

Master Plan Azerbaijan: Fruit Sector Assessment

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1. Introduction

The fruits sector consist of different types of orchards and fruit production. Fruit trees and perennial plants grow as multiannual woody crops bearing fruits. In this report, first the key features of the fruit cropping sector in Azerbaijan are described. Typically for most fruit bearing trees, it will take 3 or 4 years after the establishment of an orchard before harvesting may occur, and some years longer before the orchard is fully productive. Therefore, next to the direct investments in the production also a period of building up the orchard or plantation to a cropping field has to be taken into account. This requires extra attention to the financing of an orchard. Next to the sector's structural characteristics, the input supplying industries are analyzed. In chapter 4 trends in production, yield levels, consumption and other uses are described. Next, market opportunities per product, government policies and the sector's business environment are presented. This note concludes by suggesting investment opportunities and providing recommendations how sector development could be promoted.

2. Features of the sector

Land use

The fruit sector in Azerbaijan is a growing industry, using 171,600 hectares of land in 2016. Between 2000 and 2016, the area under cultivation has grown significantly and continuously, with 2-3% per year in the last five to six years, and 2016 is showing a further substantial increase of the cultivated area (table 2.1). When comparing fruit and berries with grapes, the area of fruit and berries cultivation has particularly increased, whereas the area under grape production is more or less constant over time.

Looking more closely at the trends of the fruit areas under cultivation, the area cultivated by hazelnut growers has increased the most (doubled to 31,000 ha over the period 2000-2016). Hazelnuts, apple orchards and pomegranate account for the majority of the area of all fruits varieties that Azerbaijan is producing.

Table 2.1 Area of planted fruits, berries and grapes (in 1,000 hectares)

	2010	2011	2012	2013	2014	2015	2016
Fruits and berries	127.7	130.5	133.5	134.2	138.5	144.1	171.6
Grapes	15.4	15.9	16.3	16.1	15.9	16.1	16.0
Total ha	143.1	146.4	149.8	150.3	154.4	160.2	187.6
Annual increase (ha)		3.3	3.4	0.5	4.1	5.8	27.4
% annual increase		2.3	2.3	0.3	2.7	3.6	14.6

Source: State Statistical Committee of the Republic Azerbaijan, stat.gov.az

Farm size

Most fruits and berries are planted in privately owned orchards, mainly by family farms and households on areas up to 2 ha, with the larger agricultural enterprises cultivating at only 7% of the fruit and berries area (Table 2.2). In grape production, about 30% of the area is used by agricultural enterprises and the share of the larger companies producing grapes is slightly increasing over time. However, the average farm size in fruit, berries and grape production is still rather small.

Table 2.2 Cultivated areas per farm type, in 1,000 Hectare

	2010	2011	2012	2013	2014	2015	2016
Fruit and berries area on agricultural enterprises	7.6	6.1	6.5	6.3	5.9	8.2	12.0
Grapes area on agricultural enterprises	3.7	4.4	4.7	4.8	4.3	4.5	4.6
Fruit and berries area on privately owned farms, family farms and households	120.1	124.4	127.0	127.9	132.6	135.9	159.6
Grapes area on privately owned farms, family farms and households	11.7	11.5	11.6	11.3	11.6	11.6	11.4

Source: State Statistical Committee of the Republic Azerbaijan, stat.gov.az

Biophysical features

Azerbaijan has various regions with different climatic conditions, from arid subtropical to cold climate types (see figure 2.1).

Azerbaijan map of Köppen climate classification

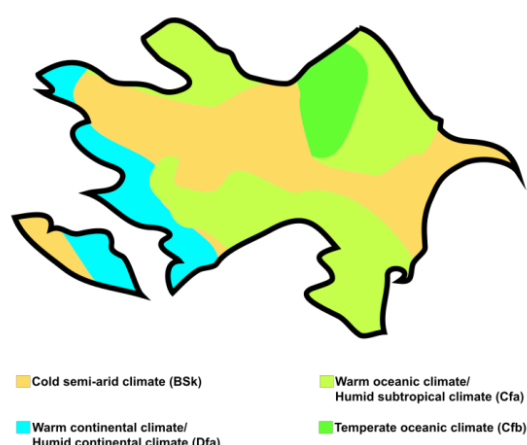


Figure 2.2: Climate classification of Azerbaijan

Source: World Koppen Classification.svg.

For fruit cultivation, climate and weather conditions are important factors determining the sector's production levels. Most fruit varieties need a cold period in winter to break its dormant rest that starts in shorter daylight circumstances. All areas in Azerbaijan have enough cold periods in winter to break this dormancy. However, the cold period should not persist too long: when early frost in spring hits the flowering fruit trees, damage can arise causing lower production volumes and/or lower quality fruit in that season. Moreover, extreme heat in summer is another risk. When fruit trees are able to cool itself through efficient water supply, hot conditions can be solved, especially in combination with shadow netting.

Soil

Top soil and vegetation of Azerbaijan is peculiar varied, with fertile areas in main parts of the country. Yet, according to Tarana (2005)¹, an estimated half of the cultivated land is affected by erosion, which is seriously damaging mountain and foothills lands. A additional factor limiting crop development is salinity, which is affecting about a third of the country's area, mainly in the south-east part of Azerbaijan

The soil type is important for fruit cultivation. Before planting, the soil should be investigated and if required, improved in terms of structure and nutrients available. Improvements of the soil structure can

¹ Tarana, B. (2005). Conditions of rural land markets in Azerbaijan. FAO, Budapest & Slovak Agricultural University Nitra, [http://eastagri.org/files/azerbaijan1173088421\[1\].pdf](http://eastagri.org/files/azerbaijan1173088421[1].pdf)

be done through machines as used in arable farming. Improving the content of microbiology in the soil can be done through compost or manure (from dairy and/or chicken farms) or by growing pre-crops like legumes. A good soil contains a good number of air, water, and sand or clay particles. It is recommended to use the soil for a crop like wheat before planting a fruit crop. The rooting system of the wheat plant will in fact improve the soil significantly.

Some fruit crops (such as berries) can also be cultivated in other growing media, like peat, coco-peat and an-organic material. This is to avoid negative effects of soil-bounded diseases and pests on yield and quality. In case the grower chooses peat or an an-organic material, the local soil types are less of importance and other production factors are more determining.

Water

An important production factor is the availability of water of good quality. For achieving high yields, fruit production should take place on land that is irrigated. Beside rainfall, water is extracted from additional sources, being surface water (canals, rivers and reservoirs) and/or groundwater, like wells. Although water canals and rivers are available in most fruit production regions in Azerbaijan, small fruit farmers use ground water, because a connection to the water canal is too expensive. Large farms are capable to organize connections to open water sources (via pipelines) by negotiating with the local government (with financial support).

The quality of water from the mountains is reasonable good (low salt and mineral content), but the quality of groundwater is varying and sometimes contains too much minerals. The water from canals or ditches is mostly gathered in larger basins before being used for drip irrigation or in a sprinkler system. The benefit is that sediments can go to the bottom and the water is much clearer before use. This helps to prevent malfunctioning of irrigation systems at the farms. On some farms reverse osmosis is available to produce good quality of water, especially for strawberries which need high quality water with a low amount of Sodium (less than 22 mg/l). Access to water (of good quality) is a serious point of attention, especially for small farmers. Information on water prices on regional level can be found in Appendix 1.

Infrastructure

This aspect of the structure refers to (the quality of) transport infrastructure (road, rail, water and air) and to communication and information systems. See figure 2.3 for a road, rail and river map of Azerbaijan. From a logistic point of view, the Shamkir and Balakan regions seems to be well situated for exports to Russia and/or Georgia, when fruits are transported by trucks (as main transport mode). Absheron and Geychay are situated more closely to the capital Baku. Only soft fruits like strawberry, blackberry and raspberry have a critical delivery time between harvesting and consumption with a maximum of four days when the product is of high quality. Other fruits do not have such a critical delivery period after harvest, and hence for them transport time is not a critical issue.



Figure 2.3: Road, rail and river map of Azerbaijan (source: funny-quotes.picphotos.net)

ICT: Mobile phones are widely used as phone connections and internet is also widely used (see also Master Plan report 'Market and competitiveness analysis of the Azerbaijan agricultural sector: an overview'). Hence, communication via phone or internet should not be an obstacle for agricultural business in general and for fruit production and trade in particular.

3. Input supplying industries

3.1 Trees and other plant material

Plant material currently used at the more modern plantations is largely imported. But also some local Azerbaijan companies offer fruit trees and plants to growers. We have seen plant material imported from France, Italy, the Netherlands, Poland and Ukraine. For companies who want to import propagation and plant material, it is not difficult to get new varieties on the varieties list. This list contains the names of varieties which may be imported and marketed in Azerbaijan, based on a registration of varieties that have been technically examined and notified by the Azerbaijan government authorities. These lists protect local growers against trade in plant material of varieties which do not comply with Azerbaijan's law. In this respect, Azerbaijan is aligned with international standards as the country is a member of the international convention for the Protection of New Varieties of Plants (UPOV) since 2004. This is important for growers as it enables them to use modern plant varieties.

The plant material imported must be free from soil parts from the land of origin, in order to reduce the risk of importing plant diseases to a maximum. For fruit trees the virus state is very important. A grower should go for virus free trees. All planting material has to be virus free and has to be tested before it is purchased. This means that rootstocks as well as the mother plants of the varieties have to be inspected and tested, and the plant health status should be registered and health statements should be verifiable. Currently, Azerbaijan's plant disease control system is not up to international standards. The national phytosanitary inspection services are yet in a process to enhance their capacities assisted by the International Plant Protection Convention (IPPC) (see www.ippc.int).

For strawberry plants it is important that the plants are grown by specialized growers and that no plants are used from own reproduction. Own reproduction practices will degenerate the plants, resulting in less production and poor quality produce.

For fruit plants in general, it is important to manage the health of the mother plant material (plants used for propagation). A plant health management system generally consists of a combination of enforcing strict rules on hygiene, using aphid (plant lice) free greenhouses, applying measures to keep the plants free from viruses transferred by aphids and other insects, and conducting DNA testing of plant material on the occurrence of plant diseases.

3.2 Energy

Azerbaijan is rich in natural gas and fossil oil. In Azerbaijan a grid structure is present, but coarse. This means that not all fruit growers are connected to the gas infrastructure. Alternatives are oil or coal. Gas is provided by the state-owned company Azerigaz OJSC. 2016 Gas tariffs are presented in table 3.1).

Table 3.1: Azerbaijan natural gas, wholesale, production and transmission tariffs

Nº	Name of service	Tariffs (including VAT, manat/1000 m ³)
1.	Production of natural gas	5.5
2.	Transportation of natural gas (for each 100 km distance)	2.0
3.	Wholesale price for distribution companies	75.0
4.	Retail prices of natural gas	
4.1.	Residential (population)	
4.1.1.	Part of the annual consumption up to 1700 m ³ (1700 m ³ including)	100.0
4.1.2.	The part of annual consumption of over 1700 m ³	200.0
4.2.	Non-residential	200.0
5.	The consumers who get gas directly from the main gas pipelines and use natural gas for production purposes (with a monthly consumption of no less than 10 million m ³)	120.0

Source: Tariff Council of Azerbaijan (<http://www.tariffcouncil.gov.az/?/az/content/66/>)

In fruit production, electricity is a main source of energy used, mainly for the operation of water pumps (irrigation), and for sorting and storage (cooling) equipment. Machines like tractors use diesel. Hardly no other energy carriers are used. For the use of electric power for irrigation also solar panels could be a good alternative. We did not see solar energy applied in Azerbaijan during our field surveys in 2017.

Electricity comes from two power stations, Azerenergi OJSC and Azerishiq OJSC. On more large fruit farms a generator is installed as back-up facility. A serious problem is the frequency of power cuts, as it happens 10-20 times per month, in general. Generators can take over the electricity supply from the public grid at those farms who have such a facility. Electricity tariffs are presented in table 3.2.

Table 3.2: Electricity tariffs

Number	The name of service	Tariffs, for 1 kWh (including VAT), kopecks
1.	Purchase tariffs from producers	
1.1.	Generation by the private small scale hydraulic stations	5.0
1.2.	Generation by the Wind Power Stations	5.5
1.3.	Generation by other alternative and renewable sources	5.7
2.	Wholesale tariffs	5.7
2.1.	For the companies operated in the Chemical and Aluminium Industries and Steel Smelting facilities based on mining ore of which average monthly consumption of the electricity (for production purposes) is not less than 5 million kWh	
2.1.1.	Day time (08.00- 22.00)	5.8
2.1.2.	Night time (22.00- 08.00)	2.8
3.	Transit transmission of the electricity	0.2
4.	Retail tariffs	
4.1.	Residential	
4.1.1.	The part of monthly consumption volumes up to 300 kWh (300 kW included)	7.0
4.1.2.	The part of monthly electricity consumption of over 300 kilowatt hour.	11.0
4.2.	Non-residential	9.0

Source: Tariff Council of Azerbaijan (<http://www.tariffcouncil.gov.az/documents/N17-EE.pdf>)

3.3 Equipment and mechanisation

Mechanisation rates are particularly low in the fruit sector in Azerbaijan. Yet, mechanisation to be used for fruit growing can be simple and effective. A grower needs a tractor, preferably with a wheel base of 140 cm in order not to take too much space between the trees and with 60 to 80HP for being able to carry a sprayer and mower. These are the basic orchard machines.

For the picking of fruits, different mechanization systems are available (see pictures on next page). The pip fruits and pomegranate are usually picked and collected in big boxes. These boxes are also used for the storage of the fruits. Internationally machines which improve the productivity of the pickers are used. This can be a "Pluc-O-trac" or a "Picking train", were the distance between picker, fruit and box are as short as possible. This kind of techniques are little used in Azerbaijan yet.

The storage facilities give growers of apples and pears the possibility to sell their product to the market over a longer period after harvest. A proper storage is done in airtight cool stores where the amount of oxygen and carbon gas can be regulated (so-called ULO cool stores). Storage facilities are essential for large farms producing large quantities in order to spread sales over seasons and benefit from generally higher prices in months beyond harvest time (generally December to July).



Other mechanisation options are in sorting and packaging of the products. Depending on the market (from local to export market) the products are packed in small or larger volume boxes. Modern sorting installations sort on fruit weight, colour and inside quality. These machines are only cost-effective when production has a certain scale. For most individual fruit growers in Azerbaijan these machines are not in reach, except if a strategy of expanding the scale of production is being followed, or, alternatively, if growers associate and invest in a sorting facility that is being used by the association members.

3.4 Labour (input, skills, competences, availability of labour qualifications)

Azerbaijan has a history in agriculture, although the oil industry is the main economic sector. Agriculture is performed on a large number of small family farms; in general labour is not a problem in terms of number of people available and salaries are generally low². Skills and competences may be a problem, though. The applied cultivation techniques and methods in open field fruit and vegetable production are rather traditional and transferred from generation to generation. Experiences with new technologies are only few.

There is a lack of teachers at agricultural schools with up-to-date knowledge of cultivation techniques and farm management. Most important, agriculture and horticulture is hardly educated. In Shamkir region for example, an agricultural vocational school (Technicum) will start in 2018 (Info local MoA of Shamkir) as one of the few of these schools in the country. In view of the application of new technologies in protected cultivation the appropriate skills and competences are therefore not present.

3.5 Services: extension and finance

Formerly, extension services were not a task of the Ministry of Agriculture (MoA). Since several years the Procurement (Institute of the MoA) is conducting extension service activities, but in practice these activities are limited and teachers/trainers are not well qualified. Most extension services are provided by input suppliers, like seed companies, substrate companies, crop protection companies and fertilizers suppliers. It is important to emphasise that this service has a commercial interest. Bigger fruit farmers use foreign consultants as well (for instance, from France, Netherlands, Italy or Turkey).

There is a lack of qualified or certified laboratories to conduct analyses of product quality, on residues (MRL's), and on soil and water quality. This hinders realising optimal cultivation conditions and to meet the requirements when selling products to high-end and/or export markets.

Access to credit is an extremely important condition to a successful business operation in agriculture and horticulture. Azerbaijan's score on the World Bank's 'getting credit' list is rather low, which means that access to credit is problematic and lending interest rates are high (ca. 16-17% in 2015/2016). Recent

² Labour cost for picking differ per region: in some areas 8 manats per hour is paid, in others 12 manats per hour (verbal information from growers).

figures show that small farmers can borrow money from commercial banks against interest rate of 18-36% (info MoA Samux), which makes access to finance rather difficult, if not impossible. On the other hand agricultural production and processing sectors may benefit from discounted credits through the following channels:

- Credits by Azerbaijan National Fund for Entrepreneurship Support (ANFES);
- State Agency on Agricultural Credits (SAAC).

The biggest provider of discounted credits to the agricultural sector is ANFES with the aim to support the development of entrepreneurship, to increase the business activity of the population and the implementation of the financial support. For some agricultural projects of the government the farmers can get a reduced interest for the a loan from a commercial bank (e.g. 6% instead of 18-36%). The difference in interest rates is subsidized by the government. Next, small farmers can buy seeds, fertilizers and chemicals from a government related Institute (Procurement), using (part of) their crop as collateral for a loan that allows them to buy the inputs from this institute. After selling the harvest the loan will be settled (Info MoA Samux).

For investments in fruit production the period between starting planting and first harvest is four or five years in most cases. Hence, considering investing in this sector, next to the investment in the orchard the money needed to bridge these four to five years needs to be taken into account.

4. Trends in production, yields, and use of fruits

4.1 Production and yield developments

The overall fruit production volumes add up to around 850-890 thousand tons in recent years (Stat.gov.az statistics). Table 4.1 shows the trends in production levels and yields of Azerbaijan's most important fruit types.

Table 4.1 Production and yields of Azerbaijan's most important fruit types (selected years)

Product	Production (in 1000 ton)			Yields (100kg/ha)		
	2005	2010	2016	2005	2010	2016
Apples	163	211	254	79.2	87.7	89.4
Berries	2	2	2	36.2	25.4	18.4
Cherries	21	18	35	88.2	58.2	82.0
Grapes	80	129	136	61.8	74.7	74.4
Hazelnuts	28	29	34	15.0	12.9	10.7
Peach	16	17	24	96.3	59.8	54.6
Pear	41	36	41	94.0	80.3	80.5
Persimmon	109	142	143	183.6	184.2	150.2
Pomegranate	98	127	145	96.7	97.7	74.0
Quince	24	23	28	84.8	71.1	77.9

Source: State Statistical Committee of the Republic Azerbaijan, stat.gov.az

In terms of volume, the production of apples, pomegranate, persimmon and grapes are the country's most important fruits. The production of these four fruits is increasing. Trends in yields of the four fruits are different, though. Yields of apples and grapes show an increasing trend over the last 10-15 years (although there are year-to-year swings in levels). On the other hand, persimmon and pomegranate yields are declining. Same is true for hazelnuts and peach whereas yields of peach, pear and quince are rather constant over time. Trends in cherry yields showed some decline in the period 2000-2010 but regained levels as since 2010 yields are increasing again.

Declining yields may be caused by many factors, for instance by the lack of knowledge how to maintain the plantings in good shape or by soil nutrients depletion or a lack of water (drought). In Azerbaijan the aging of orchards is another reason. During the field surveys in 2017 several plantations were visited where new orchards and new varieties of fruits were found. Yet, the main picture is one of traditional cultures. Moreover, part of the production of soft fruits (e.g. blackberries and feykoya) is collected from forests and publicly owned fields/areas, hence not cultured.

The average production per hectare of stone fruits and berries in Azerbaijan is comparable with European average yields of these crops (see FAO statistics). Pip fruit (or pome fruit, like apple, pears, quince) yields are rather low in comparison with surrounding and EU countries (less than 50% at an average harvest). Hazelnut yields are rather modest compared with, for instance, neighbouring countries like Armenia and Georgia and a major producing country like Turkey.

4.2 The use and marketing of fruits

The fruits can be used in two ways: to be sold at the fresh market or to the processor (to be canned, preserved, dried, frozen, juiced, etc.). Both are interesting for growers in Azerbaijan. A fresh market destination can be direct sales after harvesting, but for some crops storage life can be extended by using cool storage, and storing (plus sorting and packaging) may be an attractive strategy to sell the produce at a later time or at markets at further distance to the producer's production region.

Table 4.2 shows the use of fruits and berries in recent years. Most of the production is being consumed directly without processing and (largely) as fresh produce. The processing of fruits in (other) foods is less than 10% of the overall fruit production volume, and also juicing and canning of fruits make together around 5-6% of what is available. Azerbaijan is a fruit exporting country, illustrated by figures indicating that about 20-25% of all produce is exported. 40 % of the grape production is used for wine production.

Table 4.2 Use of fruits and berries (1,000 tonnes)

Year	2014	2015	2016
Direct consumption	629	693	678
Export	167	182	219
Production of foodstuff	67	65	60
Production of canned fruits	47	41	44
Production of Juice	20	23	16
Fodder for cattle	3	3	3
Losses	12	14	14
Storage	40	47	48
Total of resources	920	1,004	1,022

Source: State Statistical Committee of the Republic Azerbaijan, stat.gov.az

The average fruit consumption per capita is growing in Azerbaijan (table 4.3). Compared to the average of all EU28 countries (58 kg/capita), the fruit consumption in Azerbaijan is rather high.

Table 4.3 Consumption of fruits and berries in Azerbaijan, in kg per capita

	2001	2005	2010	2011	2012	2013	2014	2015
Fruit & berries	37.3	54.5	65	68.5	74.8	75.2	77.2	78

Source: State Statistical Committee of the Republic Azerbaijan, stat.gov.az

Most growers – which are largely small-scale, family farms – sell their produce by themselves (family members) at local markets or as street vendors³. Next, they sell to traders or middlemen/collectors who transport and sell at wholesale markets in the bigger cities, or to processors. In the latter case, there is little or no written contract that sets prices, quality and other trade conditions: trade relations are mainly based on verbal agreements. As a result the trade position of small growers is rather poor. This is even more so due to traders' practises to discourage farmers to engage in trade networks themselves (oral information from interviews; see also Kalilov et al., 2015). Farmers/growers lack market information and can only sell at prices offered by the middlemen.

Still, dealers and other intermediary traders gathering small quantities of products from family farms and distribute these to wholesale markets in big cities, regional markets and to overseas markets, also provide services such as logistics, grading, standardization, packaging and activities related to shipment and cargo handling. These activities show that the dealers and intermediaries are key players in the distribution channels and supply chain.

In figure 4.1 an impression is shown of the Meyvali wholesale market in Baku. Trade is done on the spot and mostly without any contracts. Producers and traders are waiting for buyers. This is also the case for imported products (e.g. from Iran) by traders selling their products on the Meyvali market. The wholesale market is not an auction, but determined by negotiating one-by-one. Payment of purchased products is in cash.



Figure 4.1: Entrance Meyvali wholesale market (left panel), local Cherries (middle panel), Berries (right panel)

³ Rough estimates show that 20-30% of vegetable products are sold on the street/highway and 20-30% on weekend markets.

The wholesale market showed great differences in quality levels of products. This could also be seen by the way products were packaged and presented. In some market stalls, products were stored in cooled cells. The wholesale market seems to operate well, but no activities or spots with regard to control on quality levels and/or food safety inspections were observed.

The quality of fruit products on the local farmers market differs very much, but in most cases will not meet the requirements for export to Russia or to Europe.



Figure 4.2: Strawberry in baskets: poor quality Pears well Packed

Quality and food safety appear to receive little attention yet in the fruit sector in Azerbaijan, except for the larger and more professional growers and traders. Yet, this has to change if growers/traders target to sell to domestic supermarket chains that quickly gain market shares in Baku and other major cities in the country. Indeed, these supermarkets demand for fruit produce that has to be grown under GlobalG.A.P control points and compliance criteria (www.globalgap.org). GlobalG.A.P guide lines are international rules regarding the use of pesticides, fertilizers, tracking and tracing the product from the field until the supermarket. But these rules also include respecting social laws in a country regarding labor, payment and working conditions. The third part of the guidelines is the hygiene in the orchard, but mainly in buildings and packaging rooms. These rules are controlled by an accredited national organization and involves field inspections on an annual basis. Processing of fruits have to comply with the criteria and guide lines of Hazard Analysis Critical Control Point (HACCP), principles and guidelines that should ensure the national and (in case of exports) international food safety standards.

Some crops and growers can add extra value by producing under an organic label. Organic is a way of producing without using chemical pesticides, fertilisers or herbicides. In order to be certified with the international Eco-label, the grower is subject to regular inspections by a national inspection agency accredited by the international organisation of organic producers. Traceability and transparency/communication on growing conditions are important features of this type of produce. In Western Europe, there is increasing demand for organic food products. For example, hazelnuts, walnuts, chestnuts, persimmons and pomegranate should fit in demand on the EU market for organic products.

Most of the fruit production is regarded as a luxury product. Therefore, it is necessarily before production is started to draft a marketing strategy identifying the possibilities and problems/competitors in the market. Target markets may require producing special varieties, selling during a specific period of the year, facing international competition, packaging and quality requirements, size, colour and taste preference etc..

Competitors on the export market

Russia is the largest export market of Azerbaijan's fresh fruits. Because of the political disturbances with Turkey and Ukraine, these countries' exports of fruits to Russia fell. Also the ban of Russia for EU fruits and vegetables since 2014 has been beneficial to the export of vegetables and fruits from Azerbaijan to Russia. Other competitors at this market are Belarus, Iran and China. One has to keep in mind, though, that the situation with regard to the Russian import ban may give the Azerbaijan growers a big advantage in exporting their fruits now, but this can easily change and then the fruit sector will face more international competition. Consequently, the Azerbaijan fruit production and trading sector must be able to compete in the international market.

5. Market opportunities and production conditions, per product

The many varieties of fruits in Azerbaijan makes it useful to group them as follows:

- Pip fruits: Apple, pear
- Stone fruits: Cherry, peach, almonds, cherry plumbs, nectarines
- Berries: Strawberry, raspberry, blackberries,
- Nuts: Hazelnuts, walnuts,
- Grapes: Table and wine grapes
- Specials: Pomegranate, persimmon
- Citrus: Lemon, mandarins, kumquats, oranges

5.1 Pip Fruits

Apple

Often the international apple market shows signs of overproduction and hence low prices, meaning that for the grower to be successful his cost price must be low and the quality high. Moreover, consumers' tastes and preferences change over time so there is always need to diversify varieties on the orchards and introduce new ones. Sales of fresh apples to potential nearby markets in the region may face tough competition as production in Russia, Ukraine and Kazakhstan are increasing as well, whereas EU producers like Poland, Romania and Italy are competitors in potential sales markets for Azeri apples in the Middle east.

However, growers using modern rootstocks (M9, B9, geneva) with modern varieties and intensive planting systems (2,500 to 3,000 trees a hectare) will have good market prospects at both domestic and export markets. Investments in cooling/storing capacity and quality improvements (including complying with international standards like GlobalG.A.P. and HACCP) will further enhance the sector's competitive position. Market opportunities for Azeri apple juices, concentrates and jams are not much explored yet but may be worth to investigate further.

Apple varieties with most export potential (as it responds to consumer preferences in among others the EU and Middle East) are, among others, Gala, Golden Delicious, Granny Smith, Breaburn and Fuji. Varieties for juice production are mostly the green and yellow varieties for good colour of the juice.

Apples can be grown in several climate zones, yet important is the amount of winter cold to break the winter rest in the flower buds. With too few winter cold hours the crop will not be successful. The soil on which apples grow should be at a minimum of 70 cm free rooting zone with now disturbing layers. Phosphor content of 5.5 to 7.5 is no problem, and not more than 1 m^{ol} of Na. in the water or the soil (= 23 mm gram/liter). The latter also implies that those parts of Azerbaijan that suffer from salty soils are not suitable for fruit production at all. The areas coloured green in Figure 5.1 below do have biophysical features suitable for fruit production with the green areas evaluated more suitable than others and the darkest coloured green areas considered to have the best fit for fruit production.

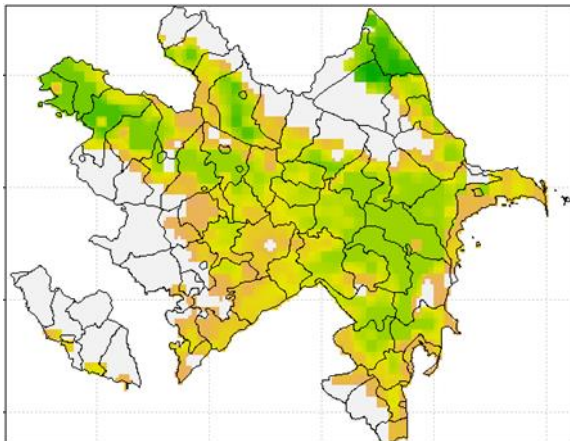


Figure 5.1 Areas in Azerbaijan suitable for pip fruits, with green areas more suitable than non-green and darkest green areas for the best fit (Hennen et al.).

Pear

On a global scale, pear production and consumption are increasing, resulting in a relatively stable international market for pears. Russia is a large importer of pears and is expected to remain so despite increasing domestic production. This may offer opportunities for Azeri pears in the big neighbouring Russian market, where traditional suppliers from Belarus, Turkey and also Argentina have strong positions. Demand increase is most positive for hard varieties that can be stored well. Such varieties can be produced in Azerbaijan. However, pear production requires a more moderate climate than apples, and are subject to demanding water and soil conditions. Also pear is quite sensitive for Bacteria fire blight which can ruin an orchard totally. Therefore, growing pears needs quite some knowledge about growing techniques and how to farm an orchard in order to be successful.

5.2 Stone fruits: Cherries, peaches and other

The production of sweet cherry is possible in quite a number of areas in Azerbaijan. Currently, most cherries in Azerbaijan are grown in small gardens and farms, where traditional varieties are cultivated. Some of the plantations visited during our field survey in 2017 were regularly pruned, yet a lot of other plantations were not. With better knowledge of how to treat rootstocks and plants, the overall performance in terms of volumes and qualities harvested would improve importantly. Modern varieties may be introduced like Kordia and Regina, both having a strong growing rootstock and delivering a bigger size of fruit; the latter would better respond to observed market demand for bigger sized cherries. Cherries are mainly consumed fresh. The product is considered rather luxury, depending on consumers with great purchasing power. In order to sell the product successfully, quality, packaging and marketing are important. This implies investment in storing, sorting, packaging and market relationships. In the period of harvesting, Turkey is the biggest competitor at local and international/neighbouring markets.

Sour cherries are mostly used for processing, in juices, concentrates and/or potted. In Russia there is a growing demand for this fruit. At the Russian market and wider internationally, there is competition from Serbia and Romania.

Stone fruits like peach, nectarine, plums or apricots grow very well in the Azerbaijan climate. For some types there is a local market, as well as in Russia and other more Northern countries, like Scandinavia and the Baltic States.

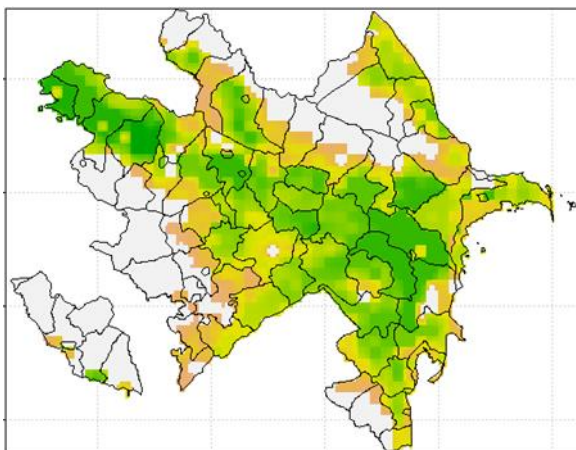


Figure 5.2 Area's in Azerbaijan suitable for stone fruits, with green areas more suitable than non-green and darkest green areas for the best fit (Hennen et al)

5.3 Berries: strawberries, raspberries

Worldwide the production of strawberries is subject to rapid developments in terms of varieties, fertilisation improvements, plant quality enhancement and plant disease prevention techniques. What we have seen in Azerbaijan, the strawberry culture is very traditional, and growers do not know the opportunities of modern cultivation techniques of this crop. Still, Azerbaijan has biophysical conditions that are very suitable for

strawberry and other berry productions such as rasp- and blackberries. These berries can be grown in different climatic zones that can be found in the country.

Production performances would be improved much if the common practice of re-using old plants year after year would be altered by purchasing new seedlings every year and conducting effective control of diseases. Moreover, with the use of new high-yielding varieties with better taste export markets would open, supplying more quality-minded countries with fresh and tasty berries. The market for processed products is also big for strawberries, growing particular varieties for processing purposes. Quick freeze or bloc freezing for juice are also possible development opportunities for the berry growing sector. This crop is also interesting for small family farms, especially when there is a central freezing facility in the region.



With regard to soil and water conditions, strawberries prefer a pH of the soil of 5.5 to 6. Strawberry production is sensitive to soil related diseases (*Verticilium* and *Phytophthora*), which are a problem to potato, tomato and pepper cultivation too. So growing strawberry on soils where these crops were grown before the production may suffer from this diseases as well. They need a rooting deep of minimum 70 cm of good soil. If the soil is not suitable for this crop, growing in substrate is an possibility. This substrate mostly is a combination of white peat, sometimes coco-peat and perlite. The salt content of the water is also an important factor. Water should not have a higher EC than 0.5. When water quality is not right it can be improved using diverse techniques. Figure 5.3 indicates regions in Azerbaijan that are (best) suitable for producing berries.

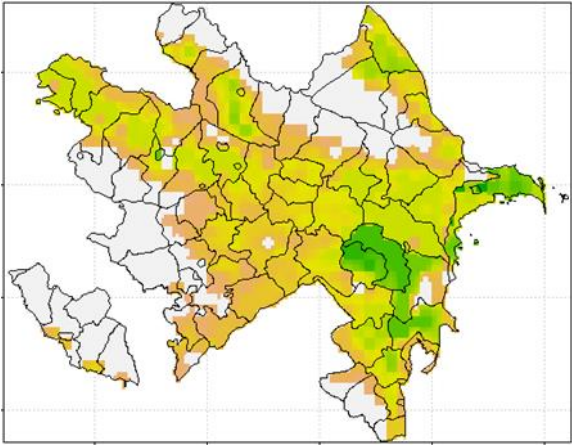


Figure 5.3 Areas in Azerbaijan suitable for berry crops, with green areas more suitable than non-green and darkest green areas for the best fit

Raspberry is a crop that is not much produced in Azerbaijan but internationally this culture is strongly growing. For instance, countries like Ukraine, Poland, Mexico and Morocco develop their production quickly. For

Raspberry the same positive market developments as for strawberries are available. At the moment the Russian market has a high demand on these fruits. Serbia is a competitor for Azeri berries at the Russian market selling mainly frozen raspberries. Blackberries are very common in Azerbaijan but growing wild in hedges etc. This crop can be made more specialized, the cropping period can be longer by using growing technique's like pruning, producing under canopy like in plastic tunnels and/or using cooled plants (Cooled plants are plants ready for production, produced by specialized growers, put in cool store and planted 6 weeks before the harvest is planned).

5.4 Hazelnuts and walnuts

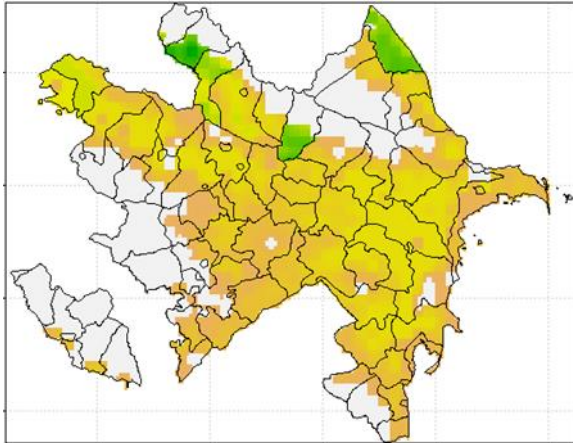
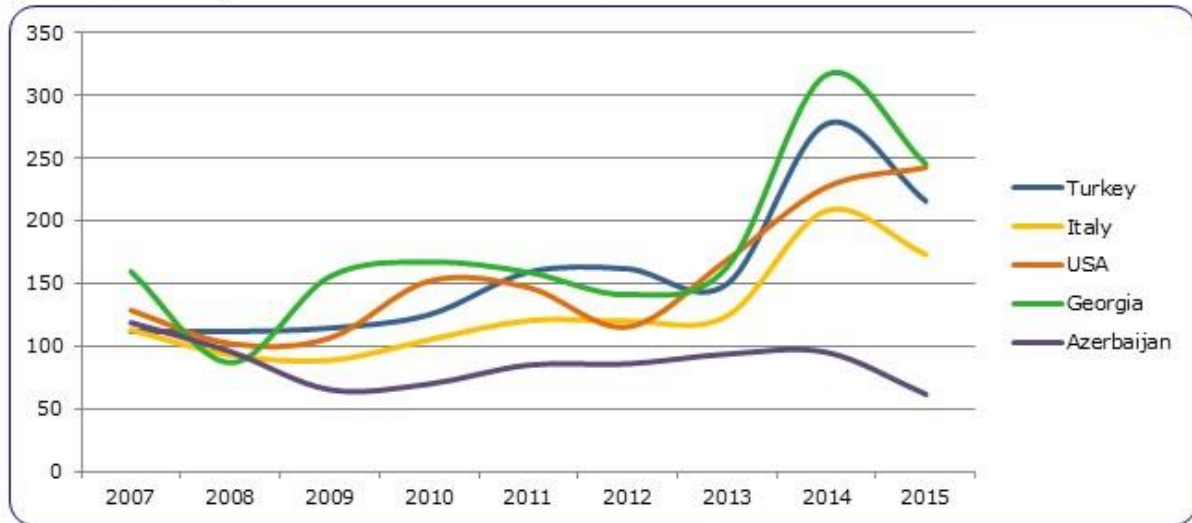


Figure 5.4 Areas in Azerbaijan suitable for Hazelnut production, with green areas more suitable than non-green and darkest green areas for the best fit (Hennen et Al)

In volume terms hazelnuts are not one of the most important fruit products in Azerbaijan, but the culture is highly concentrated in a few northern areas (see figure 5.4) and covers a lot of land. Production takes place on small farms as well as at sometimes rather large plantations run by companies. Also a well-developed drying and processing plant is available (complying with HACCP rules). The production per hectare at many plantations stays behind levels achieved in other competing countries, with a national average yield that is approximately 30% less than in Turkey (main producer in the world) and significantly lower than in neighbouring countries Georgia and Armenia.

Also the price development of hazelnuts in Azerbaijan did not follow trends in other major producing countries indicating that quality of the produce may be significantly lower than in these countries (see UN data in Figure below. Yields and quality can be improved buying grafted trees instead of seedlings. Than the harvesting can be mechanized. Also the choice of varieties, the way of watering and fertilization can be improved to get higher yields. Regarding to market price statistics, the price of hazelnut in Azerbaijan has been stable over the last 10 years, and did not show a price peak like in other countries like Turkey and Georgia. The reason for this has to be analysed.

Figure 1. Key Countries for Hazelnut Cultivation: Hazelnut Producer Prices Index (2004-2006 = 100) (2015 – estimate)



Source: UN data, IndexBox analysis

Walnut trees are found in many places in the country, in particular in the gardens, beside roads and in specialized orchards. The food is traditional in Azerbaijan and the trees last very long. After 30 years even the wood can be harvested. Important is to supply enough water to the plant. In order to build an orchard quickly also grafted trees with the right varieties for high quality, high yielding nuts should be used. Soil requirements are similar to apple (see above).

Grapes

Statistics (stat.gov.az) show (in section 4.1) grape production has increased rapidly over the last years. Grapes can be cultivated in many regions of the country (see figure 5.5).

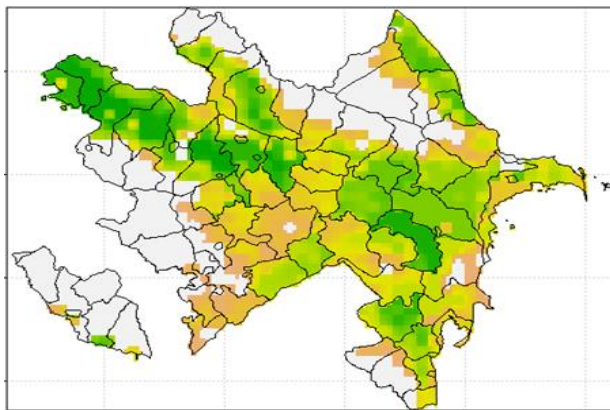


Figure 5.5 Areas in Azerbaijan suitable for grape production, with green areas more suitable than non-green and darkest green areas for the best fit (Hennen et al.)

Grapes are sold for the fresh market (about 60%) and wine processing (40%) The grapes for processing for juices and also the fresh market with seedless varieties is an attractive as growing market. The consumption of table grapes, for instance, is growing steadily worldwide. In Russia, however, consumption declined in recent years due to the country's economic set back that seems to have had a more negative impact on the demand for grapes than for other fruits. In global perspective, China, Turkey, Brazil, Italy and Spain are major table grape producers, which can be considered a benchmark for Azerbaijan producers. China's production is growing rapidly, as does its exports to neighbouring countries. Grapes do not tune in with more health-related fruits like berries or pomegranate. Many exporting countries struggle to get remunerating prices in the international markets.

Most fresh produce is sold to local markets (open markets, street sale or grocery shops). Grape growers sell their produce themselves (family members) or via traders to shops. In comparison to other fruit crops bigger volumes are available from big companies and enterprises. So, sales to larger supermarkets are possible when growers can comply with quality and stable supply requirements. In order to get more stable and remunerating prices for their produce growers need to invest in marketing activities and chain linkages such as growers' selling associations that will allow them selling larger volume and exercise market power. This is extra important to compete in a full market.

Persimmons

Internationally, the production of and demand for persimmon is growing strongly. Persimmons are well-known crop in Azerbaijan and can be grown in many regions of the country (see Figure 5.6). The fruits can be sold fresh, dried but also frozen. Not all production is done professionally: some growers do not have a proper way to sell the fruits and then these fruits are not picked and sold. Improvement of storage of these fruit can help growers to market their product on a better way.

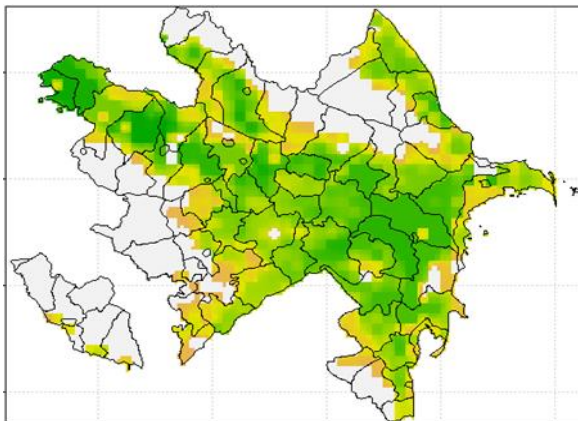


Figure 5.6 Areas suitable for Persimmons in Azerbaijan, with green areas more suitable than non-green and darkest green areas for the best fit (Hennen et al.)

Citrus

Citrus crops are grown in Lenkaran and Astaré only (see Figure 5.7). Most of the crops are cultivated at rather aged plantations, used by small family farms. During our field survey we saw new companies starting up planting bigger areas of tangerine and lemons, targeting at the Russian market.

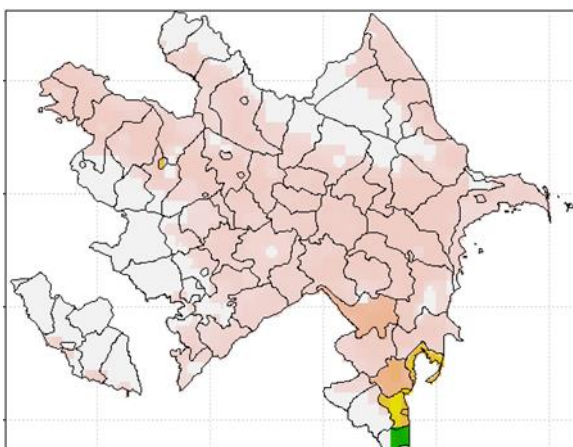


Figure 5.7 Areas suitable for citrus fruits (mandarines, tangerines, etc.) in Azerbaijan, with green areas more suitable than non-green and darkest green areas for the best fit (Hennen et al.)

6. Policies relevant to the fruit sector

Agricultural and trade policies

Most important policy support measures relevant to the fruit sector are:

- Producers are exempted from paying income taxes;
- Producers get 40 manats per planted hectare (direct subsidy);
- Discount on price of irrigation water;
- Growers benefit from subsidy on fuel (oil products) and lubricants.

More details on agricultural and trade policies are reported in the Market analysis report, part of the Master Plan project.

Environmental policies (gas/oil, tariffs)

As mentioned the government supports farmers with subsidies on fuel (oil products) and lubricants. Recently the Ministry of Economy has issued that Azerbaijan increases and differentiates natural gas and electricity tariffs (<http://abc.az/eng/news/100425.html>). The differentiation is based upon the consumption level.

The prices of gas, oil and electricity for greenhouse production are equal for the whole of Azerbaijan.

Prices (info stakeholders; price level: 2017):

- Gas: 0.20 manat per m³ (above 1,500 m³ per year)
- Oil: gasoline: 0.66 USD/l, diesel: 0.35 USD/l; www.mytravelcost.com/Azerbaijan/gas-prices/)
- Electricity: 0.12 manat/kWh (above 250 kWh per month).

Azerbaijan pursues no specific environmental policy aiming at the reduction of emission of chemicals (crop protection products) and nitrate (fertilizers products) by growers to the environment.

7. Investments opportunities in the fruit sector - promising regions

Based on the regional biophysical conditions (climate, infrastructure, available resources, etc.), field visits, interviews with public and private stakeholders and expert judgement the tool Global Detector (Hennen, 2017) is applied to indicate geographically where the opportunities for fruit production in Azerbaijan would fit best when biophysical (soil, water), climate (temperature etc.) and infrastructural factors are taken into account. In chapter 5 maps show the suitability of the country's regions for each of the fruit product discussed. In this chapter costs and revenue estimations are suggested to show the economic opportunities of investing in pip fruits (section 7.1) and soft fruits (section 7.2). More detailed product investment sheets are presented in the web tool.

7.1 Investment opportunities in the pip fruit (apple, pears and the like) sector

For pip fruit production calculations are made for investments on different sizes of farms in terms of hectares planted (Table 7.1). The investment include building facilities for an ULO cool store, for sorting and packaging installations (including own boxes), water storing capacities (water basin) and own machinery. Moreover, as building a new orchard implies that generally the first harvest will take place only after four year, the investment also includes covering losses over the first year of starting the operation.

Table 7.1 Pip fruit investment opportunities for different farm sizes: investments

Size of Farm in hectares	5	12.5	25	50
Production in kg total Farm	200,000	500,000	1,000,000	2,000,000
Investments in Buildings				
- Office	€ 4,000	€ 10,000	€ 10,000	€ 10,000
- Sorting /grading room	€ 30,000	€ 80,000	€ 80,000	€ 80,000
- Cool stores	€ 110,000	€ 260,000	€ 500,000	€ 1,000,000
- Boxes	€ 22,857	€ 57,143	€ 114,286	€ 228,571
- Storage place equipment	€ 25,000	€ 50,000	€ 50,000	€ 50,000
- Water Bassins	€ 15,000	€ 30,000	€ 60,000	€ 60,000
Investments in Machines				
-Sorting machine	€ 3,000	€ 50,000	€ 100,000	€ 150,000
-Tractors	€ 40,000	€ 40,000	€ 80,000	€ 120,000
-Sprayers	€ 20,000	€ 20,000	€ 40,000	€ 60,000
-Mower	€ 6,000	€ 6,000	€ 6,000	€ 12,000
-Picking equipment	€ 2,000	€ 2,000	€ 10,000	€ 30,000
-Weed control sprayer	€ 2,500	€ 2,500	€ 2,500	€ 2,500
Losses first 4 years	€ 163,735	€ 359,882	€ 669,813	€ 1,167,276
Total investment	€ 608,592	€ 1,378,774	€ 2,545,099	€ 4,615,348

Below, in Table 7.2 Revenues and costs of the above investments are calculated. Assumed is that yields are based on the implementation of modern fruit techniques: yields of 40 ton/ha are assumed which are double the levels achieved currently in Azerbaijan's regions with the highest yields for apples. Further, prices of 0.80 euro/kg are assumed. Labour cost for picking depends on the demand of workers, that is, the alternative employment opportunities workers may have. In some areas 8 manats per hour is paid. In other regions 12 manats per hour may be the standard. Our calculations assume the average of 10 manats per hour.

Table 7.2 Pip fruit investment opportunities for different farm size: annual revenues and costs of operation

Size of Farm in hectares		5	12.5	25	50
Revenue		€ 160,000	€ 400,000	€ 800,000	€ 1,600,000
Total costs		€ 108,825	€ 255,578	€ 494,506	€ 931,563
Labour incl. Overhead		€ 8,997	€ 22,493	€ 44,987	€ 89,974
	%	9	9	9	10
Cost of chemicals/fertilisers		€ 10,500	€ 26,250	€ 52,500	€ 105,000
	%	10	10	11	11
Cost of Plantation		€ 24,675	€ 61,688	€ 123,375	€ 246,750
	%	23	24	25	26
Costs of Machines		€ 13,230	€ 21,690	€ 42,930	€ 67,410
	%	12	9	9	7
Cost of Buildings		€ 24,823	€ 58,457	€ 97,714	€ 171,429
	%	23	23	20	18
Payback Period (in years)		12	10	8	7

A similar set of calculations is presented for soft fruits, represented by strawberries,

Table 7.3 Soft fruit investment opportunities for different farm sizes: investments in Strawberry production

Size of Farm in hectares		5	10	25	50
Production		125,000	250,000	625,000	1,250,000
Buildings					
Office	€	-	€ 10,000	€ 10,000	€ 10,000
Sorting/grading room	€	5,000	€ 10,000	€ 10,000	€ 20,000
Cool stores	€	10,000	€ 30,000	€ 30,000	€ 60,000
Storage place equipment	€	5,000	€ 50,000	€ 50,000	€ 50,000
Water Basins	€	5,000	€ 30,000	€ 60,000	€ 60,000
Soil PM	€	-	€ -	€ -	€ -
Irrigation	€	60,000	€ 120,000	€ 300,000	€ 600,000
Rain system	€	30,000	€ 60,000	€ 150,000	€ 300,000
Beds	€	10,000	€ 20,000	€ 50,000	€ 100,000
Improvement of soil	€	15,000	€ 30,000	€ 75,000	€ 150,000
Machines					
Tractors	€	40,000	€ 40,000	€ 80,000	€ 120,000
Sprayers	€	20,000	€ 20,000	€ 40,000	€ 60,000
Picking equipment	€	2,000	€ 2,000	€ 10,000	€ 30,000
Weed control sprayer	€	3,000	€ 3,000	€ 2,500	€ 2,500
Total investment	€	205,000	€ 425,000	€ 867,500	€ 1,562,500

Table 7.4 Soft fruit investment opportunities for different farm size: annual revenues and costs of operation

Size of Farm in hectares		5	10	25	50
Revenue		€ 187,500	€ 375,000	€ 937,500	€ 1,875,000
Total costs		€ 137,089	€ 232,000	€ 554,800	€ 1,271,141
Labour incl Overhead		€ 20,039	€ 40,078	€ 100,195	€ 200,391
	%	15	17	18	16
Cost of chemicals/fertilisers		€ 22,500	€ 45,000	€ 112,500	€ 225,000
	%	16	19	20	18
Cost of Plantation		€ 17,250	€ 34,500	€ 86,250	€ 172,500
	%	13	15	16	14
Costs of Machines		€ 11,700	€ 11,700	€ 23,850	€ 38,250
	%	9	5	4	3
Cost of Buildings		€ 3,000	€ 15,600	€ 9,200	€ 24,000
	%	2	7	3	2
Planting Material		€ 45,000	€ 90,000	€ 225,000	€ 450,000
		33	39	41	35
Payback Period		3	3	2	2

The investment in strawberry cultivation gives a quick return on investment in three or even two years' time in case of large scale production. The above calculations of revenues are based on yields of 25 tons/hectare and an average (season) price of 1.50 euro/kg (3 manats/kg). The plant material is used for only one crop/one season to have high quality produce that can be sold to/in supermarkets and for exports. The investments include raised beds in the soil and a complete set of machinery necessary for this kind of crops. The crop is assumed to grow in good biophysical circumstances, that is in healthy nutritious soil, with water of good quality available and adequate fertilizing, disease and plaque control in place. The produce sold is packed, shortly stored and then transported under cooled conditions.

8. Conclusions and suggestions for investment opportunities

Conclusions

- Market prospects for Azerbaijan fruits are positive in both the domestic market as on foreign markets, yet in case of fresh produce the sector may only explore market opportunities fully if innovation in varieties and quality improvements are taken into account. Investments in storing and packaging may be an attractive strategy to sell the produce at a later time or at markets at further distance to the producer's production region. Market opportunities for Azeri fruit juices, concentrates, jams or other processed forms are not much explored yet but are worth investigating.
- Looking at the biophysical features (climate, soil, water, etc.), Azerbaijan has good potentials for fruit production. Basic conditions are to some extent present in a multiple number of regions with regard to climate, water and energy supply and infrastructure;
- In a wide range of regions in Azerbaijan, fruit crops will grow successfully if the right knowledge of how to cultivate these crops in a most productive way are implemented;
- Quite a number of the large-scale fruit producing farms use modern technologies and knowledge, and are well positioned to meet the requirements and demands of export countries (CIS countries, the Middle East, upcoming markets in Asia and the EU), but may need to focus more on quality and marketing.
- Small-scale fruit growers are facing several obstacles:
 - Limited access to (good quality) water: good quality water is (too) expensive;
 - Limited access to finance: no collateral and unsecure product prices;
 - Limited access to high-end markets: small farmers do not meet the requirements of the market (cold chain, GlobalG.A.P, etc.) and their volumes are too small to be attractive to traders involved in supplying supermarkets or selling to foreign markets;
 - Limited access to knowledge: growers are little educated and consulting experts is (too) expensive.
- The agricultural knowledge and information system (education, research and extension service) is rather poor. There is a lack of educated specialists and linkages between education, research and extension service are poor. Knowledge transfer to practice is, therefore, hardly taking place.
- Although some shortcomings have been noticed in the fruit value chain, still possibilities are present to lift the fruit sector to a higher level of sustainability and competitiveness. Especially new and modern farms using modern techniques have shown that their products can meet the quality requirements of the retail and can compete with other countries on the high-end domestic and export market (e.g. Russia).

Suggestions for public investments

- The knowledge and information system deserves extra support in order to realise knowledge transfer to the fruit sector in the whole supply/value chain (production, post-harvest and logistics). More skills and competences are needed to apply modern technologies and to meet the requirements of high-end markets.
 - The local departments of the Ministry of Agriculture can host/facilitate education, training and demonstration, because accommodation in all regions is already available;
 - Involve the fruit sector & industry when setting up demonstration projects (PPP);
 - Focus efforts on reaching young entrepreneurs in the value chain and teach/train them on market and chain oriented production and trading.
- Support (small) producers in organizing producers groups in order to create collaboration and to develop market power towards wholesalers and retail. Train and educate young and middle-aged entrepreneurs to learn cooperating and sharing values and forces according the slogan 'if you want to fast, go alone. If you want to go far, go together'. The Growers of pomegranate have organised themselves in this way. And can grow with production for the fresh market, but they also set up juicing and canning operations for second grade fruit as a combined action;
- Stimulate and support actors in the value chain in developing a market strategy for 'brands' of (regional) fruit products of high quality (e.g. taste, nutritional value, organic). In this way actors in the value chain are collaborating in creating closed chains with distinct products;

- Support actors in the value chain to invest in adapted technologies and (management) methods to improve quality of products and production processes (certified products);
- Adaptation of the subsidy system into a system in which sustainability, market development and increased competitiveness are supported instead of focusing on production increase only. Look at the lessons learned from the Common Agricultural Policy (CAP) in the EU, especially for pip fruits;
- Development - in collaboration with commercial banks – of adapted or new financial instruments in supporting fruit growers to invest in sustainable and competitive production systems and management methods;
- Realise a business environment of public-private initiatives and investments. In particular investments in infrastructure (land area, energy and water supply, road/railway) can pave the path towards sustainable and competitive fruit farm development in the main and most promising fruit growing regions.

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Consulted organisations/companies

Atraco Zaqatala and Atraco Shamkir

Ministry of agriculture dep. Lenkaran

Ministry of agriculture dep. Ismaily

Lokal growers in Zaqatala, Balakan, Lenkaran, Quba, Shamkir, B

Bravo supermarket (Pasha Group) - Baku

Meyvali wholesale market (2 times) (Baku)

Yasli – Green Bazar – (Baku City).

Appendix 1: Price of water sold to the farmers through 'Water Users Union' (WUU) for irrigation purposes.

Regions	Price of 1000 m3 water for the members of WUUs, AZN
Absheron region	1-2.5
Agjabedi region	1
Agdam region	0.7
Agdash region	1.35-2.2
Agstafa region	1.4-1.55
Agsu region	2.5
Astara region	0.95
Balaken region	0.5
Barda region	0.95-1.54
Beylagan region	1.5-1.6
Bilasuvar region	1.45-1.48
Jalilabad region	1.3-1.35
Fizuli region	0.5
Goranboy region	1.5
Geychay region	1.14-1.94
Goygol region	1.5
Hajigabul region	1.4
Imishly region	1.5-3
Ismayilly region	1
Kurdamir region	1
Lenkaran city	1
Lerik region	-
Masally region	0.58-0.77
Neftchala region	1.17-1.72
Oghuz region	1
Gakh region	2-2.9
Gazakh region	1.96-2.05
Gabala region	3
Guba region	3.7-7
Gusar region	2.8-3.5
Saatly region	1.7-2.77
Sabirabad region	2.1-4.16
Shabran region	1.5-3
Salyan region	1.77-2.96
Shamakhy region	0.5
Samukh region	0.5-1.7
Sheki city	0.7
Shamkir region	0.75-3.46
Siyazan region	1.5
Tertter region	0.6-0.62
Tovuz region	1.17-1.97
Ujar region	1.1-1.5
Khachmaz region	2.5-4.63
Khyzy region	2
Khojavend region	0.5-0.8
Yevlakh city	1.1
Zagatala region	2.2-2.3
Zardab region	1.5-3.0

Source: FDMS (MoA)

Note: Water is sold with 15% higher price, for farmers who are not members of the WUU. The number of such farmers are only 0.5% of the total number of farmers.