output; having a large influence on the world market prices. The changing prices (because of scarcity or abundance) level the income for farmers (in the case of no market interference by the government). But, as is shown in Table 3, yields vary considerably within one year between regions as well; this mainly creates fluctuating incomes for individual farmers. The largest share of the wage labour market does depend on fluctuations in the economy only. With this, risks of lower capital inflows than expected are diminished.

On the other hand, tree crops also provide security that wage labour does not. In the case of wage labour someone can be fired and have no income anymore. In the case of tree crops, harvests vary a lot between years but the trees will still provide income as long as they are not uprooted.

Another advantage of tree crops as a source of income it that they do not require much attention. This makes them a relatively easy income source, and someone could take care of a large area. The only downturn here is that the trees need attention at the same time (peak seasons), constraining the area a farmer can manage individually.

5.2.2 Comparison of crop characteristics

Vegetables and field crops require time and energy input on different moments in the year. Most of these crops have to be sown every year anew. Tree crops require a big capital and time investment during the initiation period. The trees have to be pruned in the right manner in order to create a strong tree or shrub with high yielding capacity. After these first couple of years, compared to field crops and vegetables, the tree crops require less investment.

In this research, mainly fruit and nut crops are closer compared. The reason for this is that it is assumed that these crops could be most easily grown by absent farmers due to the little investment required during the year in order to be able to harvest. Hazelnut is compared with apple, kiwi, and peach on the points of agricultural practices, investments required, marketing channels and vulnerability to conditions in the research area.

Irrigation

Crops have different water requirements. For peach and hazelnut irrigation can provide higher yields, but it is not a requirement. Many farmers do not have an irrigation system on their orchards. In comparison, apple and kiwi orchards (almost) always have an irrigation system; most often sprinklers. A common issue in the area is that of ‘rotting’ roots when kiwi orchards are placed on

completely flat and low areas. For kiwi it is therefore optimal to be on sloped area where water can leave if too much and where it can be added by irrigation when needed; in other words in places where water supply can be regulated. This means that a considerable investment is required; though turning on the sprinkler system is an easy activity it requires regular physical presence.

As can be seen in Table 11, from the eight kiwi farmers interviewed, two do not irrigate their orchards. Six farmers do irrigate their orchards, with two different systems. Farmers 7 and 8 irrigated many different days, only for a couple of hours (one or two hours). This system was also found with the apple producers. Farmers 1,2,3 and 4 only irrigated a couple of days, but left their irrigation system running for many hours; up to a full day. As farmer 2 has an extreme outcome, the average is calculated with this data included and without.

Table 11: Irrigation of kiwi crop (outcomes questionnaire)

Farmer	1	2	3	4	5	6	7	8	**Average**	**Average (excl. 2)**
# hours total	156	840	180	0	240	0	30	100	257,67	141,2

Most apple and kiwi farmers make use of drip irrigation or sprinklers. The costs of these irrigation systems are (approximately) as follows. Construction of the system costs between 750 and 1.000 TL per decare, these are fixed costs. The price of the pumps used by respondents varies between 8.000 and 10.000 TL (nonlinear costs), electricity is estimated at 50-60 TL per month (non linear costs).

Pruning

All tree crops require pruning, and mostly in the young years of the trees. In the time allocation questionnaire pruning and sucker control are combined. It can be found that for all crops a considerable time is spend on these activities.

Picture 4: Common growth hazelnut shrubs in Turkey (under correct pruning practices)

As can be seen in Table 12, respondents have said to spend most time on pruning and sucker control of the hazelnut crop. This can probably be explained by the way the hazelnut crop is grown in the area. The crop is grown as shrubs, with several branches all growing from the ground (see Picture 4). In this way, the plant's sucker production stays relatively high during the years.
For all tree crops not only the labour spent on pruning is of relevance, also the quality of the activity performed. For correctly pruning the hazelnut crop it must be know which branches to keep and which to remove. For all crops light should be able to reach the fruits, and only branches growing under certain angles will give good yields.

For example, vertical branches do not give fruits. Knowledge is required to perform the job correctly, mainly in the first years after establishment. In the case of the kiwi crop, the growth of the trees has to be carefully directed and branches have to be pruned correctly. When done correctly, less pruning is needed in later years, explaining the lesser labour hours spent on pruning the crop by respondents.

Table 12: Labour hours spent on pruning and sucker control of different crops (outcomes questionnaire)

Total		Hazelnut	Apple	Kiwi	Peach
Pruning & Sucker control	# hours / decare	9,46	8,51	6,28	8,70

Fertilizing

For all crops (if not produced under biological standards) fertilizers are used. All farmers receive government support for soil requirement analysis. Therefore they precisely know the requirements in their orchards. This highly varies between orchards and also within orchards between years. For this reason conclusion on differences in fertilizing use for the crops are not in the reach of this research.

Susceptibility to disease and weather risks

Some crops are more susceptible to diseases and the weather conditions in the area than other crops. It is very humid area, and it can be very cold as well.

Picture 5: Black spots because of Venturia inaequalis

Apples are susceptible to many diseases in the research area. Many diseases are present of which 'black spots' (karaleke) are most difficult to delete. The black spots disease can be removed by pruning. The molds harm the leaves and the fruits and create quality issues rather than decreased yields.

The most important diseases harming the peach crop in the area weevils and black spots. In the case of a weevil pest is spread the yield loss can be up to 70%. Every year treatment and prevention are needed, and have to be applied 4 times a year (İleri, 18-9-2013).

The most common important weather related risk for kiwi is rotten roots, which has already been introduced under 'irrigation'. Good drainage is required and if trees are injured they have to be removed. The common cockchafer and fungi also harm kiwi, but are of lesser importance. In the research area, the kiwi crop is not susceptible to pests.

Table 13: Labour hours spent on disease control (outcomes questionnaire)

Total		Hazelnut	Apple	Kiwi	Peach
Disease control	# hours / decare	0,36	4,44	0,86	0,49

Because pollination of the hazelnut crops happens much earlier than pollination of other crops the harvests shows far more fluctuations: +/- 50% instead of the 10% changes shown by other crops. Therefore the other crops give much more stable yields and income.

Harvest practices

Harvest practices vary considerably between the crops. Hazelnuts are harvested all in once, in August – September. It is the only crop in the area which is harvested with the help of workers coming from other areas in Turkey or from other countries. Hazelnuts are smaller than most crops when they have

to be harvested and are wrapped by a green husk or they lay on the ground. For this reason, it takes longer to harvest them; workers often have to search for them in order not to miss some.

Therefore other crops can be harvested faster though they are often bigger and yield is much higher when measured in kilos. Kiwis are easiest to harvest, as they can be picked when they are unripe and hard. Therefore they can be harvested all in once (UCSFP, 1990), (Himelrick & Powell, 1998). The crop is handpicked in October or early November. The harvest of apples and peaches are spread over multiple times in the research area. Both crops have to be handles carefully and harvested at the right moment in order to assure quality and maximum storage life (NCAES, Boyette, Wilson, & Estes), (Taylor & Rushing). This makes it an activity which has to be performed professionally.

Table 14: Labour requirements for harvest for different crops

Harvest labour requirements	Hazelnut	Apple	Kiwi	Peach
# hours / decare	30.64	23.60	11.32	25.57

Constructions

Both the apple and kiwi crop are grown with the help of supportive constructions. According to Mr. (Öztürk, 16-9-2013), the costs of establishing an apple orchard are approximately 4.000 TL per decare, with 240-300 trees planted (leaving 70 cm between the trees in a line). Included are then saplings, stakes, wire and payments to workers. The costs of the constructions for the kiwi crop are comparable.

Marketing Channels

Marketing channels are not perfect for the farmers in the research area. Much of the trade is managed by traders. Also farmers have to sell their fruits directly after harvest, when prices are low. In Table 15 the marketing channels for the different crops as estimated by a local government official are provided. As can be seen, the largest share of the marketing is managed by traders. Peach is the big exception, this crop is mostly traded in the (government) trading hall. There are little marketing options and the crop is produced for domestic consumption (Mr. (İleri, 18-9-2013)). This place, after payment of taxes, works as a spot market where buyers and sellers find each other. Farmers receive a good price here (relative to quality), but also have the risk that the harvest is not sold. The supermarkets require the highest quality, but are the most secure selling channel and they come to pick up the harvest. The lowest quality peaches are sold to factories and are turned into fruit juice.

Table 15: Marketing channels for crops in research area. Based on estimation on by local government official

	Hazelnut	Peach	Kiwi	Apple
Trader	80%	-	90%	80%
Stock market	20%	-	-	-
Trading Hall	-	80%	-	New
Supermarket (local)	-	10%	10%	10%
Factory	- (small share)	10% (fruit juice)	-	-
Local market	-	-	-	10%

Eighty percent of the kiwi fruits are shipped to Europe, traders demand high quality. Traders provide good prices and manage transportation from the orchards. Because of the small total production in the area, no large marketing structures are set up as is the case with hazelnut. This reason also holds for the apple crop.

Apple is a relatively new crop in the region, and the quality of the harvest has to be improved still. Currently, only ten percent of the apples produced in region are shipped to Europe, the rest is consumed domestically (because of low quality). Most apples are bought by domestic supermarket chains. Another reason is that the area is no established apple production area (yet); other areas in Turkey are widely known for their apples. Most apples are bought by traders, the ones having least quality are sold at local markets where prices are low. According to Mr. (Öztürk), farmers benefit from if they have Good Agricultural Practices (GAP) certification. He stresses that there are no extra costs involved, as the government bears the costs of the audits. In the meantime it is a benefit in marketing, as farmers receive higher prices. Where the price of apples without GAP vary between 0,80-1,00 TL per kg, the price with GAP varies between 1,00-1,20 TL per kg. If farmers can wait with selling for some months the prices can double (Öztürk, 16-9-2013).

In comparison with the other crops the marketing channels of the hazelnut crop are best developed. For hazelnut a large manufacturing system set up; factories, several marketing channels. The reason for the little marketing possibilities put forward for peach, apple and kiwi is that there are no cold storage opportunities. Therefore the farmers' selling options are low; they have to sell their harvest right after harvest. This makes them dependent of the buyers and low prices, there is no room for price speculation by keeping the crop. Currently government supports farmers who want to build (cooled) storage by bearing 50% of the establishment costs[xxxi]. But, as Mr. (Öztürk) puts forward farmers are then still not able to bear the costs of the investment. According to Mr. (Öztürk), the costs for establishing a cooling center are approximately 1.300 TL for storing approximately 1 ton. Costs are nonlinear; storing 20 tons would costs about 35.000 TL, and 50 tons 65.000 TL.

The crops also show different characteristics related to storage. Hazelnuts can be stored for two to three years, when kept under the right conditions. The nuts have to be stored dry and when they are free from molds. Apples can be stored between 1 and 12 months (NCAES et al.), kiwi between 4 and 6 months ((UCSFP, 1990), (Himelrick & Powell, 1998)), and peach only for two weeks (Taylor & Rushing), 2014). Cold storage can be used with apple and kiwi to wait for better prices, it can be used for the peach crop in order to keep the stock in optimal condition right after harvest[xxxii].

Concluding comparison of crops

Table 16 provides an overview of the labour requirements of the crops as found in the research area. Some interesting observations can be made. The first one is looking at the total labour used (including harvest), the hazelnut crops seems to require most labour, instead of least. This raises the question how the hazelnut crop can be seen as an extensive crop. The most probable answer to this question is that because of the time that this research was performed; only resident farmers were interviewed. These farmers can spend more time in their orchards. It is expected that the absentee farmers spend considerably less time in their orchards. The high total is mainly based on the harvest, which requires considerable labour hours for the hazelnut crop. As can be seen, for the further activities hazelnut is second when it comes to required labour. This can mainly be explained by the labour required for pruning and sucker control, of which reasons have been discussed.

Table 16: Total labour requirements for different crops (outcomes questionnaire)

Total		Hazelnut	Apple	Kiwi	Peach
Pruning & Sucker control	# hours / decare	9,46	8,51	6,28	8,70
Weed control	# hours / decare	1,57	3,13	2,27	0,42
Soil management	# hours / decare	1,77	1,07	2,13	0,40
Disease control	# hours / decare	0,36	4,44	0,86	0,49
Post-Harvest Activities	# hours / decare	1,07	2,50	0,24	0,36
Total (excluding harvest)	**# hours / decare**	**14,24**	**19,64**	**11,77**	**10,36**
Harvest	# hours / decare	30,64	23,60	11,32	25,57
Total (including harvest)	**# hours / decare**	**44,88**	**43,24**	**23,09**	**35,93**
Total	**# days/ decare**	**5,61**	**5,41**	**2,89**	**4,49**
		n=28	n=4	n=8	n=9

Table 17: Average prices, production estimates over 2007-2013, and profit levels (Source: Prices from governmental website TUİK, Hazelnut yields (MOAS, 2013), kiwi and peach yields are estimates by respondents, apple: EU Fruit Juice Platform (2013)[xxxiii].

Crop	Price	Yield	Income	Profits (costs 40%)	Profits (costs 60%)	Profits (costs 80%)
	TL/kg	Kg/da	TL/da	TL/da	TL/da	TL/da
Apple	1,15	1.746	2007,90	1204,74	803,16	401,58
Hazelnut	4,69	108	504,64	302,78	201,86	100,93
Kiwi	2,53	1.500	3795,00	2277,00	1518,00	759,00
Peach	1,66	1.700	2822,00	1693,20	1128,80	564,40

Table 17 shows the calculation of income and profits per decare for the compared crops. Prices are based on official data. Hazelnut yields are also based on official data, kiwi and peach yields are based on estimations of experts. Averages are used; the estimated peach yield was for example between 1.600-1.800 kg per decare. As the estimation of the apple yield seemed to be extremely high, data were used of other production regions in Turkey. As the crop is comparably new in the Black Sea region the lower boundary was selected here. Profits are calculated based on three cost percentage options. This is done because trustworthy data on cost levels of different crops were not collected. This does not harm the conclusions for this thesis, as Table 17 shows that even under lower cost levels the profit of hazelnut production is still lower than those of the other crops. Therefore an overall comparison of crops is provided in Table 18 in order to understand why farmers do not invest in the other crops.

As can be found in Table 18, production of the hazelnut crops seems to be of least interest to farmers when considering the required labour hours found and the profits received. The specialties of the different crops explain to some extent why farmers still decide to grow hazelnuts. The factors described in Table 5 – labour intensity and moment specificity. What makes the hazelnut crop interesting for (absentee) farmers is that pruning (if any) can be performed right after harvest and that during the rest of the year applying inputs are advantageous but not required. The harvest period coincides with the holiday period in Turkey. This is not the case for the kiwi crop, which has to

be harvested approximately 3 months later; in November or December. Though the kiwi crop does not require much labour input, the input is spread over the year, as for example attention is also required during winter. This also holds for the apple crop, which is very susceptible to diseases. This requires considerable inputs during the year, disease control for example has to be applied on several moments in the spring and summer period. But maybe the largest reason expected is that the farmers are not able to bear the considerable investment of starting a new orchard (this is further discussed in Chapter 6). This can be attributed to three main reasons, which will varyingly apply to different farmers: (1) the investment requires a large financial investment, (2) labour requirements can be too intensive for older farmers, (3) the establishment of new orchards with new crops requires considerable knowledge; seen the fact that peach crop is only produced in one village.

Table 18: Summary of comparison of crops

	Labour	**Profits (40% costs)**	**Specialties**
	# days/decare	TL/ decare	
Apple	5,41	1204,74	Constructions required, most difficult to grow in area. Several harvesting moments required.
Hazelnut	5,61	302,78	Most common tree crop found. Extensive production possible. Most developed marketing channel(s). Requires much labour for harvest.
Kiwi	2,89	2277,00	Kiwi requires attention in the winter, constructions, easy (little diseases) and profitable crop if knowledge is available. Easy harvest, but in November-December.
Peach	4,49	1693,20	Takes six years to first harvest, several harvesting moments & knowledge of harvesting practices required. Produced in one village only.

5.2.3 Selling land

Next to growing other crops, farmers can also decide to sell their land. This can be seen as an one-time investment; it provides a considerable money inflow, but just one time. Prices vary considerably in the area. Near the towns and main roads prices vary between 100-300 TL/m^2, at the coast around 80 TL/m^2, while in the small villages prices vary between 6-60 TL/m^2 (depending on the quality of the land and the facilities present)[xxxiv]. North of the main road crossing Çarşamba and Terme it is maximally 20 kilometres to the coast.

As previously introduced, the decision to sell the land or not is not only based on money-terms. Farmers stay emotionally connected to the land, for example because it has been owned by the family for a long time. This argument has been mentioned often in the Turkish case.

After selling the land the farmer is immediately free to use the received money for other purposes. Not all other income options offer immediate income though. Starting with another activity requires an investment. Because this is of considerable importance for the decision to start with new income creating activities the next subchapter explains the content of the investment.

Chapter 6 Relationship between absenteeism and hazelnut policies

Chapter six discusses how absenteeism impacts the effectiveness of agricultural policies and is based on the framework established in previous chapters. Subchapter 6.1 answers the main question of this chapter for hazelnut oriented policies. As the policies (are meant to) influence productivity and total output, the influence of absenteeism on these factors is discussed here as well. In subchapter 6.2 agricultural policies for other crops are discussed. 6.3 is the final subchapter and includes possibilities of additions to the current policies.

6.1 Current policies

This subchapter focuses on the question how absenteeism influence uptake of policies. The policies are discussed one by one. In order to understand the influence of absenteeism on uptake of policies, first the targets of the policy (productivity & output related) and the influence of the policy on the absentee farmers have to be understood. Then, the main question of this chapter can be answered; how is the uptake of the policy influenced by absenteeism?

Area Based Direct Income Support

As has been discussed before, with the start of the ARIP program direct income support was introduced. Instead of price and thus output based support, direct income support was based on the size of the hazelnut orchard (area based). Though the payment is meant to improve the quality of hazelnuts, there were and are no rules about the destination of the money (Kayalak & Özçelik, 2012):44). This means that farmers can decide to invest the money in the orchard or use it for other purposes. The payment is sent to (the bank account) of farmers who have a license for hazelnut production. After application, farmers can get a license if their orchards are located in the 1st Standard Region. For the last years, the level of the support has been as follows in Table 19:

Table 19: Direct Income Payment Levels (MOAS, 2013b); (Resmi-gazete-28557, 2013)

Year	2009-2012	2013	2014
Payment (TL/da/year)	150	160	170

Two observations can be made related to the policy:

- Interviews with the government have shown that it is unclear how long this policy is continued and what the level of the future payments will be. During the research in 2013, only the price for 2014 was known by province level government. This brings a level of uncertainty with it for farmers.
- The second understanding is that currently there is no motivation for the government to stimulate productivity of orchards, because there are already excess stocks in the market (Bozoğlu, 2013). If the government would really have the intention to increase productivity, they would include rules to this policy; such as that the support can only be spent on hiring labour or buying farm inputs. The fact that this is not done shows that increasing productivity is no priority of the government.

The policy influences absentee farmers basically by providing additional income. Each year after registration they receive the payment. As can be understood from Figure 9, in many years the

support is a considerable part of hazelnut income. In the most extreme case the income received from the support (150 TL) is almost equal to the income from selling the nuts (225 TL). Comparing to the average income (see orange line), in the last years the support was equal to one fourth of the income from selling the nuts. Therefore this payment makes keeping the hazelnut orchards more attractive, as it is not linked to obligations the orchards provide 'free capital'. Because residence is not required, the policy does not influence resident and absentee farmers differently.

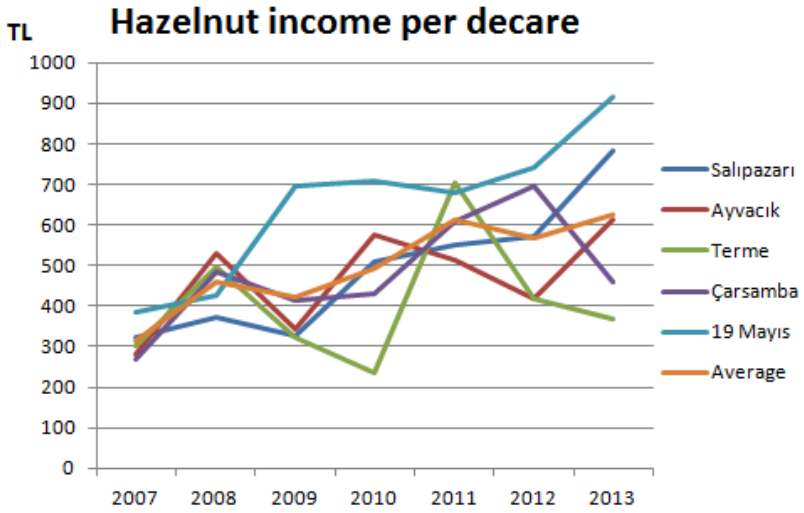


Figure 9: Income per decare (excl. support income) The exact numbers can be found on page 30.

The uptake of the Direct Income Support policy is not influenced much by absenteeism, because both residential and absentee farmers can make use of the policy. Because the capital is offered without obligations or spending rules the question why not make use of it arises. Where absenteeism does not influence the uptake of the policy, it does influence its outcomes. The support can be used to improve the quality of the hazelnuts. This outcome is only reached if the farmer spends the amount on inputs for the orchard. Here absenteeism does influence the policy; the outcomes could be much higher if all absentee farmers who spend the payment on farm inputs, for example by hiring labour or buying fertilizers. This is the difficulty of this payment; it can be used as direct income (as the name suggests), or to invest in an activity with future income as outcome. The future income requires performing activities and is currently uncertain because of the combination of the weather conditions and the new no-intervention policy, which will be discussed later. Concluding, due to absenteeism, the influence of the policy on productivity is probably lower than could have been the case.

Restrictions on Planted Area & Compensation Payments for Alternative Crops (uprooting policy)

As discussed in Chapter 1, this policy was introduced due to the undesired increase of hazelnut plantages in the 2nd Standard Region, particularly in the fertile coastal lowlands. The target was twofold; (1) control excess stocks, and (2) to create hazelnut sales revenues based on world market demand instead of on government subsidies (Lundell et al., 2004). Payments to farmers in illegal areas for uprooting existing hazelnut trees and switching to alternative crops was added (Lundell et al., 2004), (GAIN, 2009):8). Despite this regulation and compensation payments, hazelnut production continued in forbidden areas (Yavuz et al., 2003):2, (Secer, 2008):1557). "This policy inevitably

involves short term income losses to producers but should bring increased returns to producers in the medium term once annual output is reduced by 100,000 tons. At the same time, it will save the national budget $150-200 million annually" (Lundell et al., 2004):51).

This policy is in place for all current hazelnut production regions; dividing them in areas where production *is* and *is not* licensed (the 1st and 2nd Standard Region, respectively). The target of the policy was to uproot 167,646 ha of unlicensed orchards. New orchards could only be established with official government permission (Lundell et al., 2004), (Gönenç et al., 2006). The government does not fine farmers who do not uproot their orchards or who start with new orchards outside the licensed areas, they purely *suggest* farmers to uproot their orchards. After 2009-2012 the policy has been extended to 2012-15 because of low uptake at first time. Levels can be found in Table 20. In the first year after establishment farmers who have started with fruit crops also receive 350 TL/decare.

Year farmer started		'09-'10	'10-'11	'11-'12	'12-'13	'13-'14	'14-'15
Payment (TL/da/year)	First year	300	300	300	300	300	300
	Second year	150	150	-	150	150	-
	Third year	150	-	-	150	-	-
	Total	600	450	300	600	450	300

Table 20: Level of Compensation Payment (Resmi-gazete-28557, 2013)

The policy is relevant for the flat lowlands of the Çarşamba plains in Samsun province. In 2012 there were 4.911 licensed hectares and 20.139 unlicensed hectares in the Çarşamba district, totalling 25.050 hectares of hazelnut orchards (MOAS, 2013b). Çarşamba (mainly) and Terme being the only areas in Samsun province with considerable lowland area, the percentage of unlicensed area is considerably high here as well. As can be seen in Table 21, 2.239 decares (=224 hectares) of hazelnut orchards have been uprooted in the area, a small number compared to the total area with unlicensed production. In Terme a comparable area is uprooted. The Çarşamba plain has suitable conditions for growing a wide variety of crops. Other crops which are currently found in the region are corn, maize, wheat, rice, vegetables, peaches, apple, kiwi, and timber production (poplar). Small numbers of dairy cows and water buffalo are kept, mainly for family consumption (Kılıç, Avni Cinemre, Ceyhan, & Bozoğlu, 2006):88). The sentiment about the poplar production is the same as about hazelnut production; the quality land could better be used for more productive crops. No data on poplar production in the area were found.

Table 21: Farmers supported with uprooting payment, 2011 Samsun province (MOAS, 2013b)

	Number of farmers	**Decares**	**Decare / farmer**
Çarşamba	196	2.239	11,4
Terme	166	2.409	14,5
Total Samsun Province	**362**	**4.648**	**12,8**

This policy does not focus on increasing productivity of hazelnut orchards, rather it works as an incentive for hazelnut farmers to stop using their land for the production of hazelnuts and instead to produce other crops (this means to diminish the total output of the country). It targets farmers in different areas than the direct income support; namely in the unlicensed hazelnut production areas. Therefore the policies cannot compete in one orchard. On the longer term the policy can increase

productivity as well, if a considerable number of farmers uproot (part of) their orchards and demand decreases less strong (or stays equal or improves). This can improve hazelnut prices and thereby work as an incentive to increase productivity. As there is oversupply in the current hazelnut sector, this will only happen after considerable time.

When making use of this policy farmers receive a payment for maximally three years, depending on their starting year. This coincides with the period that it takes before the new crops -in case of apple and kiwi- provide the first yields after establishment. Therefore it covers "the large opportunity cost of land lying with no output for three years until the trees bear fruit" (Hill, 2010):1067), which is also included in the unit costs of investment. The support does not completely compensating the losses if compared to Figure 9, but as the policy is most attractive for old orchards with low current and future yields the support lies closer to the income as when expected based on this figure. But this missed income is not the only cost as the new orchard also has to be established. The government supports the farmers by contributing 50% of the investment. But many respondents, among which government officials, have mentioned that the support payment is not sufficient and that it is difficult for many farmers to collect the rest of the required capital.

For the analysis of this model only the Hill model is required. As was shown in Chapter 5, some new crops require a considerable investment for establishment (apple, kiwi). The constructions (for kiwi and apple) and labour input required for all crops make the investments are done in the presence of fixed costs and irreversibility. As all trees in the orchard require the same constructions and labour input, the costs do not decrease when the number of decares planted increases. These costs are definitely fixed costs, as the level and quality of production is considerably different without the constructions. In the case of cold storage, nonlinear costs are present. The costs of establishments become relatively lower when their carrying capacity increases. These costs are not fixed because cold storage facilities do not have to be present before or while the orchards are established. It is no requirement but 'only' offers benefits; as farmers can keep their harvest and sell it when prices are beneficial for them, instead of only directly after harvest. Therefore only a model including fixed costs is used in order to understand what is *required* for *starting* a new crop. The peach crop does not require constructions, and thus the fixed costs of establishment are lower. The missed income is also categorized as fixed costs.

Figure 10 shows three different options; in area one the farmers are able to carry out the investment and uproot and invest in new crops. In area 2 the farmers are not able and willing to do the investment because of the presence of fixed costs in the situation or irreversibility and risks as is found the research area. The aspect risk is discussed in under the next policy (referred to as the no-intervention policy). In area 3 additional investments are made in hazelnut orchards. This area is expected not to be relevant here. The uprooting policy is intended to shift farmers from area 2 to area 1 in the Figure, mostly by covering the issues to irreversibility of the investment and lesser by covering the risks faced with the new crops (such as the marketing issues).

For the investment of starting a new crop two resources are required; the resources capital and labour. The resource land is of lesser importance. Compensation payments improve the ability for farmers who have liquidity constraints to start with a new crop. The policy intends to influence the (absentee) farmers by making the investment of making a switch to another crop easier. This is done

either by compensation of the lost income or by facilitating capital for the investment. However, it does not support the absent farmers with what is most difficult for them to manage; labour and monitoring. Therefore the policy is more suitable for resident farmers than for absentee farmers.

This makes the answer how absenteeism influences uptake seemingly obvious. Pure the absent-aspect makes that uptake is lower; difficult to spend time. Also for absentee it is more difficult to handle risks; risks and issues increase with new crops, and from a distance lesser up-to-date information is available, so the farmers are less informed about what is required at a particular moment. The policy does not support farmers in these aspects of making the investment.

Effect of capital change on orchard constructions

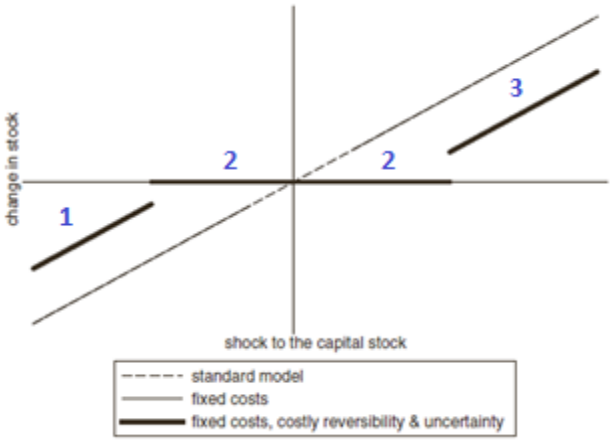


Figure 10: Investment in the presence of fixed costs – influence of shocks to the capital stock (Hill, 2010):1071)

But, when looking at additional characteristics of absentee farmers, the picture can be different. Many respondents have noticed that the amount offered by the payment is too low. Absentee can have less liquidity constraints because of additional sources of income; income can be enough to cover fixed costs of starting orchard. While resident farmers may have more difficulties getting input requirements together absentee can be better able to do so. Therefore it is concluded that the intended outcome (uprooting) can be easier for absentee farmers to be met on the point of capital requirements, but this is not because of the way the policy is set up.

Concluding, the impact of absenteeism on the effectiveness of the policy can be twofold. The first option is that due to labour (and monitoring) constraints which are not covered in the policy the uptake is diminished. The second option is that because the absentee farmers face less capital constraints they are better able to bear the investment of uprooting and starting a new crop. The long term intended effect is that the Turkish hazelnut sector has less output. After enough farmers have uprooted their orchards there can be room for increased productivity but this is not the intention of the policy.

No-intervention policy

Though not a real 'policy' when compared to the previous two, in this text the last trend in government supports is referred to as the no-intervention policy. The last policy introduced was that the government (TMO) stopped with buying excess hazelnuts in years with high output. TMO has bought the last hazelnut stock in 2008. According to Mr. Bozoğlu (2013), since the policy is in place no excess production has taken place anymore (outputs can be compared in Figure 1). Therefore, the policy has not been tested yet. Due to the historically high government involvement it is not possible to estimate what will happen when the sector faces oversupply and there is pressure on the government to buy the nuts; will the government stick to its current policy of no intervention, or will it return to old policies and help the farmers? During interviews with government employees it became clear that local government employees did not know the answer to this question either.

The no-intervention policy influences the market in such a way that prices are not regulated anymore by the government and can show more (downward) fluctuations. What this policy basically does is influencing the risk levels the farmers face. Where the government previously helped the farmers when not able to sell their nuts or would receive very low prices, currently this is not done anymore. This means that farmers have to base their decisions more on the (price) trends in the market and stocks due to oversupply as these become an issue of the farmers instead of for the government.

The adjusted Barnum-Squire model is used to explain the changes in labour patterns within the current activities. When analysing the influence of the no intervention policy on the productivity of the hazelnut crop, we have to consider the reactions, the changes in labour patterns. The production function is measured in output Income (Y), this means the price is integrated. The ww' line stays the same. Due to the policy and increased potential of fluctuations it is more difficult to estimate in advance what the production function will look like. A year in advance the male flowers can be counted to estimate the next years' crop, but weather conditions in spring then determine if they are destroyed or not. This means that the understanding of output always comes after estimation of the future stock. Therefore an activity which was estimated to have (take as an example) the ETTP2 can finally appear to only have ETTP1 as an outcome. The support prices did not level overall prices (high and low ones), but only increased the prices in years when they were low; by setting a minimum and not a maximum price. Therefore there is no upward benefit of the no-intervention policy for activities which influence yields. Therefore productivity related activities will stay equally interesting or become less interesting. Other activities can become more interesting, though. Namely, secure marketing channels become more important. The production functions of activities which improve the relationship with the buyers, professionalism or the quality of the products can shift upwards.

To return to the production side, the crop will be produced even more extensively. If farmers are unable to react by investment in other income activities, only productivity decreases when prices stay low. On country level this will produce much underproductive land, after which the prices will become better again because of the lesser nuts in the market. Those farmers who are able can benefit by increasing their productivity again. This will most probably be the resident farmers who have fewer constraints to adjust their activity performance.

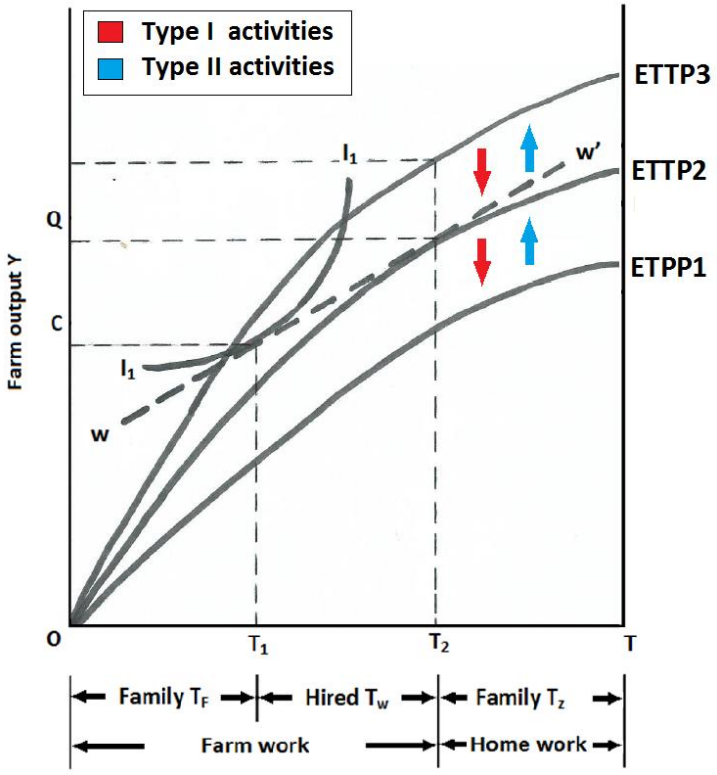
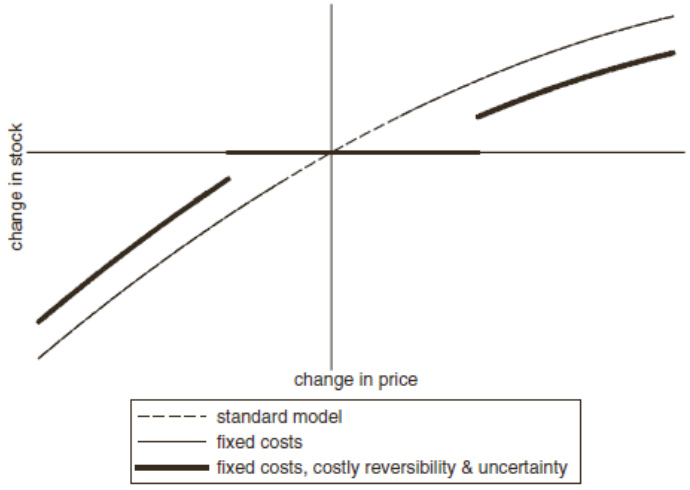


Figure 11: Relationship no-intervention policy and activity performance. Type I activities are productivity related activities, Type II activities are marketing activities. Source: based on Figure 5 with adjustments by author.

The Hill model is used to explain what will theoretically happen if farmers can react and fits the comparison well. Uncertainty is introduced by the policy. What the graph first shows is that in presence of uncertainty, only after some time a reaction follows. This is indicated by the thick black line which stays on the horizontal axis. Though in the case of the no-intervention policy it is not expected to occur on short term, what the model shows is that the reaction to positive price changes is a logarithmic function; the reaction to price changes becomes less strong. Interestingly the motivation to abandon because of negative price changes grows exponentially and thus becomes larger if negative price changes are larger[xxxv].

Figure 12: Investment in the presence of fixed costs – influence of price changes (Hill, 2010:1071)



So far nothing is said of the influence of the policy on absentee farmers. As for resident farmers, the policy makes that their income is less secured on the short term. For absentee farmers the shifts in Type I and Type II activities can be beneficial. For most Type II activities, of which the production function is expected to shift upwards, no physical presence in the orchard is required. Deals can be made by telephone and family can help with making the deal and managing the product transfer, but it brings additional management costs. For absentee farmers it can be very problematic though if they are not able to sell their stock; they are not present in the production area and thus close to their stock. As data presented in Table 22 show, prices are low right after harvest. Concluding, this policy makes the crop better manageable but at the same time less financially profitable to absentee farmers.

	Average yield (kg/decare)	Average price marketing year (TL/kg)	Average price after harvest (TL/kg)	Difference (TL/kg)
2007	77,4	4,08	3,98	-0,10
2008	143,2	3,23	2,96	-0,27
2009	96,6	4,31	3,88	-0,44
2010	115,4	4,27	4,14	-0,13
2011	95,4	6,34	5,63	-0,71
2012	122,6	4,57	4,10	-0,47
Averages	**108,43**	**4,47**	**4,11**	**-0,35**

Table 22: Yield & price averages. Averages are based on the years 2007-2012. As marketing year the period from August to July is taken. The first two months after harvest are therefore August and September.

At this moment, the option to delay is also of influence in this situation. Farmers do not know yet whether government will really not step in the market again when serious oversupply occurs. Therefore it can make use of their option to delay. Once the government really has shown that they do not help the option to delay becomes less attractive if prices in hazelnut sector are low and other crops become more attractive.

Concluding, the no intervention policy affects all farmers. The policy makes farmers susceptible to trends in the market. The question here is thus how absentee farmers will react to that. The adjusted Barnum Squire is used to reflect on this question. Production functions are income based. Therefore the function ends up lower, mainly in years with low outputs. Then even more activities will shift below or closer to the ww' line. Therefore the most probable outcome is that farmers start to use even more extensive, until the point that the abandonment line of the Hill model is touched and orchards are not interesting anymore. Then farmers have two options; let the land lie fallow or give the land another purpose by growing other crops or selling it completely. The effect on productivity will be that productivity will decrease on the short term. Investment in other crops will only follow as farmers are able to bear the costs. Total output of the sector is expected to decrease.

6.2 Additional Supports

Most of the additional supports are in place for all crops, therefore they do not function as additional benefits for the hazelnut crop or for other crops. For arable crops price support is also present. The levels can be found in Appendix F. There is no price or direct income support present for fruit crops. Further, several farming methods are supported;

- Farmers who start with the production of fruit crops one time receive 350 TL/decare.
- The government has an environmental programme (ÇATAK); if farmers apply eco-friendly farming techniques they receive 30 to 135 TL per decare, depending on the adopted techniques (MOA, 2014).
- Organic agriculture is supported with 50 TL per decare for fruits and vegetables and with 10 TL per decare for arable crops (MOA, 2014).
- The use of Good Agricultural Practices is supported with area based support as well. The support is 25 TL/decare for fruits and vegetables (MOA, 2014).
- Oil, fertilizer and soil analysis are supported with 4.30, 5.50 and 0.25 TL per decare respectively for arable crops, fruits and vegetables (MOA, 2014).
- The use of certified materials are not subject to a percentage of market tax (1% for those sold in wholesale market and 2% for others) (EU-Fruit-Juice-CSR-Platform, 2013).

6.3 Potential new policies

If the government wants more farmers to uproot their hazelnut orchards, policies have to be developed which fit the needs and constraints of the hazelnut farmers. As has been shown, because of liquidity constraints the investment costs are a large constraint for farmers in the research area to change their crops. Farmers do not have the financial resources to cover investment, even when government bears half of the costs (which is current policy). The investment can be made by institutions which do have the money available, such as the government, banks, or larger companies involved in the supply chain. The repayment can be managed from the additional benefits earned by the farmers, for example because they can benefit of higher prices. Overcoming banks' collateral constraints can be done by guarantees of the government or by repayment schemes based on the additional profits made because of the investment. An option for this is warehouse receipt financing. The produced stock works as collateral for the bank as it is controlled by an independent third party (not by the farmer), for example because it is held in a public warehouse (AgriFin, 2013). Companies in the supply chain could also bear the costs of investment and manage repayment with increased

profits created by the investment. By managing the harvest (for example) they can make sure the farmer does not sell it to other parties, thereby securing the repayment of the loan.

Though this might provide solutions to many farmers, the option that absentee farmers face liquidity constraints to a lesser extent than resident farmers has been introduced. Therefore, these options might not solve their main constraint; managing the labour input. The establishment of a new orchard requires considerable labour input, the same counts for the first years after establishment. Therefore here potential new policies are addressed which focus on combining resources and constraints of different parties in order to make use of both' strengths. This is done because of the understanding that absentee and resident farmers or other parties in the supply chain are probably not equally constrained in their resources. Two options for cooperation are introduced here.

The first one is the possibility of farmers making use of each other's strengths. A common example of this is sharecropping; where farmers produce on the land of others and the output is shared. In this case land-constrained and labour-constrained farmers join their forces. In the research area cooperation between labour constrained and capital constrained farmers could be promoted. For example, resident farmers can receive a share of the output in exchange of labour input in the orchards of absentee farmers when the last group is absent. Another option could be hiring a farm manager by a group of absentee and resident farmers, so that income can be competitive with market wages and metering (quality control) can be performed.

The second option is the potential of cooperation between farmers and companies in the supply chain. Relationship and collaborations in the supply chain can adjust based on the requirements and endowments of parties in the chain. For example, factories could manage labour inputs on the orchards in return for (a share of) the increased profits. An option would be to let factory employees prune in the orchards when the activity-levels in the factories are low. Also managing labour during the harvest would secure that the nuts are not sold to other parties.

Chapter 7 Discussion

This thesis has two main findings. (1) The current uprooting policy does not cover the constraints of investment of absentee farmers, and that therefore the influence of absenteeism on the effectiveness is high. (2) Because of current excess production in the sector the government currently has no motivation to stimulate productivity of agricultural lands.

The outcomes of this research provides us increased understanding about the importance of how policies are structured for their effectiveness. Certain questions have to be answered in order to understand the effectiveness for different farmer types. Does the policy offer farmers what they require? Do they fit the situation and trends in the sector? Are there constraints which make it impossible for farmers to make use of the policy? Policies have to be created focused on their intended outcome *and* focused on the characteristics of the farmers. The outcomes have also underlined the importance of creating good combinations of policies instead of policies that give different incentives.

The methodology used is suboptimal, because the topic of this research was changed after return from the research area. Thus, data was not collected directed to answering the research question. Therefore, the conclusions are based on theories and models and are not proven in the research area. Recommendation for a next study is to take this research as starting point and test conclusions.

In the research area, data was collected by semi-structured interviews with experts (government officials, extension officers and university employees) and by structured - interviews with farmers. Collecting information from experts is beneficial for the research as they have more overview on trends rather than individual cases. I argue here that for data collection among farmers about costs, prices, time spending et cetera, the methodology used for this research is suboptimal. Only having one interview with a farmers and doing the research only in one period is not enough; answers cannot be checked and quality of data cannot be guaranteed. Though more costly, a better system is to research farmers in an area more structurally; so in a long term research where farmer and researcher together document their information right after performance during a longer period (1-2 years minimum). This diminishes the estimation error.

The recommendation for research is to study the possibility of cooperation between parties in an (agricultural) sector, in order to make use of the resources and strengths present and cover the constraints. The potential of cooperation between capital constrained and labour constrained farmers or cooperation between farmers and companies in the supply chain are interesting options.

Further recommendation

Collection of agricultural economic data requires considerable background knowledge of agronomy, as agricultural outputs depend on many factors. The focus of the current research on the resource labour and to a lesser extent farm decisions is possible to research. But studying inputs-output relationships requires an agricultural economics or agronomy background. Therefore I would like to recommend that such research is not performed by future development economics students.

Chapter 8 Conclusions

Based on analysis of data by using economic behaviour models and by studying trends in the market the following is concluded;

- Because of the irreversibility and fixed costs of investment related to tree crops farmers are less reactive to trends in the market than farmers producing arable crops.
- Based on financial data and labour inputs, other fruit crops (than hazelnut) were found to be more profitable and time spending was found to be comparable. Several aspects were found which can explain why many farmers still prefer to grow hazelnuts. The marketing channel of the hazelnut crop is found to be most developed in the research area. The fruit crops require cold storage, which is little present in the area. It was found that the fruit crops require activities performed more spread in the year. This makes performing the activities more difficult for absentee farmers. The apple crop is most susceptible to diseases in the area. As is discussed in the following conclusions, the farmers can be unable to bear the investment of starting a new crop. The last point put forward is the knowledge which is required for the establishment and maintenance of the fruit crops.
- Absenteeism has no influence on the uptake of the Direct Income Support. Productivity increases can be lower because absentee farmers face labour constraints for applying inputs which could have been bought with the money of the support.
- The uprooting policy is intended to make farmers uproot their hazelnut orchards in areas which also suit other crops and to diminish excess hazelnut stocks.
    - Based on analysis of economic behaviour models it is concluded that current uprooting policy does not cover the constraints of absentee- and resident farmers.
    - Resident farmers mostly face liquidity constraints. The uprooting policy does address liquidity constraints, but the level of support does not meet the requirements.
    - On the other hand, absentee farmers are expected to face less liquidity constraints of investment because of additional non-farm income sources. This would mean they are better able to bear the investment. But these farmers mostly face labour and monitoring constraints, which are not covered in the uprooting policy. Therefore the influence of absenteeism on the effectiveness of the policy is concluded to be high.
    - The effectiveness of the policy might be increased after covering the constraints faced by (absentee) farmers. Therefore, new ways of cooperation in the sector are proposed.
- Currently the government does not intervene in the market (anymore) by setting support prices and buying excess stocks. In this situation farmers are more susceptible to downward price changes and marketing risks. The attractiveness of performance of activities can change as a reaction to trends in the sector and wider economy.
    - In case of lower prices and increased marketing risks it is found that farmers use less labour inputs for productivity improving activities, and more labour inputs for marketing activities. Thereafter two options are found to be possible. If farmers are unable to invest, only productivity decreases. If farmers are able to invest, first productivity decreases until the point is reached that investment in other crops is more interesting to the farmer. Then (s)he will uproot and invest in another crop.

    - Due to the option to delay, absenteeism influences the effectiveness of the policy by making farmers to react on trends less fast. Growing hazelnuts becomes less competitive to other crops. Farmers are expected to respond by investing later, because of the influence of absenteeism on performance of farm activities (the reasons are the shadow price of performing farm activities because of other income sources and labour constraint of investment).
- For countries with a monopoly position as Turkey in the hazelnut sector excess production is not beneficial because the amounts produced by the country set prices in the world market. This can balance hazelnut revenues in years with varying production output. If lesser nuts are produced in the whole sector, farmers receive higher prices and vice versa. In the optimal situation production occurs at the smallest area required (under high productivity), so the rest of the area can be used for other crops. Because of current excess production in the sector the government currently has no motivation to stimulate productivity of agricultural lands. Therefore both the absence of productivity stimulation policies and the presence of absentee farmers focusing on other income sources (and their combination) can be important factors explaining the current productivity levels in the Turkish hazelnut sector.
- Excess production in the sector is expected to diminish if the government does not intervene in the market. If the government on top of that enables farmers to invest in other crops not only total production in the Turkish hazelnut sector is expected to diminish, but fertile lands can be used for the production of other crops as well.

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Appendices

Appendix A - Historical policies and trends

In this appendix additional background information on the historical policies and trends is provided.

The sector has a long history of government support, with price support and input subsidies, restrictions on planted area, payments for alternative crops, direct income support, and high border protection (Burrell & Kurzweil, 2007), (Yavuz et al., 2003), (Kayalak & Özçelik, 2012). The 1930s and 1940 are used as a start because in this time interesting trends started. The period was characterized by state control of the economy and public services (Burrell & Kurzweil, 2007):2). In this period several product-oriented Agricultural Sales Co-operatives Unions (ASCUs) were established[xxxvi], among which Fıskobırlık for hazelnut in 1938. According to Burrell & Kurzweil the 1950s saw "a shift towards more liberal domestic and external economic policies, which led to macroeconomic instability and strong stabilization measures" (2007):2). In 1964 the government started with hazelnut support prices and input subsidies for fertilizers and pesticides to encourage hazelnut production and to raise producers' incomes. Fıskobırlık was responsible for hazelnut purchasing of the government (Secer, 2008):1557) and were also instrumental in channelling subsidised inputs to farmers" (Burrell & Kurzweil, 2007):7-8). The level of the support prices was linked to politics (Gönenç et al., 2006):23), as was the case in the State Economic Enterprises (SEE's). "Agricultural SEEs' pricing policies tended to reflect the political cycle. In pre-election periods, increases in selling prices were held below the rate of inflation, catching up only months later. Such practices were one of many factors contributing to their losses" (Burrell & Kurzweil, 2007):7). The big rural population had a considerable vote in Turkish politics.

After the economic crisis of the late 1970s, there was "a switch to export-led growth policies and progressive trade liberalization" (Burrell & Kurzweil, 2007):2). In 1980, the Turkish government undertook a major reform program to open the Turkish economy to international markets. Among others, a Support and Price Stabilisation Fund (DFIF) was being established with a "revenue-raising objective" (Burrell & Kurzweil, 2007):9). During its early years, the liberalization program achieved considerable success in reducing external deficits and restoring economic growth (U.S. Library of Congress). During the 1980s, the agricultural export regulations (including the ones for nuts) were simplified. Finally they were completed in 1995" (Burrell & Kurzweil, 2007):10).

Burrell and Kurzweil described the following period in the later 1980s as being marked by "continuing macroeconomic instability, with two major currency collapses and deep recessions" (2007:2). Heavy support to the agricultural sector started in the latter 1980s (Burrell & Kurzweil, 2007):2). In the 1980's the Government purchased approximately 50% of the total hazelnut production (Secer, 2008):1557) (see Table 23). Afterwards, due to policies real wages significantly improved in the period 1988-1994. Agriculture shared in this trend, and saw its border protection and output subsidies significantly increased" (Burrell & Kurzweil, 2007):2).

In the 1990s policies were introduced for controlling the area planted for hazelnuts (Burrell & Kurzweil, 2007):13), meant to control the accumulation of hazelnut stock. The regulation was enacted in 1995, but due to lack of funds it was not implemented (Yavuz et al., 2003):2). In the wider

economy, deficits increased and exchange rate pressure lasted and ended up in an economic meltdown in 1994, which ended in currency devaluation and a new stabilisation package. In the following period the agricultural sector did not bear the heaviest burden of adjustment, rather government spending in agriculture continued and was even appointed as one of the reasons of the collapse (Burrell & Kurzweil, 2007):3).

Year	Fıskobırlık purchased amount (tons)	Total Production (tons)	Share Fıskobırlık purchase of Total Production
1970	148.196	270.025	54.88 %
1975	251.135	346.500	72.48 %
1980	101.151	250.000	40.46 %
1985	11.921	184.000	6.48 %
1990	129.591	375.000	34.56 %
1995	34.292	435.000	7.88 %
2000	91.648	495.000	18.51 %
2005	50.996	580.000	8.79 %
2006	44.932	780.000	5.76 %
2007	4.572	570.000	0.8 %
2008	5.014	860.000	0.58 %
2009	70	440.000	0.02 %

Table 23: Historical purchase amounts of Fıskobırlık (Kayalak & Özçelik, 2012):44)

In 2000 the current policies got their shape. Due to the financial crises, another program of structural adjustment for the economy was started, in which the agricultural policy reform was important (Burrell & Kurzweil, 2007):3). After pressure of the Worldbank and International Monetary Fund to reduce the government intervention on hazelnut prices (Gönenç et al., 2006):23), in 2000, an agricultural policy reform program was started called 'ARİP' (Agricultured Reform İmplementation Project). "[The] program replaced most government-determined prices and product and input subsidies with non-product-specific direct income support, but without any adjustment of external protection" (Burrell & Kurzweil, 2007):I). Secondly, the government tried to reorganize the HASCU by providing financial independence and administrative autonomy in order to increase efficiency. Purchasing harvest was reduced to 10% of the production in the 2000's (Secer, 2008):1557, (Burrell & Kurzweil, 2007):I). The restriction on hazelnut plantings also returned to the front (GAIN, 2009):8).

Because the support prices were inflexible[xxxvii] and paid out late, many (small) farmers decided to sell their hazelnut to traders for lower (but directly received) market prices (Yavuz et al., 2003):2). Though many farmers marketed their hazelnuts via other channels, the support prices still had considerable influence on the market: "these measures over time undoubtedly distorted regional cropping patterns, supported inefficient production structures and shielded the sector from competitive forces" (Burrell & Kurzweil, 2007):12).

Meanwhile, Fıskobırlık was still supported by the government. With the help of the DFIF fund, the government provided credits with low interest rates. This stopped in 2003. While hazelnut production in Turkey was increasing, the quantities bought by Fıskobırlık strongly decreased (Kayalak & Özçelik, 2012):44).

In 2006 Fıskobırlık was not able to purchase hazelnuts anymore due to financial issues. Therefore a new law came into being stating that TMO (the Grain SEE[xxxviii]) -and thus the state- had to become involved in the hazelnuts sector again by procuring hazelnuts (Kayalak & Özçelik, 2012). This lasted for three years, after which no nuts were bought anymore by the government. No hazelnuts have been bought by the government anymore until this date.

Appendix B - Migration from Turkey

Migration to Germany started in 1961 with guest worker programs, promoted by the Turkish government (Escobar et al., 2006; Martin, 1991):3). In the guest-worker programs, migrants were expected to rotate in and out of the country. "Most of the migrants rotated in and out of the country as expected, but guest-worker programs got larger and persisted longer than expected. As a result, some workers settled with their families" (Escobar et al., 2006):709). Recruitment for these programs ended in 1973, after which most workers stayed (Escobar et al., 2006):711).

Through time a shift occurred in the type of migrants travelling abroad. In the early stages mainly relatively skilled and educated young men migrated, from the economically more developed regions of Turkey. The share of rural migrants at this stage was low, with just 17.2%. In the second half of the 1960s low educated rural workers were recruited, after which the demand for female labourers increased in the late 1960s and early 1970s. After 1973 labour migration became less important than migration for family reunification and political asylum" (Adaman & Kaya, 2012):8).

Appendix C - Migration in Turkey

The Turkish Statistical Institute (TÜIK), the source of the data on migration, used the following definitions for constructing the data. In-migration and out-migration: migrants who arrive in the reference area from other areas within the country and the other way around, respectively. Net migration: The difference between in-migration and out-migration for a specific area (in-migration minus out-migration). Net migration rate: the number of net migration per thousand persons who migrate (TÜIK).

Table 24 provides the latest migration data, for the periods 2007-2012.

Table 24: Net migration and rate of net migration by statistical region. Source: TÜIK, based on Address Based Population Registration System Results, ttp://www.turkstat.gov.tr/VeriBilgi.do?alt_id=1067

	Total population	Net migration					Rate of net migration (‰)					Average rate of net migration (‰)
Region	2011-2012	2007-08	2008-09	2009-10	2010-11	2011-12	2007-08	2008-09	2009-10	2010-11	2011-12	
Total Turkey	75,627,384	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.00
İstanbul	13,854,740	26,675	39,481	102,583	121,782	30,461	2.10	3.06	7.77	8.98	2.20	4.82
Western Marmara	3,247,669	30,074	12,573	14,599	15,861	25,052	9.73	4.03	4.62	4.95	7.74	6.21
Aegean	9,779,502	34,692	16,563	955	1,225	25,355	3.70	1.74	0.10	0.13	2.60	1.65
Eastern Marmara	7,058,367	82,161	42,570	37,579	42,824	37,090	12.57	6.37	5.51	6.18	5.27	7.18
Western Anatolia	7,253,247	20,063	31,544	39,128	50,308	26,194	2.98	4.60	5.59	7.05	3.62	4.77
Mediterranean	9,611,007	19,449	4,790	5,479	-11,797	-10,524	2.15	0.52	0.58	-1.24	-1.09	0.18
Central Anatolia	3,853,025	-34,299	-19,170	-34,624	-33,878	-15,862	-9.00	-4.99	-8.95	-8.78	-4.11	-7.17
Western Black Sea	4,483,603	-19,529	-10,842	-50,720	-39,557	-14,393	-4.35	-2.40	-11.16	-8.80	-3.20	-5.98
Eastern Black Sea	2,545,274	-5,622	1,585	-22,703	-24,949	18,495	-2.24	0.63	-8.98	-9.88	7.29	-2.64
Northeastern Anatolia	2,226,155	-58,268	-32,588	-30,104	-27,973	-34,434	-26.12	-14.72	-13.58	-12.46	-15.35	-16.44
Centraleastern Anatolia	3,756,322	-39,613	-33,207	-33,255	-61,679	-27,091	-10.89	-9.09	-9.08	-16.49	-7.19	-10.55
Southeastern Anatolia	7,958,473	-55,783	-53,299	-28,917	-32,167	-60,343	-7.56	-7.12	-3.80	-4.11	-7.55	-6.03

Appendix D - Differences in GDP per capita between regions of Turkey

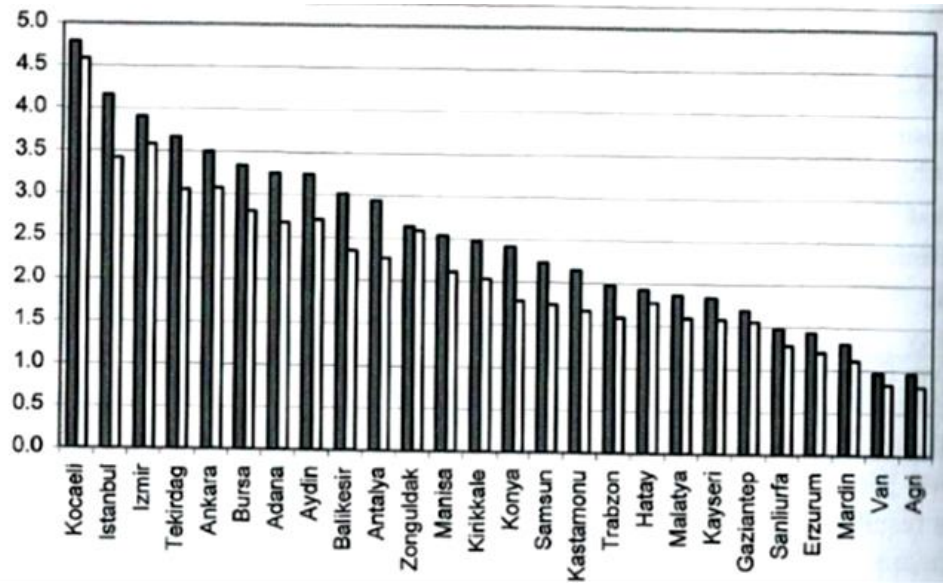


Figure 13: GDP per capita in NUTS II regions (nominal thousand Euro), 1998 (black) and 2001 (white). Source: Oskam, Longworth & Yildiz, 2005:22.

Appendix E

In this appendix some background information is provided about the models used.

Chayanov

In the Chayanov model, *Y* expresses the output or income created by the farm household. *I* shows the utility lines of the household, expressing the combinations of labour and output creating the same utility for the total household. The point where utility line I_2 is horizontal shows the minimum output or income requirements of the household. The TVP line is the production function.

Ellis has introduced a labour market and a market wage in the Chayanov theory, see Figure 4. In this version a wage cost line (*ww'*) is added. "this wage cost line represents the opportunity cost to the household of alternative uses of family labour time, namely, 'home' activity (i.e. household non-farm activity), farm work, or wage work off farm" (Ellis, 1993):123-124). Home time has replaced leisure days and includes both leisure and household non-farm activities; "activities associated with the daily maintenance of the household" (Ellis, 1993):125). With the introduction of the wage cost line the labour time spent on the farm is compared with market wage rates. In this situation the household can decide whether to spend all its labour on the farm, make use of additional labour on the farm, or hire out their labour and earn the market wage. L_e shows the amount of labour which the family is prepared to commit to farm production, "where the income (*Y*) which the household is prepared to sacrifice for one more hour of home time (*Z*) is equated to the market wage. (...) Optimum labour use in farm production is given by L_t, where the marginal product of labour equals the market wage" (Ellis, 1993):125). In the case L_t is located more to the right than L_e, the difference between them is the amount of labour hired in by the household for farm work (see Ellis (1993), page 124 for the related figure). In the research area the opposite situation is found; farmers do not hire in additional labour to increase their farm output, but they prefer to spend their time on the labour market instead on farm activities. This situation is shown in Figure 4; "the household is prepared to commit L_e hours of labour either to farm work or to wage work off the farm. In this case L_e is greater than the optimum level of labour use in farm production, L_t, and the difference between the two is the amount of off-farm wage labour the household is prepared to supply to the labour market" (Ellis, 1993):125).

Model used by Hill

The model as used by Hill is also further discussed here. Hill has created four models of investment (and abandonment) based on the following concepts. She works with some concepts;

- V_t, which is the marginal unit of investment.
- *C*, the unit cost of investment. This includes both the costs of establishing a new orchard as the opportunity costs of the land giving no output for the years it takes until the new crop first bears fruits.
- P_t is the unit price of the crop.
- Q_t is the level of the capital stock. An important concept is the desired level of capital stock, Q_t^*; the level of capital which equalizes V_t and *C*. Either investment or abandonment will happen until this point is reached. The number of trees present is understood as the capital

stock. “A household can increase Q_t by planting new (...) trees or by replacing old trees for new trees (NPV is higher because of higher future benefits). Q_t can be reduced by uprooting trees” (Hill, 2010):1067).

- Uncertainty influences the model (as many investment decisions) as follows; in the case of uncertainty the investor might wait with the investment even if $V_t > C$.

Appendix F

Table 25: Overview of support for arable crops (MOA, 2014)

Nr.	Supported product	Unit support (TL/kg)
1	Sunflower Oil	0.24
2	Cotton seed	0.50
3	Soybean	0.50
4	Canola	0.40
5	Maize	0.04
6	Safflower	0.45
7	Olive oil	0.60
8	Wheat	0.05
9	Barley, Rye, Oats, Triticale	0.05
10	Rice, Beans, Chick Peas, Lentils	0.10
11	Tea	0.12

Endnotes

[i] Hazelnut production is important for Turkey's economy. Hazelnut is "the main economic activity of nearly 400,000 households in the form of family farming in the Black Sea Region. (…)The hazelnut economy directly and indirectly supports 8 million people" (Gönenç, Tanrıvermi, & Bülbül, 2006):20).

[ii] "Average over production** of hazelnut in the period 1970-2001 was 29,000 tons (raw), and during the last ten years it averaged 48,000 tons. Due to the state's support policies, Fiskobirlik's hazelnut stocks increased to levels of 100,000 – 200,000 tons in some years. These stocks have either been sent/sold to other government organizations or processed into oil. Processing, warehousing, general administrative and financial expenditures for these hazelnut stocks are high compared to the sales revenue from oil production. It is estimated that $150-200 million is being wasted each year for hazelnut oil production" (Worldbank, 2004:58). Over production is calculated by subtracting domestic consumption and exports from total production.

[iii] "The Y-axis in the diagram above indicates the productivity in terms of annual yield per hectare and the X-axis indicates the region. (…) The "Whiskers" on the ends of each box indicate the maximum and minimum annual productivity over a fourteen-year period. (…) Each box illustrates where 50% of the annual productivity occurred in the 14-year period. A wider whisker and box range indicates significant change in the productivity annually, and a narrow range indicates more consistent productivity over the period" (Tulum, 2009):735) "The data used to perform the diagrams and the plot-size graph were gathered from the producers' cooperative union (Fiskobirlik) and national and international industry trade associations (ITA), Turkish Department of Agriculture and Forestry (DAF), Turkish Department of Foreign Trade (DFT), Turkish Statistical Institute's (Turkstat) 2001 Agriculture Census" (Tulum, 2009):735).

[iv] See (Dillman and Carlson (1982); Petrzelka and Marquart-Pyatt (2011)), for example also on sharecropping.

[v] Some researchers have focused attention on migratory trends among farming and rural populations such as (Mather, 2000), (Wolleswinkel & Weersink, 2001), (Halfacree & Rivera, 2012) and (Mollett, 1991) (derived from (Cheshire et al., 2013))

[vi] With migrants now being seen as 'agents of development' (Bakewell, 2008):1341).

[vii] Next to the topic being outside the reach of this research, historically remittances to Turkey have been relatively low compared to remittances to other countries (Escobar et al., 2006).

[ix] "A more sophisticated formulation of risk/uncertainty preferences would require detailed information on the probability of all possible outcomes (or more correctly the peasants' subjective assessment). It would also require explicit studies on actual attitudes towards risk among peasants in the study area" (Holden, 1993):252).

[x] 'Findik Üretimine Izin Verilecek Ilçeler' are the areas called where hazelnut production is allowed.

[xi] Yellow: grain, Red: hazelnut, Light blue: rice, in the hazelnut area some other areas can be distinguished: purple: various vegetables, green in hazelnut area: peaches.

[xii] This is explained as follows by Holden: "He developed the theory so as to make it relevant for the analyses of the farm firms, commercial farms, farm households and subsistence farms" (Holden p.244-245).

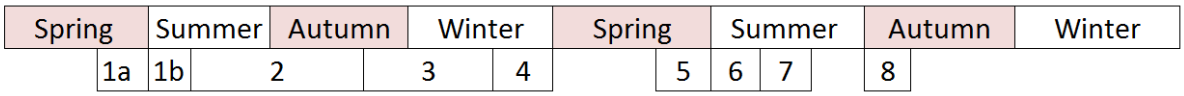
[xiii] As Low puts forward in his book on economics of farm household in Southern Africa, the focus away from self sufficiency is less applicable in the area of his research as a "considerable proportion of a farm-household's time is taken up with non-market activities" (1986)31-32).

[xiv] Of Chayanov (1966), Nakajima (1986) and H.N. Barnum and L. Squire (1979).

[xv] Holden also includes the assumption of increasing marginal disutility of labour input.

[xvi] "This implies that the household in its overall utility maximization problem maximizes the aggregated utility over all time periods subject to a set of multiple time constraints. Furthermore, there will be some possibilities for substitution between time periods. Since the marginal expected utility curves and the marginal disutility at the equilibrium point will change from period to period, the trade-offs will be complex" (Holden, 1993):247).

[xvii] A biennial plant is a flowering plant that takes two years to complete its biological lifecycle. The first five (initial) steps are critical to the production of high quality fruits (in general for all fruits and nuts). The hazelnut tree has male and female flowers on the same tree. The nut develops out of a female flower if it is pollinated with pollen from male flowers of an appropriate cultivar ('pollinizer'). The plant is self-incompatible, it cannot be pollinated by trees of the same cultivar. Therefore, a pollinating cultivar is interplant among the main cultivar(s). Pollination occurs by wind.



1.	Initiation of male and female flowers. 1st male flowers, which takes 2-3 weeks (a), thereafter female flowers, which takes 3-4 weeks (b).
2.	Development. The development continues slowly until the flowering period in the winter or the early spring.
3.	Resting period. (Dormancy) The catkins (male flowers) close at the beginning of the winter.
4.	Flower opening and pollination. Optimal pollination occurs two weeks after flowering
5.	Fertilization. Only after 4 or 5 months after pollination the actual fertilization happens. At that moment, the nut has a 8-10mm diameter.
6.	Growth I. Approximately 10 days after fertilization the nuts starts to grow fast. The increase of size takes a couple of weeks after which the nut is full grown. During the first period of growth, the germ (edible part of the nut) grows slowly. In the period 3-5 weeks after fertilization the germ only reaches appr. 4% of the final size.
7.	Growth II. During the shell hardening the germ starts to grow, filling the whole nut within 3 to 4 weeks.
8.	Ripening. After the filling process the nut ripens. This takes 2-3 weeks, varying per cultivar and area. The shell turns brown and the germ is released from the shell. Ripening in Turkey: end July/August/start of September, depending on the altitude of the orchard and climatic conditions.

(Sources: (Wertheim & Goedegebure, 1988):10,11,18; (Serttas, 2009)):3).

[xviii] The shot-hole borer is a beetle. Turkish name: Dalkiran, Latin name: Xyleborus dispar. It bores holes and passages in trunks and therefore weakens the tree/shrub.

[xix] The common cockchafer is a beetle as well. Its Turkish name is Findikta Mayis Böceği, or 'manas'. Its Latin name is Melolontha melolontha. A large part of its life cycle it lives underground. The larvae's eat and damage or even kill the roots. The adults eat the flowers and leaves of the plant.

[xx] Three different types of activities also demand the labour & time input; off-farm income options, leisure demands, and maintenance activities: activities preparing products for consumption.

[xxi] Keşap Fındık Üreticileri Birliği**,** located in Keşap, Giresun province. The group is gaining knowledge by various ways; own experiences, research data, and cooperation with various institutes such as the Hazelnut Research Institute in Giresun, the Soil Institute, the university of Giresun and a certification program. Website: http://www.kfub.com.tr/

[xxii] This number can perfectly be compared with the labour requirements for the orchards in Keşap; 100 days for 10 decares -or 10 days for 1 decare-, of which the number of hours worked were not specified. The reasoning is as follows: the labour costs of 2.4 TL/kg and the average production of 200 kg/da mean that the average labour costs are 480 TL/da. Wages in the area vary around 45-50 TL. This means that with the 480 TL,

approximately 10.10 daily wages (480/47.5) can be paid. As 45-50 TL are the wages for a full working day (+/- 8 hours) in the area, 8-hour working days can be used for the comparison.

[xxiii] This number is retrieved from Table 3. The outcome of the questionnaire for the average production in 2013 is 105.9 kg per decare, which is close to the average used here.

[xxiv] The difference between prices is based on the statement of Mr. Şahin (7-10-2013) that they receive 10% higher prices. It is assumed that because not only quantity but also quality would increase by following the same production methods, this would also happen in the research area.

[xxv] Increased efficiency (lower relative costs with higher production) is not included.

[xxvi] The same proportions as in Keşap are assumed.

[xxvii] The average size of the orchard of Samsun is based on the short questionnaires, of Keşap is calculated based on the interview held with Mr. Şahin (7-10-2013) (=3500 decares of 110 farmers).

[xxviii] "Meter means to measure and also to apportion. One can meter (measure) output and one can also meter (control) the output" (Alchian & Demsetz, 1972):778).

[xxix] (Binswanger & Rosenzweig, 1986) created six assumptions (the presence of risk and costs of information and four behavioural assumptions fitting this thesis) and also discussed their consequences. The assumptions can be found on page 507 of their article.

[xxx] These regions are called 'Findik Üretimine Izin Verilecek Ilçeler' in Turkey (Resmi-gazete-27856, 2011).

[xxxi] The government does have a policy with which they can contribute 50% of the investment if a farmer decides to invest in cold storage (*Soğuk Hava Deposu* in Turkish*)* until TL 150,000 for individuals and TL 600,000 for legal bodies (translated from (MOAS, 02-2013):19).

[xxxii] The difference with hazelnuts is that the temperature has to be low, 0°C for kiwi and peach (UCPTC, Crisosto, Mitcham, & Kader) Taylor & Rushing, 2014), and between -1 and 4^{o}C for apples, depending on the variety (NCAES). Additionally, the kiwi crop should not be stored with other crops that secrete ethylene, as this hastens ripening (UCSFP). As average temperatures are between 23.4 ^{o}C in August and 12.4^{o}C in November and on average 7.8 ^{o}C between December and March (MGM) in the Samsun province, cooled warehouses are a necessity if farmers want to store their crop in order to wait for better prices in the case of apples and kiwis or if they want to keep their peach crop in optimal condition right after harvest.

[xxxiii] Average commercial apple yield in Turkey 17,460 kg/hectare (in 2002) – 23,100 kg/hectare (in 2012) (EU-Fruit-Juice-CSR-Platform, 2013):7) based on reports Turkish Ministry of Agriculture (2013) Plant Production Head Office Formal Report). As the apple crop was introduced in the research area much later than in the major apple production areas, apple yields are assumed to be lower here. The yields of 2002 are used for calculations therefore.

[xxxiv] Prices are retrieved from the land market website (Sahibinden) http://www.sahibinden.com/ on 13-3-2014.

[xxxv] In order to see it the following trick can be applied; shifting to the right from the vertical axis it can be seen that distance of the lines to the horizontal axis grow less strong than when shifting to the left from the vertical axis.

[xxxvi] The ASCUs contributed in marketing activities and from the second half of the twentieth century they also played a key role in implementation of agricultural policies (Burrell & Kurzweil, 2007:7)

[xxxvii] "Support prices were announced after planting, and payments were usually made one year or more after harvest and delivery. (...) Once announced, support prices could not be adjusted for changes in market conditions during the growing season or post-harvest, and many did not reflect differences in product quality. SEEs had to act as guaranteed buyer of last resort, so that when purchases exceeded storage or processing capacity, they made distress sales on the world market. (...) The short-run production incentives provided by these payments were weakened by the timing of the price announcement, and by the fact that high rates of inflation throughout the period eroded their value and exacerbated real price uncertainty" (Burrell & Kurzweil, 2007:12-13).

[xxxviii] "A key group of institutional players in the agricultural policy arena have been the state economic enterprises (SEEs). It is important to note that SEEs flourished extensively throughout the Turkish economy during most of the period under review, until the recent wave of full or partial privatizations. In agriculture, the earliest SEEs date from the 1930s [such as] TMO for grains. (...) SEEs carried out manufacturing and commercial activities on behalf of the state, in line with strategic plans and annual directives from relevant government bodies. (...) The trading losses and capital needs of these organisations were regularly met from public funds. For the years 1991-95, the annual average duty losses of TMO, and [two other SEEs] taken together were USD 622 million, and they rose to an annual average of over USD 1.7 billion during 1996-2001. The government began writing off the debt of agricultural SEEs in the mid-1990s" (Burrell & Kurzweil, 2007:7). One factor explaining the losses was the pricing system in pre-election periods (Burrell & Kurzweil, 2007).