Agricultural Value Chain in Imereti and Racha regions

Berry farming

1 Introduction

The present research was carried out by the Association of Young Economists of Georgia in collaboration with Czech University of Life Sciences Prague (Faculty of Tropical AgriSciences) and People in Need from March 2015 to July 2015. This study is a part of regional value chain analysis for the main products of agricultural sector in Imereti and Racha regions.

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 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 Berry value chain analysis following districts were covered:

Table 1 - species of berries and relevant municipalities[1]

Species of Berry	Municipality
Strawberries	Terjola, Tkibuli
Raspberries	Baghdati, Kahragauli
Blueberries	Vartsike, Tkibuli

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

March to May 2015 - gathering field data for main products
June –July 2015- finalization of reports

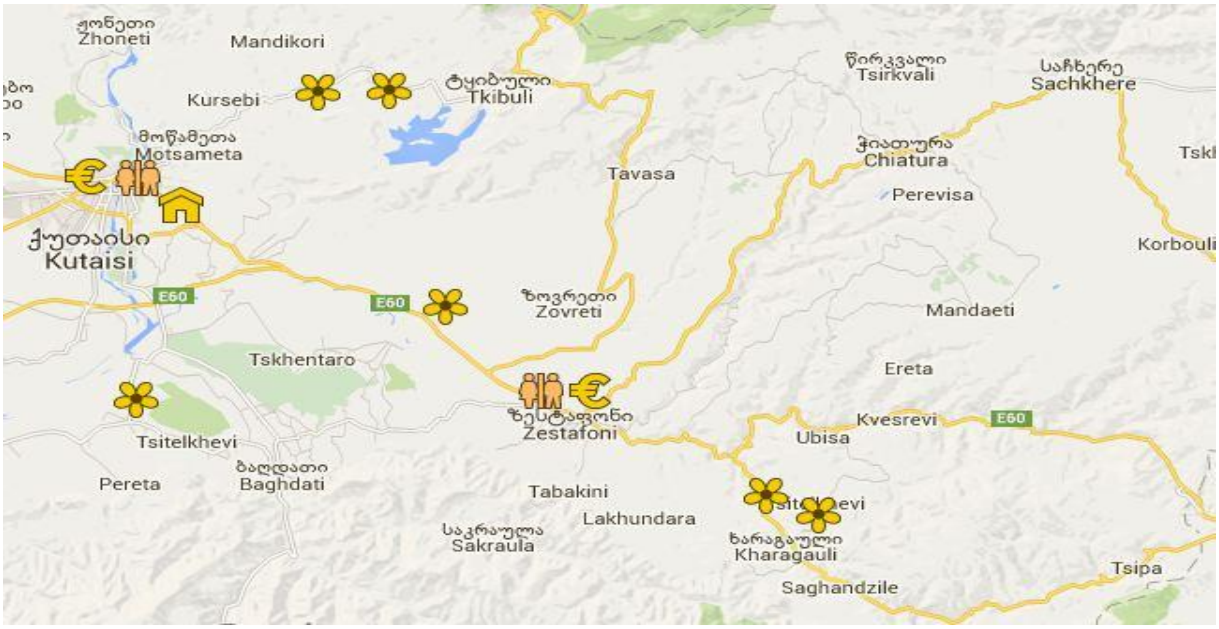
[1]Note: Berry farming is spread only in Imereti region, there have not been found any of them in Racha region.

For the analysis mainly qualitative research based on key-informants and conveniently selected group of farmers is used, which is designed to reveal a target group's range of behaviour 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 inputs.

Main field data collection instruments for Berry production included (spatial distribution is visualized in Picture 1):

Interviews with representatives of berry farmers
Interviews and observations of input supplier shops
Interviews with representatives of collectors
Berry market screening

Picture 1 - Map of locations for data collection in targeted region



Producer
Inventory Stores
Wholesaler
Local Market

However, it should be taken into consideration that qualitative research is only part of the project that generally reflects the most widespread information. The secondary quantitative and qualitative data is based on the unity of consolidated researches including official statistical data.

But still, it is necessary to bear in mind, that the qualitative research is only partially representative and captures mainly general and the most frequent information. The secondary quantitative and qualitative data relies heavily on an examination of existing, accumulated research, combining official government data with studies conducted by other organizations. etc.

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

3 Berry farming as Sector of Georgian Agriculture

Berry farming is a traditional part of agriculture in Georgia, common in almost all parts of the country and, due to the natural and climatic conditions of the different regions, the variety of berries produced in the country is very diverse.

Out of target regions, barriers are produced only in Imereti. In addition, during previous years just strawberries were cultivated and not for commercial purposes, but for household consumption. New raspberry and blueberry plantations were created about 3-5 years ago. The same crops can be successfully grown in the Racha region, however, there is no any berry farm identified.

The study shows that berry farming is developing quickly in the Imereti as market demand has risen. However, without official statistical data it is hard to determine the profitability and development prospects and trends in the field. Field experts state that production volume remains small and still cannot meet local demand.

Strawberry growing and picking is a traditional direction for the Imereti region therefore farmers are more occupied with growing strawberries rather than any other crops. Farmers mainly grow strawberries in their household plantation of which the area generally ranges from 0.05 ha to 0.5 ha, and their products are mainly sold on the local (regional) market. The raspberry and blueberry have only started to be grown in the last few years. Currently, there is up to 7 relatively large scale plantations of these corps in Imereti region.

Due to the small volume of production of berries there are no processing factories yet, although if production expands a processing enterprise could be profitable.

The natural and climatic conditions are favourable for berry crops, but in order to ensure the continuity of production it is necessary to cultivate berries in not only open fields, but also in greenhouses. At the same time, refrigerators are important in order to extend the season for these berries, a facility which none of the producers have at this stage.

Since berry specific national statistics is not available it is difficult to assess sector development state and prospective on country level.

4 Value Chain of Berry farming

4.1 Production Systems

About 10% of rural households (according to expert estimates) in the Imereti region own a strawberry plantation. In addition, in recent years, the plantation area has been systematically increasing. If 10-15 years ago strawberries were mainly grown only for personal or family consumption, now a large proportion is earmarked for market. As for raspberries and blueberries the cultivation of plantations in the region started only about five years ago and currently there are only two large and five small farms producing raspberries, for each of which the plantation area does not exceed 1 ha; and 2 plantations for blueberries with total area of 15 ha.

Strawberries

During the summer, strawberries are grown on open ground. Outside the season, the strawberries are grown in greenhouses and the periods of harvesting are in autumn, winter and spring.

There are two main species of strawberry in Georgia: short-day and day-neutral. Short –day species are intended for greenhouses and day-neutral - for open ground. The difference between them is the number of days it takes for the buds to develop. Short-day varieties of flower buds develop in the autumn, when the days are shorter, and the day-neutral strawberries develop buds regardless of the length of the day. Short-day strawberry varieties are harvested from late May through June. In appearance, the fruit is large, dark red and sweet. In addition, there are frost-resistant varieties which do not freeze even in the cold winter conditions, but they still need to be covered with mulch.

Day-neutral strawberry species blossom from June to autumn until the first frost, and they can be grown as multiyear or single year plants, and are relatively small in terms of size. Several factors are taken into account when choosing the area for cultivation of strawberries: soil type and fertility, acidity, drainage, wind, sunlight, water availability and crops previously grown in that area. The location should attract plenty of sunlight and should not be in low, areas. Ground where weeds have been growing, or where strawberries were being grown, should be avoided. The in soil formication is important, and it is also recommended that strawberries be cultivated in areas which had previously been used for grazing. A soil analysis should be conducted before cultivation, with the optimal level of acidity at 6-7 units. In western Georgia strawberries should be replanted in late September and early October, at which time the soil should be moist, at a

Picture 2 - Strawberry plantations in open soil

distance of 25-35 cm from each other and 1.2 meters between rows. Seven seedlings should be planted for each square meter.

Raspberries

Areas can be found in almost all regions in Georgia, where climatic conditions are favourable for growing raspberries, so there is excellent potential for the expansion of the production of these crops. Polish species of raspberry such as "Polka" and "rashka", as well as the American "tuleimani" are common in Imereti. As a rule, the region's farmers grow three varieties of raspberries.

Picture 3 – Raspberry plantation in Kharagauli

Raspberry is partially a bush with a height of 1.5 m, year-long vegetative grass like shoots, while the two-year shoots are bark like and fruitful, which dry up after reproduction.

Raspberries are an important crop for gardeners. The fruit has a delicate aroma and extraordinary taste. Raspberries are grown in rows which are separated from each other at a certain distance. Beams are set up in each row at a distance whereby metal can be stretched in between. The crops should be planted in a way in which they will be able to receive maximum sun light, although they can also be grown in the shade. The area should have naturally good drainage, be fertile, have a high level of organic substances (2-4%), with a pH indicator from 6.0 to 7.0. A sandy or lightly clayed area is best for raspberries.

Raspberries should be planted on flat or slightly inclined (<8%) land. Rows should be arranged in the opposite direction of the inclination in order to prevent soil erosion. Land preparation is done by tractor, it is plowed and the seedlings are planted by hand.

Blueberries

Blueberries are perennial flowering plants with indigo-colored berries from the section Cyanococcus within the genus Vaccinium (a genus that also includes cranberries and bilberries). Four

types of barriers from the genus Vaccinium are widespread in Georgia: mountain (Vaccinium myrtillus), blue (Bluebarries; Vaccinium uliginosum), red (cranberries - Vaccinium vitis-idaea) and Caucasian type (Vaccinium arctostaphylos). Farmers in the region of Imereti prefer to grow blue blueberries. The biggest blueberry plantations are in Vartsikhe (6 ha) and Tkibuli (9 ha).

Blueberries (wild type) are less demanding in terms of environmental conditions. They are grown in all types of soil, but acidic soil is necessary for maximum harvest. In wild conditions it grows in small, rocky and sandy soils. It has a relatively low demand for light and moisture. It is notable for a shallow root system and resistance to frost. It can bear up to 20-25 °C of frost.

Blueberries require one that is acidic, high in organic matter, and well-drained yet moist. pH should ideally be between 4 and 5.Bushes should be planted in the early spring. If available, one to three-year-old plants are optimal. Distance between rows should be 1.2 meters and between plants – 0.9 meters. Mulching is important for newly planted blueberries, mulching should be 25-40 cm wide and 10-15 cm deep. Mulching is done form various organic materials, most popular are: woodchips, saw dust, hey and nutshell. Blueberries start flowering in May-June and harvesting period covers July- August.

4.2 Productivity

A separate analysis of the production figures of all major species of berry found in the region is necessary to be undertaken in order to fully assess the productivity of the field.

Strawberry - Strawberries are a perennial berry containing a lot of vitamins. Its juice is used to treat anaemia, beriberi, gastric diseases and it improves the intestinal movement and metabolism.

3500 saplings are planted on 500 $m^2$of open ground from which 1kg of fruit can be yielded per sapling in case of appropriate care. . A total of 5% of the fruit is lost during harvest or for other reasons. Therefore, the maximum yield from a crop area of 500 m^2 is 3325 kg. The season price is 3-5 GEL per kg. Therefore, assuming that the average price is 4 GEL, which ultimately represents a profit of 13300 GEL. Labour costs for four persons during the season (2 months) are 2800 GEL, fertilizers and pesticides consumption cost an estimated 300 GEL, packaging containers cost 1500 GEL, leaving a net profit of 8620 GEL.

It is possible to cultivate 10 000 small plants on 500 m^2 in modern greenhouses which, if appropriately looked after, will give a yield of 1kg for every plant, from which the total harvest will be 10 tons. The selling price for the product out of season is 7-15 GEL meaning that assuming an average price of 10 GEL the income would be 95000 GEL. The labour costs of two people would amount to 9600 GEL (12 Months), fertilizers would cost 3000 GEL, electricity costs 400 GEL, water costs 1600 GEL, containers cost 4275 GEL which would leave a profit of 76125 GEL if the product was to be sold straight from the plantation, without the cost of transportation.

It will costs5200 GEL to plant on 500 square meters of space, of which 250 square meters would be for soil preparation, 150 GEL would cover the purchase of samulchi, 800 GEL covers irrigation systems, 500 GEL caters for workforce services, and 3500 GEL caters for the purchase of seedlings. The best species for open-field cultivation are "Fortuna" and "Festival".

Raspberry - Raspberries are divided into two groups according to their fruiting season: summer and autumn. Summer bearing raspberries produce fruit on two-year branches, approximately two months after the appearance of spring buds if they were not damaged during the winter. It grows vegetatively during the first year, its leaves fall in late fall and rest in winter. A new growth process begins in the early spring of the next year. Summer bearing raspberries do not produce fruit in the first year. Fall bearing raspberries bear fruit in their first year from shoots on the upper part of their branches after 6-8 weeks in the late summer and fall. This type of plant can fruit on the bottom part of its branches in the spring of its second year, during the 4-week harvest season.

Picture 4 - Raspberry plantation in Bagdati

In good conditions, raspberry bushes last 10-12 years. The selling price is 4-5 GEL per kg and peak season is May - June. 10,000 saplings are planted on 0.5 ha of land and 0.5 kg is obtained from each sapling. Therefore, if we take the average price of 4.5 GEL, then the total income from sales will be 22,500 GEL. The producers of the region generally sell their product directly from their farms and is mainly taken by wholesalers on the open markets, specifically: Kutaisi, Tbilisi, Zestafoni, etc. and.

Picture 5 - Blueberry plantation in Bagdati

Bluebarries – Various types of blueberries are widespread in the country and Imereti Region, but Legacy and Bluecrop are two most adequate and most disseminated in the Imereti Region. Table 6 describes major types of blueberrie

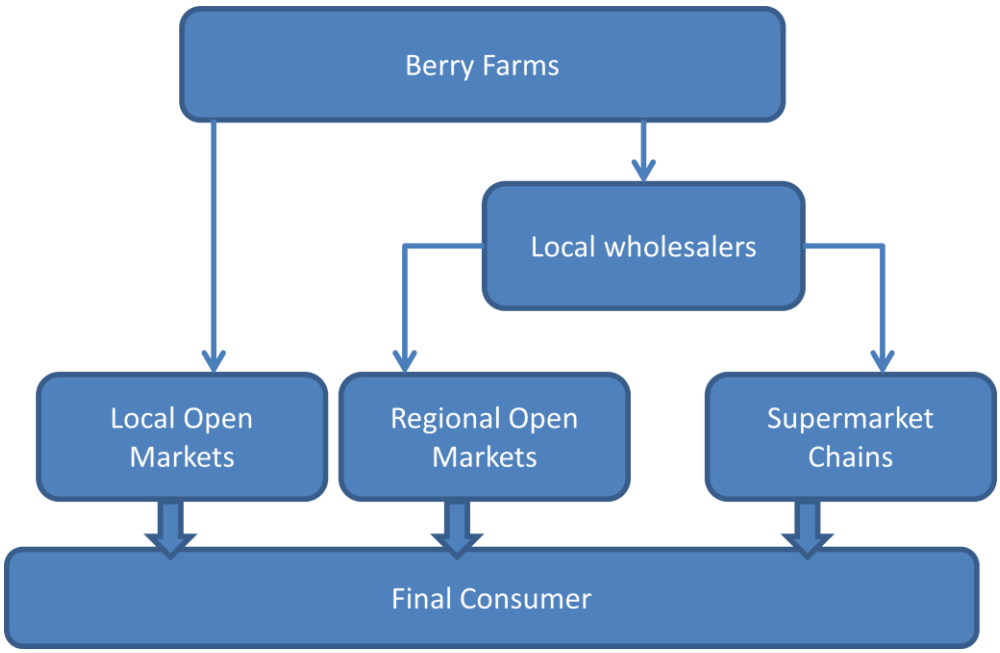
Table 2 – Characteristics of blueberry species

Species	Plant height (m)	Plant width (mm)	Harvest (kg)	Maturity (month)
Berkley	1.8 - 2.1		4-8	8
Blue crop	1.6 - 2.0	18-20	6-9	8
Patriot	1.2 - 1.8	19	5-7	7
Brijida	1.8 - 2.0	15	4-6	8
Duke	1.2 - 1.8	17-20	6-8	7
Sunrise	1.2 - 1.8	17-20	6-8	7
Legasi	1.2 - 1.8	17-20	6-9	8

The study showed that the retail price for blueberries in 2014 was 1,5 Gel and if we take into consideration that 3000 seedlings can be planted on one hectare then in the case of an average harvest the income from the species Legasi and Bluecorp would be approx. 33750 GEL (1.5 GEL (1kg) * 7,5kg (average yield from one plant) * 3000 (the amount of plants on 1 hectare).

4.3 Product chain typical for Imereti and Racha regions

Figure 1- Main value chain of berries in Imereti region



Barry Farmers – there are up to 100 small and medium scale farmers producing strawberries, 7 – medium size – for Raspberries and 2 large size ones are producing bluebarries. Just household based smalll farms sell products by themselvs on local open markets. Other producres sell barries from

farmers gate to wholesallers. Only one Farm in Vartsike has own proccesing line, which basiccaly just sorts and packs the fresh bluebarries. All the products are sold in fresh form.

Local and regional market - Mainly wholesalers deliver the barriers to the local markets. Some of the small farm owners themselves take the products to sell them at the local open market. Barriers are commonly taken to Kutaisi, Zestafoni and other municipalities. A small portion might also be brought to Tbilisi agri markets as well. .

Supermarket Chains The study revealed that large companies (for example Goodwill and Carrefour) mainly focus on relatively large producers who can ensure stable supply. Also, these large chains mainly transport the goods by themselves in refrigerated automobiles or have contracts with large wholesalers in order to ensure the quality, appearance and value of the product. Actually, only blueberries produced in Imereti region, (2 farmers in Vartiskhe and Tkibuli) deliver the product to supermarket chain through wholesalers.

Wholesalers - Medium and Large producers mostly sell their products directly from their farms to local wholesalers which, in turn, sell the products at the local and regional open markets. Each producer usually has regular communication with one or two wholesalers, who in turn have relations with a reseller in open market and /or a store which is provided with products according to demand. In addition, all producers sell their berries fresh and none of them have a storage refrigerator. There are up to 7 wholesalers, which work on barriers in the region.

4.4 Product Prices

The study showed that the prices in the region for berry fruit were quite stable over the past years due to the stable demand on the market. Slight changes (max. 20%) were mostly caused by the amount of crop production. A large amount of crop production causes a decrease in prices and vice versa.

Table 3 - Prices of berry products produced in Imereti region

Berries	Retail price GEL/ Kg		Wholesale price GEL/ Kg	
	Season	non-season	Season	non-season
Strawberries	3-5	12-15	1.5-3	10-12
Raspberries	4-5	12-17	2.5-3.5	10-15
Blueberries	3-5	10-12	2.5-3	8-10

5 Competitiveness Diamond – Input Conditions, Demand Conditions, Related Industries, Context

5.1 Supply of Inputs

The following components are necessary for the production of berry fruit:

Plant (seedling)

Strawberry - The cost of 1 seedling of strawberry is 1 GEL. Most popular varieties are "Fortuna" and "Festival". Just one medium size farm uses so called "Malina" strawberry – seedling of wich cost average 1.2GEL. Seven seedlings are planted on $1m^2$, therefore 3500 GEL is necessary in order to grow a plantation of $500m^2$. Strawberries can be planted in different schemes although two rows on higher land is the best choice and one of the most widespread methods in the world. In this case, the distance between the rows should be 30-35 cm, the cumin which is covered in black plastic mulch should be 60-67.5 cm in width. The distance between the strawberry seedlings should be 30-35cm, in accordance with the type. It is best if the seedlings are planted in a checkered pattern so that the plant in one row is diagonal to the plant in the other row.

Raspberry **-** Raspberry seedlings cost 1-1.5 GEL. It differs from other plants in that it only grows leaves the first year and short branches the second year on which the plant develops. In Imereti region farmers grow Nova and Carolina types of Raspberry, seedlings of which they buy in Karaleti (Shida Kartli Region)nursery house.

Blueberries - American seedlings were imported, which on its hand was considered to be the most suited to the conditions of Georgia, and which one plant cost 8 Euros (19 GEL) Nowadays farmers do not buy imported ones, since there are two nurseries one in in Samegrelo and another in Adjara Regions. They have in-vintro laboratory and make seedlings, the price varies from 5 to 8 GEL per unit. The seedlings are 1 year old and reach maximum yield after 4 years and still grow for up to 30 years.

Chemicals

The above described three crops need fertilizers to enrich the soil throughout the whole year, as well as chemicals to fight against a variety of diseases and parasites. However, as research shows, this burden is minimal in the initial cost, ranging from 5 to 10%. Farmers purchase them at nearby agro-shops, while the poisoning is done using mechanical machines or by electric vehicles in large farms.

Farmers in Imereti region mainly use following chemicals – Lipaedin, Beverin, Turingen. These means are used together and one litre of fluid is mixed in 50 litters of water.

Researched framers claimed that sometimes available on local agro-shops chemicals are not always of relevant quality. In order to avoid this, usually they buy the means they have already used and almost never try any novelties in this terms.

Labour force

The need for workers is seasonal. Specifically, the need for personnel arises in the spring and during harvest. According to the interviewed farmers the share for work remuneration from the overall

income is 10-15%. High levels of qualification are not needed for the work therefore finding workers is not difficult. Five people are needed for work on 1 ha and they receive 0.5 GEL for every picked kg.

5.2 Demand

Since there is no national statistics available on barriers production and consummation, it is difficult to measure actual demand and consumption pattern. According to experts, approximately 29 million GEL of strawberry, raspberry and blueberry was consumed in 2013 from which 75% was strawberry, 20% raspberry and about 5% blueberry. The demand is mostly from Tbilisi and other highly populated cities.

Mainly the barriers are consumed in fresh form. Demand as well as supply is highest on summer. Despite these barriers are also available in winter time as well, demand is very low. The consumers do not consider greenhouse barriers as healthy, and they avoid daily consumption, rather buy it for special occasions only. Also it is very popular to make the jams from barriers and stock it for whole years. Hence, many of families (both in urban and rural areas) buy barriers in large amounts in summer and make jams with own transitional recipe.

5.3 Related Industries and their Income

Most household farms in the region of Imereti work in various different segments of agriculture. Large farmers grow a couple of different types of berries which makes their business diverse. For example, a large farm in Bagdati grows raspberries and blueberries allowing for a high yield in one crop to compensate for a low yield in another.

None of them are engaged in any additional related industry. Apart of blueberries (seedling of which requires special laboratory), farmers have opportunity to develop seedling nurseries. Also in case they manage to increase volume of production, processing of barriers could be an profitable option for local farmers.

5.4 Competition

The competition in this field should be considered in the following two directions: first – direct competition which is between the local producers; and second - indirect competition from imported berries. Anyway the import is very low so far. According to official information, In 2013 the barriers of the genus vaccinium (digit code 081040) import was just 138 USD, in 2014 the indicator has significantly increased and reached 5 526 USD, which still remains as a very low in terms of any threat to the local producers or making any changes to market structure. As for strawberries, import data is much higher, but still insignificant in terms of market influence – 117 038USD in 2013 and 143 783USD in 2014. Presumable, import takes place mainly in winter period, to meet the increased demand on all types of fruit products during winter holidays (New Year, Christmas).

Regarding competition between producers, as they stated themselves, since the volume of their production is low they are all able to realize their products at a stable normal price during the year; therefore the competition is limited. However, it should be stated that due to the high price and profitability of the berry fruit, the area covered by plantations in the region is being expanded gradually and subsequently the volume of production will grow, which will create competition on the market.

6 Strategic Productivity and Quality

6.1 Berry production in relation to food safety and quality

The quality of the fruit which is sold on the market is subject to the control of the state which is the obligation of the national food agency. However, in reality the products do not go under stringent checking. However, the farmers themselves believe that their production would be able to meet quality control standards because it is produced in a clean environment, using natural food products. Although in the case of an increase in the volume of production of the berry fruits the producers will have to get in contact with foreign markets for export where quality control is very important and the sellers will have to prove their product's quality.

6.2 Berry production in relation to food safety and quality

Georgian legislation regulates food safety standards and norms to ensure market from unsafe production. However regarding the berry farming sector, there are no efficient and effective mechanisms for controlling the quality of berry production (raw and/or final) and to ensure that only high-quality products go to the market. Low interest from Georgia national food agency regarding the berry products is reasoned by small amount of self-produced berry products.

In order to develop the field of berry farming and export the products to the European market it is important to abide by the regulations of European law, which state the following:

Agricultural products have to respect European animal and plant health and hygiene rules to enter the EU. This is required for all imports, wherever they come from in the world. The DCFTA will help Georgian products meet the requirements, where they do not already do so. In order to develop the field of fruit farming and export the products for the European market must abide by the regulations of European law, which state the following:

- **The Basic Law on Food**: Regulation (EC) No 178/2002 laying down the **general principles and requirements of food law**, establishing the European Food Safety Authority and laying down procedures in matters of food safety;
- **Food labelling rules**: (Directive 2000/13/EC) to ensure that the product label meets all the specific requirements (product treatment, perishable dates, place of origin, etc.), is accurate and does not mislead the consumer. From 2015 will be replaced by Regulation (EU) No 1169/2011 on the provision of food information to consumers.
- **Hygiene Regulations** (Regulation (EC) No 178/2002) - possibly the most difficult requirement for processors to satisfy at this point in time, since current operators typically do not have adequate facilities, equipment or systems to ensure proper hygiene standards.
- **Processing Standards** - a certificate of conformity to various EU market standards governing: quality (processing facilities, additives)
- **Plant Health Control** - this regulation protects against the spread of plant pests. A certificate must accompany imports of plants and plant products.
- **Import License** - a license allowing the import agricultural products into the EU markets –For Georgia that also includes "GSP+" standard.

- **Permitted food additives** and their provisions: Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on **food additives**

Although currently none of the producers from the target regions are exporting their product, the field has good prospects for development and the above mentioned information would be beneficial for the farmers.

7 Operational Productivity – Processing, Transportation, Diseases and Biological Hazards

7.1 Processing

There are no berry fruit processing factories in the target regions. The study showed that the reason for this is the low production volume of the crop rendering a factory unprofitable. However, in the future, if production volume increases it would be possible for a factory to be cost-effective. Nowadays, there is only one production line In Imereti Region. However it is only for the sorting and packaging of the berries and is owned by blueberry farm.

7.2 Transportation

The need for transport in the field is not high. The producers use transport mainly for fertilizer and pesticides and since they are not needed in large amounts the farmers usually use their own vehicles. Also, small and medium sized producers/collectors usually supply their products to the market by means of public transport or their own private non-specialized light vehicles, but the number of products transported is usually rather small. In addition, unspecialized transportation reduces quality and shape of berry products. Large sized farmers/collectors mainly transport the goods by themselves in refrigerated automobiles or have contracts with large wholesalers in order to ensure the quality, appearance and value of transported product.

7.3 Diseases and Chemical treats

Cranberries - It can catch diseases such as monolease rotting, faded sprouts, grey rot, stem cancer and dried sprout. Some might attract mold in rainy and wet conditions.

In order to prevent these diseases from spreading, the plants should be sprayed with antifungal medicine such as topnise, uprane, copper and others. Blueberry bushes are damaged by Silkworm, leaveworms, aphids, beetles and May beetles. All available medicines are used in doses which are recommended by agri -experts. They can be purchased at any of the agricultural stores.

Raspberry - the main pests are weeds, insects and mites, diseases and nematodes. It is important for growers to know pest damage symptoms and frequent monitoring of plants is also important in order to prevent serious outbreaks. Early identification of pests and appropriate control measures are necessary in order to achieve satisfactory crop production and economic profit. The most common diseases of raspberry are caused by fungi, although some diseases can also be caused by bacteria and viruses. The severity of the disease depends on many factors including the type of plant, the stage of growth, environmental conditions, cultural practices and density of plants.

Strawberry - It often suffers from different pest problems from planting to harvest. There is a large variety of piercing-sucking and chewing pests. All tissues of the plant are vulnerable to pests, including the roots, crown, stem, leaves, flowers and fruit. Effective pest management programs include measures with frequent monitoring and, if necessary, appropriate treatment to avoid damage. It is necessary for growers to know symptoms of pest damage. The most serious disease is Aphids which is mainly found in nut plantations. There are many methods of pest prevention including sanitation, biological and chemical control.

8 Supply Chain Management – Flow of Goods and Information in the Chain

In most cases, the small-scale producers sell their products on the market themselves. They transport products using their own vehicles or public transport. Larger producers sell their product to large trade facilities (for example Goodwill and Carrefour supermarkets) and/or to wholesalers, who transport the goods by themselves. Large producers place the product in big boxes or pack them into small packages and send them in which case special transportation is needed which will ensure the right temperature for the product.

Small and medium size farms have verbal agreements to wholesaler. Only one large farm (producing blueberries) have written general contract with supermarket chain. Information flow is also verbal; neighbouring farms share the information among each other. There is no opportunity to update and or receive information on market, new technologies or modern ways berry farming available for regional farmers.

9 Human resources, social capital and know-how

9.1 Know-how and access to extension services

The study showed that the cultivation of berry fruits is becoming more and more popular in the region, although modern technologies are scarcely implemented and the fruit is produced through old traditional methods on open field. For many, the expense of applying modern methods is prohibitive.

Today, none of the producers in the region have refrigerators, which will ensure that the fruit will not spoil and consequently will enlarge the period when the crops can be delivered to the market. Some farmers have expressed their will to purchase refrigerators.

There are no any extension services provided by the government or non-governmental sector on one hand, and on anther farmers also are not looking for such opportunities. Since they do not have problems with selling the products, they do not pay additional affords for development.

9.2 Opportunities for Formal Education

There are practically no means of receiving formal knowledge regarding modern methods of berry farming in the regions. The University of Agriculture of Tbilisi is the only entity with bachelor and masters programs – but they also do not provide berry specific courses.

9.3 Social Capital and Cooperation

The level of cooperation in the field is quite low and limited to information exchanged via personal relationships. The small amount of entrepreneurs poses a problem withthe formation of cooperatives for raspberry and blueberry producers. As for strawberry farmers –despite their number is sufficient for cooperative initiatives, they have never even attempted to unite ther affords for any reason.

By all means there is certain opportunity for , farmers to jointly create plantations, buy pesticides, deliver the product to the market and determine terms of delivery with the buyer and conduct other activities together. So far this opportunities are not recognized by the locals.

10 Institutions and Business Environment

10.1 Business Environment

The interviewed entrepreneurs did not express any complaints regarding the business environment. They generally do not encounter any formal or informal barriers. However the biggest barrier cited is the limited or no access to finance, which does not allow them to quickly develop their farms.

Generally, it can be said that the business environment of the country is liberal, the volume of taxes is low, it is simple to start a business, property rights are protected and there are no institutional barriers on the market.

10.2 Governmental support

There are no state programs which are specifically targeted on the barriers' production development, although some general programs might have a positive impact, including the following programs executed by the Ministry of Agriculture: Produce in Georgia; Preferential agro-credit; Cooperative Promotion Project, etc.

The study showed that the main directions in which entrepreneurs need state support are the following:

- Purchase modern equipment through leasing, in order to develop storage systems with refrigerators;
- Control of the quality of pesticides and fertilizers on the market.

11 Conclusions and recommendations

11.1 SWOT

S • Favourable climate conditions • Stable demand on the market	W • Lack of storage facilities • Low access to financial resources • Low production volume • No extension service,
O • Building new plantations and increasing production volume • Development of cooperatives in the field	T • Risk of diseases • Weather conditions

11.2 Potential for improving the berry production chain?

Building new plantations and increasing production volume. Despite no official data is available on market size for berries, there is certain space for increasing production volume, since all existed farmers easily sell their products after harvesting. In a long run period export opportunities could also be an option. Creating new plantations or widening current ones will be beneficial as for current farmers, also for start-ups.

Processing factory - There is no full berry processing factory with full processing cycle in the region. The processing of berry fruit into different products would be a very profitable business since the local population frequently use products made from berries and even use them for medicinal purposes.

Storage facilities - Also, today none of the producers in the region have refrigerators, which would ensure that the fruit will not spoil and consequently increase the period in which crops can be delivered to market. So far they meet demand on season and do not have any difficulties in selling, but along with the prospective of increasing production volume, access to proper storage facilities will become a crucial point.

Development of cooperatives – Despite at the moment there is quite limited opportunities for cooperation mainly due to attitudes of strawberries producing farmers and also few number of other berry farms, cooperative initiatives could play important role for sector's development is the Region. This issue will become more important when competition will increase as within the region, also from other regions. Cooperatives could be a development solution especially for small scale strawberries' producers.

12 References and Bibliography

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