

Agricultural value chain in Imereti and Racha regions

Hazelnuts production

1. Introduction

The present research was carried out by the Czech University of Life Sciences Prague (Faculty of Tropical AgriSciences) in collaboration with People in Need and the Association of Young Economists of Georgia from July 2013 to June 2014. This study is a part of regional value chain analysis for the main products of agricultural sector in the Imereti region.

The goal of this analysis is to provide background information and baseline data for subsequent implementation stages of the project Enhancing Small Farmers' Cooperation and Productivity in Imereti Region financed in the framework of European Neighborhood Programme for Agriculture and Rural Development in Georgia (ENPARD Georgia)- Small Farmers Co-operation component.

This research would not have been possible without funding from the ENPARD Georgia and Czech Development Agency project "Support for Cooperatives in Imereti, Georgia".

2. Research methodology

The research team followed an approach that allowed handling several issues concurrently. Data collection was organized and methods selected in order to assess specific issues from different angles supported by a triangulation of qualitative and quantitative methods. After the identification of the 8 local products with the highest development potential (based on local expert and government officials interviews), we carried out a more detailed survey thematically focused around each selected product. For hazelnut production value chain analysis following districts were covered:

- Vani
- Samtredia

The field data focused on agricultural product in the Imereti Region was collected at following stages:

March to June 2014 - gathering field data for main products

July 2014 – April 2015- finalization of reports

For the analysis mainly qualitative research based on key-informants and group of farmers is used, which is designed to reveal a target group's range of behavior and the perceptions that drive it with reference to specific topics or issues. As a main qualitative research method is used method of semi-structured in-depth interview. Interviews were conducted with small number of key informants who must have first-hand knowledge about examined issue. Each interview took from 1.5 to 2 hours. Diversity of key informants was important to cover whole value chain from suppliers to the local market. It means to identify and interview different-sized farmers (from small subsistence to commercials), collectors, middlemen, processors, sellers on a local market, exporters, together with agro-shops selling seeds or seedlings and different kinds of tools, technology, pesticides, herbicides, fertilizers or other

- Focus group discussions with farmers engaged in viticulture and/or viniculture
- Interviews with hazelnut producers
- Interviews and observations of input suppliers
- Hazelnut market screening

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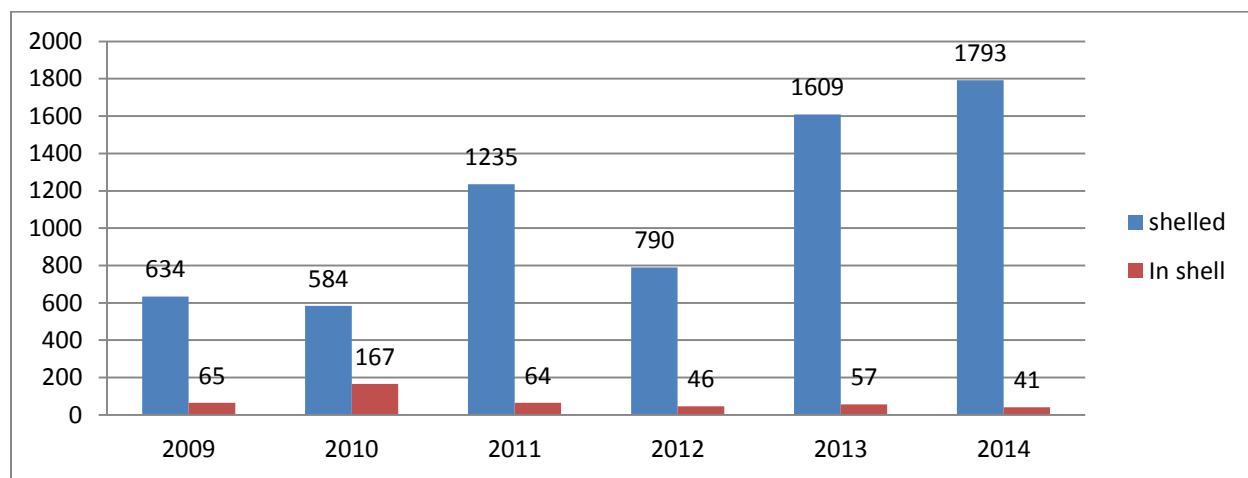
Due to the lack of agricultural activity in Racha region, National Statistical Bureau of Georgia does not publish any specific data regarding the agricultural sector.

3 Hazelnut industry as a sector of Georgian agriculture

The worldwide production of hazelnuts with shells has increased globally to 914,447 tons in 2012. The 10 biggest producers are: Turkey with almost 75% of worldwide production (660,000 tons), Italy (85,000 tons), the USA and Azerbaijan (30,000 tons each), Georgia (25,000 tons), China (23,000 tons), Iran (21,500 tons), Spain (14,000 tons), France (8,500 tons) and Poland (4,200 tons)(FAO, 2014). The production of hazelnuts in the EU is highly unstable with its production at 125,000 tons on average. This number is not sufficient for the consumption of EU residents so another 150,000 tons are imported in the EU each year.

The Georgians have traditionally considered hazelnuts as a part of their culture and of immense economic importance. According to USAID (2011), hazelnuts account for 24 percent of Georgian agricultural exports. Georgia is the world's fifth largest producer of hazelnuts; it is the fifth largest exporter of in-shell hazelnuts and the fourth largest exporter of shelled hazelnuts in the world. Data from FAOSTAT shows that the number of in-shell hazelnuts has increased twice since 2000 (diagram 1). The same situation is apparent in the case of shelled hazelnuts, which indicates increasing processing tendency from 2000 to 2012 years. Other products such as blanched hazelnuts, roasted meal or chopped hazelnuts are produced in lesser quantities.

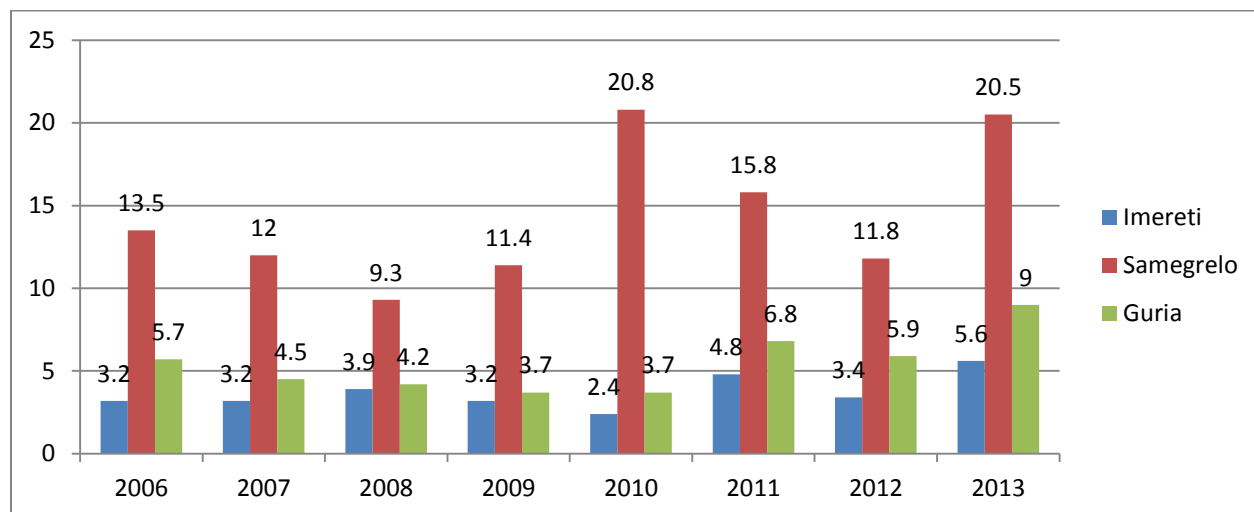
Diagram 1 – Production of hazelnuts in Georgia (thn tons)¹



More details of the regions of Georgia show distinctly that the highest hazelnut production is in Samegrelo and Zemo Svaneti region although the production has been decreasing since 2010. Samegrelo and Zemo Svaneti regions are followed by Guria and Imereti regions with roughly stable production since 2006 (see diagram 1).

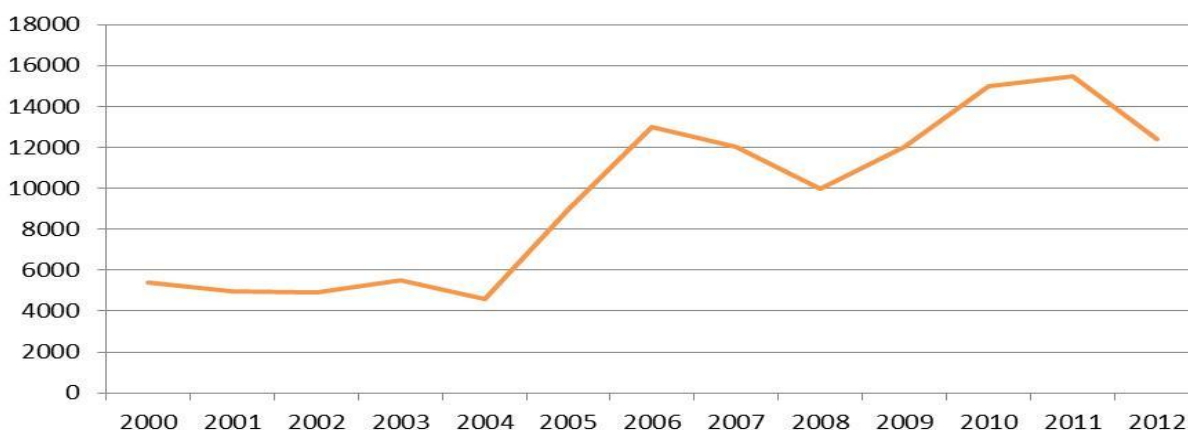
¹ Geostat.ge - http://pc-axis.geostat.ge/Table.aspx?rxid=c8ca81e9-2824-4c5b-a46a-c80202913531&px_db=Database&px_type=PX&px_language=ka&px_tableid=Database%5cAgriculture%5cPlant+Growing%5cPermanent+Crops%5cAT2202.px&layout=tableViewLayout1

Diagram 2 – Production of hazelnuts in regions (th tons)²



Even with its status as one of the major exporters of hazelnuts, the Georgian hazelnut value chain remains largely untapped. Georgian producers are capable of reaching higher standards (USAID, 2011). This is also demonstrated by the curve representing the total hazelnut harvesting area (diagram 3) which follows the production curve for in-shell hazelnuts. This means that in the last ten years, there were no significant steps that would contribute to the intensification of production.

Diagram 3 – Hazelnuts harvested area for 2012 (hectares)³



² http://pc-axis.geostat.ge/Table.aspx?rxid=c8ca81e9-2824-4c5b-a46a-c80202913531&px_db=Database&px_type=PX&px_language=en&px_tableid=Database%5cAgriculture%5cPlant+Growing%5cPermanent+Crops%5cAT2202.px&layout=tableViewLayout1

³ http://faostat.fao.org/site/569/Table.aspx?rxid=c8ca81e9-2824-4c5b-a46a-c80202913531&px_db=Database&px_type=PX&px_language=en&px_tableid=Database%5cAgriculture%5cPlant+Growing%5cPermanent+Crops%5cAT2202.px&layout=tableViewLayout1

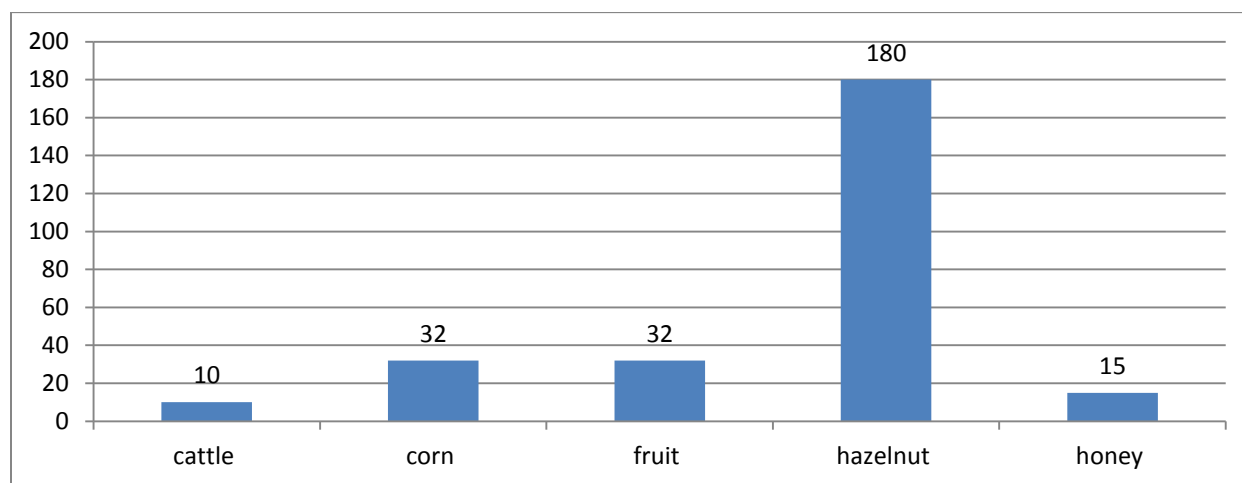
4 Hazelnuts value chain description

4.1 Production systems

Hazelnut production is especially popular in Imereti region as it is the third most productive region in Georgia. The main district of hazelnuts production in Imereti is Vani, Chagani and Samtredia. In the village of Dzulukhi, where the focus group discussion was conducted, 100% of the local farmers (around 250 households) collect hazelnuts. Each household has in its possession 1.5 hectares of land on average, 60% of which is used for growing hazelnuts. Therefore, about 150 hectares are occupied by hazelnuts. The median value of income from agriculture is 80%. The average crop capacity is 1 ton per hectare, in total around 150 tons are produced yearly. The majority are sold to the market through a middleman, who sets the price. Farmers complained of the lack of a nuts collection centre, which would help them to increase the price. The situation was similar in all visited areas. Due to the fragmentation and small size of hazelnut producers, they have different varieties which they harvest at different times, and they use different production and storage technologies which impacts on quality (USAID, 2011).

Besides hazelnuts, farmers produce, for their own subsistence. Both for subsistence farming and for market they produce hazelnuts, milk, cheese, meat and fruits as apple, pear or Tkemali. Some farmers have started to plant Paulownia trees for the wood. They are extremely fast growing, up to 20 feet in one year. Some species of plantation Paulownia can be harvested for saw timber within five years. Once the trees are harvested, they regenerate from their existing root systems

Diagram 4 – Main products cultivated together with hazelnuts in Georgia 2013 (tons)⁴



4.2 Productivity

Two hazelnut species, *Corylus pontica* and *Corylus colchica*, were the ancestors of various endemic hazelnut varieties. These have been adapted for the specific soil and climate conditions in Georgia to produce high quality cultivars through natural selection and hybridization (e.g. 'Gulshishvela',

⁴ Geostat.ge – combined

‘Shveliskura’, ‘Khachapura’, ‘Anakliuri’, ‘Dedoplis Titi’, ‘Nemsa’, ‘Saivanobo’, ‘Berdznula’ etc.). These cultivars originated in the eastern and south-eastern Black Sea coast and adjoining regions. Hazelnuts are mainly grown in regions in which the average of active annual temperatures ranges from 3800 to 4250°C, average annual rainfall reaches 1500-1900mm, relative air humidity is 70-75%, and the elevation above sea level is between 450 and 650m, though hazelnuts also grow naturally on elevations of up to 1800 meters above sea level (GEONUTS, 2013). Depending on climatic conditions, hazelnuts ripen between the middle of July and the middle of August, with the average production from 5 to 10kg from one bush. In order to achieve a high yield, it is necessary to keep a minimum distance of four meters when planting new bushes to ensure enough space to grow.

The average yield per hectare for Georgian hazelnuts is about 1 MT. Respondents stated that a yield between 600 and 1500kg per hectare was dependent on soil and provided inputs (herbicides, fertilizers). The average yield is comparative to the quantity of Turkish hazelnuts. Italian hazelnuts yield 1.5 MT/ha and hazelnuts grown in the USA (mostly Oregon) yield 2.5 MT/ha (USAID, 2011). Although a slight increase was recorded in 2006-2012 years, Georgian hazelnut yields are significantly lower than international averages. This reduces net income, the quantity available for processing by the Georgian hazelnut sector and the amount sold/exported on an international scale

Most farmers did not have any mechanization which would contribute to work effectiveness and its facilitation. All work is done manually. Where any of the farmers own fundamental mechanization, they lend it to others for a fee. From 2011 it has become possible to order mechanization from bigger collection points as well.

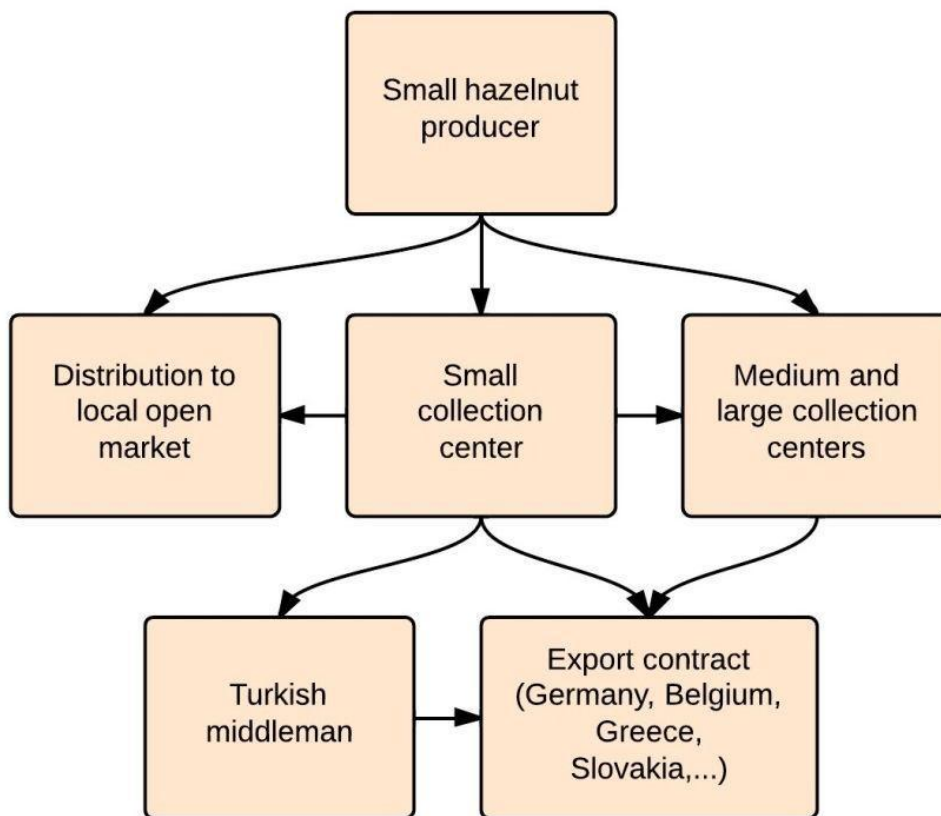
4.3 The product chain typical for Imereti

The hazelnut value chain involves several actors and different pathways before products reach the final customer. Hazelnuts are sold from the producer in the following ways:

- Directly to local open market – the product is sold to the market seller who pays for the stand on the market, e.g. a market stand in Kutaisi costs between 150 and 200 GEL per month (plus energy costs), depending on the location. To a small extent, this chain may be accompanied by a middleman or an intermediary. He does not process hazelnuts in any way, he only has the role of re-seller.
- To small collection centers – these collection centers provide services as aggregation, cleaning, sorting, grading, packing, and some may remove the shells of hazelnuts. They buy up products directly from farmers; farmers carry their production to collection centers by themselves or the collection center send out vans to buy hazelnuts from small farmers. Some collections centers dispose on their own land where they grow hazelnuts to overcome any fluctuation in supply of farmers e.g. in Vani there are three of these centers.
- To medium and large collection centers – in addition to services provided by small collection centers some operate roasting, slicing/dicing, grinding, and packaging equipment in an attempt to diversify their production and become an ingredient supplier as well as a raw material

supplier. These medium and large collection centers which are used by producers in Imereti region and are located in Zugdidi, Martvili, Kutaisi or Senaki

Scheme 1 – Main supply chain of hazelnuts in Imereti and Racha regions



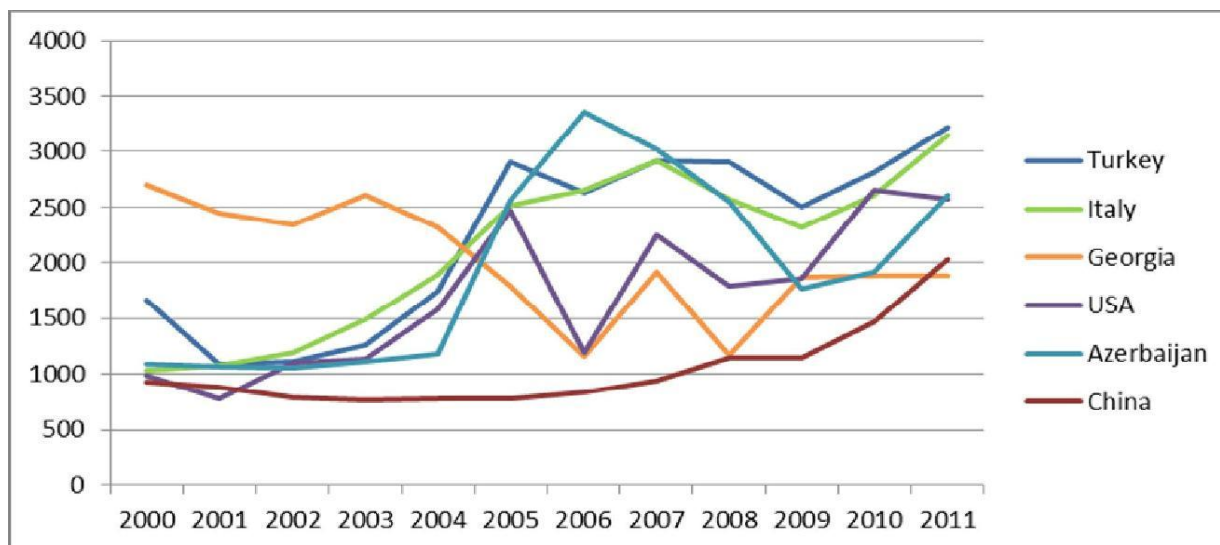
Collection centers typically sell production directly to the European market on the basis of price, or through Turkish suppliers who “take their margin” before selling on to the European market.

Furthermore, there are some differences in how farmers sell their production. Usually, production is not sold in one lump sum but in parts (e.g. 100 kg each month), according to the financial need of the family. Likewise, it is advantageous to sell part of the harvest in the Collection centers typically sell production directly to the European market on the basis of price, or through Turkish suppliers who “take their margin” before selling on to the European market winter and spring months, when the price is at the highest level. If the farmer disposes of free financial resources, then he buys up the production from the others and sells it at a time when prices are at their best.

4.4 Production prices

According to international statistics, the production price in Georgia is 1.89 USD/kg (3.3 Georgian Lari - GEL). Compared with the biggest producing countries, mainly neighbouring Turkey and Azerbaijan, the price is highly competitive (see diagram 5).

Diagram 5 – Production price of hazelnuts in USD/ton



Although the production price is at a lower level, the final price is highly influenced by the price on the Turkish market. This changes every month and is wide ranging. It is important to note that the price of sorted hazelnuts (38% of total production) is almost twice the price of unsorted ones (62%). Sorted hazelnuts are divided into four groups according to their size: 9-11mm, 11-13mm, 13-15 mm, 15+ mm. The size also changes the price of production (see Table 1).

Table 1 – Changing of Georgian hazelnut prices in USD/kg

Calibration	Percentage	Price
9– 11 mm	5%	2.50 GEL
11– 13 mm	40%	3.15 GEL
13– 15 mm	40%	3.8 GEL
15 + mm	15%	4 + GEL

5 Competitiveness diamond – input condition, demand conditions, related industries, context

5.1 Supply of inputs

Local varieties of hazelnuts in Georgia are well known for their basic advantages. They have a powerful root system which draws in sufficient quantities of all the necessary components from the soil, and therefore chemical fertilizers are applied only to a minimum degree. However, for the majority of interviewed respondents and focus groups participants, fertilizers represent the main input, which they say costs 300-800 GEL per year per household.

These varieties also do not suffer from an insect pest problem, thus pesticides are barely used. According to the research conducted by USAID and NEO (New Economic Opportunities Initiative) in 2013, the area of Kutaisi, Tskatulbo and Khoni is threatened mainly by big bud mites (*Phytoptus avellana*), in Samtredia and Khoni there is an occasional issue of the Long horn beetle (*Obera linearis*). Other pests such as Fall webworm or Nut weevil were not observed.

There are agro shops in almost every village that provide farmers with basic inputs. In bigger cities, e.g. in Kutaisi, these shops are located at open markets or very close to them. On local markets, in spring and autumn, there is the possibility to buy new plants for the price of about 0.5 GEL.

Picture -1 New plants supplier at local market



Picture -2 Hazelnut seedlings



Regarding the work on the plantations, most farmers manage it by themselves with the help of family members. At harvest time, some farmers hire workers for collecting hazelnuts, cleaning from husk or for

guarding the plantations against thieves. Daily payments range from 10 to 20 GEL, according to the work which is carried out.

Some machinery for weeding, herbicides application or cleaning from green husk may be hired from other farmers or from mechanization providers in order to streamline the work. Prices range between 40-50 GEL per hectare and machine.

5.2 Demand

The majority of farmers produce only in-shell hazelnuts, which they are harvesting, drying and cleaning from husk manually or with the help of hired machinery, a so-called husker. Farmers sell their production to local market sellers, to middlemen or to collection centers. Some of the chain members then further process hazelnuts by removing shells. These two products (shelled hazelnuts and hazelnut kernels) are the most exported, with the greatest demand for bigger varieties of hazelnuts.



Exporting to the EU is based on GSP+ which is a component of the EU Generalised Scheme of Preferences. This system allows for export from Georgia benefits from a tariff preference and hazelnuts can enter the EU market with a reduced import tariff of 0%.

There are almost no large supermarket chains available in Imereti, even the regional capital Kutaisi. Among the existing markets, hazelnuts are seldom seen as the majority of households grow their own hazelnuts. For this reason, demand is not so high and trade does happen, it happens at the local market.

On the international market, there is also a big demand for deeply processed products whose production can provide only a few of the largest factories. These products are blanched, roasted, sliced, chopped hazelnuts, or hazelnut meal and paste.

Picture 3 – Shelled hazelnuts, hazelnut kernels, blanched, sliced and roasted hazelnuts



Hazelnuts are a popular ingredient in Georgian cuisine. They are used for the preparation of churchkhela which is a traditional sausage-shaped candy made by repeatedly dipping a long string of nuts in tataro - a mixture of flour, sugar and Badagi (concentrated fresh grape juice). Another well-known traditional Georgian confection Gozinaki is made of caramelized nuts and fried in honey. Moreover, hazelnuts are used for production of various cakes and as a traditional spiced hazelnut sauce served with chicken.



Picture 7 – Hazelnut shells

5.3 Related industries

The hazelnut industry is closely connected with the problem of waste management and utilization of shells. From 1kg of in-shell hazelnuts approximately 0.5kg of hazelnut shells are produced. Processing plants usually sell these at a low cost, usually for 0.15-0.20 GEL/kg.

Shells are valuable mainly in the energy industry as they are of high calorific value with 4100-4410 cal/kg. Customers of hazelnut shells further process them into briquettes or charcoal using a biomass briquette machine which can make solid biomass fuel. Shells are also bought by bakeries for its combustion and calorific qualities. To a smaller extent, shells are used in horticulture as a good building element for pathways and in recent years there were also some studies conducted for the use of hazelnut shells as a renewable and low cost lignocellulosic material for bioethanol production.

5.4 Competition

All respondents confirmed that competition is very strong as all households in fertile areas are growing hazelnuts. Producers do not acknowledge the sales problem but a number of producers then reflected on the price they will receive from middlemen or processor.

Concerning the neighboring states, the biggest competitor is Turkey as it produces about 75% of the worldwide hazelnut production. Turkish middlemen are regularly buying production from local farmers. On the one hand, local farmers have assured sales; on the other hand, Turkish middlemen assume the margin the local farmers could have obtained if there was a direct connection with the end-customer.

According to USAID (2011) there is a lack of communication and cooperation between hazelnut producers, consolidators, processors and exporters which makes the Georgian hazelnut industry less competitive in the international market. Also, processing and shipping infrastructure is very weak, thus the country's competitiveness in the future will depend on its ability to improve these systems

6 Strategic productivity and quality

6.1 Hazelnuts in relation to food safety and quality

The main challenges for growth of production for the local retail and supermarket chains as well as international markets relate to quality and food safety. The common farmers, with 1 ha of hazelnut plantation, usually have no certification for food safety and quality from accredited laboratory facilities as it is not needed for sales at the local market. Consequently, their negotiating position is weakened.

Modern legislation and a system of monitoring of food quality and safety standards is missing in Georgia. There are no food safety management systems, no defined responsibilities within the food supply chain, while the application of HACCP and traceability principles as well as requirements about labelling and packaging are not properly defined and enforced. In Georgia, there are only a few manufacturers with ISO 22000 certification.

6.2 Phyto-sanitary, hygienic and quality requirements required for export

Export to the EU is based on the Generalised System of Preferences, known as GSP+. The specific rules of procedures for GSP+ are set out in Regulation 155/2013. Regarding the quality, currently buyers and sellers informally agree on UNECE (United Nations Economic Commission for Europe) standards DDP-03 and DDP-04 concerning the marketing and commercial quality control of traded in-shell hazelnuts and hazelnut kernels (see Annex 1 and Annex 2). The purpose of these standards is to define the quality requirements of in-shell hazelnuts at the export control stage, after preparation and packaging.

In 2012, the American National Standards Institute (ANSI) accredited two Georgian laboratories to implement international standard ISO/IEC 17025 for testing agricultural export commodities. According to EPI (2012), these two Georgian laboratories are opening their doors wider to international markets and allowing a wider range of products to be more competitive. It is expected that exporters of agricultural produce will have improved access to higher market segments such as established supermarket chains that require internationally-recognized tests.

7 Operational productivity – processing, diseases and biological threats

7.1 Processing of hazelnuts

Technical development is a key factor of labor efficiency and productivity. Small farmers in Georgia have generally no or very little mechanization, which is outmoded. Collection is usually done manually. After being collected from the fields,

hazelnuts are laid in 10-15cm thickness to be pre-dried under the sun until their leaves turn brown. After drying, hazelnuts are separated from their leaves manually or by using harvesting machine



Picture 8 – Hand sorting

(thresher or husker) and laid over canopies in thin layers to be dried under the sun. The total period of drying, including the pre-drying, can be a maximum of 15-20 days depending on the weather conditions (FTG, 2012).

Many processing factories then have dryers, separators, shellers and sorting lines. The bigger factories also use vacuum-packing equipment, cardboard packaging etc. After drying, the hazelnuts are moved in to a vacuum based gravity separator that removes the rest of the husk material, broken shells and other unsuitable material. From here, hazelnuts are transferred to the sorter which helps to separate them according to size categories. This allows the cracker to be set to the specific size of hazelnuts for more uniform cracking. In the cracker, about 70% of hazelnut shells are broken on the first pass. Then hazelnuts are moved back into a separator to remove the whole nut kernels from the shell material. The cracking process is repeated several times. Lastly, hazelnuts go for hand sorting to remove, by hand, unwanted kernels and any shell material or whole nuts.

7.2 Transportation



Transportation from field to the local market or to the processing factory is performed by the farmer himself or by collector. In some cases, the collection center sends out vans to buy hazelnuts from small farmers. Vans are suitable for the transport of 3 tons and hazelnuts are usually transported in 50kg sacks from jute. Bigger processing factories may also use carton boxes, vacuum bags or non-vacuum polyethylene bags. Export from Georgia to Europe is ensured mainly by 20-ton trucks, the average price

is 5,000 USD. The final price and delivery time differs according to the point of destination. The average time of transportation is 10 days and needs about 7 additional days for request preparation.

7.3 Pests and diseases

Diseases are represented mainly by different kinds of blight which is characterized by a rapid discoloration and wilting of plant tissues or by small ball-shaped pustules. It can be reduced by a copper spray used in September after the harvest or in early March. The same treatment supplemented by lime sulphur is used against moss which grows due to the excessive shading and lack of pruning. On the other side, young trees which are not grown enough to shade the trunk are threatened by sun scalding (USAID, 2013). Trees are also vulnerable to frost. regarding pests, the most common are Weevil (*Balanus nucum*), Longhorned Beetle (*Oberea linearis*), Leaf-tier Moths (*Machimia Tentoriferella*), Winter Moths (*Operophtera Brumata*), Leaf Roller Caterpillars (*Calpodas Ethilus*), Oblique-banded Leaf Roller Caterpillars (*Choristoneura Rosaceana*), Fall Webworm (*Hyphantria Cunea*), Bud Mites (*Phytocoptella Avellanae*) and Aphids (*Corylobium Avellanae*). If any of these pests appear, it is appropriate to apply chemical sprays on the basis of consultations in agro-shops

8 Supply chain management – flow of goods and information in the chain

The hazelnut value chain in Imereti is of medium length with several actors and different pathways until the product reaches the final customer. There are no dominant stakeholders controlling or governing the chain. It is based on personal contact; however, these contacts are irregular. There are no written contracts or agreements specifying trade conditions in place. Generally, the farmer sells his harvest to the buyer with a higher price.

A lack of long-term and formal commitments is also the reason for the spread of knowledge and innovation in the supply chain being very limited.

9 Human resources, capital, and know-how in the hazelnuts supply chain

9.1 Know-how and access to extension services

Most hazelnut growers in Imereti have years of experience. They learned the techniques from their fathers and grandfathers as hazelnut growing is usually a family business. However, as regards the technical progress some training is necessary to maintain the quality and yield at international level. Some respondents, mainly in Vani, already received some training provided by ELKANA and all rated it as very beneficial. ELKANA provided consultation and advice about hazelnut growing and pruning and organized several trainings focused on quality improvement. It was supplemented by brochures giving the information about cultivation.

The Training Program for Hazelnut Farmers in Georgia was also provided by USAID in cooperation with Fererro. The main goal for these trainings was to improve the capacity of Georgian hazelnut producers and to give farmers access to best practices and market opportunities. Since 2011, there has been training for 3,000 Georgian hazelnut farmers.

Moreover, farmers have the opportunity to take consultations at the Department of Agriculture at their municipalities. In Guria region, there is also an analysis center which, for a fee, provides soil analysis and recommends appropriate fertilizers. To gather information, some farmers also use professional books and searching for internet resources.

9.2 Opportunities for formal education

At this moment, there are no known official courses focused on hazelnuts growing, quality enhancement, processing or certification in Georgia. This could be the opportunity for universities or for establishing new training centres.

10 Institutions and business environment

10.1 Association of hazelnut growers

There is just one organization of hazelnut growers in Georgia. In 2007, the first attempt was made to establish the Hazelnut Growers Association (HGA) with 22 main players on the Georgian market, including AgriGeorgia. The meeting of founders was conducted and a verbal agreement has been reached but no legal document has been prepared concerning the establishment of HGA. According to AgriGeorgia, The Hazelnut Growers Association is already established with more than two dozen companies. The association is aimed at unifying growers and improving their overall skills particularly in terms of cultivation, processing and know-how. Goals for the HGA are to support hazelnut growers to increase production and quality of hazelnuts, implement modern technologies of primary treatment or processing and help in marketing expansion. The headquarters of HGA is located in Tbilisi, and then there are branches in regions of Samergrelo, Guria, Adjara, Imereti and Kakheti.

10.2 Governmental support

In general, the Government has been supportive of agricultural development and rural poverty reduction and, particularly in recent years, agriculture has been returning as a priority of policymaking and public investments. Although there is no direct support from the Georgian Government to farmers, the Government is cooperating together with foreign organization as Ferrero or USAID, which have an interest in industry improvement.

11 Conclusions and recommendations

11.1 SWOT

S <ul style="list-style-type: none"> Long-standing tradition in nuts cultivation Competitive production price Location at the Black Sea region – the most suitable location for hazelnut growing 	W <ul style="list-style-type: none"> Low productivity (hazelnut yields are significantly lower than international averages) Quantity of hazelnut suppliers Excessive land fragmentation and small size of hazelnut producers Outdated machinery Lack of knowledge of modern processing technologies
O <ul style="list-style-type: none"> Cooperation of farmers in purchase of inputs processing, marketing and selling in bulk Increase economic yield through training provide on production and quality Growing demand at international markets Demand for hazelnuts by international Tariff preference under the Generalized System of Preferences (GSP+) 	T <ul style="list-style-type: none"> Competition from Turkey, the world's biggest exporter with more experiences at international market Inability to affect the market price Barriers of entry to global market

11.2 What is the potential for improving or upgrading by introduction of cooperative farming?

Following interventions should be applied:

Increasing the access to mechanization centers – Although the mechanization centers exist, the farmers have not sufficient access to the centers. Due to the lack of machinery at centers the farmers cannot fully follow the agriculture timeframes.

Increasing the quality of plants protection – There is a need for more qualified specialist in planting and higher quality plant protection chemicals.

Supporting the establishment of cooperatives – Small farmers cannot buy substantial modern production resources and technologies. Therefore, more farmers' cooperatives are needed to increase the farmers' access to modern technologies.

Usage of more productive species - to increase the production volumes and decrease the dependence on local environmental and climate changes.

12 References and bibliography

- EM Consulting. Georgian Hazelnut: Unique opportunity for cooperation for your food business. (on-line) Available from: http://www.iemc.eu/download/EMC_Hazelnuts.pdf
- FAO. 2014. FAOSTAT. Food and Agricultural Organization, Rome
- FTG. 2012. Turkey's Hazelnut. Giresun: FTG. Available at <http://www.ftg.org.tr/en/turkish-hazelnut-turkeys-hazelnut.htm>
- Hazelnut Valley Farm. 2014. (online) Available from: <http://hazelnutvalleyfarm.com/> Mirotadze, N. 2004. Hazelnuts in Georgia. Acta Horticulturae (ISHS), 686: 29-34. National Statistics Office of Georgia. 2014 GeoStat. Available from:
<http://geostat.ge/index.php?lang=eng>
- Natsvlishvili, I. 2012. Accredited local laboratories to increase agriculture export. Georgia Today. (online) Available from: http://www.georgiatoday.ge/article_details.php?id=10532
- OECD. 2011. International Standards for Fruit and Vegetables: Inshell Hazelnuts and Hazelnut Kernels. (on-line) Available from: <http://www.oecd-ilibrary.org/docserver/download/5111123e.pdf?expires=1399752232&id=id&accname=ocid56027718&checksum=C21ACCB44A7D01171A97350ADBE021A>
- USAID Economic Prosperity Initiative. Hazelnut Production Manual: Better Management for Higher Yields and Increased Profits. (on-line) Available from: http://www.rciproject.com/rcicaucasusgeorgia_files/Georgia_EPI_%20Hazelnut%20Production%20Manual_11.pdf

- USAID Economic Prosperity Initiative. 2011. Value Chain Assessment Report. (on-line) Available from:
<http://www.greengeorgia.ge/sites/default/files/EPI%20Value%20Chain%20Assessment.pdf>
- USAID, NEO. 2013. Creating a database to track the movements of the four primary hazelnut pests in Georgia. (on-line) Available from:
http://www.georgianeoe.ge/failebi/Georgia4_11_2013_16271.ppt

13 Annexes

The excerpt of UNECE STANDARD DDP-03 concerning the marketing and commercial quality control of INSHELL HAZELNUT

A. Minimum requirements¹

In all classes, subject to the special provisions for each class and the tolerances allowed, the inshell hazelnuts must display the following characteristics:

(a) The shell must be:

- intact; however, slight superficial damage is not considered as a defect, provided the kernel is physically protected
- clean; practically free of any visible foreign matter, including residues of adhering husk affecting in aggregate more than 5 per cent of the total shell surface
- free from blemishes, areas of discoloration or spread stains in pronounced contrast with the rest of the shell affecting in aggregate more than 25 per cent of the surface of the shell
- well formed; not noticeably misshapen.

(b) The kernel must be:

- free from rancidity
- sufficiently developed; kernels should fill at least 50 per cent of the shell cavity
- not desiccated; kernels with dried out or tough portions affecting more than 25 per cent of the surface are to be excluded
- free from blemishes, areas of discoloration or spread stains in pronounced contrast with the rest of the kernel affecting in aggregate more than 25 per cent of the surface of the kernel
- well formed.

(c) The whole produce (shell and kernel) must be:

- dried in accordance with section “B. Moisture content”
- sound; produce affected by rotting or deterioration such as to make it unfit for human consumption is excluded
- free from mould filaments visible to the naked eye
- free from living pests, whatever their stage of development
- free from damage caused by pests, including the presence of dead insects and/or mites, their debris or excreta
- free of abnormal external moisture
- free of foreign smell and/or taste.

13. 2 The excerpt of UNECE STANDARD DDP-04 concerning the marketing and commercial quality control of HAZELNUT KERNELS

A. Minimum requirements

In all classes, subject to the special provisions for each class and the tolerances allowed, the hazelnut kernels must display the following characteristics:

The kernel must be:

- intact; however, the absence of part of the tegument or a scratch/chafing and scraping less than 3 mm in diameter and 1.5 mm in depth shall not be considered as a defect
- sound; produce affected by rotting or deterioration such as to make it unfit for human consumption is excluded
- clean; practically free of any visible foreign matter
- sufficiently developed; no shrunken or shrivelled kernels that are extremely flat and wrinkled, or with desiccated, dried out or tough portions affecting more than 50 per cent of the kernel
- free from blemishes, areas of discoloration or spread stains in pronounced contrast with the rest of the kernel affecting in aggregate more than 25 per cent of the surface of the kernel; the presence of hazelnut kernels with a brown or dark brown center, normally accompanied by a small separation of the cotyledons, which does not affect the taste or smell is not regarded as a defect
- free from living pests, whatever their stage of development
- free from damage caused by pests, including the presence of dead insects and/or mites, their debris or excreta. However, pest damage caused by cimiciato is allowed, provided that there is only one spot on the kernel that does not exceed 3 mm in diameter by 3 mm in depth
- free from mould filaments visible to the naked eye
- free from rancidity
- free of abnormal external moisture
- free of foreign smell and/or taste.

The condition of the hazelnut kernels must be such as to enable them:

- to withstand transportation and handling to arrive in satisfactory condition at the place of destination.