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VALUE CHAIN ANALYSIS OF MANDARIN
IN ADJARA

PEOPLE IN NEED CZECH REPUBLIC

PMC Research

Value Chain Analysis of Mandarin

In Adjara

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- **Khulo Local Action Group;**
- **Keda Local Action Group;**
- **„Black Sea Eco-Academy";**
- **„Union of Georgian Muslims".**

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Abbreviations and Acronyms

NNLE	Non-Entrepreneurial (Non-Commercial) Legal Entity
AR Adjara	Autonomous Republic of Adjara
GDP	Gross Domestic Product
GeoStat	National Statistics Office of Georgia
CSO	Civil Society Organisation
VCA	Value Chain Analysis
DCFTA	Deep and Comprehensive Free Trade Area Agreement
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	UN Food and Agriculture Organization Corporate Statistical Database
UNDP	United Nations Development Programme

Our sincere gratitude goes out to everyone who helped us with this study by partaking in meetings and interviews. This includes The Ministry of Agriculture of the Autonomous Republic of Adjara, farmers, cooperatives, collection and processing companies, exporters, international donor organisations and local civil societies.

1. Executive Summary

Production of food and agricultural produce (both in its primary and processed form) holds a significant share in the Georgian economy (approximately 14-16% of the GDP). Agriculture is particularly important for the development of the country's provincial regions, where the majority of the population is employed in this sector, and agriculture represents one of the main sources of income for many families. It is also worth noting that agricultural produce holds a relatively high share (approximately 30%) in the country's exports, and represents a large part of the exports to the European Union.

Although agriculture is not the main driving force of the economy in Adjara, it still plays an important role, particularly with regards to the production of citrus crops. Adjara is Georgia's leading producer of citrus fruit, supplying the local market and exporting a large part of the produce abroad. The main goal of this study is to conduct a value chain analysis for mandarin oranges (mandarins) in Adjara. Mandarins account for more than 90% of the region's and the country's citrus crop production.

More than half of the agricultural holdings in Adjara (54%, totalling 24,000 holdings) include a small mandarin plantation (0.2 ha on average), yielding up to 2 tonnes of mandarins each year. Although revenues from mandarin sales do not constitute the main source of income for such families, they still play an important part in generating revenues, particularly during the period before the New Year.

Apart from farmers, the mandarin value chain in Adjara also includes the collectors, consolidation centres, exporters, processing companies and others. From the farmer until the consumer, the value chain creates 2-3x added value, which is distributed unevenly among the participants in the chain. There is a lack of coordination and cooperation among farmers. There is also no vertically integrated value chain, and there are very few contractual relationships. Therefore, both the horizontal and vertical relationships in the chain are underdeveloped.

The state and donor organisations play significant roles in the mandarin value chain. Since mandarin is the main agricultural crop in Adjara, numerous programmes and projects are directed towards the development of this field each year (including the subsidies of fruit submission prices). As a result, there are individual cases of progress, but achieving rapid modernisation of the sector requires more proactive work.

Mandarin orange is one of the main agricultural products whose export brings in annual revenues to the Georgian economy. Nevertheless, the sector faces numerous challenges requiring a multilateral approach towards each link within the value chain, in order to ensure that the sector responds to the challenges of modern market economy and becomes competitive on high-value markets such as the European Union (particularly through DCFTA).

A large part (approximately 40%) of the mandarin plantations in Adjara is either old or suffers from diseases, requiring replacement. Due to lack of knowledge and access to funding, farmers cannot maintain the full agro-technological cycle, leading to a decrease in the yield (approximately 10 tonnes), as well as a high share (around 20%) of non-standard fruit. There are few early-season and late-season mandarin cultivars in the region, which prevents lengthening of the harvesting season and subsequently achieving higher prices and revenues.

The existing collection points and refrigeration facilities are often insufficient and do not satisfy the modern standards of quality that are prevalent in the leading mandarin-producing countries (e.g. Spain, Morocco, Turkey). Furthermore, the export markets of Georgian mandarin are less diversified, with more than 90% of the exports going to high-risk markets (Russia and Ukraine). Beyond the

traditional markets, it has not been possible to achieve coverage in new, more stable markets with high purchasing power.

Against this background, it is becoming increasingly difficult to establish oneself on the EU market. Last year, mandarin was exported to Poland and Lithuania in test quantities of 20t and 3t, respectively. It is worth noting that the mandarin cultivar most commonly grown in the EU countries (clementine) differs from the one cultivated in Georgia (satsuma). Thus, Europeans are used to the sweeter taste of clementines. On the other hand, Georgian mandarins have lower sugar content, which may be more attractive for the European consumer. However, a lot of effort will be required to convince Europeans to change their taste.

The testing and demonstration plots at NNLE Agro Service Center, operated by the Ministry of Agriculture of AR Adjara, have been testing new mandarin cultivars for several years. Several cultivars have already been recommended, and the ministry is operating a programme to help farmers replace overage mandarin trees with new saplings (including early-season cultivars). Unfortunately, such saplings are produced in limited quantities, and cannot enable renewal of plantations on a massive level. On the other hand, farmers have themselves not been showing much interest in renewing plantations and employing modern approaches for plantation maintenance. Interest among young people is critically low.

Against the background of the challenges that exist in each link of the mandarin value chain (production, sorting, storage, packaging, labelling, etc.), it will be difficult to achieve a sharp increase in exports of Georgian mandarins to the EU market within a short period of time. However, by undertaking a consistent approach, it can be possible to realise the export potential of Georgian mandarins on the European market in the medium and longer term.

2. The Aim of the Study

The aim of this pilot study is to familiarise civil society organisations with modern research methods for studying the agro-food sector, so that in future they can conduct such studies independently and enable a more effective use of the free trade regime with the European Union (more specifically, to provide all stakeholders with information about DCFTA).

The chief goal of the study is to analyse the value chain for mandarin orange, which constitutes one of the most significant agricultural crops in Adjara, in order to determine the potential of the mandarin production and processing industry in Georgia, particularly with regards to conducting exports to the EU.

The study will describe the mandarin value chain (from the producer to the consumer), identifying the limitations and advantages associated with the chain. Results of the study will be used to devise recommendations for development of the sector.

This is the first time that such a comprehensive value chain analysis (VCA) has been carried out for the Georgian mandarin sector, and we hope that the results of this study will act as a guide for all stakeholders to help develop the sector and improve the economic conditions for all the parties involved.

3. Methodology of Research

3.1. Product Selection

Various criteria have been used for the important process of selecting the agricultural product for this study. Representatives of the civil society organisations (CSO) partaking in value chain training presented a list of products, one of which was ultimately selected for the pilot study. This study should form the basis for the CSOs to independently conduct value chain analyses for various products in the future.

Having agreed upon the list of potential products, participants of the training proceeded to meet various stakeholders from the Adjarian agriculture sector, including farmers, representatives of cooperatives, the Ministry of Agriculture of AR Adjara and its sub-divisions, NNLE Agro Service Center and NNLE Agricultural Projects Management Center, CSOs, as well as regional representatives of UNDP and Mercy Corps. The aforementioned parties identified the following list of products that they believed to be important for the region: blueberries, garlic, mandarin oranges, bayberries, persimmon, kiwi, poultry products, dried fruit and potatoes.

Following the meeting, CSO representatives proceeded to establish the criteria and relevant coefficients (criteria weights), based on which mandarins were ultimately selected as the research product (for a detailed methodology of the selection process, see Appendix 1).

3.2. Deskwork

This study is based upon the analysis of the results obtained from various deskwork and fieldwork. More specifically, the deskwork included analysing (studying and processing) the existing data, such as statistics and publications. Furthermore, the modern literature, articles and strategic state documents related to mandarin production were studied.

3.3. Fieldwork

Most of the fieldwork was carried out in Adjara between October and December 2017. It included meetings with 4 focus groups representing various links in the mandarin value chain, as well as 24 face-to-face interviews.

Focus Groups

The first pilot meeting took place with a mixed focus group, which discussed the existing situation in the sector and composed the first draft of the mandarin value chain. The focus book guide – devised on the basis of the aforementioned meeting – was subsequently used for the other focus group meetings.

The municipalities of Khelvachauri and Kobuleti each hosted one focus group meeting with farmers, discussing the existing situation in the sector, the challenges and the advantages. Each meeting was attended by 7 farmers who were chosen based on various criteria, such as the size and location of mandarin plantations, gender, etc. A focus group meeting also took place with 7 representatives of the Ministry of Agriculture of AR Adjara. For detailed information about all focus group meetings, see Appendix 2.

Interviews

Apart from the focus groups, the region hosted 24 face-to-face interviews, using a pre-devised, semi-structured questionnaire. Respondents included farmers, suppliers of pesticides and saplings, refrigeration facility operators, processors, collectors, exporters, experts, representatives of the State Agricultural Service, and others. Furthermore, a group visit was made to the mandarin export and processing plant in Kobuleti. Two researchers attended the citrus forum in Batumi. Finally, several meetings took place with representatives, from the Ministry of Agriculture of AR Adjara. For details about all the interviews, see Appendix 3.

The fieldwork took place under the guidance of the PMC research centre representatives, and with the active participation of representatives from 4 CSOs.

The information obtained as a result of the deskwork and fieldwork was processed, analysed, and presented in the final report as follows:

- Market research of the mandarin sector was carried out, assessing the existing situation in the sector with regards to production and international trade in Georgia, as well as globally;
- The strengths and weaknesses of the Georgian mandarin sector were assessed;
- The whole link of the mandarin value chain was illustrated, including the participants and external factors;
- Vertical and horizontal relationships between the participants of the value chain were described;
- Added values were assessed for each chain link, both for the domestic mandarin market and the export market;
- Economic calculations were carried out for various categories of farmers;
- Requirements of the EU market and the potential of the Georgian mandarin on this market were studied;
- Obstacles to the development of the sector were identified, and appropriate recommendations were devised.

4. Research Limitations

This was a pilot study that had the goal of providing civil society organisations (CSO) with the experience of carrying out studies of this kind – something which they had little previous experience of. Nevertheless, CSO representatives provided a significant contribution to this document. Due to limited resources, the study could not be conducted on a large scale. However, meetings and interviews took place and material was collected in sufficient volumes to allow an analysis and relevant conclusions to be made.

The existing statistics about the number, area and average yield of the agricultural holdings with citrus fruit (mandarin) plantations, found in various sources (FAOSTAT, GeoStat and information supplied by the Adjarian Ministry of Agriculture), often differ significantly from each other. In many cases, we had to rely on local sources (GeoStat and the Adjarian Ministry of Agriculture data), as research showed that they were more accurate than others.

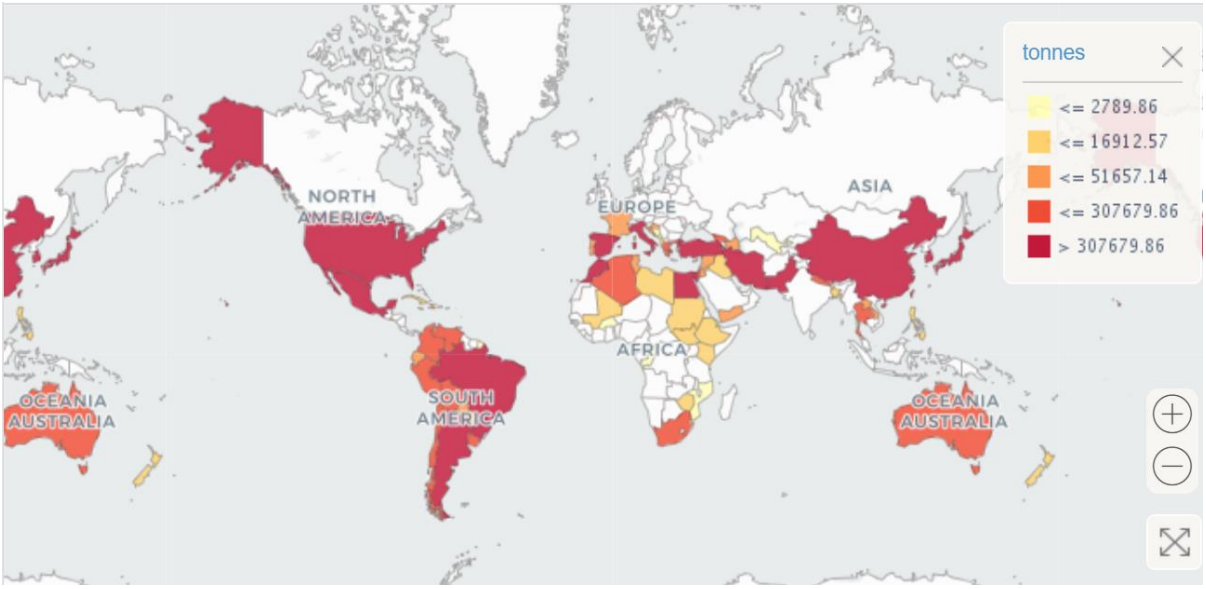
In spite of all of the above, this study represents one of the first attempts to comprehensively describe and document the Georgian mandarin sector. We would recommend to carry out more detailed studies in order to gain a deeper understanding of specific issues or specific links of the value chain.

5. Brief Overview of the Mandarin Sector

5.1. Global Production of Mandarins

According to FAO data for 2016, mandarin oranges were produced by more than 70 countries during that year[1]. Mandarin plantations covered 2.6 million hectares of land across the world in 2016, yielding approximately 32.8 million tonnes of fruit. The distribution across the continents was as follows: 22.2 million tonnes in Asia, 3.9 million tonnes in Europe, 3.9 million tonnes in the Americas, 2.7 million tonnes in Africa, and 0.1 million tonnes in Australia and Oceania.

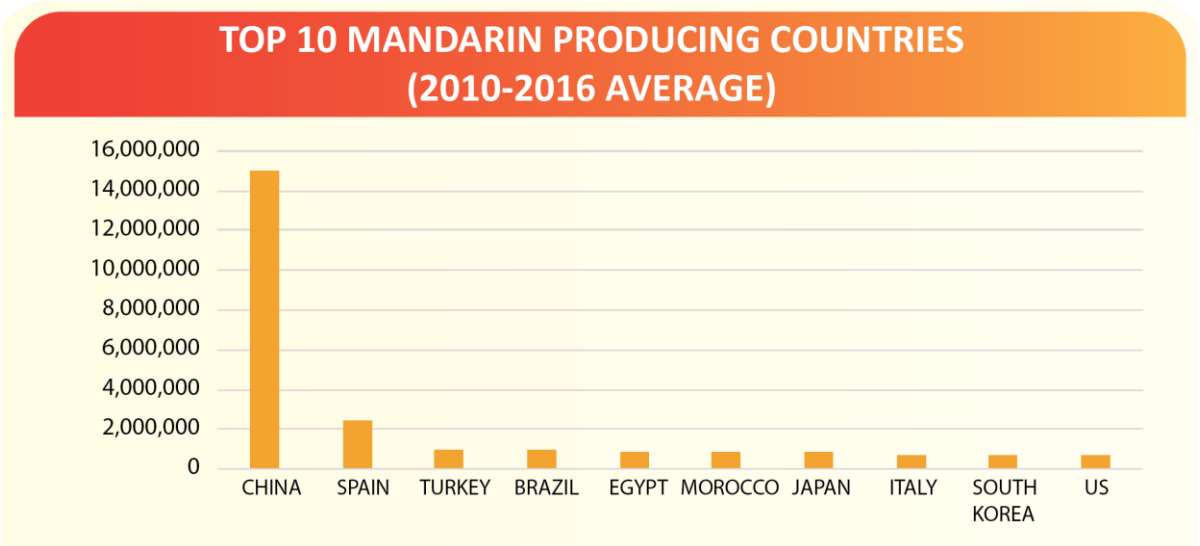
Map 2: Mandarin producing countries



Source: FAOSTAT (20.03.2018)

The top 10 of mandarin producing countries looks as follows:

Figure 17: Top 10 mandarin producing countries (2010-2016 average)

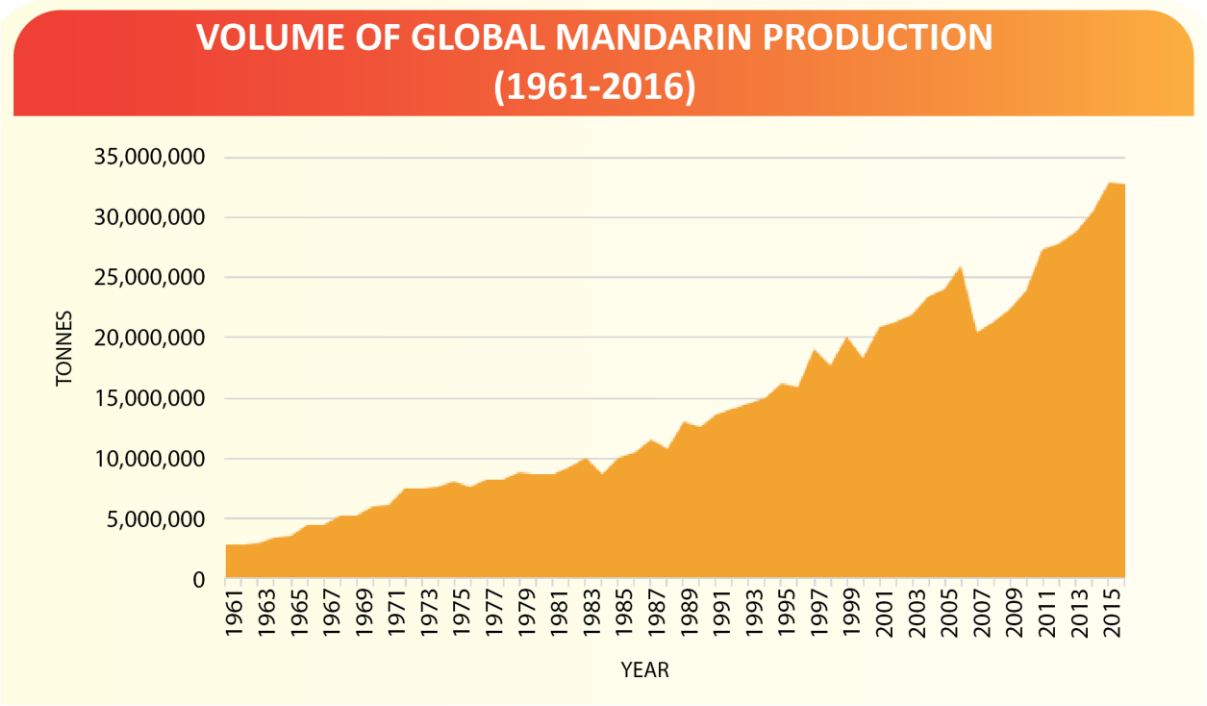


Source: FAOSTAT (20.03.2018)

[1] Apart from mandarins, this category also includes tangerines, clementines and satsumas.

The dynamics of global mandarin production vary between years, but there has been a substantial overall growth. Thus, only 3-4 million tonnes of the fruit were produced in the 1960s, while today's figure exceeds 30 million tonnes (see Figure 2).

Figure 18: Volume of global mandarin production (1961-2016)

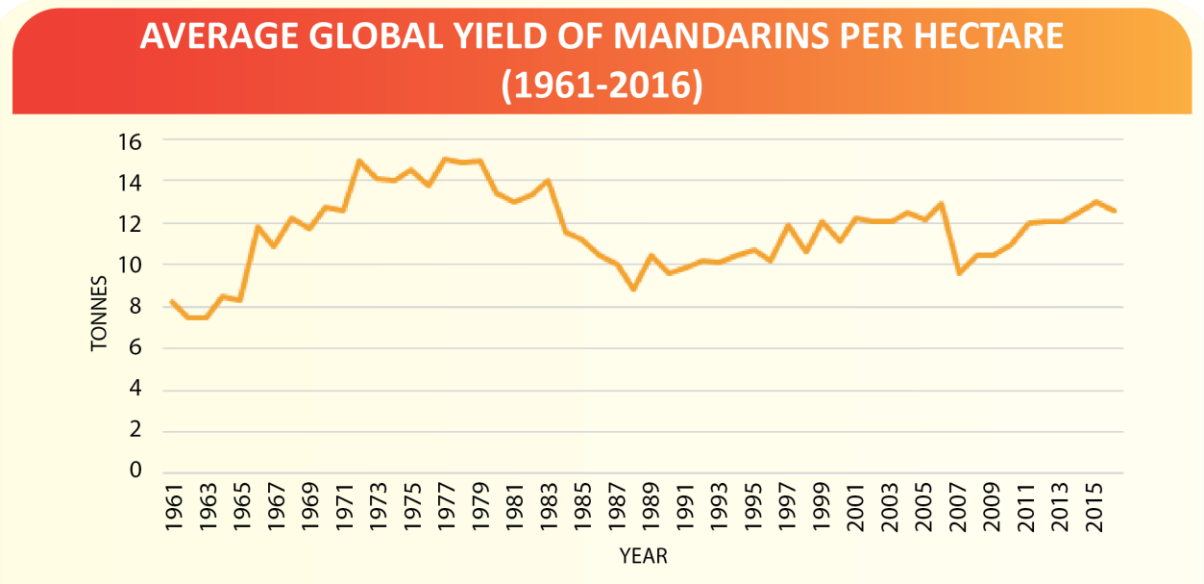


Source: FAOSTAT (20.03.2018)

Global production of mandarin is growing, although the 2006 harvest was significantly damaged by drought and frost. As a result, production figures fell by 22% in 2007, but subsequently began growing again.

While the number of mandarin plantations increased 7.6 times between 1961 and 2016 (from 0.34 million ha to 2.6 million ha), production volumes increased 11.6 times during the same period (from 2.8 million tonnes to 32.8 million tonnes). This indicates that the average yield per hectare has increased. However, the highest figure was recorded at the end of the 1970s, while in recent years, the figures have been fluctuating around the 12 t/ha mark (see Figure 3).

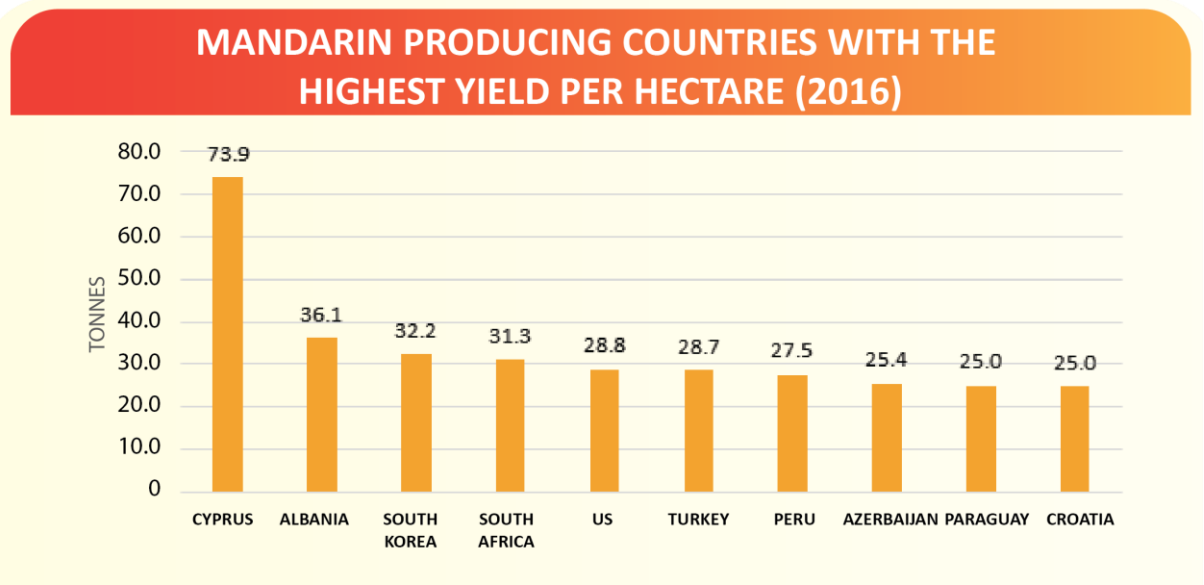
Figure 19: Average global yield of mandarins per hectare (1961-2016)



Source: FAOSTAT (20.03.2018)

The average yield per hectare in the world's most productive countries substantially exceeds the global average figure – the leading countries yield more than 24 t/ha (see Figure 4).

Figure 20: Mandarin producing countries with the highest yield per hectare (2016)



Source: FAOSTAT (20.03.2018)

5.2. Global Mandarin Trade

The global mandarin trade was worth approximately $4.5 billion in 2016 (for 5.1 million tonnes of mandarins).

Table 18: Main exporters and importers of mandarins by total value (2016)

Exporters	Importers
Spain	**Russia**
China	**Germany**
Turkey	**France**
Morocco	**United Kingdom**
South Africa	**United States**

Source: ITC – Trade Map (20.03.2018)

In 2016, the five main exporters accounted for 71% of the total mandarin trade. As for the imports, the share of the top 5 countries in this category was 48% in 2016.

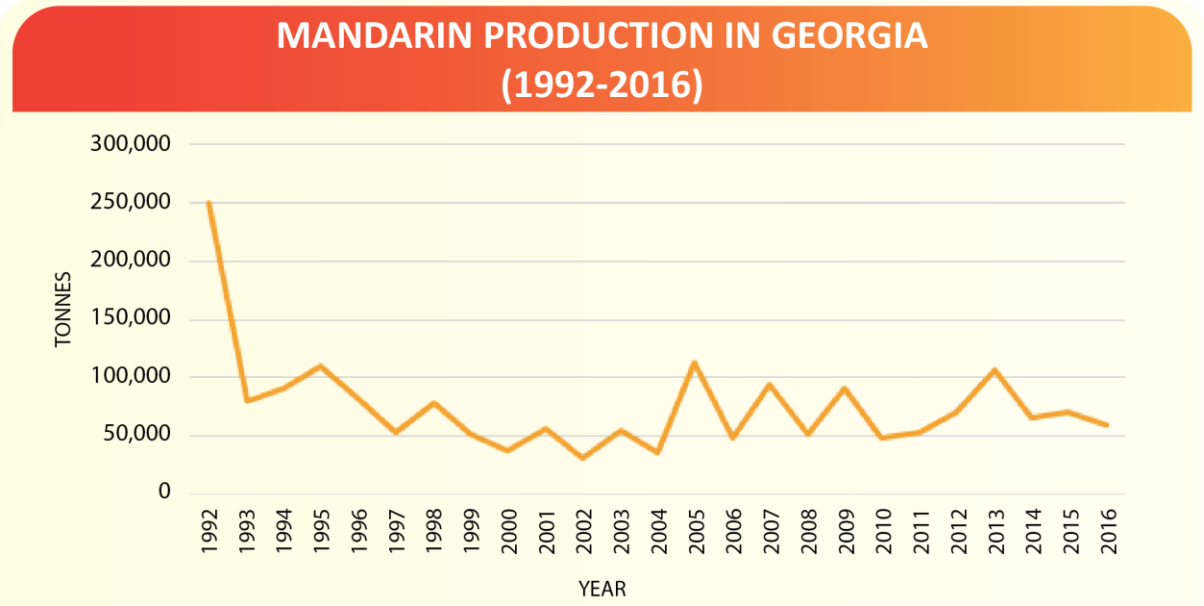
Mandarins are supplied to domestic and international markets both in fresh and processed forms. The global export value of mandarin concentrate reached $500-600 million in recent years. The leading countries in this category are Argentina, Netherlands, Italy, Spain and Mexico. The main importers of processed mandarin concentrate are the United States, Netherlands, Germany, Japan and France.

5.3. Mandarin Production in Georgia

Based on FAOSTAT data for 2016, Georgia ranks 30th among the 73 mandarin producing countries by volume of production. Mandarin was introduced in Georgia at the end of the 19th century from Italy and Japan[2], soon becoming popular in the east of the country. Georgia is one of the most northerly countries among those that produce mandarin.

The volume of mandarin production in Georgia today varies from year to year, based on climate conditions and periodicity (see Figure 5). In 2016, Georgia produced 60,000 tonnes of mandarins, while the record figure of 113,400 tonnes was set in 2005.

Figure 21: Mandarin production in Georgia (1992-2016)

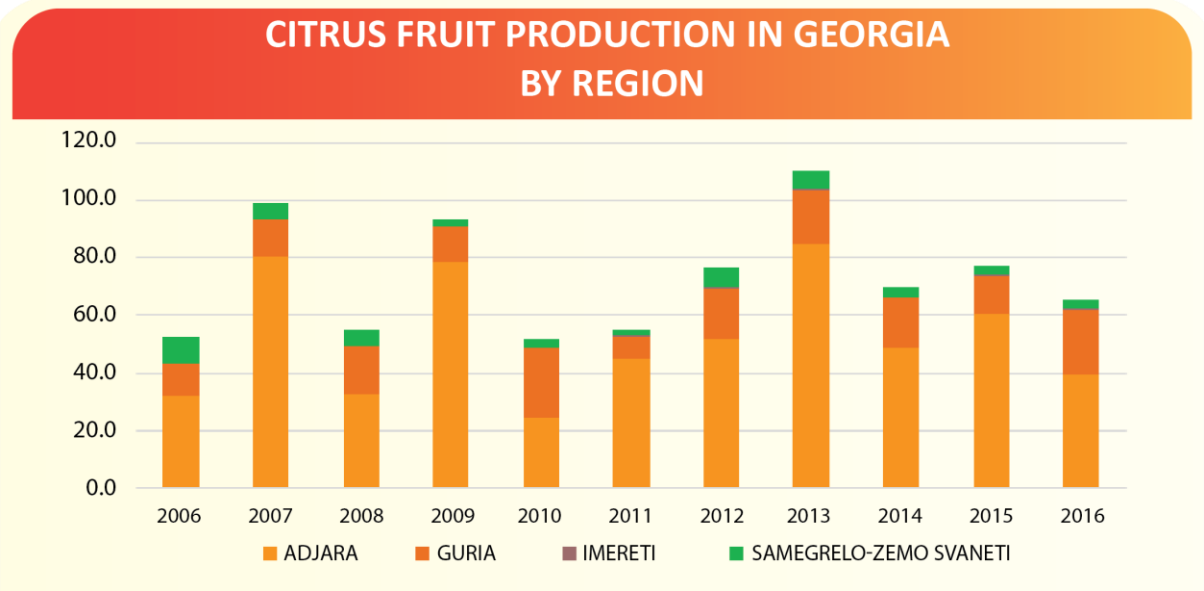


Source: FAOSTAT (20.03.2018)

[2] I. Lekveishvili, 1978;

The main citrus fruit-producing regions in Georgia are Adjara, Guria, Abkhazia, Samegrelo, and to a lesser extent, Imereti (see Figure 6). Approximately 70% of the country's citrus fruit is produced in Adjara. Mandarin oranges hold a 92% share in the country's citrus crop production.

Figure 22: Citrus fruit production by region



*Source: GeoStat. *No data available for Abkhazia.*

Based on the 2014 agricultural census, there are 37,400 holdings operating citrus fruit plantations in Georgia. Most of these holdings own citrus gardens of up to 1 ha in area, and only 16 holdings have a plantation that is larger than 3 ha in area. 74% of the holdings are cultivating citrus fruit on areas between 0.10 and 0.49 ha.

As for mandarin plantations specifically, the characteristics of an average holding are as follows: plantation size – 0.18 ha, which includes 120 mandarin trees; average yield – 1.8 tonnes. The main characteristics of the Georgian mandarin sector are listed in Table 2 below:

Table 19: Mandarin sector in Georgia

Mandarin Sector in Georgia (2014)									
Location	Mandarin Plantations	Mandarin Trees in Plantations		Holdings with Trees in Plantations	Average Mandarin Holding		Mandarin Production		
	ha (total)	Number of Trees (total)	Trees / ha	Number of Holdings	ha	Number of Trees	tonnes (total)	t/ha	kg/ tree
Georgia	**6 766**	**4 398 400**	**650**	**36 639**	**0.18**	**120**	**65 612**	**9.7**	**15**
AR Adjara	4 836	3 143 500	650	24 142	0.20	130	46 060	9.5	15
Guria	1 516	985 600	650	8 346	0.18	118	15 980	10.5	16
Imereti	24	15 400	650	239	0.10	64	188	7.9	12
Samegrelo-Upper Svaneti	377	245 000	650	3 892	0.10	63	3 384	9.0	14

Source: Author's calculations, based on GeoStat's 2014 agricultural census data

The table shows that as of 2014, mandarin plantations in Georgia covered 6766 hectares of land. The majority of them (71.5%) are located in Adjara, followed by Guria (22.4%), Samegrelo (5.6%) and Imereti (0.5%). The aforementioned area includes 4.4 million mandarin trees (650 trees per hectare). The calculated average yield per hectare is approximately 10 tonnes (approximately 15 kg or 250 fruits per tree[3]).

[3] An average mandarin fruit weighs 60g.

6. The Scope of Research: AR Adjara

6.1. General Characteristics

AR Adjara is located in south-western Georgia, next to the Black Sea. It is bounded to the north by Guria, to the east by Samtskhe-Javakheti, to the south by Turkey, and to the west by the Black Sea. Adjara covers a territory of 2900 square kilometres (4.1% of the Georgian territory), and its population is 337,000 (9% of the Georgian population). The region is highly urbanised, with 187,800 people (55.4% of the population) living in urban areas (GeoStat, 2016).

Map 3: Georgia (AR Adjara in red)

Source: Wikimedia

The gross added value of Adjara was ₾2.5 billion (8.5% of Georgia's GDP) in 2016.

Table 20: Gross Added Value of Adjara (Millions of GEL)

Sector	2011	2012	2013	2014	2015	2016
Agriculture	94.8	118.5	133.8	134.7	142.1	134.5
Manufacturing	129.8	131.0	152.3	159.3	170.5	204.0
Household Processing	60.8	58.7	62.2	62.9	65.7	62.8
Construction	142.6	200.0	223.9	316.0	323.9	341.5
Trade; Renovations	197.6	196.5	243.7	292.1	296.9	334.5
Transport and Communications	110.4	114.5	122.4	153.3	185.0	126.3
State Governance	284.4	188.0	180.1	170.6	183.1	224.6
Education	109.0	115.8	120.0	143.4	152.4	162.4
Healthcare and Social Services	147.6	121.7	120.6	150.3	168.0	215.8
Various Services	344.9	430.7	439.1	457.1	506.8	692.1
Gross Added Value (Total)	**1,621.9**	**1,675.4**	**1,798.1**	**2,039.7**	**2,194.3**	**2,498.5**

Source: GeoStat

Table 3 shows that as of 2016, the leading sectors in Adjara were the service sector (27.7%), construction (13.7%) and trade (13.4%). Agriculture held a 5.4% share in the region's GDP in 2016.

According to the 2014 agricultural census, there were approximately 45,000 holdings operating in Adjara (7% of the Georgian total). Adjara has less agricultural land that any other Georgian region apart from Racha-Lechkhumi and Lower Svaneti. The total area of land used by the agricultural holdings in Adjara is 19,700 hectares (2.5% of the total agricultural land in Georgia). The average area of land owned by a business entity in Adjara is 0.4 ha, which is considerably less than the Georgian average of 1.23 ha. Nevertheless, Adjara holds leading positions in various fields, such as citrus fruit and walnut production. The region also produces considerable amounts of sweetcorn and potatoes. Livestock production (cattle and trout production, beekeeping) is mainly practiced in the highlands of Adjara. In recent years, investments made in the agriculture of Adjara mainly cover the following fields: greenhouse and sapling production, freshwater fishing and processing (tea, tobacco and fruit, including nuts and citrus fruit[4]).

More than half of the agricultural holdings in Adjara own a mandarin plantation. Mandarin production is particularly important for the municipalities of Khelvachauri and Kobuleti, where 75% of the holdings own a mandarin plantation with an average area of 0.20 ha, 130 trees, and a yield of 1.9 tonnes of fruit. The average calculated yield of mandarins in Adjara is 9.5 tonnes for each hectare of land with 660 trees, each yielding an average of 15 kg of fruit. Detailed information regarding the mandarin sector in Adjara is shown in the table below.

Table 21: Mandarins in Adjara

Mandarins in Adjara (2014)										
Location	Holdings	Mandarin Plantations	Mandarin Trees in Plantations		Holdings with Trees in Plantations	Average Mandarin Holding		Mandarin Production		
	#	ha	Number of Trees	Number of Trees	Households	Ha	Number of Trees	tonnes	t/ha	kg/ tree
Georgia	**642 209**	**6 766**	**4 398 400**	**650**	**36 639**	**0.18**	**120**	**65 612**	**9.7**	**15**
AR Adjara	**44 757**	**4 836**	**3 143 500**	**656**	**24 142**	**0.20**	**130**	**46 060**	**9.5**	**15**
City of Batumi	6 541	583	379 200	627	4 131	0.14	92			
Kobuleti	15 237	2 682	1 743 500	678	11 311	0.24	154			
Khelvachauri	10 836	1 569	1 020 000	631	8 684	0.18	117			

Source: Author's calculations, based on GeoStat's 2014 agricultural census data

[4] AR Adjara Regional Development Strategy 2016-2021: http://adjara.gov.ge/uploads/Docs/acdb5711834a4d0e86f1f4f04e46.pdf

Picture 1: A mandarin plantation in Adjara

Photo: Manana Kartsivadze

6.2. Mandarin Types and Cultivars

The climate and soil conditions in Western Georgia are favourable for commercial production of mandarin oranges. The type of terrain where mandarin gardens are cultivated is of major importance. The terrain types of choice are plains, small slopes (0-5^0), medium slopes (5-2-^{0}) and steep slopes (no more than 20-30^0)[5]. Mandarin gardens require warm plots, located at an altitude of up to 350 metres. Preferable soil types include deep, carbonated, humus-rich red, as well as lightly and medium-carbonated or alluvial soils[6].

Mandarin cultivars differ by the strength and length of their development. Since Georgia is one of the most northerly mandarin-producing regions, it is easier to cultivate relatively frost-resistant species here. One such species is the Japanese cultivar Unshiu, which can withstand temperatures below -10 to -12 °C, and is widely used in Georgia. Its trees grow 4-5 m in height, and stand out through their broad oval crowns. The fruit is medium to large in size (50-75 g), seedless, sweet-sour, and its chemical composition is as follows: sugars – 6.17%; acidity – 0.98%; vitamin C – 36-38%.

Other cultivars that are popular in Georgia include the Georgian early-season cultivar, which represents a somatic mutation of the Unshiu. It was discovered in 1958 in Chakvi. Its trees are relatively short (1.8-2.5 m), with strong, compact branches. Its fruit is large (82-85g), round, with an aromatic, sweet-sour taste. Compared to Unshiu, the fruit ripens 25 days earlier. Kawano Wase is a

[5] http://agronews.ge/mandarinis-movla-moqhvanis-intensiuri-teqnologia-rekomendatsia/
[6] http://agrokavkaz.ge/dargebi/mebageoba/tsitrusi-mandarinis-movla-moqhvanis-thanamedrove-teqnologiebi.html

cultivar of Japanese origin, and is a variation of the Unshiu mandarin. Its trees are 2.0-2.5m in height, while its fruit is large (75-90g), round, slightly flat, with a sweet-sour taste. The fruit ripens in the first half of October[7].

Other known early-season cultivars include Miyagawa Wase, Okitse Wase, Miho Wase, Tiahara Unshiu, and others. There are 28 mandarin cultivars represented at the testing and demonstration plots at NNLE Agro Service Center, built in 2012 in Chakvi, and operated by the Ministry of Agriculture of AR Adjara[8]. Recommendations regarding cultivation of the Tiahara Unshiu have already been issued, as a result of which, 7 hectares were cultivated in 2016. This is an ongoing process, and the Adjarian Ministry of Agriculture operates annual programmes to help farmers cultivate new mandarin plantations and substitute overage trees with new ones.

[7] Z. Gabrichidze (2015). Agrotechnology of Citrus Fruit (http://srca.gov.ge/files/%E1%83%AA%E1%83%98%E1%83%A2%E1%83%A0%E1%83%A3%E1%83%A1%E1%83%98%E1%83%A1_%E1%83%90%E1%83%92%E1%83%A0%E1%83%9D%E1%83%A2%E1%83%94%E1%83%A5%E1%83%9C%E1%83%9D%E1%83%9A%E1%83%9D%E1%83%92%E1%83%98%E1%83%90.pdf)

[8] http://agrosc.ge/greenhouse.php?id=2&lang=ge

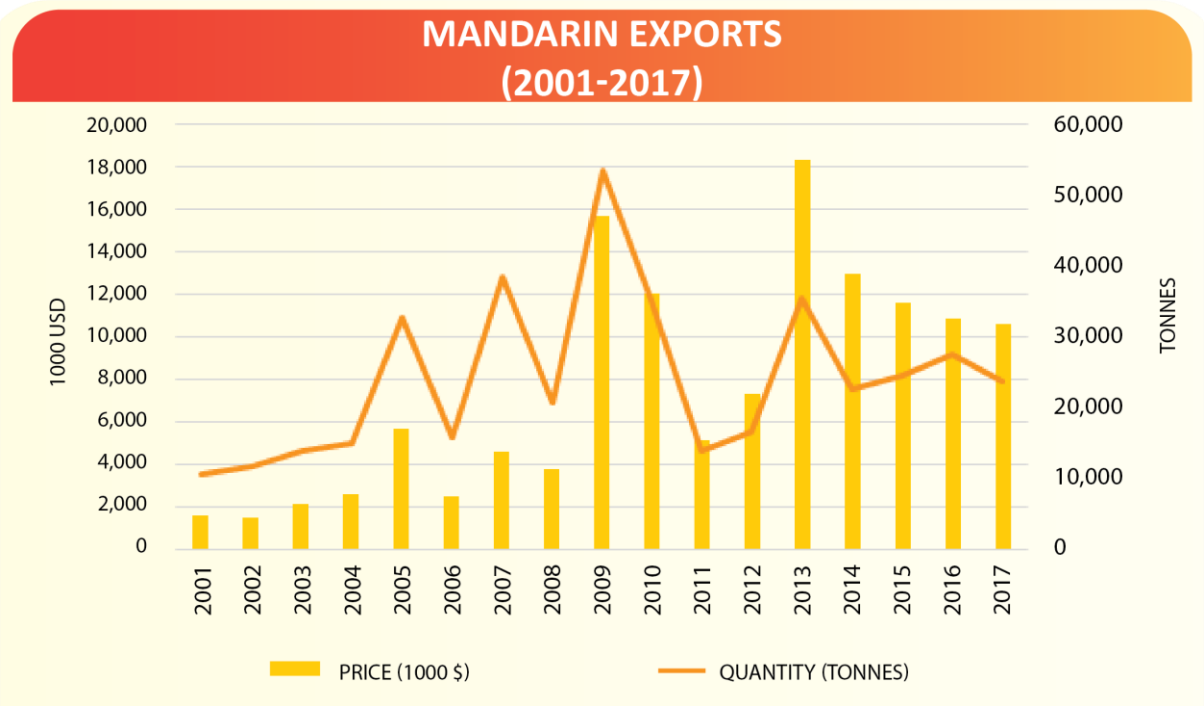
7. Mandarin Export and Import

Mandarin is one of Georgia's most important exports, as it is one of the country's leading agricultural products. Standard mandarins are exported in fresh form, while non-standard fruit is processed locally and exported in the form of concentrate (see below for details).

7.1. Mandarin Export from Georgia

Figure 7 below shows the data for mandarin exports by year (2001-2017). We can see that there was a sharp growth in mandarin exports in 2009-2010, and later in 2013. These leaps coincided with relatively high yield figures in Georgia. Also, in the former case, the majority of exports went to Ukraine, while in the latter case, the growth in export figures was conditioned by the lifting of the Russian embargo on Georgian produce. There are no figures to show precisely what percentage of Adjarian mandarins is being exported. We can assume that the share of Adjarian-produced mandarins in the country's total volume of mandarin exports is similar to Adjara's share in domestic mandarin production, i.e. around 70%.

Figure 23: Mandarin exports from Georgia (2001-2017)



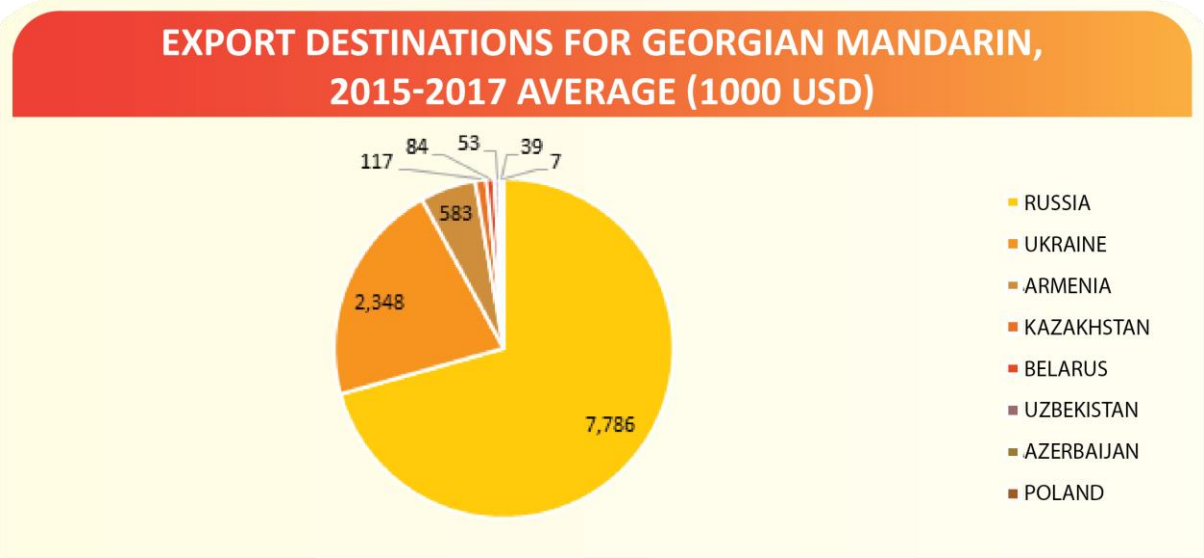
Sources: GeoStat and ITC (www.trademap.org) (30.03.2018)

Based on the official data from the last three years, Georgia's annual mandarin exports amounted to 25,000 tonnes on average (40% of the total output), representing a value of around $11 million[9].

The main export markets for Georgian mandarins are countries of the former USSR, and particularly Russia and Ukraine, which account for more than 90% of the mandarin exports over the past three years (see Figure 8).

[9] Furthermore, the Adjarian Ministry of Agriculture estimates that 8000 tonnes of mandarins are being exported to Azerbaijan each year. They are not included in the official export data, as they are not subject to customs registration.

Figure 24: Export destinations for Georgian mandarin



Sources: GeoStat and ITC (www.trademap.org) (30.03.2018)

With regards to the price of mandarin exports, the highest figures were recorded in 2014, when they reached the 576 USD/t mark. The subsequent slight decrease in prices was largely due to the devaluation of the lari against the US dollar, as the figures would have continued to grow if converted into the national currency. The average figure for the last three years was 438 USD/t. The highest price for Georgian mandarin exports during this period was recorded in Belarus (545 USD/t), while the lowest prices were recorded in Kazakhstan (361 USD/t) and Uzbekistan (398 USD/t). The prices on the largest export markets were 448 USD/t for Russia and 409 USD/t for Ukraine.

Mandarin export from Georgia starts in October, peaking during the most active phase of the 'orange harvest' in November and December. By February and March, the volume of mandarin export is greatly reduced.

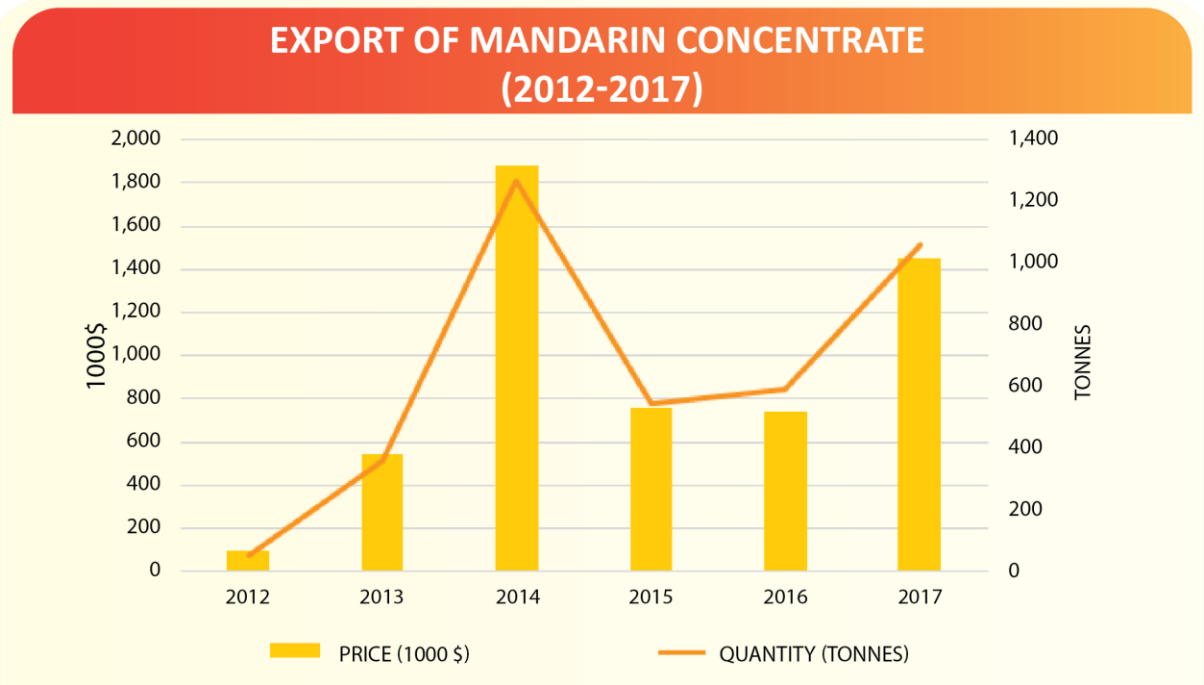
Export of Mandarin Concentrate

Apart from fresh mandarins, Georgia has also been actively exporting mandarin concentrate[10] since 2012. Over the last three years, the country has exported an average of over 700 tonnes of mandarin concentrate worth approximately $1 million each year[11] (see Figure 9).

[10] Non-standard mandarin fruit is processed into concentrate.

[11] In terms of the volume of mandarin fruit, concentrate produced from approximately 11,000 tonnes of non-standard mandarins (an average of 732 tonnes of concentrate) was exported annually between 2015 and 2017.

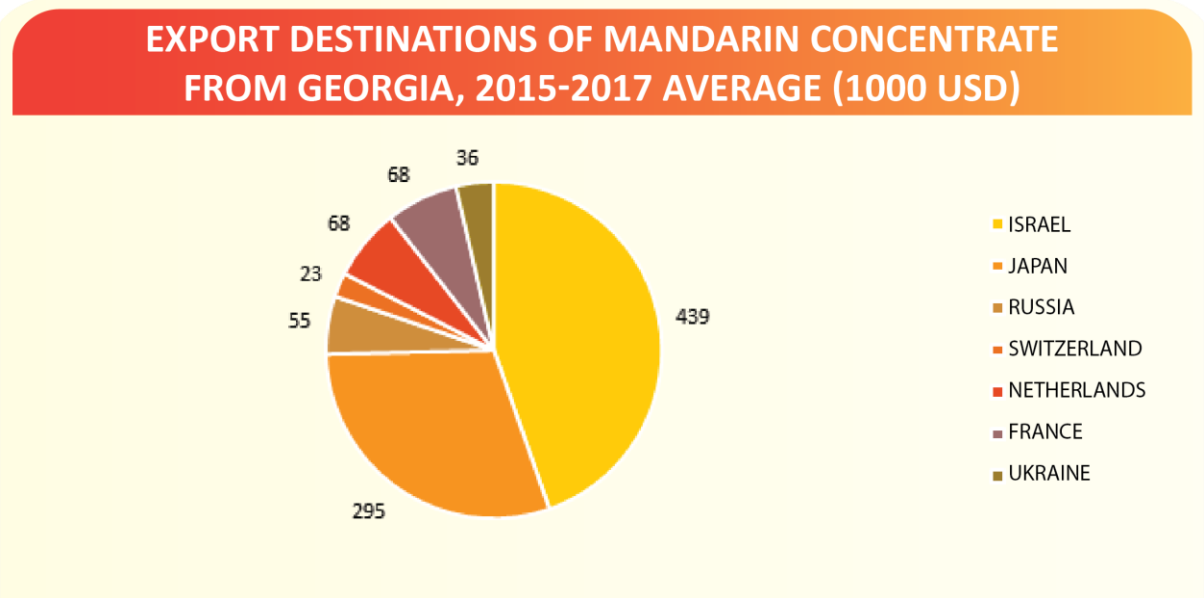
Figure 25: Export of mandarin concentrate from Georgia



Sources: GeoStat and ITC (www.trademap.org) (30.03.2018)

The main destination countries for mandarin concentrate exports are high-value markets such as Israel and Japan, which account for 75% of the exports (see Figure 10). Other destinations include France, Netherlands, Switzerland, Russia and Ukraine. The average price of the concentrate is 1400-1500 USD/t.

Figure 26: Export destinations of mandarin concentrate from Georgia



Sources: GeoStat and ITC (www.trademap.org) (30.03.2018)

Due to the fact that mandarin concentrate can be stored for a relatively lengthy period of time (approximately 2 years in refrigerated conditions), it can be exported throughout the year.

Picture 2: Mandarin concentrate in a processing plant in Adjara

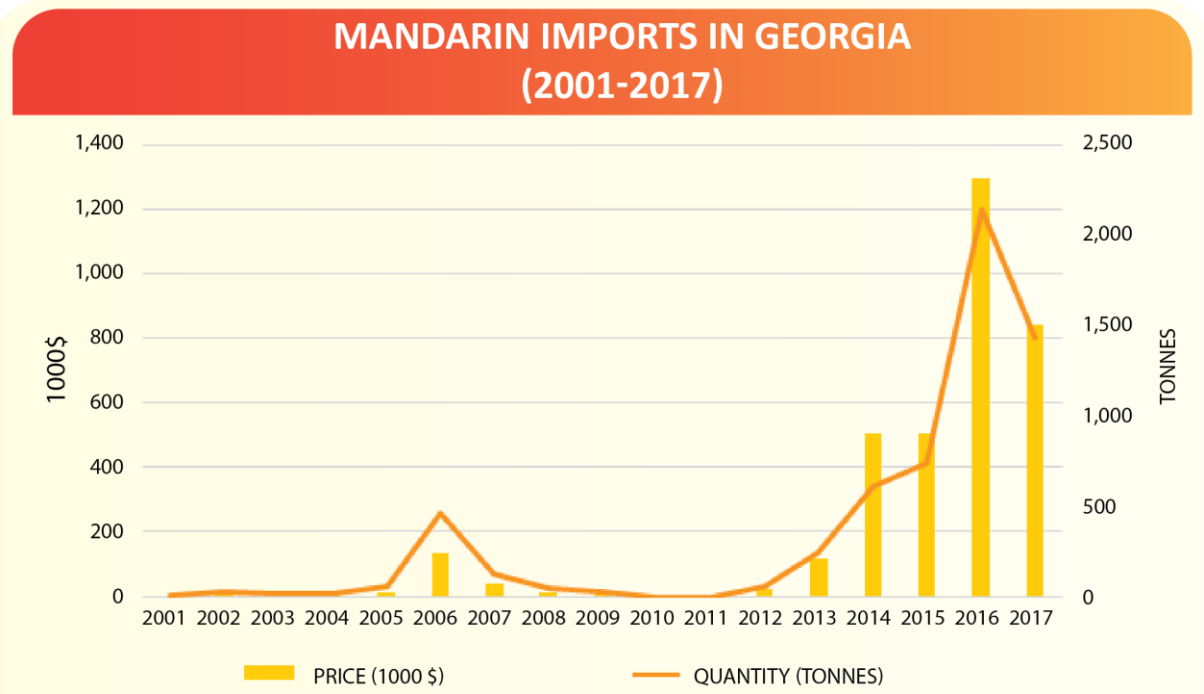
Photo: Ministry of Agriculture of AR Adjara

7.2. Mandarin Imports in Georgia

Although Georgia produces substantially more mandarins than it consumes, mandarin imports are still coming into the country. This mainly happens during the months when local mandarin is not yet ripe (September and October), or when local supplies are exhausted (April and May).

Figure 11 below shows that mandarin imports to Georgia have increased during the recent period. Approximately 1000-2000 tonnes of the fruit, worth between $500,000 and $1.3 million, are being imported in Georgia.

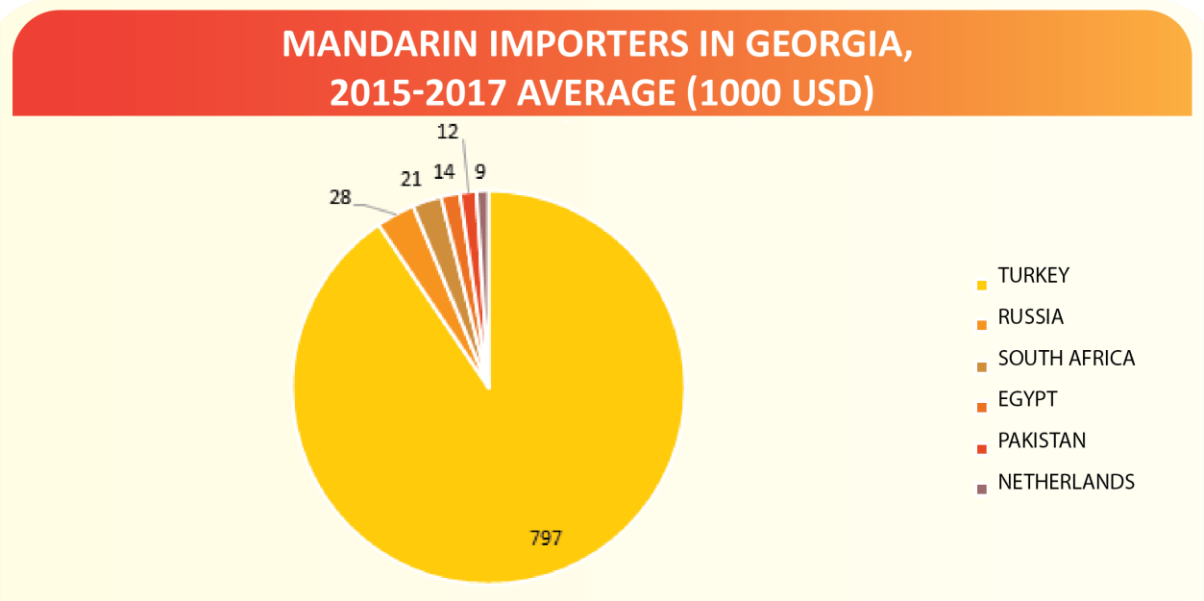
Figure 27: Mandarin imports in Georgia (2001-2017)



Sources: GeoStat and ITC (www.trademap.org) (30.03.2018)

The main importer is neighbouring Turkey, which has a 90% share in total imports, with other countries holding minor shares of the import market (see Figure 12).

Figure 28: Mandarin importers in Georgia



Sources: GeoStat and ITC (www.trademap.org) (30.03.2018)

With regards to import prices, they vary considerably between countries. The average import price is 630 USD/t. The average price of mandarins imported from Turkey is 600 USD/t. However, it has to be pointed out that import prices vary considerably from one month to another, exceeding the 1000 USD/t mark during the period between May and August.

Georgia also imports some mandarin concentrate, though its volume and value is minuscule, never exceeding several tonnes and $1000. It is mainly used by juice production companies.

8. Mandarin Value Chain in Adjara

8.1. Description of the Mandarin Value Chain in Adjara

Mandarin produced in Adjara is mainly divided into three categories – Super, Class 1 (both in the standard category), and NS (non-standard).

Non-standard Mandarin

Non-standard mandarin includes fruit that has a diameter of less than 40-45 mm, and/or a damaged surface. The percentage of non-standard fruit within the total yield varies from one year to another, mainly depending on weather and quality of plantation maintenance. In 2015-2017, the share of non-standard mandarin was 17% on average. This category of mandarin fruit has been subsidised by the government for several years. Whenever a processing company pays at least 20 tetri (₾0.2) per kilogram, the state covers 10 tetri of that amount[12].

The two main mandarin-processing companies are LLC Georgian Industrial Asset Management Group and TCF Georgia, the former of which processes 2-3 times more fruit annually than the latter. Based on the average figures from the last three years, 11,000 tonnes of mandarin are processed in the country as a whole. As the average price is 0.20 GEL/kg, we can assume that farmers' revenues from selling non-standard fruit is approximately ₾2.2 million per year, half of which is paid by the processing company, while the other half is subsidised by the state.

Processing companies use non-standard mandarin to produce mandarin concentrate. On average, 15 tonnes of mandarin produce 1 ton of concentrate, which has a sugar content of 60%. In turn, 1 litre of concentrate produces 5 litres of juice. Thus, we can calculate that 3 kg of non-standard mandarins produce 1 litre of juice. Concentrate can be stored for 2 years in refrigerated conditions.

Each year, a minimum of 20% of the harvested mandarins end up in the non-standard category, which twice exceeds the figures in major mandarin-producing countries[13].

Standard Mandarin

Standard mandarins are divided into two quality categories – Super, which is larger than 55 mm in diameter and has an undamaged surface, and Class 1, which has a diameter of 45-55 mm and insignificant damages to its surface. Standard mandarins are sold both on the local and export markets. Fruit designated for export is calibrated, waxed (though not in all cases), placed in plastic, cardboard or wood packaging, and sent to destination countries using various forms of transport[14].

Research shows that approximately 1/3 of the mandarin harvest is consumed on the domestic market. These are largely standard mandarins, although in recent years, the relatively undamaged, non-standard fruits have also been sold in fresh form on the local market[15].

Average domestic consumption of mandarins in 2015-2017 was 22,400 tonnes[16], of which 1400 tonnes (6.25% of the total) were imported, while Georgian produce accounted for the rest.

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[12] http://adjara.gov.ge/Branches/description.aspx?gtid=608538&gid=4#.WsUEVohuZnI

[13] For example, the share of non-standard mandarin in Turkey does not exceed 8-10%.

[14] http://citrus.moa.ge/index-ge.html

[15] The diameter of such fruit can be less than 40 mm, but its surface must not be damaged.

[16] On average, 25,000 tonnes of mandarins were exported in 2015-2017 in fresh form. Additionally, small quantities of mandarins exported to Azerbaijan are not included in official statistics. According to the Adjarian Ministry of Agriculture, they account for 8000 tonnes annually. An average of 11,000 tonnes of non-standard mandarins were used to produce concentrate, mostly for export. If we take the total average amount produced in the country (65,000 tonnes), subtract the

Picture 3: Standard-category mandarins, ready to be exported (Adjara)

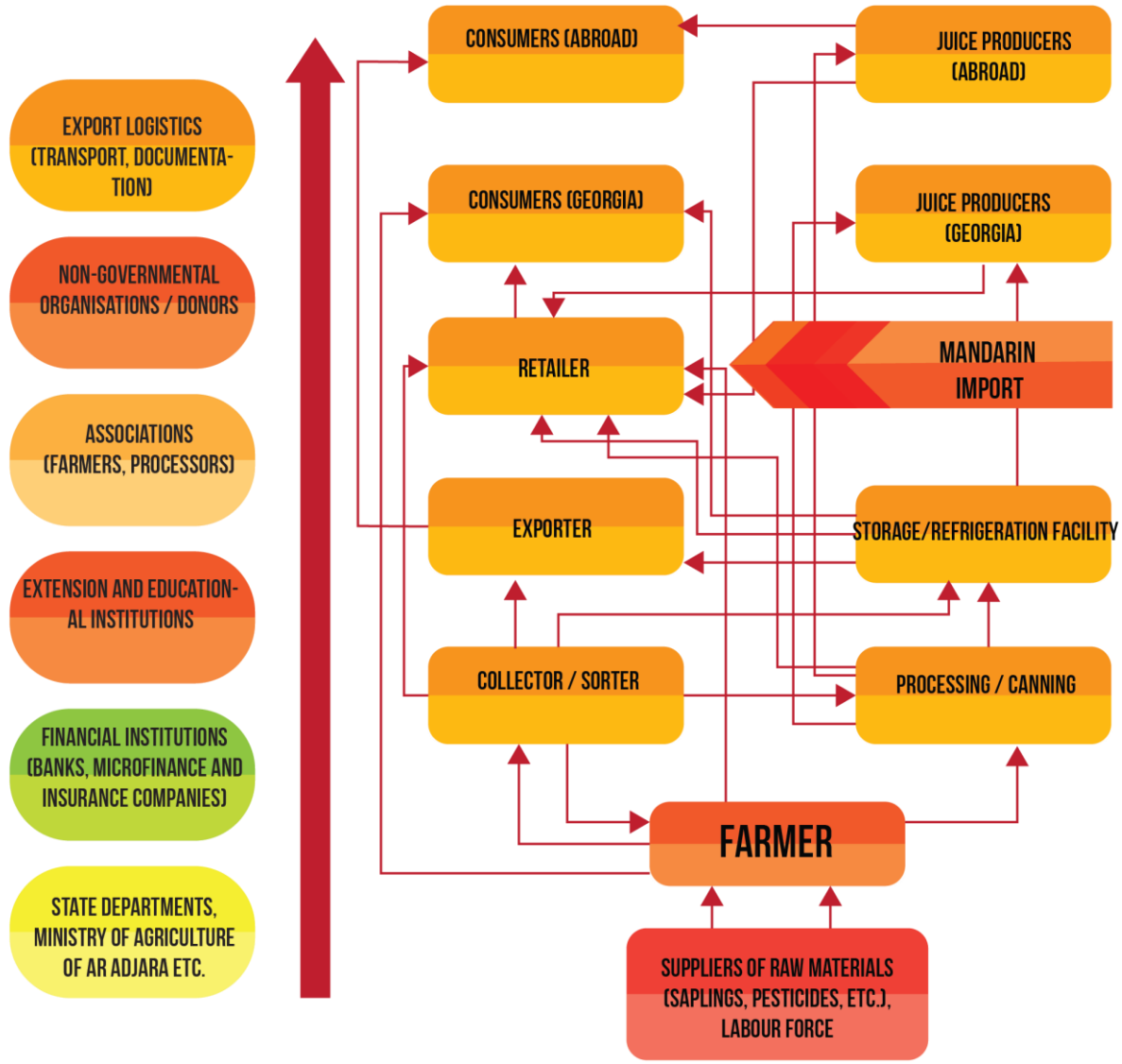
Photo: Ministry of Agriculture of AR Adjara

8.2. Illustration of the Adjarian Mandarin Value Chain

The diagram below illustrates the mandarin value chain, which is composed of internal and external factors. Both these groups, as well as the value chain illustration as a whole, are discussed in detail below.

exported amount (44,000 tonnes) and add the average amount of imports (1400 tonnes), we arrive at the average figure of 22,400 tonnes with regards to domestic consumption.

Diagram 5: Mandarin Value Chain (Grid Map)



8.2.1. Mandarin Value Chain Participants in Adjara

The main participants of the mandarin value chain can be divided into the following groups:

Suppliers of Raw Materials
Mandarin cultivation requires the following: suitable soil, saplings, pesticides, and a good extension service. Each of these elements will be discussed in detail below.

Soil. Although Georgia is one of the most northerly producers of citrus fruit, it has considerable production potential that was analysed centuries ago, when mandarin plantations were first introduced in the country. Through proper soil analysis, the fertile surface of the soil can be appropriately enriched for mandarin plantations. There are laboratories operating in the region, and the state even subsidises such tests (farmers have to pay ₾20 instead of ₾80). However, it transpired that these labs cannot conduct tests for all of the substances, requiring more thorough and expensive

tests to be conducted. Land in Adjara is sparse and fragmented, which hinders the establishment of large plantations in the region. Further problems are presented by unregistered lands and underdevelopment of the land market as a whole.

Saplings. Agro Service Center began testing new cultivars in 2012, and has been issuing recommendations regarding the use of various cultivars that are suited to the subtropical conditions in Adjara (e.g. Tiahara Unshiu). Participants in the state programme receive these saplings in return for a small contribution (provided they satisfy the terms). Furthermore, saplings are sold by several private nurseries. One-year-old saplings cost ₾3, while three-year-old saplings cost ₾7-8.

Pesticides. There are now numerous suppliers and distributors/sellers of pesticides operating in the region. However, many farmers point out that the quality of the products often does not correspond to the price. Farmers treat plants with cheap chemicals, and are not fully adhering to the agro-technological map. As a result, the yield is low, and the percentage of low-quality (non-standard) mandarins in the total yield is quite high (20% on average).

Labour Force

In Adjara, as well as in Georgia as a whole, mandarins are picked manually. The fruit sorting process is also labour-intensive, meaning that the workforce is highly active during the harvesting period. Furthermore, mandarin tree maintenance requires considerable effort. Although demand for labour is quite high during the harvesting season, labour shortages do not constitute a major problem, as family members and friends usually help each other pick the fruit. A hired worker is paid between ₾20 and ₾30 per day.

The lack of highly skilled workforce, which is required for lopping, spraying and other agricultural activities, as well as processing, remains a problem in the region. Young people have a limited interest in this field, which means that the situation can worsen considerably in the future, if the older generation cannot be replaced with a new one.

Farmers

According to GeoStat's 2014 agricultural census, Adjara has up to 24,000 mandarin-producing agricultural holdings with an average area of 0.2 ha. Some holdings operate a plantation on two different plots, which complicates the plantation maintenance process and increases costs. Mandarin plantations in Adjara cover approximately 4800 hectares with more than 3 million mandarin trees in total.

Farmers differ from each other in terms of mandarin plantation maintenance. In this regard, the study identified three types of farmers, which are described in detail below.

Intermediate Links – Citrus Fruit Sorting and Refrigeration Facilities

Mandarins in Adjara are prepared for export by up to 40 citrus fruit sorting facilities. Their combined processing capacity exceeds 30,000 tonnes. Here, mandarins are calibrated, waxed, placed in plastic, cardboard or wood packaging, and packed into pallets. Boxes can also be produced for 45,000 tonnes of mandarins[17].

Starting in 2014, the region has seen the establishment of agricultural cooperatives, which are operating with the support of the government and donor organisations. As of today, there are 10 cooperatives operating in Adjara. They are mainly involved in the value chain through collecting, sorting and preparing the fruit for export or for sale on the domestic market.

[17] http://citrus.moa.ge/index-ge.html

Modern refrigeration facilities operating in Adjara can store up to 7000 tonnes of citrus fruit. Furthermore, there are household cellars that can each store several tonnes of fruit, but the temperatures and humidity levels do not correspond to the required standards. Nevertheless, these cellars are frequently used to supply local markets, or for short-distance exports.

In spite of the above, the shortage of intermediate links (collection, sorting and refrigeration facilities) is regarded as one of the main obstacles to the development of the sector. The Adjarian Ministry of Agriculture has initiated relevant projects to address this issue.

Picture 4: Mandarin sorting, Adjara

Photo: Ministry of Agriculture of AR Adjara

Exporters

For several years, AR Adjara has been operating citrus fruit headquarters based on 'one-window principle,'[18] whereby exporters can prepare export documents (see Appendix 4) in approximately 1 hour, and pay only for a phytosanitary certificate for each container. According to the data obtained from the headquarters, there were a total of 30 exporters registered in Adjara in 2017.

Interestingly, many intermediate links use the exporters to take mandarins abroad. Several intermediaries have stopped exporting the fruit themselves, preferring to sell mandarins through exporters, rather than take responsibility for transporting and selling the produce themselves.

Processing / Canning

A large part of non-standard mandarins are purchased by two large processing companies, which pay an average of 20 tetri (₾0.2) per kilogram, of which 10 tetri are subsidised by the state. These enterprises are processing approximately 11,000 tonnes of non-standard mandarins each season, with most of the mandarin concentrate being exported abroad.

Mandarin concentrate is also used, albeit in small quantities, by local plants to produce fruit juice. However, mandarin juice is not a popular drink among the Georgian consumers.

[18] http://citrus.moa.ge/index-ge.html

Last year, one of the Georgian canning plants also began producing mandarin jam.

Retailers
Retailers purchase the sorted mandarins in order to sell them directly to the consumer. Retailers usually sell mandarins on open markets, as well as roadside and street stalls. Small market shops and supermarkets sell the fruit in a more sophisticated form.

Aside from weighted mandarins, you can also find supermarkets selling pre-packaged and well-presented fruit. In all other cases, mandarin is weighed in accordance with the required amount.

Consumers
Georgian Consumers
The study showed that the local population consumes a considerable amount of mandarin. Consumers prefer Georgian mandarin due to its natural appearance, taste, acidity, healthy elements and sugar content. Georgian consumers buy mandarins based on the size, colour and taste of the fruit. The price of mandarin is affordable for them during the season, and more or less affordable during the off-season. Some Georgian consumers consume processed mandarins in the form of juice, while others rarely consume it. Consumers of processed mandarins believe that imported products are more accessible on the local market than its local equivalent.

Foreign Consumers
A survey of foreign consumers showed that they like Georgian mandarin due to its taste (it is slightly sour), its relatively low price, as well as the fact that it has a less 'perfect' appearance, which for many people is a sign that it is more natural. Foreign consumers identify the price as the only major element that gives Georgian mandarin potential on the European market. Their advice with regards to entering the EU market mainly concerns product certification and branding.

Processed products mentioned by foreign consumers include mandarin juice, canned mandarin and jam (e.g. in Germany, Wilkin & Sons products imported from the U.K.), although they are not familiar with any products made from Georgian mandarin.

Demand for mandarins is particularly high during winter, but also during spring, when there is a threat of cold viruses (as mandarin is rich in Vitamin C).

8.2.2. External Factors Affecting the Mandarin Value Chain

The processes inside the mandarin value chain are significantly affected by external factors, the main ones of which are described in detail below.

State Departments
The Ministry of Agriculture of AR Adjara, in coordination with the Georgian Ministry of Environmental Protection and Agriculture, is implementing several projects that are specifically designed for citrus fruit farmers. One such project, set up in 2011, involves the demonstration plots where new citrus fruit cultivars (including 64 new mandarin cultivars) are being tested. Several of these cultivars have already been officially recommended and cultivated on 7 hectares of land through state support, with a further 9 hectares planned for 2017-2018.

In 2013-2014, the government supported the establishment of up to 30 collection points (consolidation centres), which are still operating today, helping farmers and intermediaries collect, sort and prepare mandarins for export or for sale on the domestic market.

For several years, the Ministry of Agriculture of AR Adjara has been trying to raise citrus fruit producers' awareness in field conditions through its own efforts, as well as through the extension service. Work is also ongoing on the demonstration plots, where farmers will learn all the necessary procedures and activities in accordance with the agro-technological calendar of the mandarin crop.

The citrus fruit headquarters[19] has been operating since 2014, coordinating the mandarin harvesting process. The headquarters operate a hotline, as well as a 'one-window principle' for preparing export documents, which simplifies the procedures, saves time and reduces business costs. The headquarters also oversees the processing of non-standard mandarins, where the state subsidises half of the amount.

A state-funded agricultural insurance project, which includes the mandarin crop, has been operating for several years. This is also a state-subsidised programme, which allows mandarin growers to pay only ₾300 per hectare, with the remaining ₾700 being covered by the state. The agricultural insurance programme currently has certain flaws, with farmers complaining about the damage assessment process, as well as the length of the insurance period.

Specialists from the Department for Rural Development and the Agricultural Project Implementation Service of the Adjarian Ministry of Agriculture represent one of the most important sources of information in the region. Furthermore, they collect information about the mandarin plantations, the expected yield, market prices, etc.

Programmes of the Georgian Ministry of Environmental Protection and Agriculture that are directly related to the mandarin sector include "Plant the Future," "Preferential Agro Credit," "Enterprise Georgia" and "Agricultural Insurance." These programmes are implemented by the Agricultural Projects Management Agency, in cooperation with the private sector. "Plant the Future," which aims to support the cultivation of perennial crops, does not yet have any beneficiaries from the citrus fruit sector. This is partly due to the programme's minimum requirement of 1 ha of land, but also due to a lack of interest from the citrus farmers towards the programme.

Nevertheless, the Adjarian Ministry of Agriculture, through the Agricultural Projects Management Centre, is implementing the "Effective Perennial Agricultural Crop Production Support" programme, which will see early-season mandarin gardens being cultivated on a 9 ha area this year, and on a 25 ha area in 2019. The programme funds the cultivation of a 0.05-1.00 ha sized garden for each beneficiary. In case of mandarin gardens, farmers and agro-entrepreneurs receive the following types of funding for the purchase of early-season mandarin saplings: 100% of the cost of saplings for the renewal of overage gardens; and 30% of the cost of saplings for the cultivation of new plantations.

Another noteworthy project is the internship programme of the Adjarian Ministry of Agriculture, which offers young people studying in the field of agriculture paid internship opportunities each year. This is a good experience for students, particularly against the background of a virtual lack of interest among young people for citrus fruit production.

Over the past several years, the city of Batumi has hosted the annual Citrus Forum. Organised by the Adjarian Ministry of Agriculture, it takes place in September, and includes participants from various countries[20]. The forum involves business-to-business (B2B) meetings between the participants before the start of the mandarin season. Furthermore, the ministry organises the annual citrus festival, which usually takes place in December. Among other activities, it includes the tasting of fresh citrus fruit, as

[19] http://citrus.moa.ge/index-ge.html

[20] The 2017 edition of the Citrus Forum was attended by representetives of 35 companies from 9 countries.

well as its various products (for example, attendees at the 2017 edition of the festival got to taste the Rezonyac brandy).

International Donor Organisations and Local Non-Governmental Organisations

Numerous international organisations have been operating in Adjara over the years. Several organisations are still active in the agriculture sector today, usually helping mandarin-growing farmers by providing training, equipment, etc. To this end, we must highlight the EU's ENPARD programme, which is still being implemented through the United Nations Development Programme today. The project has supported up to 15 cooperatives in the region.

Also worth highlighting is USAID's "Economic Prosperity Initiative" project, which provided citrus fruit-producing farmers with intensive training regarding mandarin plantation maintenance, with a view to increasing the yield and the quality of the produce. This programme ran for 2 years, and based on expert assessment (delivered in 2014), farmers who made proper use of the knowledge obtained through the training programme would be able to penetrate the European market and compete with other exporters within approximately 5 years (by 2018-2019[21]). Unfortunately, 4 years later, there are very few cases of Georgian mandarin reaching the EU market – in 2017, one container (20 tonnes) was exported to Poland, and 3 tonnes to Lithuania.

Apart from international donor organisations, we must also highlight the role of the local NGOs that are actively involved in the development of the mandarin sector. These include by the biological farming association Elkana and the Black Sea Eco Academy, which provide mandarin-producing farmers with training in various fields.

Financial Institutions (Banks, Microfinance Organisations and Insurance Companies)

Although there are many financial institutions operating in the region, lack of access to loans is regarded as one of the main obstacles facing the local farmers. To this end, the "Preferential Agro Credit" programme implemented by the Agricultural Projects Management Agency is seen as one of the few sources of cheap loans available to the farmers. This programme is well suited for large enterprises. However, small enterprises such as citrus fruit farms, of which there are many in Adjara, find it difficult to access loans through this programmes, as banks are often asking for high-liquidity assets as collateral. Therefore, accessing funds remains a major challenge for small and medium enterprises in the region.

With regards to agricultural insurance, the government, in cooperation with the private sector (i.e. the insurance companies), began insuring harvest and subsidising insurance premiums several years ago, in order to reduce risks for farmers. More specifically, the insurance covers climate-related risks (hail, flood, storm, as well as autumn cold snaps from 1 September until 30 November[22]). The table below shows the main characteristics for buying insurance and calculating/paying out for the potential damages[23]. This insurance covers the harvest, and is only valid until 10 December.

[21] http://www.iset-pi.ge/index.php/ka/iset-economist-blog/entry/e1-83-a5-e1-83-90-e1-83-a0-e1-83-97-e1-83-a3-e1-83-9a-e1-83-98-e1-83-9b-e1-83-90-e1-83-9c-e1-83-93-e1-83-90-e1-83-a0-e1-83-98-e1-83-9c-e1-83-94-e1-83-91-e1-83-98

[22] http://apma.ge/projects/read/agroinsurance/4:parent

[23] A good manual for assessing the damage on mandarin plantations has been devised by BFC as part of the SDC-funded PAFAI project.

Table 22: State Agricultural Insurance Project – Mandarins

Culture	Agency Contribution	Farmer Contribution	Insurance Tariff	Normative Price (GEL/ha)	Normative Price (GEL/kg)	Normative Yield (kg/ha)	Amount Payable by Farmer	State Subsidies
Mandarin	70%	30%	10%	10,000	0.5	20,000	300	700

Source: Agricultural Projects Management Agency (www.apma.ge)

Changes in the Agricultural Insurance Programme came into force this year, whereby only those farmers who have registered their plots and obtained the appropriate cadastral codes can benefit from the programme. In the short term, this is likely to lead to a decrease in the area of insured mandarin plantations. On the other hand, this may push the farmers towards registering their land, which will enable improvement of the Georgian land market. It is also important to continue and strengthen the development of agricultural insurance in Georgia.

Sectoral Associations

Although there are farmers' associations in Georgia, none of them are operating specifically for the benefit of citrus fruit growers. Mandarin growers themselves are not showing a particular interest towards establishing a farmers' association of this kind.

Educational Institutions and Research Centres

The region has several universities and colleges. The Shota Rustaveli State University in Batumi has quite a long history, and is regarded as one of the leading regional universities in the field of agriculture. The university's faculty of technology devotes particular attention to studying citrus fruit production. However, modern approaches towards the aforementioned studies need to be strengthened.

International Trading Environment and Logistics

Georgia is a member of the World Trade Organization. It has favourable trade agreements with the European Union, the CIS, Turkey, the United States and Japan. Trade relations were with China were strengthened in 2016.

If Georgia can produce high-quality mandarins that satisfy the appropriate standards, it can export the fruit to the aforementioned countries under low-tariff or even tariff-free conditions. Competition is also likely to increase on the domestic market, as the trade agreements are mutually beneficial.

Customs arrangements for the goods designated for export are carried out by the customs authorities. Enterprises can implement these arrangements at the citrus fruit headquarters in Adjara under the 'one-window principle.' However, a lot of work remains to be done with regards to farmers and enterprises within the value chain obtaining certificates of high standards (ISO, Global Gap).

Up to 30 exporters in Adjara are transporting mandarins abroad using refrigerated trucks, as well as ferries for maritime export to Russia and Ukraine.

Since mandarin is a perishable product, there are considerable risks attached to its transportation. In case of Georgian mandarins, these risks include sea storms (during ferry transport) and closures of the Jvari Pass, which complicates mandarin exports during the winter.

9. Cost and Revenue Analysis

9.1. Producer Expenses and Revenues

Mandarin producers' expenses and revenues depend on the agro-technological activities that are necessary for the maintenance of plantations, although these are not being implemented properly in the majority of the cases. Many trees are old and have a low yield. Farmers are not putting much effort into trying to renew them, or to carry out the required agricultural activities (lopping, mowing, spraying, etc.). Thus, very few farmers look after their plants properly, while the majority do not manage to maintain the plantations on a consistent level.

The majority of the costs sustained by the farmers are related to the maintenance of the mandarin plantations (lopping, purchase and use of fertilizers and pesticides), as well as labour-related expenses, particularly during the harvesting process.

The revenues depend on the yield (including the quality of the fruit) and the prices. Based on these criteria, the farmers can be divided into the following three categories:

(1) Mandarin growers who maintain their plantations on a basic level, yielding 12 t/ha (most farmers in Adjara belong to this category);

(2) Farmers who maintain their plantations to a moderate degree, yielding 20 t/ha on average;

(3) Newly cultivated and well-maintained gardens can yield 40 t/ha, while semi-intensive plantations can yield 50 t/ha or more.[24]

Therefore, economic calculations were made for three types of farmers, in order to compare them to each other. The main figures for all three types are summarised in the table below. Calculations are made for plantations with an area of 1 ha, with the following assumptions:

Typical Farmer – has overage trees (more than 50 years old), rarely substitutes them with new ones, and carries out a small percentage of the required agro-technological activities (including the use of fertilizers and pesticides). Uses help from family and friends for labour-intensive activities. Does not normally have agricultural insurance. Sells approximately 80% of the yield, consumes the rest at home or gives it to family and friends. Often leaves damaged fruit (unsuitable for sale) unpicked.

Medium Farmer – has overage trees (more than 50 years old), but tries to substitute them with new ones as often as possible. Does not carry out all of the required agro-technological activities, and uses fertilizers and pesticides in moderate amounts. Uses help from family and friends, as well as hired workforce for labour-intensive activities. Usually has agricultural insurance. Sells approximately 85% of the yield, consumes the rest at home or gives it to family and friends. Part of the yield is unsuitable for sale.

Farmer with a Good (Semi-Intensive) Plantation – has a newly cultivated mandarin garden. Performs the required agro-technological activities in full (including the use of fertilizers and pesticides). Rarely uses family members for labour-intensive activities, instead relying on hired workforce. Has agricultural insurance. Sells approximately 85% of the yield, consumes the rest at home or gives it to family and friends, etc.

[24] There are currently no such farmers in Adjara, with the exception of several farmers who cultivated new gardens a few years ago (with the process still ongoing on a yearly basis). The budget for cultivating and maintaining such gardens were provided by the Ministry of Agriculture of AR Adjara.

Table 6 below shows the main economic parameters that characterise the various types of mandarin farmers (allowing for certain prices and yield volumes). See Appendix 5 for more detailed calculations.

Table 23: Marginal profit comparison among various types of mandarin farms

#	Indicators	Typical Farm	Medium Farm	Semi-Intensive Farm
1	Total Costs (GEL)	2,917	4,403	12,211
2	Yield for Sale (kg/ha)	10,000	17'000	38'000
3	Weighted Average Sale Price (GEL/kg)	0.55	0.55	0.60
4	Revenues (GEL)	5,500	9,350	22,800
5	Profit (GEL)	2,583	4,947	10,589
6	Prime Cost (GEL/kg)	0.24	0.22	0.31
7	Profit Margin (GEL/kg)	0.22	0.25	0.26
8	Profit Margin (%)	47%	53%	46%
9	Break-Even Point (kg/ha)	5,245	6,691	15,979

Source: Author's calculations based on interview results. Economic calculations of the Adjarian Ministry of Agriculture have also been taken into account.
Note: Detailed economic calculations are included in Appendix 5.

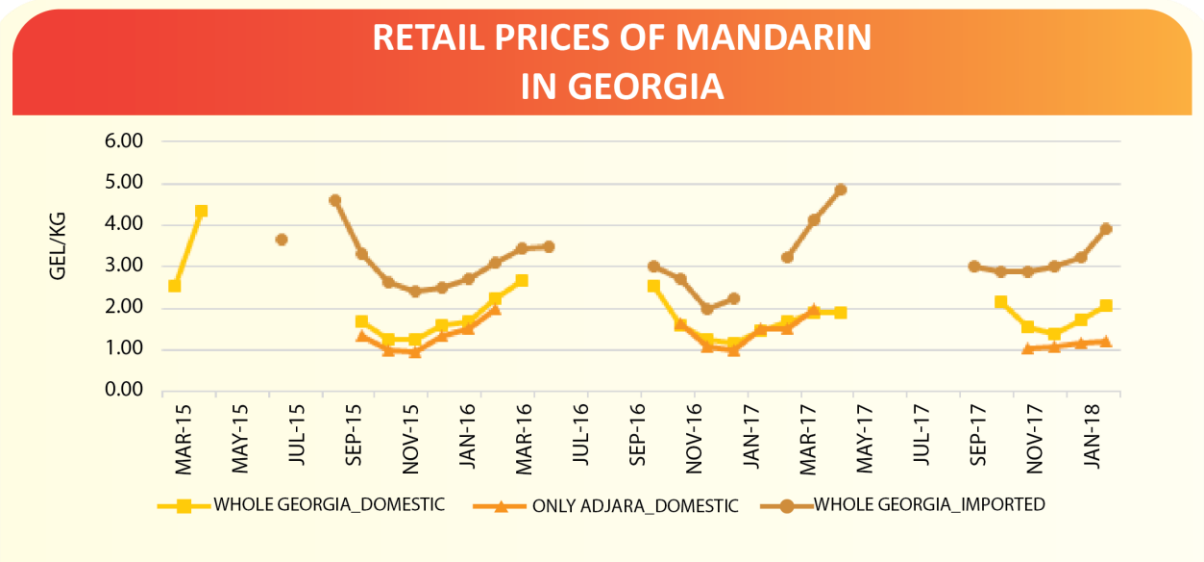
It is worth noting that developing a semi-intensive farm requires a substantial starting investment (see Appendix 6). However, the results substantially exceed those of the other two farm types. Furthermore, a semi-intensive garden has a lifespan of at least 50 years, while the lifespan and yield of overage trees decreases each year. Moreover, the differences in the yield are not only quantitative, but also qualitative, which reflects itself in the sale price.

9.2. Added Value Analysis

The added value for each link of the chain is the price difference between various links. The diagrams below (Diagram 2, 3 and 4) reflect the distribution of added value between various links of the value chain. The following three cases are presented: (1) supply of standard-quality mandarins to the domestic market for consumption, (2) mandarin export to Russia, and (3) mandarin export to Poland[25]. Based on our assessment, between 20,000 and 25,000 tonnes of mandarins are consumed in Georgia each year. Georgian mandarins account for more than 90% of the local consumption. As expected, the retail price of mandarin in Adjara is lower than in Georgia as a whole. Imported mandarins are more expensive, largely due to the fact that they are available on the domestic market during the off-season, but also due to their visual appearance and size. The figure below shows the month-by-month retail price comparison for the last three years.

[25] All prices presented as average figures

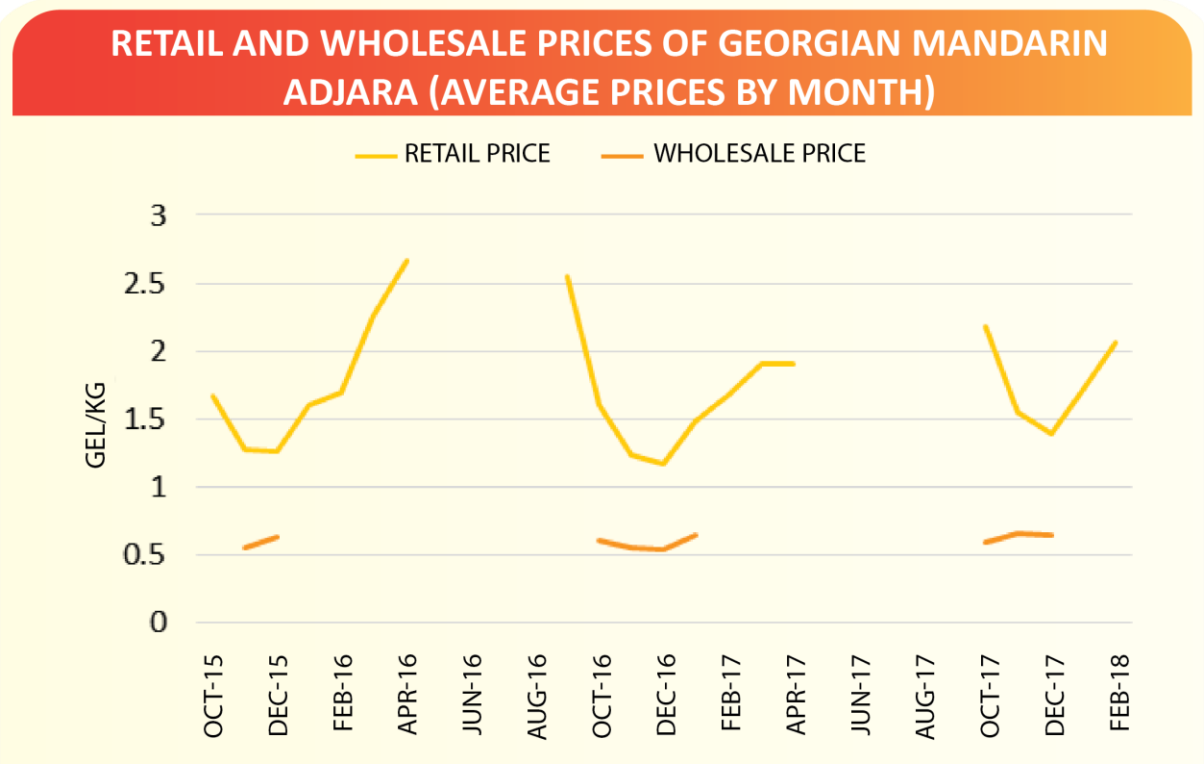
Figure 29: Retail prices of mandarins in Georgia



Source: Georgian Ministry of Environmental Protection and Agriculture

With regards to the comparison between retail and wholesale prices of Georgian mandarin, the range is quite broad – the average retail price in Adjara is approximately twice as high as the wholesale price. The difference is even higher compared to the average retail price in Georgia as a whole. These differences are clearly illustrated in the figure below.

Figure 30: Retail and wholesale prices of Georgian mandarin in AR Adjara



Source: Georgian Ministry of Environmental Protection and Agriculture

Thus, we can see that the average monthly wholesale price ranges between 0.55 and 0.65 GEL per kilogram, while the minimum retail price is 1 GEL/kg, rising to 2 GEL/kg in March.

Diagram 6: Added value in the chain (in case of mandarin sales on the domestic market)

Value Chain Link	Value of Sales (GEL)	Expenses (GEL)	Profit (GEL)	Added Value (GEL)	Added Value (%)	Profit (%)
	0.30					
Farmer	0.60	0.30	0.30	0.30	33%	50%
Intermediary	0.80	0.70	0.10	0.20	22%	17%
Retailer	1.20	1.00	0.20	0.40	44%	33%
Total			0.60	0.90		

Source: Author's calculations

Note: There may be another link between the intermediary and the retailer (e.g. the wholesaler)

The calculations show that retailers create the most added value (44%), followed by farmers (33%) and intermediaries (22%).

With regards to mandarin processing, research shows that non-standard fruit is sold for this purpose at an average price of 20 tetri per kilogram. The processing company uses the fruit to produce and export mandarin concentrate. Although the price is low, it corresponds to the standard of the fruit.

As mentioned earlier, approximately half of the mandarins produced in Georgia are exported in fresh form. These are usually the best mandarins produced in the country.

Diagram 7: Added value in the chain (in case of export to Moscow)

Value Chain Link	Value of Sales (GEL)	Expenses (GEL)	Profit (GEL)	Added Value (GEL)	Added Value (%)	Profit (%)
	0.35					
Farmer	0.65	0.35	0.30	0.30	14%	27%
Intermediary	1.10	0.90	0.20	0.45	21%	18%
Exporter	2.00	1.70	0.30	0.90	42%	27%
Retailer	2.50	2.20	0.30	0.50	23%	27%
Total			1.10	2.15		

Source: Author's calculations based on surveys, the citrus headquarters[26], and the study commissioned by the Adjarian Ministry of Agriculture on mandarin production and export logistics (2017[27]).

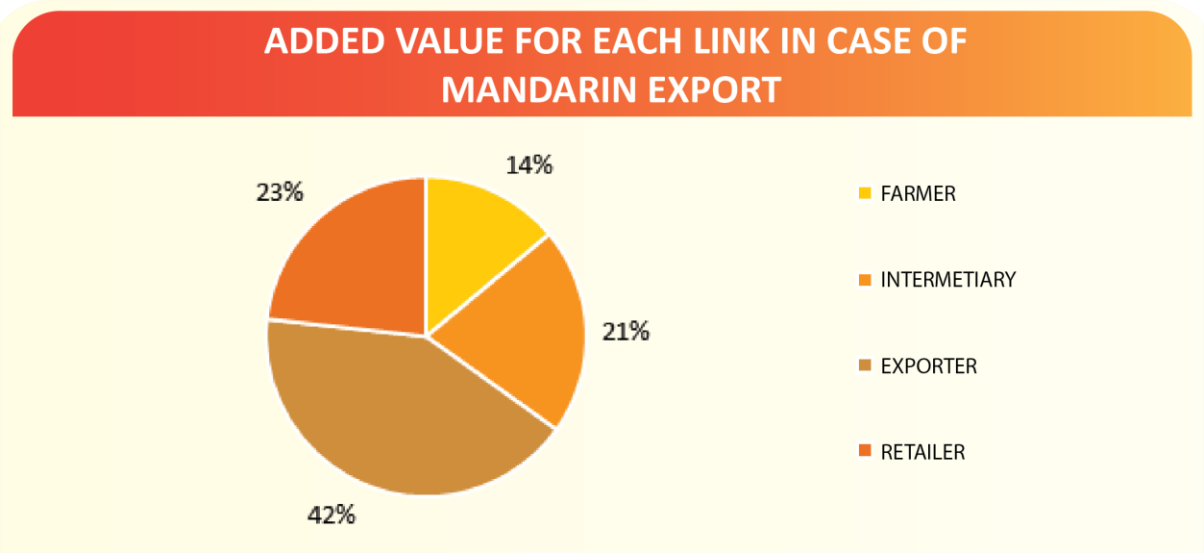
In case of mandarin exports, the value chain is longer due to the increased number of participating links. Consequently, it also creates more added value. The most added value is created by exporters[28], followed by retailers, intermediaries (collectors, sorters, packers) and farmers (see Figure 15).

[26] http://citrus.moa.ge/index-ge.html

[27] *Mandarin Production and Export-Related Logistical and Other Research, and Relevant Recommendations*. Prepared for the Ministry of Agriculture of AR Adjara by IBERGES Consulting (2017).

[28] Note: There may be one or more intermediate links involved between the exporter and the retailer, before the mandarin reaches the consumer.

Figure 31: Added value for each link (in case of export)



Source: Author's calculations based on surveys, the citrus headquarters [29], and the study commissioned by the Adjarian Ministry of Agriculture on mandarin production and export logistics (2017).

It is worth noting that transportation costs differ according to the distance to the export country and the type of transport. Detailed information can be found in the study commissioned by the Adjarian Ministry of Agriculture last year[30].

[29] http://citrus.moa.ge/index-ge.html

[30] *Mandarin Production and Export-Related Logistical and Other Research, and Relevant Recommendations*. Prepared for the Ministry of Agriculture of AR Adjara by IBERGES Consulting (2017).

10. Mandarin Market in the European Union

As seen earlier, 3.9 million tonnes of mandarin were produced in Europe in 2016 – almost entirely by countries of the European Union. Spain and Italy account for more than 80% of the European output.

The European Union accounts for approximately 45% (2.1 million tonnes) of the global mandarin imports in terms of volume, and 50% ($2.2 billion) in terms of value. Therefore, the EU countries collectively represent the largest mandarin market in the world. Notably, the average price of imports in the EU (1050 USD/t) is 10% higher than the global average price.

Table 7 lists the largest importers of mandarins within the EU, based on the average figures for 2014-2016.

Table 24: Major E.U. Importers

Country	Quantity (tonnes)	Value (million USD)	Price per ton (USD)	Main Exporters and their Share*
Germany	397 571	437	1 101	Spain (90%)
France	357 781	429	1 199	Spain (76%) Morocco (10%)
United Kingdom	312 956	389	1 244	Spain (46%) South Africa (18%) Morocco (13%) Peru (8%)
Netherlands	206 004	238	1 156	Spain (39%) Morocco (15%) South Africa (14%) Peru (8%)
Poland	139 320	110	789	Spain (68%) Italy (12%)
Belgium	73 930	104	1 404	Spain (65%) Germany (15%)
Italy	85 301	89	1 054	Spain (82%)
Romania	62 448	33	525	Greece (44%) Turkey (19%) Italy (16%)
Czech Republic	57 248	43	747	Spain (70%)
Sweden	54 688	55	1 007	Spain (52%) Morocco (24%)ს
--	--	--	--	--
Lithuania	41 582	33	779	Spain (33%) Netherlands (24%) Italy (12%) Morocco (10%)
Latvia	14 334	12	851	Spain (62%) Italy (24%)
Estonia	8 208	7	896	Spain (59%) Italy (12%)

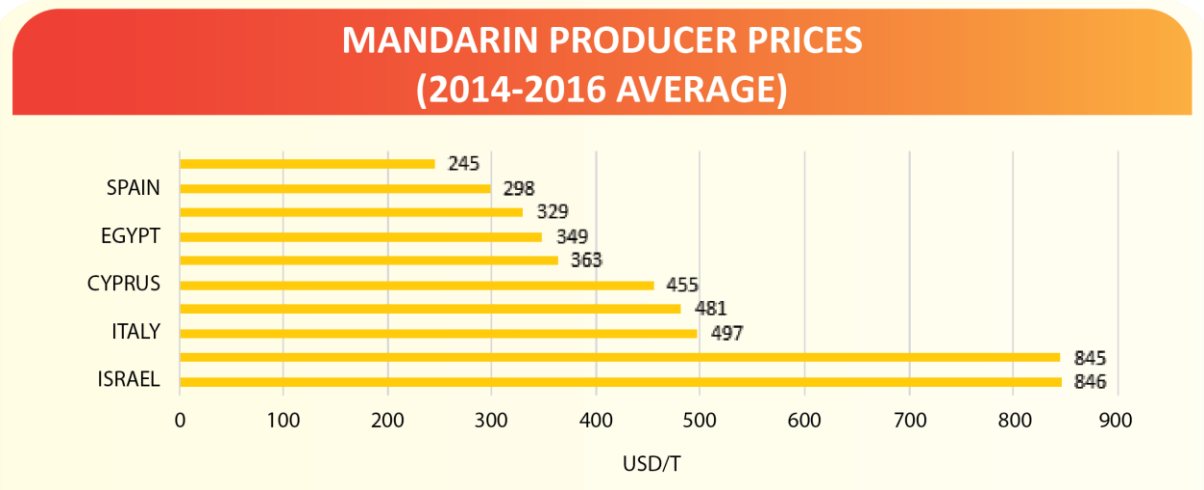
*Source: ITC – Trade Map. *Calculated by export volume*

As we can see, the EU is mainly supplied with mandarins by its own member countries (Spain, Italy, Greece), although countries such as Morocco, Turkey, Peru and South Africa also play an important

role. There are other countries (Israel, Argentina, Uruguay, Egypt, Chile, Cyprus etc.) that supply the EU with mandarins in small quantities.

Out of the countries which supply the EU with mandarins, the lowest producer prices are recorded in Turkey, Spain and Morocco (245-330 USD/t, on average). In contrast, producer prices in South Africa and Israel are considerably higher (approximately 845 USD/t).

Figure 32: Mandarin producer prices



Source: FAOSTAT (25.03.2018)

10.1. Georgia and the European Union

The Deep and Comprehensive Free Trade Area agreement (DCFTA) with the European Union[31] allows Georgian produce to be exported tariff-free to the market with the world's largest purchasing power, although there are exceptions on certain products[32]. Mandarin is one of the 28 products that are subject to an EU market entry price, meaning that there is a minimum set price on the imports, which will be described in more detail below.

In order for the mandarin exporters to be able to maximise the possibilities offered by the free trade agreement with the EU, they must ensure that their produce fully complies with the EU market requirements. Individuals interested in trading with Europe are offered support portals by both the EU[33] and Georgia[34].

Mandarin is free from customs duties, except in cases[35] when the price in the invoice falls below the fixed price set by the EU[36]. In this case, the exporter will be charged the price difference (see Table 13 in the appendix below).

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[31] http://www.economy.ge/index.php?page=economy&s=7

[32] http://www.dcfta.gov.ge/public/filemanager/agreement/trade/%E1%83%93%E1%83%90%E1%83%9C%E1%83%90%E1%83%A0%E1%83%97%E1%83%98%20II.pdf

[33] http://trade.ec.europa.eu/tradehelp/

[34] http://www.dcfta.gov.ge/

[35] http://www.dcfta.gov.ge/public/filemanager/agreement/trade/%E1%83%93%E1%83%90%E1%83%9C%E1%83%90%E1%83%A0%E1%83%97%E1%83%98%20II.pdf

[36] http://www.dcfta.gov.ge/ge/agreement , http://www.dcfta.gov.ge/public/filemanager/eu4b/%E1%83%91%E1%83%90%E1%83%96%E1%83%90%E1%83%A0%E1%83%96%E1%83%94%20%E1%83%A8%E1%83%94%E1%83%A1%E1%83%95%E1%83%9A%E1%83%98%E1%83%A1%20%E1%83%A4%E1%83%90%E1%83%A1%E1%83%A11%20%E1%83%93%E1%83%90%E1%83%A5%E1%8

EU countries produce and supply their own market with one of a mandarin hybrid called clementine. It differs from the Georgian mandarin (the satsuma cultivar) through its more attractive visual appearance, sweeter taste and a thicker peel.

Therefore, directly comparing Georgian mandarin to the European clementine is difficult. European consumers are used to the clementine and sweeter citrus fruits. However, as Europe is seeking to reduce per capita sugar consumption on the continent, the Georgian satsuma will have an opportunity to establish itself on the EU market through an appropriate marketing campaign and an improved visual appearance.

Georgian mandarin was exported in small quantities to only two EU countries in 2017 (20 tonnes to Poland and 3 tonnes to Lithuania). The Polish example showed that the export process to the EU is not complicated compared to other countries (including the traditional mandarin markets, such as Russia and Ukraine). Poland asked for a heavy metal content analysis document, which can be obtained in Georgia and is not expensive (approximately ₾150-200 per container). The exported fruit was of standard quality, with an average diameter of 50 mm (EU size code 4 or 5), and packaged in plastic boxes in accordance with the EU standards. It was shipped on a ferry from Batumi to Ukraine, and later in a refrigerated truck via Ukraine to Warsaw. Depending on the weather conditions at sea, transportation takes between 7 and 10 days, which is a reasonable time period, considering that Georgian mandarin can be stored for at least 20-21 days under the appropriate conditions of temperature and humidity.

As for the mandarin export fees in the EU, the Polish example shows that Georgian mandarin is free from duty payments, but is subject to customs charges in accordance with the relevant norms (see Appendix 7 for detailed requirements for mandarin imports in the European Union).

Diagram 8: Added value in the chain (in case of export to Warsaw)

Value Chain Link	Value of Sales (GEL)	Expenses (GEL)	Profit (GEL)	Added Value (GEL)	Added Value (%)	Profit (%)
	0.35					
Farmer	0.65	0.35	0.30	0.30	12%	25%
Intermediary	1.10	0.90	0.20	0.45	18%	17%
Exporter	2.20	1.90	0.30	1.10	45%	25%
Retailer	2.80	2.40	0.40	0.60	24%	33%
Total			1.20	2.45		

Source: Author's calculations based on surveys and the study commissioned by the Adjarian Ministry of Agriculture on mandarin production and export logistics (2017)[37].

3%95%E1%83%94%E1%83%9B%E1%83%93%E1%83%94%E1%83%91%E1%83%90%E1%83%A0%E1%83%94%E1%83%91%E1%83%A3%E1%83%9A%E1%83%98%20%E1%83%9E%E1%83%A0%E1%83%9D%E1%83%93%E1%83%A3%E1%83%A5%E1%83%A2%E1%83%94%E1%83%91%E1%83%98.pdf

[37] *Mandarin Production and Export-Related Logistical and Other Research, and Relevant Recommendations*. Prepared for the Ministry of Agriculture of AR Adjara by IBERGES Consulting (2017).

When it comes to establishing yourself on the EU market, the decisive factor may not be the price, but the introduction of Georgian mandarin to the European consumer. It is important that consumers get used to its sour taste relative to the clementine, which will require considerable marketing efforts.

11. Main Players and Relationships between Them

11.1. Horizontal Relationships in the Value Chain

The main horizontal relationships identified within the mandarin value chain are described in Table 8 below.

Table 25: Horizontal relationships within the value chain

Relationship	Description of the Relationship
Suppliers of raw materials	Supply of agricultural services has recently increased in Georgia, as well as Adjara, where there are 26 networks selling agricultural products. This has sharpened competition and led to a subsequent improvement in pricing and quality of service. It is also worth highlighting that the state has been actively purchasing extension services in recent years.
Between farmers	Mandarin production in Adjara takes place on a large scale in the neighbouring municipalities of Kobuleti and Khelvachauri, which enables cooperation among farmers. However, farmers do not tend to unite themselves in cooperatives or associations, which would improve their cooperation in various fields, such as sharing of knowledge, pooling of assets, joint procurement and marketing, etc.
Between intermediaries (wholesalers)	Numerous intermediaries (collectors, sorters) operate in the region during the harvesting period. Nevertheless, the sale of mandarins often remains a challenge due to the remoteness of such facilities and the low price of mandarins. There is competition among the intermediaries, who offer farmers similar prices and quality. As for the processing of non-standard (low-quality) mandarins, there are two large companies operating in this field. These firms can influence pricing (although this market is subsidised, meaning that it is also influenced by the state).
Refrigeration / Storage Facilities	There are several refrigeration facilities in the region, as well as cooling facilities set up in household cellars. The level of cooperation between these facilities is low, although there are individual cases of cooperation.
Exporters	Mandarin export from Georgia mainly takes place between November and January. There are approximately 30 exporters operating and competing with each other in Adjara during this period. Cooperation among them is very rare.

Processors / Canners	There are two large processing companies operating in the region. They process non-standard mandarins and supply the mandarin concentrate to the export markets, as well as to Georgian canning plants (in small quantities). The processing plants do not actively cooperate with each other. The same is true for the canning plants.
Between Retailers	There are numerous retailers in the region, from open markets to mini-markets, supermarkets and hypermarkets. Prices are relatively high in the latter.
Between Consumers	Mandarin is quite popular among the consumers in Georgia. It is associated with the New Year's celebrations, and is purchased and consumed in large quantities during that period. Mandarin is rarely consumed in Georgia in processed form.

11.2. Vertical Relationships in the Value Chain

The main vertical relationships identified within the mandarin value chain are described in Table 9 below.

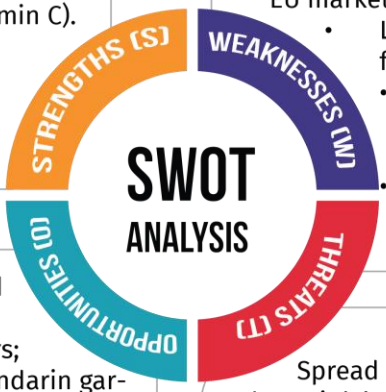
Table 26: Vertical relationships within the value chain

Relationship	Description of the Relationship
Between suppliers of raw materials, labour force and farmers	Farmers believe that access to agricultural products and services is growing. However, they point out that the quality of goods and services often does not correspond to the price. Obtaining qualified advice regarding mandarin cultivation and maintenance remains a challenge for the region. Competition for labour force has increased during the harvesting period in particular. However, there are certain groups that organise and supply labour to the farmers. NNLE Agro Service Center of the Adjarian Ministry of Agriculture has been operating since 2011, testing up to 30 new mandarin cultivars and providing advice to the farmers.
Between farmers and intermediaries	Relationships between farmers and intermediaries are non-contractual and informal. Most farmers do not have firm relationships with intermediaries, and sell their produce to several different intermediaries simultaneously.
Between intermediaries and exporters	Intermediaries and exporters have a contractual relationship, with both sides trying to fulfil the terms of the respective agreement. Intermediaries normally collaborate with several exporters simultaneously.
Between processing and canning plants	Relationships between the processing and canning plants are formal. However, concentrate is purchased in very small quantities.
Between intermediaries and retailers	The form of this relationship depends on the retailer type. Trade on the open market is usually based on informal agreements, while relationships with mini-markets, supermarkets and hypermarkets are contractual.
Between retailers and consumers	The markets have many customers both in urban and rural areas. Market prices are lower than in other retail stores, which is a decisive factor for a certain customer segment. Some consumers also believe that food purchased in markets is more natural and healthy. Supermarkets offer customers a comfortable environment for purchasing food. Accordingly, the prices are higher than in markets. Supermarkets usually have a different target audience which is willing to pay higher prices.

12. SWOT Analysis of the Mandarin Sector in Adjara

Analysis of the mandarin sector in Adjara identified its strengths, weaknesses, as well as opportunities and threats, which are presented in Table 10 below.

Table 27: SWOT analysis of the mandarin sector in Adjara



- Export produce;
- Competitive price (e.g. compared to Turkey);
- Institutional experience in mandarin production (mandarin cultivation culture);
- Source of employment and revenue for local residents;
- Natural produce, cultivated with limited use of pesticides;
- Georgian mandarin (satsuma) has a thinner rind and is easier to peel than the European clementine;
- Healthy product (rich in Vitamin C).

- Overage, poorly maintained, low-yielding plantations;
- Large percentage share of non-standard mandarins in the total yield;
- Changes in the yield volume (low yield almost every other year);
- Farms have small plots of land, which hinders the growth of the economy;
- Lack of the necessary knowledge and experience in each link of the mandarin value chain;
- Low level of interest among young people;
- Underdeveloped nurseries;
- Lack of refrigeration facilities;
- Low diversity of the export markets and reliance on unstable markets;
- Lack of awareness about the satsuma cultivar on the EU market;
- Lack of knowledge and motivation among the farmers to adopt innovations;
- Lack of knowledge and experience about the modern mandarin maintenance technologies;
- Absence of sectoral associations and weak development of cooperatives.

- Plantation renewal, replacing old trees with new ones, cultivating early-season and late-season cultivars;
- Cultivating highly productive mandarin gardens (intensive and semi-intensive gardens);
- Opportunity to achieve full coverage of the local market (substitute imports with early-season and late-season cultivars, and develop storage technologies);
- Support programmes of the Adjarian Ministry of Agriculture;
- Using the tourism boom in Adjara and Georgia as a whole to develop agro tourism in mandarin plantations;
- Developing export markets;
  - o European Union market (through relevant short- and medium-term marketing activities);
  - o Former Soviet republics (reduce the level of dependency on Russia and Ukraine at the expense of increasing the share of exports to other countries);
- Increasing employment and revenues.

Spread of diseases and pests (ticks, dung beetles, stink bugs);
- Negative impact of natural events (frost, flooding, drought, hail);
- Losing the export markets (through embargos or competition from neighbouring countries);
- Losing the competition to Turkey and other countries on the EU market;
- Mandarin gardens being substituted with other crops (e.g. nuts) on a massive scale.

13. Employment and Revenue Generation Potential in the Mandarin Sector

13.1. Employment Prospects

As mentioned earlier, there are approximately 24,000 farms with an average mandarin plantation area of 0.2 ha. Maintenance of mandarin plantations does not represent the main form of employment for the majority of these farmers. However, they devote considerable time to it. We must also keep in mind that there are few alternative sources of employment in mandarin-producing villages, and many people (including most young people) work in Turkey seasonally. Apart from these families, the value chain seasonally employs numerous people, especially during the harvesting season, when daily salaries range between ₾20 and ₾30.

13.2. Revenue Generation

Most farmers in Adjara have various sources of income, as the commercial activities of small and medium-scale farmers are quite diversified. The income sources include various fields of agriculture (horticulture and livestock production), as well as other sectors of the economy. Revenues from mandarin sales represent approximately 10-15%[38] of the total annual revenues of an average mandarin plantation-owning household[39], especially during the New Year period. Apart from the plantation owners, the mandarin value chain seasonally employs numerous other people, particularly for the purposes of collecting the harvest, sorting the fruit and preparing it for export.

The region of Adjara collects approximately ₾30-40 million from the mandarin sector each year. This constitutes 15-20% of the region's agricultural produce (primary and processed), but does not exceed 1.5% of the total added value created in Adjara each year.

Therefore, development of the sector, which is achieved through better maintenance and renewal of gardens, planting new cultivars, increasing productivity, improving the quality of the harvesting and subsequent processing processes, as well as penetrating new high-value markets / segments, will lead to an increase in revenues for each link within the sector, the region of Adjara, and the country's economy as a whole.

[38] Accoring to GeoStat data for 2016, the average monthly income for a household enterprise in Adjara is ₾992.6 (unfortunately, there is no data breakdown on urban and rural levels).

[39] Revenues from mandarin sales for an average mandarin farm (0.20 ha in area, yielding 2 tonnes of fruit) amount to ₾900-1200.

14. Discussion and Recommendations

14.1. Main Obstacles Facing the Mandarin Sector

The mandarin value chain analysis identified several significant obstacles that are related to the following three groups: production, post-harvest activities (sorting, storage and processing) and sales.

14.1.1. Obstacles to Production

Overage plantations (at least 1/3 of the total) constitute one of the main problems with regards to production/output, requiring renewal and substitution with new cultivars. Furthermore, plantations are not being maintained properly, causing low yield and low quality of the yield (including a high percentage share of non-standard mandarins). The quality of the yield is also affected by natural events (hail, frost, excessive precipitation), as well as by a lack of funding and knowledge about fighting diseases, leading to inappropriate planning and implementation of treatment measures. A new threat to mandarin plantations has recently emerged in the form of brown marmorated stink bugs. They had a limited impact last year, as an early drop in temperatures during autumn meant that the bugs went dormant before the ripening of the fruits. Nevertheless, they will remain a threat for mandarins in the upcoming years. To this end, the ministry is planning to provide farmers with 3200 units of mobile spraying equipment to combat the bugs.

Another obstacle concerns the lack of qualified labour force. There is a lack of awareness in the region about modern approaches to mandarin garden maintenance. To this end, USAID's "Economic Prosperity Initiative" project carried out certain activities, but there is still limited interest among farmers to consider modern approaches.

Only a small number of farmers cultivates intensive and semi-intensive gardens, although several programmes have been implemented to this end by the Adjarian Ministry of Agriculture. Thus, NNLE Agro Service Center is implementing the "Agricultural Extension Supply" sub-programme, which includes teaching farmers and agro-entrepreneurs about using citrus fruit cultivation technologies in field conditions, even though a large part of the existing extensive gardens has a low yield. Moreover, a shortage of early-season and late-season cultivars means that Georgian mandarin is only found on the domestic market for several months, when prices are at their lowest. At other times, imported mandarins are sold on the market at a higher price.

14.1.2. Obstacles to Post-Harvest Activities

One of the most important post-harvest activities is to store the fruit in appropriate conditions, as mandarin is a perishable product. Due to the shortage of suitable refrigeration facilities in the region, mandarins cannot be properly refrigerated and stored on a timely basis, which ultimately affects the length of its use-by period. The situation is worse in household cellars, where suitable temperatures cannot be maintained.

Although non-standard mandarins are processed in Georgia, with most of the concentrate being exported abroad, and a small amount being used by local juice factories and canneries, there is still a noticeable shortage of processed mandarin on the domestic market. It is possible to produce jams, marmalades, dried fruits and cognac, with the latter two already being produced in Adjara. However, we must bear in mind that the processing industry mostly uses low-quality, cheap mandarins, which are less profitable (or completely unprofitable) for farmers to produce. It is therefore preferable to focus on creating a suitable infrastructure for storing fresh mandarins.

14.1.3. Obstacles to Sales

There is only a short period of time during which mandarins can be sold. This is due to the fact that mandarins cannot be stored for a lengthy period, and the processing factories pay low prices for the fruit. Farmers are therefore only justified in selling non-standard mandarin to the aforementioned plants.

The markets are characterised by low diversity. We are largely dependent on the Russian and Ukrainian markets. Russia is an unstable market that can impose an embargo for various reasons, as seen in 2006-2013. It is therefore important to actively try to penetrate and establish ourselves on new markets.

Quality control of mandarin exports must be taken into account, as there are occasions when the quantity of the fruit of the standard demanded by the purchaser (wholesaler) exceeds the allowed norm[40].

Coverage of the European Union market needs to be achieved, as the free trade agreement affords certain advantages to Georgian mandarins in penetrating this market, which is characterised by its high purchasing power. Unfortunately, Georgia does not currently manage to satisfy the required standards, establish effective logistics channels and conduct an appropriate marketing campaign, which means that Georgian mandarin cannot successfully compete on this market.

EU countries produce and supply their own market with one of a mandarin hybrid called clementine. It differs from the Georgian mandarin (the satsuma cultivar) through its more attractive visual appearance, sweeter taste and a thicker peel.

Therefore, directly comparing Georgian mandarin to the European clementine is difficult. European consumers are used to the clementine and sweeter citrus fruits. However, as Europe is seeking to reduce per capita sugar consumption on the continent, the Georgian satsuma will have an opportunity to establish itself on the EU market through an appropriate marketing campaign and an improved visual appearance.

14.2. Recommendations

Overcoming the aforementioned obstacles and achieving rapid development of the sector requires a comprehensive approach with regards to strengthening each link of the value chain.

Existing plantations must be renewed, early-season and late-season cultivars developed, and productivity increased by improving maintenance. Farmers should become more actively involved with the **demonstration plots**, in order to better familiarise themselves with the agricultural technologies, as well as learn and implement the modern approaches that constitute best practices in mandarin-producing countries.

According to the USAID project experts, proper maintenance of existing gardens (through improved lopping, use of fertilizers and plant protection) can increase the yield by up to 300%[41]. This will require **good extension work** based on practical learning. State support is recommended with regards to staff recruitment and training (possibly in Turkey or another country abroad). The staff will then be able to train farmers at the demonstration plots.

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[40] E. Livny, A. Maximov (2017). *Identifying Sectoral Priorities in Georgian Agriculture*.

[41] Steve Goss (2014). *Ajara Agriculture Sector Competitiveness and Export Promotion Policy Study.* Financed by UNDP and EU's ENPARD project.

In order to renew overage plants and plant early-season and late-season cultivars (with a view to extending the harvest season and allowing farmers to sell their produce at higher prices), it is recommended that the **Agro Service Center increases the number of tried and tested cultivars**. This will enable a faster renewal of plants (the number of saplings is currently limited, with a small number of farmers able to benefit from the state programmes that are aimed towards the development of intensive and semi-intensive farms, as well as new cultivars).

It would also be beneficial to learn to **develop high-value mandarin plantations** (e.g. bio-farms). It is important to **incorporate agro tourism infrastructure** into the mandarin plantations, attracting tourists and additional income. This would be particularly appropriate in the light of recent growth in the number of tourists in Adjara and Georgia as a whole.

In order to develop the refrigeration, collection and sorting facilities, it is recommended that farmers consider establishing cooperatives in order to achieve development both on the horizontal level (through cooperation among farmers) and the vertical level in the value chain. This will allow them to create added value, e.g. by developing the calibrating and storage facilities and collaborating directly with the exporters (bypassing the intermediary link), or by conducting the exports through their own efforts. Furthermore, it is possible to unite the existing players (farmers, collectors, exporters) into such associations to create a strong, vertically integrated chain.

In order to prolong the season, it is important to **develop refrigeration enterprises** (facilities) in the region. This can be achieved through farmers' unions. Generally speaking, establishing farmers' cooperatives or associations that will focus on supplying farmers with various services will strengthen the farmers' position on the market with regards to selling their produce. It will also be possible to jointly purchase agricultural products and extension services under the umbrella of a cooperative, which may provide a source of scale economies for small farmers.

Market diversification must be emphasised to ease the country's dependence on the Russian market – an unpredictable market that contains substantial marketing risks. To this end, we must identify countries where Georgian mandarins can be exported to (trade relationships with various countries or blocks of countries should be taken into account).

There are individual cases of **Georgian mandarins being exported to the European Union**. This area requires support, in order to ensure that more exporters and foreign consumers become interested in the Georgian product. As we saw earlier, Georgian mandarin has an advantage over its competitors (e.g. Turkey) with regards to price. However, the product quality needs to be improved, and relevant standards have to be maintained. More importantly, the Georgian satsuma cultivar needs to be introduced to the European consumer. It must be positioned as a natural product that contains less sugar and has more health benefits than the European clementine. Degustation of the Georgian mandarin at forums and exhibitions, as well as its introduction to the European consumer, requires more attention from the state and the donor organisations through close cooperation with the private sector.

The planning and implementation of **activities designed to promote Georgian mandarin** among visiting tourists (e.g. the citrus festival) will help popularise this product.

In order for the mandarin sector and its value chain links to function effectively, it will be necessary to enhance knowledge through modern methods and approaches. The region's universities and colleges must strengthen the mandarin cultivation/storage/processing professions and courses, which ought to be based both on theory and on practical learning. It is also highly important to create mechanisms to **encourage young farmers** and rejuvenate the sector (e.g. through special promotional programmes

for young citrus farmers). Generally, the citrus farming development policies must be aimed primarily towards those groups that have the ability and willingness to employ modern and innovative approaches, thereby boosting productivity. Focusing on this category of farmers will also help grow the plantations and achieve economies of scale in the future.

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8. Steve Goss (2014). *Ajara Agriculture Sector Competitiveness and Export Promotion Policy Study.* Financed by UNDP and EU's ENPARD project.

Internet Resources:

1. *Agro Service Center of the Ministry of Agriculture of AR Adjara: http://agrosc.ge/greenhouse.php?id=2&lang=ge*
2. *Ministry of Agriculture of AR Adjara: http://adjara.gov.ge/Branches/description.aspx?gtid=608538&gid=4#.WsUEVohuZnI*
3. *Food and Agriculture Organization Corporate Statistical Database (www.faostat.org)*
4. *Deep and Comprehensive Free Trade Area Agreement – Support Portal: http://www.dcfta.gov.ge/*
5. *Trade Helpdesk: http://trade.ec.europa.eu/tradehelp/*
6. E. Livny, G. Darchidze, I. Kochlamazashvili (2015). *Georgian Tangerines.* ISET Economist Blog *(http://www.iset-pi.ge/index.php/ka/iset-economist-blog/entry/e1-83-a5-e1-83-90-e1-83-a0-e1-83-97-e1-83-a3-e1-83-9a-e1-83-98-e1-83-9b-e1-83-90-e1-83-9c-e1-83-93-e1-83-90-e1-83-a0-e1-83-98-e1-83-9c-e1-83-94-e1-83-91-e1-83-98)*
7. *National Statistics Office of Georgia (www.geostat.ge)*
8. *International Trade Centre (www.trademap.org)*
9. *Agricultural Projects Management Agency (www.apma.ge)*
10. *Georgian Ministry of the Economy and Sustainable Development: (http://www.economy.ge/index.php?page=economy&s=7)*
11. *Citrus Headquarters (http://citrus.moa.ge/index-ge.html)*

Appendices

Appendix 1. Product Selection

Several criteria were identified for the product selection process, which was divided into two stages. The first-stage weighted criteria were divided as follows: export potential of the product on the EU market (weight - 35%), potential to substitute imports on the domestic market (weight - 25%), potential to create added value in the chain (weight - 20%), and the specifics of agriculture (e.g. climate) in Adjara (weight - 20%). Each product was assessed for each criterion on a 5 point scale, whereby 5 was the highest assessment, while 1 was the lowest assessment. Furthermore, each point was awarded on the basis of discussion and consensus amongst the group members. First-stage assessment results are shown in Table 11 below.

Table 28: Product selection: first stage results

Criteria	Coefficient	Blueberry	Garlic	Mandarin	Bayberries	Persimmon	Kiwi	Poultry	Dry Fruit	Potatoes
The product's export potential on the EU market;	0.35	4	3	3	2	2	3	1	3	1
Potential to substitute imports on the local market;	0.25	2	4	2	1	1	3	4	4	3
Potential to create added value in the chain;	0.20	3	2	4	1	2	4	3	2	3
Specifics of agriculture in Adjara;	0.20	2	2	5	1	2	3	2	2	3
Total		**2.9**	**2.9**	**3.4**	**1.4**	**1.8**	**3.2**	**2.4**	**2.9**	**2.3**

The five strongest products based on the first stage results advanced to the second stage, where they were assessed based on the following two criteria: lack of previous value chain-related research in the relevant field (weight – 40%) and the existence of a value chain, which would help CSO representatives conduct the value chain research more effectively (weigh – 60%). Based on the aforementioned criteria, researchers agreed that studying the mandarin sector in Adjara constituted a priority. Results of the second stage of the selection process are shown in Table 12 below.

Table 29: Product selection: second stage results

Criteria	Coefficient	Blueberry	Garlic	Mandarin	Kiwi	Dry Fruit
Lack of value chain research	0.40	2	2	1	2	2
Existing value chain, which will help CSO to study this subject	0.60	3	2	4	3	2
Total		**2.60**	**2.00**	**2.80**	**2.60**	**2.00**

Appendix 2. Focus Groups

#	Focus Group Participant Status	Focus Group Participants (Names, Job Titles)	Date	Focus Group Moderator(s) / Researchers
1	Pilot focus group with mandarin sector representatives	1) Kuka Bakhtadze (Collector / Exporter); 2) Gia Chkhartishvili (Collector / Exporter); 3) Davit Mamuladze (Ministry Representative); 4) Dato Malakmadze (Exporter).	24/09/2017	Researchers and Instructor
2	Farmers from the villages of Ortabatumi and Korolitavi (Municipality of Khelvachauri)	1) Ismail Beridze (Farmer); 2) Avtandil Brundadze (Farmer); 3) Vazha Machutadze (Farmer); 4) Davit Turmanidze (Farmer); 5) Nugzar Chkhaidze (Farmer); 6) Sulkhan Kikava (Farmer); 7) Natalia Tsetskhladze (Farmer); 8) Tsiuri Sharashidze (Farmer).	01/11/2017	Manana Kartsivadze, Iuri Surmanidze
3	Farmers from the village of Chaisubani (Municipality of Kobuleti)	1) Ilia Churkveidze (Farmer); 2) Kako Churkveidze (Farmer); 3) Gia Shamilishvili (Farmer); 4) Darejan Kurshubadze (Farmer); 5) Jumber Jijavadze (Farmer); 6) Jumber Tsetskhladze (Farmer).	01/11/2017	Manana Kartsivadze, Iuri Surmanidze
4	Representatives of the Ministry of Agriculture of Adjara	1) Mamuka Turmanidze (Head of Agricultural Development Department); 2) Jimsher Diasamidze (Head of Sectoral Development Department); 3) Soslan Shervashidze (Department of Rural Development employee); 4) Zurab Varshanidze (Head of Agricultural Extension Department); 5) Irma Apkhazava (Head of Policy and Analysis Department); 6) Nargiz Bezhanidze (Investment and Donor Relations Department employee); 7) Davit Jashi (Sectoral Development Department employee).	10/11/2017	Manana Kartsivadze, Iuri Surmanidze

Appendix 3. Interviews

#	Respondent Status / Job Title	Name of the Respondent	Interviewer / Researcher
1	Farmer	Davit Evgenidze	Madona Palavandishvili
2	Farmer	Jimsher Verulidze	Madona Palavandishvili
3	Farmer	Mirian Gorgiladze	Madona Palavandishvili
4	Farmer	Gocha Gorgiladze	Madona Palavandishvili
5	Farmer	Lamara Bakuradze	Madona Palavandishvili
6	Farmer	Murman Devadze	Madona Palavandishvili
7	Farmer	Nargiza Basiladze	Madona Palavandishvili
8	Farmer	Malkhaz Kenchadze	Madona Palavandishvili
9	Farmer	Joni Abuladze	Meri Chelidze
10	Farmer	Tengiz Kartsivadze	Manana Kartsivadze
11	Collector	Avto Kurshubadze	Manana Kartsivadze
12	Collector / Exporter and Refrigeration Facility	Vazha Mkurnalidze	Manana Kartsivadze
13	Sapling Supplier	Mirza Kurshubadze	Manana Kartsivadze
14	Agricultural Product Enterprise	Merab Tavdgiridze	Manana Kartsivadze
15	Processor	Avto Zoidze	Iuri Surmanidze
16	Processor	Davit Malakmadze	Iuri Surmanidze
17	Collector / Exporter and Processor, Ltd. TCF Georgia	Kakha Shavadze	Meri Chelidze
18	Collector / Exporter, Ltd. Skhalta	Amiran Beridze	Meri Chelidze
19	Mandarin consumer (Georgia)	Lali Iseridze	Meri Chelidze
20	Mandarin consumer (Georgia)	Nini Kiknadze	Meri Chelidze
21	Mandarin consumer (Georgia)	Jumber Dzirkvadze	Meri Chelidze
22	Mandarin consumer (Zagreb, Croatia)	Ivana Lagindza	Tamta Tavartkiladze
23	Mandarin consumer (Münster, Germany)	Oliver Lamers	Tamta Tavartkiladze
24	Mandarin consumer (Zilina, Slovakia)	Tomas Durana	Tamta Tavartkiladze
25	Head of the Department of Development at the Ministry of Agriculture of AR Adjara	Mamuka Turmanidze	Researchers and Instructor

Appendix 4. List of Export Documents[42]

The AR Adjara Chamber of Trade and Commerce can produce, approve and issue the following documents for exporters:

1. Certificate of Origin (Form CT-1 – preferential; ORIGIN – non-preferential);

2. Certificate of expertise on the origin of goods;

3. Certificate of Quality (based on lab research report);

4. Declaration of Conformity (based on lab research report);

5. Invoice;

6. Contract based on ИНКОТЕРМС 2010 terms;

7. CMR (transport document);

8. TIR Carnet (transport company);

9. Certificate on genetic modification;

10. Phytosanitary certificate.

[42] http://citrus.moa.ge/files/doc-ge.pdf

Appendix 5. Economic Calculations by Farm Type

A typical farmer's expenses and revenues per hectare (for a plantation that has already borne fruit)					
Plantation Maintenance Costs					
Agrotechnical Activity Costs	**Period**	**Unit**	**Quantity**	**Costs per Unit**	**Total (GEL)**
Mowing, tree crown formation	February, March	ha	1	600	0
Combined mineral fertilizer **NPK**		kg	300	1.5	450
Nitrogen fertilizer		kg	500	1	500
Organic fertilizer (biofertilizer – plant probiotics)		tonnes	1.5	700	1050
Costs of using mineral and organic fertilizers (mulching)		kg	4750	0.1	0
Activities aimed at protecting the plantation from snow and other unfavourable conditions	November, December, January	men/day	15	30	
Spraying Activities	February, March, May, June, August				
Fungicides (4x)		kg/GEL	20	20	400
Insecticides (4x)		kg/GEL	4	40	160
Bio pesticides		kg/GEL	2	50	100
Pesticide spraying costs		ha	2	100	200
Mowing, mulching	June - August	ha	1	600	
Agro-technical Activity Costs					**2 860**
Unforeseen Costs					
From garden maintenance costs		ha	100%	2%	57
Other Expenses					
Irrigation water cost		ha	1	70	0
Land tax		ha	1	87	0
Insurance (subsidised)		ha	1	300	0
Picking Costs	October - November	kg	12,000	0.05	0
Total Costs					**2 917**
Yield and Revenues	**Period**	**Unit**	**Quantity**	**Revenues per Unit**	**Total (GEL)**
Mandarin Yield and Revenues	October - November	kg	10,000	0.55	**5 500**

Source: Cost and revenue tables supplied by the Ministry of Agriculture of AR Adjara, updated in accordance with the results of the interviews.

Note: Whenever the sum is indicated as zero (0), it either means that the activity in question is not carried out by the farmers, or that farmers are carrying out the activity themselves, without sustaining expenses.

A medium-scale farmer's expenses and revenues per hectare (for a plantation that has already borne fruit)					
Plantation Maintenance Costs					
Agro-technical Activity Costs	**Period**	**Unit**	**Quantity**	**Costs per Unit**	**Total (GEL)**
Mowing, tree crown formation	February, March	ha	1	600	0
Combined mineral fertilizer **NPK**		kg	300	1.5	0
Nitrogen fertilizer		kg	500	1	500
Organic fertilizer (bio fertilizer – plant probiotics)		tonnes	1.5	700	1050
Costs of using mineral and organic fertilizers (mulching)		kg	4750	0.1	0
Activities aimed at protecting the plantation from snow and other unfavourable conditions	November, December, January	men/day	15	30	0
Spraying Activities	February, March, May, June, August				
Fungicides (4x)		kg/GEL	20	20	400
Insecticides (4x)		kg/GEL	4	40	160
Bio pesticides		kg/GEL	2	50	100
Pesticide spraying costs		ha	2	100	200
Mowing, mulching	June - August	ha	1	600	0
Agro-technical Activity Costs (Total)					**2 410**
Unforeseen Costs					
From garden maintenance costs		ha	100%	3%	72
Other Expenses					
Irrigation water cost		ha	1	70	70
Land tax		ha	1	87	87
Insurance (subsidised)		ha	1	300	300
Picking Costs	October - November	kg	20,000	0.05	1000
Total Costs					**3 939**
Yield and Revenues	**Period**	**Unit**	**Quantity**	**Revenues per Unit**	**Total (GEL)**
Mandarin Yield and Revenues	October - November	kg	17,000	0.55	**9 350**

Source: Cost and revenue tables supplied by the Ministry of Agriculture of AR Adjara, updated in accordance with the results of the interviews.

Note: Whenever the sum is indicated as zero (0), it either means that the activity in question is not carried out by the farmers, or that farmers are carrying out the activity themselves, without sustaining expenses.

A semi-intensive farm's expenses and revenues per hectare (for a plantation that has already borne fruit)					
Plantation Maintenance Costs					
Agro-technical Activity Costs	**Period**	**Unit**	**Quantity**	**Cost per Unit**	**Total (GEL)**
Mowing, tree crown formation	February, March	ha	1	600	600
Combined mineral fertilizer **NPK**		kg	600	1.5	900
Nitrogen fertilizer		kg	750	1	750
Organic fertilizer (bio fertilizer – plant probiotics)		tonnes	3.5	700	2450
Costs of using mineral and organic fertilizers (mulching)		kg	4750	0.1	475
Activities aimed at protecting the plantation from snow and other unfavourable conditions	November, December, January	men/day	15	30	450
Spraying Activities	February, March, May, June, August				
Fungicides (4x)		kg/GEL	20	20	400
Insecticides (4x)		kg/GEL	4	40	160
Bio pesticides		kg/GEL	4	50	200
Pesticide spraying costs		ha	4	100	400
Mowing, mulching	June - August	ha	1	600	600
Agro-technical Activity Costs (Total)					**7 385**
Unforeseen Costs					
From garden maintenance costs		ha	100%	5%	369
Other Expenses					
Irrigation water cost		ha	1	70	70
Land tax		ha	1	87	87
Insurance (subsidised)*		ha	1	300	300
Picking Costs	October - November	kg	40,000	0.1	4000
Total Costs					**12 211**
Yield and Revenues	**Period**	**Unit**	**Quantity**	**Revenues per Unit**	**Total (GEL)**
Mandarin Yield and Revenues	October - November	kg	38,000	0.6	**22 800**

Source: Cost and revenue tables supplied by the Ministry of Agriculture of AR Adjara for intensive mandarin farms, although there are currently no such farms operating in Adjara, or in Georgia as a whole, that have already borne fruit.

Appendix 6. Economic Calculations for New Semi-Intensive Plantations

Economic calculations for the development of a mandarin plantation (cultivar: Tiahara Unshiu) and full agro-technical activities by year											
N	Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	**Total for 9 Years**
1	Plantation development costs (GEL)	22,870	0	0	0	0	0	0	0	0	**93,960**
2	Cost of annual agro-technical activities, including harvesting (GEL)	0	6,055	6,205	6,705	8,585	9,385	10,385	11,385	12,385	
3	Yield by year (kg)	0	0	1,500	6,500	12,000	20,000	30,000	40,000	50,000	**160,000**
4	Revenues obtained from the plantation (GEL). Sale price: 0.6 GEL	0	0	900	3,900	7,200	12,000	18,000	24,000	30,000	**96,000**
5	Profit margin	0	0	0	0	0	1,615	3,615	12,615	17,615	**2,400**
6	If agro-technical activities are followed with precision, then the plantation will reach full yield (50 kg per tree) from the 9th year. The cost of the agro-technical activities carried out during these 9 years is GEL 93,960. The yield amounts to 160 tonnes, with revenues amounting to GEL 96,000. Therefore, the profit margin for the 9th year is GEL 2400 (96,000 – 93,600).										

Source: Ministry of Agriculture of Adjara

Appendix 7. European Union Requirements for Mandarin Imports

Table 30: Duty rates on mandarins in the European Union

Product	Description	Conventional Rate of Duty (%)
Mandarins (Satsuma and Other Cultivars)	1 January – end of February, product entry price for 100 kg (net).	
	Price ≥ € 28.6	16%
	€ 28 ≤ Price < € 28.6	16% + 0.6 €/100 kg/net
	€ 27.5 ≤ Price < € 28	16% + 1.1 €/100 kg/net
	€ 26.9 ≤ Price < € 27.5	16% + 1.7 €/100 kg/net
	€ 26.3 ≤ Price < € 26.9	16% + 2.3 €/100 kg/net
	Price < € 26.3	16% + 10.6 €/100 kg/net
	1 March - 31 October	16%
	1 November - 31 December, product entry price for 100 kg (net).	
	Price ≥ € 28.6	16%
	€ 28 ≤ Price < € 28.6	16% + 0.6 €/100 kg/net
	€ 27.5 ≤ Price < € 28	16% + 1.1 €/100 kg/net
	€ 26.9 ≤ Price < € 27.5	16% + 1.7 €/100 kg/net
	€ 26.3 ≤ Price < € 26.9	16% + 2.3 €/100 kg/net
	Price < € 26.3	16% + 10.6 €/100 kg/net

Source: http://www.dcfta.gov.ge/public/filemanager/Entry%20Price.pdf

Although customs duties have been abolished on most products, there are still some barriers (standards, certificates, sanitary and phytosanitary norms, etc.) which will only be removed once the Georgian legislation is fully harmonised with that of the European Union[43].

In order to present Georgian mandarin on the EU market, the product must comply with the following requirements[44]:

1. Pesticides must be used in limited amounts.
2. It must not be dangerous for people's health.
   The product, its origin and all necessary documentation (invoice, transport document, goods insurance, list of goods, customs declaration)[45] are checked to ensure the safety of imports.
3. The product must comply with marketing standards[46].
   In accordance with DCFTA, mandarin benefits from special marketing standards[47], of which **product quality** is particularly important. It must not be spoiled by pests, frost or dehydration. It must not have an unnatural odour or taste. Fruit designated for sale must be able to withstand transportation and reach its destination undamaged.
   One of the indicators of quality is **product ripeness**. Mandarin must reach an appropriate level of ripeness, which is determined by minimum contents of sugar and juice, the sugar/acidity ratio and colour (see Table 14 below).

[43] http://www.parliament.ge/uploads/other/22/22580.pdf
[44] https://www.cbi.eu/market-information/fresh-fruit-vegetables/buyer-requirements/
[45] http://trade.ec.europa.eu/tradehelp/documents-customs-clearance
[46] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R0543&from=en ; http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32011R0543
[47] https://www.cbi.eu/market-information/fresh-fruit-vegetables/buyer-requirements/

Table 31: The European Union's minimum quality requirements

Minimum Quality Requirements:			
Cultivars	Minimum Juice Content (%)	Minimum Sugar/Acidity Ratio	Colour
Satsuma	33%	6,5:1	At least 1/3 of the surface must be of the fruit's typical colour
Clementine	40%	7,0:1	
Other mandarin types and hybrids	33%	7,5:1	

Mandarin exported to the EU must be in the highest ('Extra') Class, Class I or Class II.

Table 32: EU quality requirements

Classification	**Characteristics**
Extra-Class Mandarin	Highest class of mandarin that is completely unspoiled, or has insignificant surface damage.
	5% tolerance for Class I fruit content (Class II content cannot exceed 0.5%).
Class I Mandarin	The shape of the fruit is not ideal. The surface has sustained minor damages from sun, hail, pests, packaging, etc.
	10% tolerance for Class II fruit content (sub-Class II fruit content cannot exceed 1%).
Class II Mandarin	Class II mandarin has significant faults with regards to its shape and colour, as well as considerable damage to its outer surface. However, it retains its natural characteristics and satisfies the minimum market requirements.
	10% tolerance for sub-Class II fruit content (fruit that does not satisfy the minimum requirements). Rotten fruit content cannot exceed 2%.

Apart from quality, the **size** of the mandarin fruit also plays an important role**.** The **minimum size** of the mandarin is 45 mm in diameter.

Table 33: Minimum size of the imported citrus fruits in the European Union

Fruit	Diameter (mm)
Lemon	45
Satsuma, other mandarin cultivars and hybrids	**45**
Clementine	35
Orange	53

It is acceptable for the quantity, size or weight of the mandarin fruit to be up to 10% below the stated minimum figures (e.g. 43 mm diameter for satsumas and other cultivars, and 34 mm for clementines).

Uniformity

In order to preserve uniformity of the produce, the difference between the mandarins in a package must not exceed the following:

- 10 mm if the diameter of the smallest mandarin inside the package is less than 60 mm;
- 15 mm if the diameter of the smallest mandarin inside the package is between 60 mm and 80 mm;
- 20 mm if the diameter of the smallest mandarin inside the package is between 80 mm and 110 mm;
- There is no limit in case the diameter of the smallest mandarin inside the package exceeds110 mm.

Size Code

There are 7 forms of size code classification in the European Union:

Table 34: Mandarin classification by size code

	Size Code	Diameter (mm)
Satsumas, other mandarin cultivars and hybrids	1 - XXX	78 and more
	1 - XX	67 - 78
	1 or 1 - X	63 - 74
	2	58 - 69
	3	54 – 64
	4	50 – 60
	5	46 - 56

Along with quality and size, it is also important how the product is **presented on the market**. Packaged mandarins must be of the same origin, cultivar, quality, size and ripeness. The packaging must be of high quality, so that the fruit does not become damaged. Labelling should be done carefully (non-toxic ink must be used).
The **label** must contain the following information: identification details, name of the cultivar, origin and specifics (class, size). Attaching the official testing label is optional.

4. Product must be healthy
   Mandarins exported to the European Union must comply with the EU's phytosanitary requirements[48], meaning that the product must be accompanied by documents certifying its safety and quality[49]. In case of mandarins, the documents in question are the **phytosanitary certificate** issued by the National Food Agency (NFA) of the Ministry of Agriculture and the **Certificate of Origin (EUR 1)** issued by the Revenue Service.
   Furthermore, the product must pass the phytosanitary and customs inspections, must be imported into the European Union by a registered importer, and the export must be declared prior to the product arriving at the customs.
5. Contamination control is mandatory.

[48] http://trade.ec.europa.eu/tradehelp/sanitary-and-phytosanitary-requirements
[49] http://www.dcfta.gov.ge/

Mandarins can become contaminated during packaging, transportation or storage. The EU has set maximum levels for contaminants[50] in order to protect European consumers and supply them with healthy products.

[50] http://exporthelp.europa.eu/update/requirements/ehir_eu14_03v001/eu/auxi/eu_heafocon_annex_r1881_2006.pdf