ORGANIC AGRICULTURE IN AZERBAIJAN

Current status and potentials for future development

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Food and Agriculture Organization United Nations

Baku, 2018

ISBN 978-92-5-13100-5

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Printed in Azerbaijan

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Foreword

Azerbaijan is a country located in South-Western Asia, bordering the Caspian Sea and lying in two continents: in Asia and, by a small part in the north of the Caucasus range, in Europe. Agriculture has been an important activity for Azerbaijan throughout its history. After the rapid development in the base sectors, contribution of agro-food businesses to the national economy has proportionally decreased. According to the figures of 2015, more than 46.9% of the population live in rural areas, and 36.4% of the total employment is in agriculture. Today, agriculture is the major sector providing employment and contributing to food security unless there are higher figures for other sectors. The differences in climate conditions and topography are favourable for the rich natural and agricultural biodiversity. A very wide range of plants can be either collected from the wild or grown. It is possible to cultivate subtropical or Mediterranean species, such as citruses, tea or olives, as well as those adapted to cold or temperate conditions, such as walnuts or apples. Despite all these advantages, there are problems which require solutions to boost the agro-food production and trade. The environmental problems, such as saline soils, occurred as an after effect of mismanagement in the past. Major problems in reaching the market seem to be due to the weak linkage among actors, and thus the lack of communication between the producer and the buyer. This knowledge gap exists throughout the value chain, starting from production (e.g. volume and production cost/farm gate price of the product) to quality and packaging expectations of the market, traceability, maximum residue levels, and may go up to the management level.

How can organic agriculture and certified organic agro-food production bring advantages to Azerbaijan's agriculture? What is the current state of art? What needs to be done, by whom, and how? To find answers to these questions, this book compiled the existing data on Azerbaijan's organic agriculture experience, and the information and activities materialized through the FAO-implemented Project GCP/AZE/006/TUR: Development of Organic Agriculture and Institutional Capacity Building in Azerbaijan financed by the Government of the Turkish Republic during 2015-2017.

In many cases, reliable and updated data and knowledge of a country or a specific sector guides and promotes the developments or investments. It also urges the responsible authorities to consider the gaps, identify needs, and plan the actions to be taken. The book's chapters give an insight into

general features of agriculture in Azerbaijan, organic agriculture in the world and in Azerbaijan, the official institutional system, certification activities, legislative framework on organic agriculture, education and training, value chains, domestic and export markets, priority crops and regions in the marketing of organic products. The recommendations aim to strengthen the organic agriculture movement in Azerbaijan by proposing solutions to the existing bottlenecks. One has to remember that all these issues are in continuous change due to various internal and external factors. Thus, the data or the situation as in the legislative framework may change in due time. Azerbaijan with its past history of agricultural production and rich genetic diversity has great potential to integrate the organic management system with the local/regional values. The book aims to create a stepping stone to promote a sound and rapid development of organic agriculture in Azerbaijan.

Acknowledgements

This book is produced under the Project GCP/AZE/006/TUR: Development of Organic Agriculture and Institutional Capacity Building in Azerbaijan implemented by FAO and financially supported by the Government of the Turkish Republic. The project activities are accomplished as a joint effort of FAO, the Ministry of Food, Agriculture and Livestock of the Turkish Republic, and the Ministry of Agriculture of Azerbaijan. Mr Hafız Muminjanov from the FAO Subregional Office for Central Asia (FAOSEC), as the Lead Technical Officer; Ms Carmen Bullon from the Legal Office in Rome as the Legal Officer; Ms Melek Cakmak, Ms Tarana Bashirova and Mr Vugar Bashirov from the FAO Partnership and Liaison Office in Azerbaijan provided technical guidance to the project activities. The project coordinator Mr Oktay Huseynov; international consultants Ms Raushan Zhazykbayeva, Mr Levent Yildiz and Ms Vildan Karaslan; and the National Consultants Mr Rasul Balayev, Mr Mohamed Guluzade and Mr Vugar Babayev kindly supported the project's implementation. The authors, Ms Uygun Aksoy, Mr İsmet Boz, Mr Hezi Eynalov and Mr Yagub Guliyev contributed to the project's implementation as international and national consultants.

The book is edited by Mr Hafiz Muminjanov, FAOSEC, and designed by Mr Timour Madibaev.

The book's aim was to compile the existing data on organic agriculture and those collected through the project activities in order to display the current state-of-art in Azerbaijan. The book will also be available in the Russian and Azerbaijani languages to help decision makers and all stakeholders. This basis is expected to trigger further activities and projects on organic agriculture. The funding and support provided by the FAO-Turkey Partnership Programme (FTPP) to both the project and the book is deeply appreciated.

Abbreviations and acronyms

ANAS	Azerbaijan National Academy of Sciences
AZE	Azerbaijan
AZERSUN	The first foreign private company in Azerbaijan's food industry
AZN	Code for manat, national currency of Azerbaijan
AZPROMO	Azerbaijan Export and Investment Promotion Foundation
AZSTAND	State Committee for Standardization, Metrology and Patents of Azerbaijan (www.azstand.gov.az)
CB	Control body performing inspection and certification of organic produce
CIS	Commonwealth of Independent States
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIBL	Forschung Institute für Biologische Landwirtschaft (Research Institute for Organic Agriculture)
FTPP	FAO-Turkey Partnership Programme
GABA	Ganja Agribusiness Association
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (www.giz.de)
GMO	Genetically Modified Organism
GoA	Government of Azerbaijan
GOST	(Russian: ГОСТ) A set of technical standards maintained by the Euro-Asian Council for Standardization, Metrology and Certification (EASC)
Ha	Hectares
HS	The Harmonized Commodity Description and Coding System, also known as the Harmonized System (HS) of tariff nomenclature, is an internationally standardized system of names and numbers to classify traded products.

IC	International consultant
IFOAM	International Federation of Organic Agriculture Movements, Organics International
IMO	Institut für Market Ökologie
ISO	International Standards Organization
MAP	Medicinal and aromatic plants
m.a.s.l.	Meters above sea level
MoA	Ministry of Agriculture of the Republic of Azerbaijan
MoENR	Ministry of Ecology and Natural Resources of the Republic of Azerbaijan
ME	Ministry Economy of the Republic of Azerbaijan (previously Ministry of Economic Development)
MoH	Ministry of Health of the Republic of Azerbaijan
MoLSP	Ministry of Labour and Social Protection of the Republic of Azerbaijan
Mln	Million
NGO	Non-governmental organization(s)
NOP	National Organic Program of the USA
Obanatur	Farm commodities marketing company
OPEC	Organization of the Petroleum Exporting Countries
RIAE	Research Institute of Agricultural Economics, Azerbaijan
SCC	State Customs Committee of the Republic of Azerbaijan
SCSMP	State Committee for Standardization, Metrology and Patents
SSC	State Statistical Committee of the Republic of Azerbaijan.
TIKA	Turkish Cooperation and Coordination Agency (Türkiye İşbirliği ve Koordinasyon Ajansi (www.tika.gov.tr))
UAE	United Arab Emirates
USA	United States of America
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WS	Workshop

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Introduction 1

1. Introduction

The Republic of Azerbaijan (Azərbaycan Respublikası – in Azerbaijani) is a democratic republic established in 1918 as the first democratic and secular republic in the Turkish and Muslim world. After almost two years since its establishment, it was incorporated into the Soviet Union in 1920. As many states which separated from the former Soviet Union and proclaimed independence after the collapse of communism, Azerbaijan similarly gained independence in 1991.

Azerbaijan is located in southwestern Asia, and most of its territory lies in the Asian continent, while a small portion in the north of the Caucasus range is located in Europe. Its highest peak is the Bazarduzu Mountain (4 466 m.a.s.l.) Azerbaijan borders on the Caspian Sea in the east, Iran in the south, Armenia in the west, Georgia in the north-west, and Russia in the north. The Azerbaijani Autonomous Republic of Nakhchivan (Nakhchivan Autonomous Republic) forms an exclave landlocked by the Republic of Armenia, and has a small part in the west which borders on Turkey. With an area of 86 600 km², Azerbaijan is slightly bigger than Austria or slightly smaller than the U.S. State of Maine. Its population is almost 9.5 million, and its capital city is Baku. The official language is Azerbaijani spoken by 90%.

Azerbaijan's economy is highly dependent on oil and natural resources. Export income which makes the most significant contribution to the development of the country also depends on oil production. Although sectors other than oil, such as construction, banking, and real estate, are also subject to growth, oil exports will probably remain the main driving force of Azerbaijan's economy. Internationally well-known projects, such as the Baku-Tbilisi-Ceyhan Pipeline, the Baku-Novorossiysk, and the Baku-Supsa pipelines, will continue to contribute to the republic's economy and to its strategic power in the region. In addition to oil production and exports, Azerbaijan has another opportunity to enter the international market thanks to its rich natural gas reserves. When the Southern Gas Corridor between Azerbaijan and Europe is completed, this will create another long-term and sustainable revenue source for Azerbaijan.

Azerbaijan is a net importer of food products, though it possesses diverse topographic and climatic zones which allow for the agricultural production of a wide range of plants and animals including products of fisheries

and beekeeping. The major problem lies in low agricultural productivity, mainly because of fragmented holdings and serious degradation of natural resources. Mismanagement in plant and animal production has led to soil erosion, salinity, reduction of soil fertility and organic matter, increased secondary salinization and water logging, degradation and desertification. All these factors have resulted in undermining agricultural growth and sustainable food production. Establishment of the Republic urged significant structural changes including land tenure and management capacity in farming practices. During this phase, the oil and gas resources received utmost attention in the economic growth. In Azerbaijan, agriculture is currently a major contributor to economic growth, employment and poverty alleviation. Even though its share in the Gross Domestic Product (GDP) is still low, special attention is given to non-oil sectors led by agriculture to diversify economic activities and to provide higher food self-sufficiency levels.

In Azerbaijan, agriculture is the third contributor to the national economy after the oil and construction sectors. Agriculture contributes 8% to GDP, while it employs above 38% of the total labour force compared with 1% in the oil sector. Agricultural holdings are 99.8% private, out of which 66.8% are family farms, 32.8% are engaged as subsistence farming, and 0.2% are run by agricultural enterprises. Agro-industry plays a crucial role by generating $2.7 billion that equals to 41% of manufacturing output. Main areas are the processing of meat and dairy products, and canning of fruit and vegetables. 99.8% of the processors are private small to medium-sized enterprises (Anonymous, 2011).

Azerbaijan has made only limited progress in institutionalizing market-based economic reforms. The public and private sector's previous negative experience and structural economic inefficiencies remain a drag on the long-term growth, particularly in the non-oil sectors. Several other obstacles impede Azerbaijan's economic progress, including the need for stepped-up foreign investments in the non-oil sectors and the continuing conflict over the Nagorno-Karabakh region. Weakened trade with Russia and the other former Soviet republics is being strengthened, while the trade is increasing with Turkey and the European nations. Long-term prospects depend on the world's oil prices, Azerbaijan's ability to negotiate export routes for its growing gas production, and its ability to use its energy wealth to promote growth and spur employment in the non-oil sectors of the economy.

Figure 1. Map of Azerbaijan[1] and Economic Regions[2]

[1] Source: http://ontheworldmap.com/azerbaijan/road-map-of-azerbaijan.html
[2] Source: https://www.wpclipart.com/geography/Country_Maps/A/Azerbaijan/Azerbaijan_economic_regions.png.html

Recent falls in oil and gas prices and the global economic crisis have deeply influenced Azerbaijan's economy, which experienced approximately 40% devaluation in January 2016. Although the purposes of this devaluation were to diversify the national economy, pave the way towards increasing international competitiveness and export, strengthen the balance of payments, and ensure the strategic stability of the international payment capability of the country, many sectors, particularly small and medium-size businesses and consumers, were adversely influenced. This experience reminded once again to policy makers and all intellectuals of the country that diversification of the economy, particularly to reduce the dependency on oil and gas reserves, was inevitable. One of the opportunities for Azerbaijan to reach this goal is the development of agro-food and related sectors.

Considering gross domestic products by the sectors of the economy, agriculture, forestry and fisheries produce nearly 5.3% of the total amount because of the higher contribution of the oil and energy sectors. According to 2015 figures, the total imported commodities valued to $9.2 billion, out of which 9.9% is food and live animals, and 3.9% beverages and tobacco. Fertile lands, abundance of water and climatic diversity create favourable conditions for a strong agricultural sector. The existence of nine climatic zones allows the country to produce a variety of agricultural products, and provides new opportunities.

Oil is the main driving force of Azerbaijan's economy. However, during the last few years, low oil prices, dependency on imports and higher food prices urged agricultural and rural development programmes. The National Development Programme setting out the GoA policies for agricultural, rural and agro-industrial development includes 3 state programmes aiming at efficient utilization of natural and economic resources to form a sustainable national economic system integrated into the world-wide economic system. These programmes are:

(I) the State Programme of Socio-Economic Development of the Regions of Azerbaijan for 2009–2013;
(II) the State Programme of Poverty Reduction and Sustainable Development for 2008–2015;
(III) the State Programme of Ensuring Reliable Population in Food Provision for 2008–2015;
(IV) Strategic Road Map for the Production and Processing of Agricultural Products in the Republic of Azerbaijan.

The main focus of the National Development Programme is on high-value products with natural comparative advantages that increase their added value. Apples, pomegranates, olives and olive oil, hazelnut, cabbage and chickpea are considered/listed as products with natural advantage. Milk, mutton and beef are listed as products of animal origin with higher potential. This approach is also mentioned for export-oriented organically grown products.

Being one of the important producers of agricultural goods in the CIS, Azerbaijan seeks to further develop its agriculture and food industry for import substitution as well as for export. Considering the human resources engaged in agricultural sector and natural resources available, Azerbaijan has not yet utilized its full potential to increase the output from this sector. A long-term strategy based on the environment-friendly and climate-smart agriculture, research work focused on site-specific solutions and training, and dissemination will facilitate this intensification process and make it possible for Azerbaijan to achieve a higher contribution to GDP from agriculture and related sectors. The high growth rates in the global organic market and increasing concerns for food safety and environmental issues in Azerbaijan make organic agriculture a promising target.

Agriculture in Azerbaijan 2

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2. Agriculture in Azerbaijan

Agriculture is one of the most important sectors in Azerbaijan due to its socio-economic impact. As of 2016, approximately 4.6 million (47%) of the total population (9.7 mln) live in rural areas, and 36.4% make their livings by agriculture, forestry or fishing activities. Of the 86,600 km^2 of the country's territory, the utilized agricultural area is 4,769.7 km^2 (0.055%). The utilized agricultural area per capita within 15 years has decreased from 0.58 ha in 2001 to 0.49 ha in 2015 due to the population increase. Land uses other than arable land have remained almost stable. A detailed breakdown of agricultural land use is displayed in Tables 1 and 2.

There was a significant conversion of land ownership and reduction in farm sizes after the independence was gained. Private owners, family peasant

Table 1. Land use in Azerbaijan

Year	Population, 1,000 individuals	Person per		Utilized agricultural area per capita, ha	Arable land, 1,000 ha	Permanent crops, 1,000 ha	Hayfields and pastures, 1,000 ha	Forests, 1,000 ha
		1 km^2 of territory	utilized agricultural area					
2001	8,191.4	95	173	0.58	1,775.9	227.0	2,682.9	1,037.6
2002	8,269.2	95	174	0.57	1,783.2	225.9	2,681.7	1,037.0
2003	8,349.1	96	176	0.57	1,785.6	225.8	2,690.3	1,037.8
2004	8,447.4	98	178	0.56	1,790.8	222.8	2,691.4	1,037.8
2005	8,553.1	99	180	0.56	1,797.6	221.5	2,693.9	1,037.8
2006	8,666.1	100	182	0.55	1,795.5	221.1	2,693.6	1,037.8
2007	8,779.9	101	185	0.54	1,808.4	224.7	2,677.8	1,038.8
2008	8,897.0	103	187	0.53	1,818.4	227.5	2,669.0	1,038.8
2009	8,997.6	104	189	0.53	1,832.5	227.0	2,656.2	1,039.9
2010	9,111.1	105	191	0.52	1,842.7	227.4	2,655.3	1,040.7
2011	9,235.1	107	194	0.52	1,843.8	227.2	2,655.8	1,040.8
2012	9,356.5	108	196	0.51	1,855.0	230.9	2,640.6	1,040.8
2013	9,477.1	109	199	0.50	1,884.3	230.3	2,614.2	1,040.2
2014	9,593.0	111	201	0.50	1,885.6	233.5	2,609.8	1,040.3
2015	9,705.6	112	204	0.49	1,897.5	237.0	2,595.2	1,040.3

Source: http://www.stat.gov.az/source/agriculture/indexen.php.1.2

Table 2. Total and breakdown of sown land (1 000 ha) according to the type of agricultural production

	2011	2012	2013	2014	2015
Total sown areas	1,608.2	1,647.1	1,684.2	1,613.8	1,585.4
Total cereal and leguminous (including below-mentioned)	967.3	1,031.4	1,074.1	1,001.4	952.1
Wheat	654.2	687.9	689.5	609.9	539.7
Maize	33.6	35.6	38.6	37.7	36.9
Barley	262.9	291.5	329.4	338.8	361
Rye	0.1	0.2	0	0.1	0
Wild oat	1.8	1.4	1.6	1.5	2.2
Millet	0.1	0.2	0.1	0.1	0.1
Rice	1.8	1.7	2.1	1.1	1.2
Leguminous crops	12.8	12.9	12.8	12.2	11
Total industrial crops (including below-mentioned)	66.9	48.5	42.2	43.8	38.7
Cotton	42.8	29.2	23.5	22.9	18.7
Tobacco	1.4	1.5	1.2	1.1	1.4
Sugar beet	7.3	3.6	5.5	5.7	4.9
Sunflower for seed	11.3	11	9.4	11.7	10.7
Other	4.1	3.2	2.6	2.4	3
Potatoes. horticultural crops and vegetables (including below-mentioned)	179.7	174.5	171.5	165.7	166
Potatoes	65.2	66	65.3	61.7	61
Vegetables	81.1	78.3	77.6	76	77.1
Other horticultural	33.2	30	28.5	28	27.9
Forage crops (including below-mentioned)	394.3	392.7	396.4	402.9	428.6
Perennials	385.3	383.6	384	388.9	416.9
Annual plants	7.8	7.4	10.7	12.4	9.8
Maize (silage)	0.8	1.2	1.5	1.4	1.8
Silage (without maize)	0.3	0	0	0	-
Edible roots	0.1	0.5	0.2	0.2	0.1

Source: http://www.stat.gov.az/source/agriculture/indexen.php.1.19

farms and households realized 92.7% of the agricultural gross output in 2015. In plant production, this share was 95.2%, and 90.3% in animal production. Gross output in plant products is calculated as 2761 million manats, and animal products as 2,874.2 million manats, yielding to 5,635.3 million manats in total. According to the figures of 2015, the gross agricultural output (calculated on

actual prices) in million manats (1 US dollar = 1.65 manats as of 20 April 2017) shows that the shares of plant and animal products are almost equal (source: State Statistics Committee of the Republic of Azerbaijan).

In Azerbaijan, of the 1,585,400 ha of sown land, 90% can be irrigated. The area of irrigated lands has been extended from 1 426 thousand ha in 2,000 to 1,432.7 thousand ha in 2006. The available resources for the future development of rural agriculture in Azerbaijan have not been exhausted yet. Available soil-climate conditions of Azerbaijan may enable to further increase the area of irrigated lands up to 3.0-3.5 mln ha. However, shortage of water resources does not allow this to happen. The irrigated land is to a large extent (84.6%) allotted to annual crops, whereas permanent crops occupy 11.4% of the irrigated area. The total irrigated land and its distribution seem to have been stable since 1970. The water resources in Azerbaijan are assessed at 32.3 billion m^3. The 31.9% of the water resources are generated in the country, and the rest come from adjacent territories, mainly from Georgia and Armenia. Other Caucasian countries have richer water resources compared to Azerbaijan. Additionally, the water evaporation rate is 2.5 times higher than the total amount of rainfall in Azerbaijan. The water sources are rivers, lakes, water reservoirs, and springs. The share of groundwater in total reserves is rather low (0.4%). Major water users in Azerbaijan are the industry (11,300 m^3 is consumed by fossil power plants, fisheries and processing) and agriculture. The major water consumption in agriculture is accounted for by irrigation (8,500 mln m^3), treatment of salinized soils (330 mln m^3), and other activities (430 mln m^3), totalling 9,260 mln m^3 (Table 3). Water losses may go up to 90% in irrigation due to the infrastructure (Jafarov, 2004).

Prior to independence, the common agricultural policies and their impact on agriculture exerted quite a significant effect on Azerbaijan's production

Table 3. Water resources in Azerbaijan

Water resource	Quantity (million m^3)	% of total reserve
Rivers	8,360	32.1
Lakes	350	41.0
Springs	3,500	2.3
Water reservoirs	38	23.2
Groundwater	–	0.4

Source: Jafarov, 2004

capacity. Some of the main crops, such as grape or cotton, were reduced in volume after gaining independence. The cotton production area also shrank, but the problems with salinity remained. Grape was one of the major products in the 1980s (Table 4), but the vineyard area almost halved from 1991 to 1992, and then again reduced drastically after 1995. The recent programme to extend vineyard areas is underway. The yields are increasing as a result of new vineyards being established with new varieties (Table 4). However, to improve efficiency and market access, there is a need to make a detailed analysis of the regions in terms of soil and climate conditions, and choose the most appropriate rootstocks and grape varieties. The market analysis for fresh grapes and those processed, dried or converted into wine or juice has to be done before further extension.

The environmental diversity in Azerbaijan provides an opportunity for crop production to range from subtropical to cool or temperate environments. Lankaran, the southern region, is known for citrus, tea, early vegetables, grain and grape production. Sheki-Zagatala region is famous for its nuts, tobacco, and cattle husbandry. Greenhouses are erected in Shamkir, and out-of-season vegetables are grown there for the export market, namely in Russia. In Absheron and other areas around Baku, vegetables are produced mainly for the local market. Ganja is a highly productive area with a focus on cotton and fruits. Gedebey (or Gadabay) is famous for potato production and for honey. While these provinces are well-known for crop production, salinity is the major problem in Aran valley.

The north-eastern Quba-Xaçmaz (or Kuba-Khachmaz) region focuses more on apple and other fruits. Nowadays, the main target is the improvement

Table 4. Grape production in Azerbaijan between 1985 and 2015

Years	Cultivated area 1 000 ha	Cultivated area under grapes at fruit-bearing age 1 000 ha	Gross harvest 1 000 tonnes	Yield in hundredweight per ha
1985	267.8	218.8	1,789.6	81.0
1990	181.4	156.1	1,196.4	76.5
1995	97.7	94.7	308.7	32.6
2000	14.2	13.9	76.9	35.8
2005	9.6	7.2	79.7	61.8
2010	15.4	11.2	129.5	74.7
2015	16.1	13.5	157.1	86.6

Source: State Statistics Committee of the Republic of Azerbaijan, 2017

of processing industry due to inferior product quality and problems in supply chain management. The farms are mostly managed individually by traditional knowledge acquired from the previous generation. The extension service system and farmers' organizations are being revisited and activated anew. In the case of apple, for instance, the cold chain is crucial to establish the value chain, gain access to markets, and promote exportation, while the initial stage starts at the farm by determining the exact time of harvest maturity. The updated and improved infrastructures have to be coupled with the quality management and improvement. Not only quality, but also safety issues may hinder exports. During the last few years, hazelnuts exported from Azerbaijan to the EU member states were found to have aflatoxins above the permitted levels in the EU according to the Rapid Alert System for Food and Feed (http://www.nutfruit.org). EC decided to introduce a more frequent border control for all hazelnuts of Azerbaijan origin (https://ec.europa.eu/ food/safety/rasff_en).

Wheat, the major staple food, contributes to more than 50% of the daily intake of calories. Cereals cover more than 40% of the cultivated land and receive utmost attention because of their contribution to self-sufficiency. Thus, GoA subsidizes cereal production through direct payments per unit area. Additional subsidy exists for fuel and chemical fertilizers. In Azerbaijan, nearly 90% of the farms (620,000) are small holdings which occupy 85% of the agricultural lands. Almost all small holders have a few animals which provide for their family consumption of meat, milk and their products. It also allows them to use animal manure directly in their plots. Due to the small farm sizes and lack of farmers' cooperatives/unions, these farmers have difficulties in market access. Recently, farmers' organizations were highlighted to allow joint planning and practices according to the market demand.

Wheat is the topmost imported commodity in terms of value. According to the 2015 figures, 1,35 mln tonnes of wheat worth 296 million US dollars were imported. Russia, Ukraine, Brazil and Belarus are reported as the major suppliers of food and beverages in the decreasing order. Food and agricultural imports account for about 20% of the total import value, and the main imported products include poultry, tobacco, wheat, rice, vegetables, fruits, processed foods and powdered milk. On the other hand, Azerbaijan exports some agro-food products: mainly canned and fresh fruits and vegetables, fruit juice, early potato, and raw tobacco.

Several reports on agriculture and related sectors are available. The brief FAO report based on an official research has concluded that Azerbaijan has a comparative advantage in the production of fruit (oranges, apples and pomegranates) and vegetables (tomatoes and cabbages), as well as oilseeds (sunflower) and nuts.

The Research Institute of Agricultural Economics (RIAE), Azerbaijan, prepared a country report in 2015 through the project funded by the EU's Seventh Framework Programme. Main subjects and data covered in this reports were:

- macroeconomic environment and policies;
- situation and development of the agricultural sector;
- situation and development of upstream and downstream sectors;
- agro-food trade and trade developments;
- agricultural policy and institutional environment; and
- future prospects for the agricultural and food sector.

Azerbaijan Export and Investment Promotion Foundation (AZPROMO) published a report in 2011 on Azerbaijan agriculture and food processing giving statistics on dairy products, fruits and vegetables, viticulture, sugar products, beverages, animal husbandry, fisheries, apiculture, organic oils, tea, hazelnuts, cereals, and canned food. The report gives information about investment opportunities and reasons for investing in Azerbaijan's agro-food industry.

In Azerbaijan, analyses were performed using the PRECIS-1.4 model, and according to their forecasts, temperature increases by 1.5-1.6°C are foreseen for the 2021-2050 period. In the period of 2071–2100, temperatures are expected to rise by 3-6°C. The massive energy sector is the main contributor to greenhouse gas emissions, followed by agriculture. The major greenhouse gas is CO_2, with a share of 71% among all calculated as CO_2 equivalent, followed by CH_4 (28.5%) and N_2O (0.7%) (Aliyev, 2011).

Azerbaijan faces environmental problems that impact air, soil and water quality. Oil and energy sectors are the major pollutants, while the use of monocultures (e.g. cotton) and agroecosystem mismanagement place agriculture among the main contributors, especially to soil degradation and water pollution. An additional challenge is the climate change and its impact on surface waters that is and will continue to be the main source of fresh water supplies in the near future. Therefore, projections

should be made per region and for major crops. Organic agriculture which avoids monocultures, readily soluble synthetic fertilizers and pesticides, and requires crop rotations, can be a solution in the areas where soil degradation problems are still on the agenda.

Organic agriculture in the world and in Azerbaijan 3

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3. Organic agriculture in the world and in Azerbaijan

3.1. Organic agriculture: definitions and principles

Organic agriculture is a farming system that evolved as an alternative to input-intensive industrialized agriculture. The terms "organic", "biological" and "ecological" are accepted as synonymous in almost all standards on organic agriculture. There are different definitions highlighting different positive aspects provided by organic agriculture, however all are developed upon the same basic principles.

The USDA National Organic Program defines organic production through the methods allowed or restricted as "a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming systems rely on crop rotations, crop residues, animal manures, legumes, green manures, on-farm organic wastes, and aspects of biological pest control to maintain soil productivity and tilth, supply of plant nutrients and control of insects, weeds and other pests". It also states that organic is a labelling term that indicates which food or other agricultural product has been produced through approved methods that integrate cultural, biological, and mechanical practices, foster cycling of resources, promote ecological balance, and conserve biodiversity. Synthetic fertilizers, sewage sludge, irradiation, and genetic engineering may not be used (www.usda.gov.us).

Codex Alimentarius has a more ecosystem-friendly approach and defines organic production as "a holistic production management system which promotes and enhances agroecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems" (www.codexalimentarius.org).

IFOAM's definition embraces human and social aspects and quotes that "organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation, science to benefit the shared environment and promote fair relationships and a good quality of life for all involved" (www.ifoam.bio).

It follows from the above definitions that solutions for organic agriculture need to be made with regard to the local conditions by considering both the ecosystem functions and socio-economic circumstances. The benefits provided are not limited to clean environment and safe food only; organic management allows stewardship of natural resources for the current and future generations. The core focus in definitions of organic agriculture may shift from a more technical approach to a more ecosystem-management-based and holistic one. Despite the differences in the standards valid at national and/or international levels and the mentioned definitions/ approaches, basic principles are common. Organic agriculture theory and practice should be built on these basic principles. IFOAM summarizes these principles as 4 pillars, namely health, ecology, fairness and care (http://www.ifoam.bio/sites/default/files/poa_ english_web.pdf).

The development of organic agriculture in a specific country or region has to consider locally available resources and diverse ecosystems, and be based on traditions, ethics and socio-economic conditions, but a national organic system should fit within a more global context.

Principle of Health	Principle of Ecology
Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.	Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.
Principle of Fairness	**Principle of Care**
Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.	Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

3.2. Organic worldwide

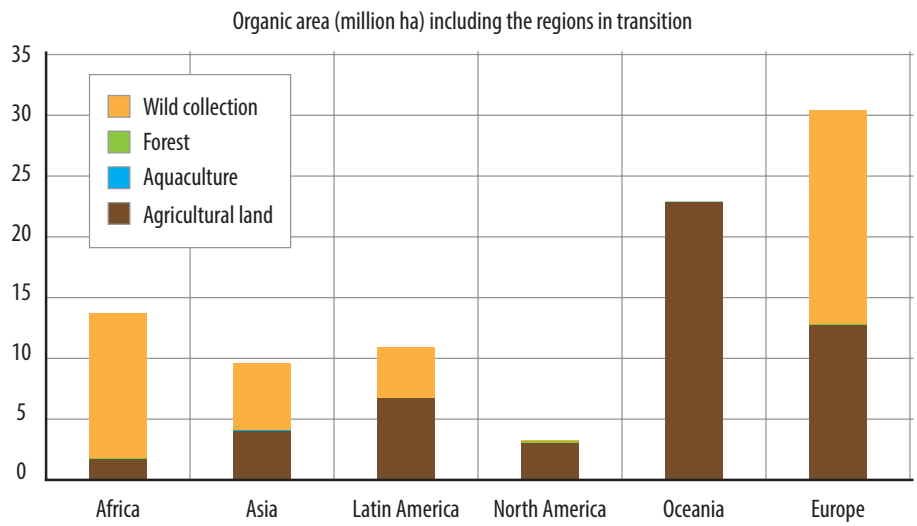
Brief information with recent figures on organic agriculture in the world is included in the book to locate the current position of Azerbaijan. Organic agriculture is widely practiced in the world with activities reported from more than 179 countries. More than 85 countries had their national legislation on organic agriculture in 2015 (Willer and Lernoud, 2017). World statistics are collected through a joint activity of FIBL (Switzerland), IFOAM, Organics International (Germany), and the latest statistics are updated and released in special reports yearly in February during Biofach, the World's

largest fair on organic products. The version for printing is available at an on-line interactive website for maps, tables and figures as a beneficial tool for researchers, decision makers and others.

The key indicators display an increasing trend in the world-wide organic production and organically managed areas which totalled 11 million ha in 1999 and increased to 50.9 million ha in 2015. The area certified as organic enlarged by 6.5 million ha from 2014 to 2015, with two thirds being in Australia. The largest certified organic area is in Oceania with 22.8 million ha, and then followed by Europe (12.7 mln ha), Latin America (6.7 mln ha), Asia (4.0 mln ha), North America (3.0 mln ha) and Africa (1.7 mln ha), in the decreasing order. In 2014, the annual growth in surface area was 5.5% in Africa, 4.7% in Asia, 2.0% in Europe, 1.2% in Oceania, and 1.0% in America. Similar increases occurred between 2014 and 2015 as 33.5% in Africa, 11% in Asia, 8.2% in Europe, and 21% in North America. The organic area shrunk both in 2014 and in 2015 due to the loss in certified grazing land in Argentina and Falkland Islands (Willer and Lernoud, 2016 and 2017).

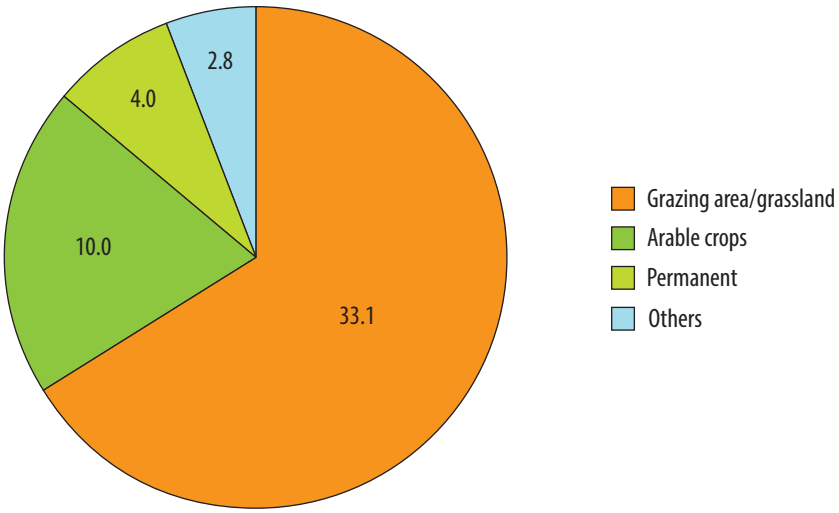
Besides the cultivated land, organic products are harvested from wild or other areas that are certified as organic, including aquaculture, forests and grazing areas on non-agricultural land. These areas totalled to 39.7 million ha in 2015. Wild collection area comprises 43.4%, and other certified areas 0.6% of the total territory certified as organic. As presented

Figure 2. Total organic area by regions and by activity types (mln ha).



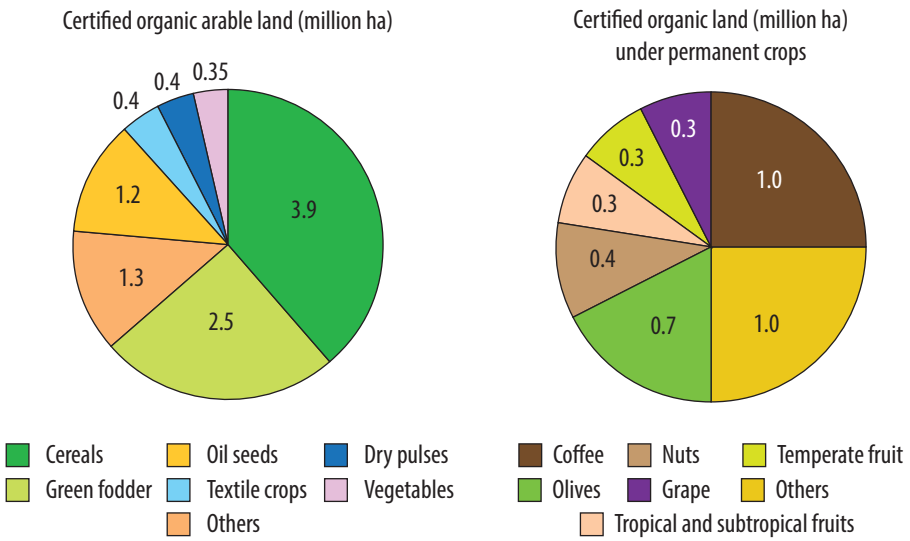
Source: Willer and Lernoud, 2017

Figure 3. Distribution of certified organic agricultural land (mln ha) in 2015



Source: Willer and Lernoud, 2017

Figure 4. Distribution of certified organic arable land and permanent crops in 2015



Source: Willer and Lernoud, 2017

in Figure 2, Oceania and North America have almost no or very little non-agricultural land certified as organic. On the other hand, European, Asian, and especially African countries see the wild collection non-agricultural areas as an opportunity – e.g. for beekeeping, aquaculture, collection of

bamboo, berries, nuts and mushrooms from the wild. Totally, 31,279 ha are certified as organic in Asia and Latin America. The forest areas totalled 266,833 ha in 2015 and were mainly located in North America, Africa and Europe (Willer and Lernoud, 2017).

3.3. Organic agriculture in Azerbaijan

3.3.1. Production

Azerbaijan's main official statistical data source is the State Statistical Committee (SSC) of the Republic of Azerbaijan. It gathers and regularly updates demographic and social statistics, economic statistics, environmental and other statistical data. Although there is a large variety of statistics in different areas of agriculture, forestry and fishing, no specific data is collected on organics. The main statistical data on the agricultural sector includes the general data and the data on plant and livestock husbandry. The data on regions include areas under agricultural crops, agricultural yields, agricultural productivity, and livestock husbandry. The website (http://www.stat.gov.az/source/agriculture/indexen.php) displays not only the updated national statistics but also provides data on international comparisons and main economic indicators of agricultural enterprises and private owners.

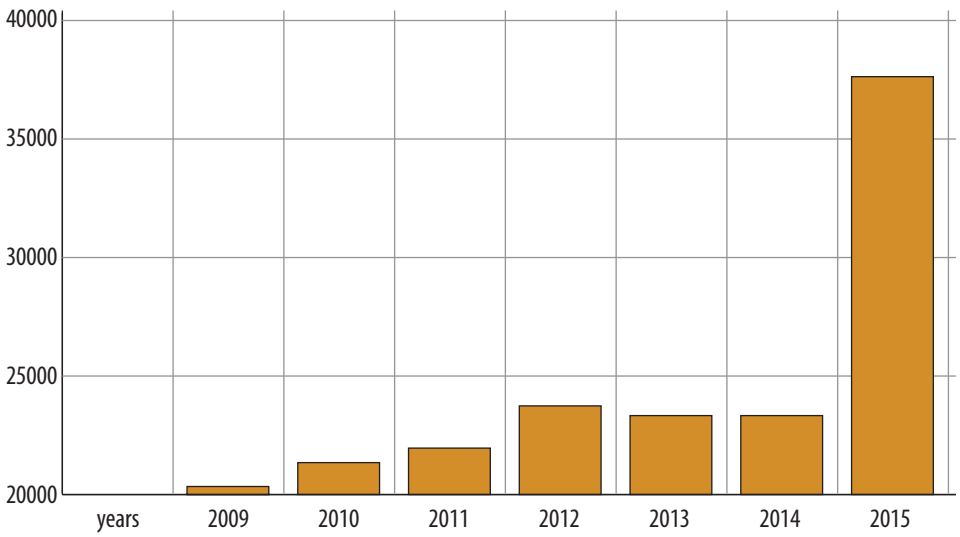
Azerbaijan's official institutions/organizations, particularly Ministry of Agriculture (MoA), Ministry of Economy and Industry (MoE), and Ministry of Ecology and Natural Resources (MoENR) collect and update statistical data about different areas of agriculture and related sectors. Even if the legislation has an article on data collection, a specific system or unit specializing on systematic collecting and updating of organic production, processing, marketing, consumption, import, and export data is not yet in place, as of May 2017. The existing legislation identifies certification bodies as data sources, and the SSC as the national authority responsible through the MoA. Since no official data prevails about organics in Azerbaijan, information is collected from private/civil society organizations involved in organics, such as GABA, or AZERSUN, together with the data presented in the worldwide statistics (Willer and Lernoud, 2015; 2016; 2017). Mainstream retailers concerned about selling healthy food and/or planning to get involved in marketing of organic products in the future have their own data sets about the products they sell and main preferences of consumers. In Azerbaijan, data for exportation is gathered through the State Customs Committee. They collect data according to the existing nomenclature, and since the organic goods are not assigned specific codes in the lists of traded goods, Customs Directorate does not have data on organic agriculture.

In Azerbaijan, organic production began almost a decade ago. As for 2015, the land under organic management was reported as 0.8% of all agricultural land (Willer and Lernoud, 2017). The authors reported data on organic agriculture in Azerbaijan based on the information provided by GABA. According to Willer and Lernoud (2016), the forest area certified as organic was 123 ha, and the area certified for wild harvest was 919 ha yielding to totally 24,782 ha of certified organic lands in 2012. The wild harvested areas were comprised of berries (161 ha), fruit (421 ha), nuts (160 ha) and MAP (177 ha). The number of farms was 297 and the number of processors was 34 in 2014. The data reported for 2015 are displayed in Table 5.

In 2014, the total land area certified as organic in Azerbaijan was reported as 24,391 ha (Figure 5), out of which 23,331 ha are cultivated land, 937 ha are allocated to wild collection of fruit, nuts, berries and medicinal aromatic plants, and 123 ha to forests.

The retail market value is estimated as 3.0 million euros. In Azerbaijan, mainly annual or permanent plants are produced organically. Cereals occupy the first place in terms of the organic certified land area; however, the share of certified organic fruits is higher within the total production volume (Table 6). The fruit orchards in the conversion stage are also expected to contribute to the future growth of fruit production in Azerbaijan. The only organic certified animal product is honey, with 932 beehives certified as organic in 2014.

Figure 5. Distribution of Organic Arable Land and Permanent Crops in 2009-2015 in ha



Source: Willer and Lernoud, 2015; 2016; 2017

Table 5. Breakdown of activities on the total certified land area and collections from the wild in Azerbaijan (2015)

Area specifics	Certified area (ha)	Major activity type	Certified agricultural land (ha)	Share of organic in total (%)	Wild collection activity	Certified area (ha)
Agricultural land	37,630	Cereals	1,598	0.2	Berries, wild	161
Aquaculture	123	Citrus	21	0.7	Fruit, wild	161
Forest	123	Dry pulses	6	0.04	Fruit, wild	541
Wild collection	1,063	Temperate fruit	754	1.5	Medicinal and Aromatic plants	56
Total	38,939	Subtropical fruit	495	4.8	Nuts	179
		Vegetables	213	0.2	No details	126
		Oil seeds	126	0.7	Total	1,063
		Grapes				
		Olives	13	0.8		

Source: Willer and Lernoud, 2017

Table 6. Major crops produced in Azerbaijan and certified as organic (including those in conversion) in 2012 and 2014

Crops	Organic area (ha)		Organic share (%)		Area fully converted (ha)		Area under conversion (ha)	
	2012	2014	2012	2014	2012	2014	2012	2014
Cereals	2,186	1,598	0.2	0.2	548	0	1,638	1,598
Oil seeds	126	126	0.6	0.7	50	50	76	76
Protein crops (pulses)	6	6	0.0	0.05	2	2	4	4
Citrus	8	21	0.3	0.9	2	2	6	19
Grapes	41	41	0.3	0.3	1	1	40	40
Olives	13	13	0.7	0.7	5	5	8	8
Temperate fruit	698	754	1.5	1.5	131	112	567	642
Subtropical fruit	385	495	4.1	4.8	180	180	205	315
Vegetables	192	213	0.2	0.2	57	55	135	158

Source: Willer and Lernoud, 2014; Willer and Lernoud 2016

The organic certified land area increased by 14,299 ha from 2014 to 2015. Major growth was in subtropical and temperate fruits and vegetables, and to a lesser extent in oil seeds and pulses. The number of organic beehives was 932 in 2015. The figures for 2015 report 123 ha of certified aquaculture as well as 123 ha of forest area. There are 305 producers, 50 processors and 50 importers in Azerbaijan registered by the foreign certification bodies functioning in the country (Willer and Lernoud, 2017).

3.3.2. Inspection and certification

In Azerbaijan, there is a specific legislation on organic production since 2008. It is called as "Azərbaycan Respublikasının Ekoloji Təmiz Kənd Təsərrüfatı haqqında Qanunu" ("The Law of the Republic of Azerbaijan on Ecologically Clean Agriculture") in the current legislation or sometimes referred as "üzvi" (natural) in the everyday language. Starting from 2008 onwards, "ecologically clean" is used as a synonym for organic or biological. In some other Central Eastern countries, such as Kazakhstan, "ecologically clean" has a different connotation – it means a different quality scheme or concept where the final product is analysed, and if found free of contaminants at levels stated in national legislation, the product is then labelled as "ecologically clean".

Despite the existing Law and its bylaws, the organic system is not complete and/or not fully implemented at the national level. This further hinders institutional set-up, registry or supervision of the inspection and certification bodies. Due to this gap, all inspection and certification functions are taken over by foreign control bodies (CBs) with reference to the standard(s) demanded by the importing country. They have no links to the Azerbaijani authorities.

GABA had an initiative in establishing a national inspection body, AZEKOCERT, but it could not function due to the lack of legal support. The organic products are certified mainly according to the EU legislation and destined to the European markets. Recently, there have appeared products destined to USA and certified according to the National Organic Program (NOP). Main organic products certified as organic are rose oil, pomegranate, persimmon and hazelnut, plus fruits, berries and medicinal and aromatic plants collected in the wild. IMO implemented a Project on Fair Wild to promote social standards in organic wild harvest; however, these activities were not carried out onward in Azerbaijan after the project was terminated.

For the EU, the control bodies listed as operating in the third countries, inspecting the exporters involved in imports from the third countries according to the provisions of Article 19 of regulation (EC) No 1235/2008, laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 as regards the arrangements for imports of organic products from the third countries, are ECOCERT SA (France), ETKO (Turkey) and Lacon Gmbh (Germany) (http://ec.europa.eu/agriculture/ofis_public/pdf/r8_0000_en.pdf).

Some other foreign bodies are certifying products for export to other countries as Turkey[3], USA or Switzerland[4]. In Switzerland, the List of Recognized Certification Bodies (1 July, 2015) for the purpose of imports from Azerbaijan relevant to specifications referred to Article 23a of Organic Farming Ordinance (SR 910.18) contains the following: Abcert AG AZ-BIO-137 (Germany), Agreco R.F. Göderz GmbH AZ-BIO-151 (Germany), Bio Inspecta AZ-BIO-161 (Switzerland), BCS Öko-Garantie GmbH AZ-BIO-141 (Germany), Ceres GmbH AZ-BIO-140 (Germany), ECOCERT SA AZ-BIO-154 (France), and LACON AZ-BIO-134 (Germany). All these CBs are authorized to certify unprocessed or processed plant products targeted to organic markets. In the USA, such CBs as CERES, ECOCERT and LACON are authorized by the USDA for certification according to NOP (https://organic.ams.usda.gov/Integrity). The USDA list of products certified according to NOP and imported from Azerbaijan includes pomegranate, pomegranate juice, pomegranate concentrate, rose oil, and rose petals. Major companies certified by these foreign CBs and involved in organic processing and exportation are AzərŞəkər İstehsalat Birliyi (Sugar Production Union), Azersun, AzGranata MMC, Elba, Gilan Qebele, Jaliar and Agribioekotex.

3.3.3. Legislative framework

In Azerbaijan, food is subject to the Law on Foodstuffs (1999) for the management of quality, manufacturing and organizing of the foodstuffs and provision of the food security. Azerbaijan became a member of the Codex Alimentarius Commission in 2011. Azerbaijan adopted 162 standards of food production for free movement of goods. National standards are registered by AZSTAND and bear the abbreviation “AZS”. The regional standards “GOST”, adopted by the Interstate Council for Standardization and Certification of the CIS, are also used. To develop a national system in line with regional and international standards, the Technical Council of Standardization and Technical Regulation, and the Experiment and Testing Centre were established under AZSTAND in 2009.

In January 2010, Azerbaijan became an affiliate member of the European Committee for Standardization. Azerbaijan completed an EU twinning project “Support to the Improvement of Legal and Technical Aspects of Food Quality and Safety Assurance and Certification Requirements of

[3] According to the Turkish Law and regulation, the imported organic goods are evaluated case by case, and there is no authorization of CB for equivalency with other countries.
[4] IMO (Turkey) and IMO (Switzerland) functioned also in Azerbaijan but now merged with ECOCERT both at the international level and in Turkey.

Azerbaijani Fishery Products" (Anonymous, 2010). Despite this project focusing on the fisheries sector, various gaps exist in the overall food safety legislation.

One of the main obstacles that may affect overall food safety as well as organic market monitoring is the lack of a regulation with an updated list of pesticides with active ingredients and maximum residue limits for different agro-food products.

In Azerbaijan, organic agriculture efforts on preparation of a legislative framework started in 2005 by GABA. These efforts successfully ended up with the Law adopted in 2008. Various laws that have been accepted since then, and are subject to amendments or changes.[5] The main legislative documents related to organic food and the farming system establishment in Azerbaijan are summarized below:

The Law of the Republic of Azerbaijan on Ecologically Clean Agriculture (No 650-IIIQ/13 June 2008)

The Law states that organic agriculture derives its roots from the Constitution of the Republic of Azerbaijan and laws/by-laws related to "standardization", "legal protection of consumers", and "food products". All issues related to forest products, wild animals and production by using synthetic inputs, transportation, storage and consumption of agro-food products are also governed by the legislation in the Republic of Azerbaijan.

The Law had an amendment on March 18, 2014 (No 80) when sub-paragraph 4.0.1-1 ("for protection of the plants traditionally cultivated in Azerbaijan") was added to the paragraph 4.

Cabinet of the Ministers Decision (January 8, 2009)

This decision was taken to facilitate the implementation of articles 1–5 of the President's Decree (No 818/25 August 2008) on organic agriculture. It comprises the guidelines including the lists of allowed products for plant and animal production. The decision defines the rules and regulations for organic farming, methods and rules to be applied, lists of inputs allowed and not allowed, certification types and conditions, rules for accrediting certification agencies, functions of certifying agencies, rules of certifying organic products, sample formats of certification, rules for branding, transportation, storage, and distribution of organic products.

[5] In Azerbaijan, all legislative acts are downloadable from the webpage www.e-qanun.az.

Two articles of the Cabinet of Minister's decision were amended with a decision on February 1, 2013 (No 550) for clarification.

Presidential decree (No 267/24 May 2010)

The Presidential Decree "On Additional Measures for Ensuring the Implementation of the Law of the Republic of Azerbaijan on Ecologically Clean Agriculture" identifies the ministries and other public institutions responsible for implementation of the functions stated by the Law.

Cabinet of Ministers' Decision (No 159/30 August 2010)

Decision of the Cabinet guarantees the scientific implementation of organic agriculture by MoA, MoE, MoENR, MoH, and the Azerbaijan National Academy of Sciences (ANAS) through their functions which were already stated. There were changes in the names of the Ministries which were further reflected onto this decision in 2014 and 2016.

The priority areas that are expected to support legal and physical development of organic agriculture under the mandates of MoA, MoENR, MoH and ANAS are listed as follows:

- determine suitable areas by analysing the environment and soils, and setting up principles;
- prevent soil pollution and improve soil fertility;
- promote local genetic resources and develop new varieties/hybrids that are resistant to drought, salinity etc.;
- develop rotation and management programmes suitable for organic farming based on scientific results;
- improve grassland and grazing areas through scientific management;
- develop biological, mechanical and agrotechnical methods for pest, diseases and weed management;
- develop technologies to produce soil amendments based on plant and animal wastes, to enhance technology for production, storage and processing of organic products;
- prepare guidelines for prevention of soil and water resources pollution through implementation of organic activities;
- organize training on technologies utilized for preparation of organic fertilizers and composts; develop and implement technologies for organic poultry and aquaculture production;
- training on scientific basis for production of agricultural products in biosphere reserves; and

- prepare projects to learn about international experience on organic agriculture production.

Additionally, the following duties are foreseen for MoA, MoE, MoENR, ANAS and SCSMP:

- organize activities to educate people in the field of organic agriculture on ecology, training and dissemination of information;
- take necessary steps to prepare scientific articles, journals and books;
- organize exhibitions and fairs to spread information on organic agriculture;
- organize special courses, seminars and conferences in order to increase capacity in the field of organic agriculture; and
- promote participation of specialists and farmers in activities organized in foreign countries.

According to the decisions of the President and CM, the SSC of Azerbaijan has to collect data on organic agriculture as well as all other agricultural statistics. The existing legislation has some gaps which hinder the current functioning of the authorities identified for the registry of organic operators (farmers, processors and exporters), authorization of the control bodies, or data collection and announcement. Agricultural census is performed at intervals, the latest two being in 2005 and 2015 on 1.3 million farms. The SSC collects agricultural data annually through a representative sampling based upon the list prepared by MoA. In this regard, the SSC prepared a form to collect data on the organic sector and requested a list for organic operators from the MoA. Since the system is not yet in place, MoA could not provide the list. The problem is that the organic operators' registry system has not been created yet, thus there is no official data on organic agriculture in Azerbaijan. Internationally available unofficial data on organic agriculture are collected through private data sources.

All stakeholders agree that there is a need to identify the Competent Authority, and many believe that it should be MoA. However, this proposal coupled with the formation of an interministerial committee that may facilitate the cooperation among the stated government offices is not yet accomplished.

Draft Guidelines for the production, processing, labelling and marketing of organically produced food (2014)

With the issued decisions, responsibilities are identified and distributed among different state institutions. Despite detailed definition of responsibilities,

there is neither a plan setting up the timeframe and initiation/coordination for the proposed activities, nor identification of a competent authority (to lead/coordinate). Under such conditions, following the Cabinet's decision in 2010, the SCSMP started preparation of a draft standard for organic food and farming which was completed only in 2014. This draft covers organic plant and animal production, beekeeping, aquaculture, packaging, and transportation. A list of permitted inputs is also included. Due to the shortages of the draft, a new initiative has been put forward within the framework of the Project GCP/AZE/006/TUR implemented by FAO.

3.3.4. Scientific infrastructure

In Azerbaijan, agricultural research is carried out by state institutions, namely research institutes and universities. Agrarian Science and Information Advisory Center within MoA coordinates national agricultural research institutes based in Baku or other provinces. The two agrarian universities in Ganja and Nakhchivan also function under MoA. Azerbaijan State Agrarian University in Ganja has initiated a branch on organic farming and may have scientific capacity to address the needs of the stakeholders in Azerbaijan; however, there is a need to find/develop structures to link these groups.

There are thematic institutes (e.g. for vegetables or grapes). Their scientific structure is currently undergoing changes to improve efficiency. Though research work has been performed and inventories prepared for specific regions or crops, the dissemination of information is still very limited. In order to stimulate organic farming practices, existing information/ knowledge needs to be revised with an emphasis on agroecology and shared by stakeholders. A pilot plot managed organically is established at the Vegetable Research Institute of the Agrarian Science and Information Advisory Centre in Absheron to examine the effects of conversion to organics, to obtain best rotation program for vegetables, and to demonstrate organic practices to the farmers (Figure 6).

In 2015, the Centre on Organic Agriculture was established in Gakh at the Institute of Botany of the Academy of Sciences to promote organic agriculture in Shaki-Zagatala region. The main reason to have the Centre in this particular region is its clean and rich natural resources. The Centre with its trained staff prepared an action plan with the following objectives: to preserve local varieties well-suited to the region; to support farmers during their transition to OA; and to establish a high-tech laboratory for soil, water and plant analysis. Few soil- and water-analysing labs with limited analytical range are available for the analysis of agricultural and

Figure 6. The organic plot established at the Vegetable Research Institute in Absheron and used for technical training

food products. In Azerbaijan, mainly in Baku, there exist several labs, for instance, the Toxicology Lab of the State Phytosanitary Control Service under the MoA, State Customs Committee's laboratory, and the Specialized Lab of the Ministry of Economy which seem to be developing as reference labs. The laboratory at the Customs can perform aflatoxin analysis and is authorized to inspect exported hazelnuts. In Azerbaijan, there is a law on biosafety, but there are no labs performing GMO analyses.

Organic production and decisions on certification do not fully rely on the results of the analyses of products or of inputs. The organic certificate guarantees that the whole chain is fulfilled in accordance with the reference standard. However, for monitoring purposes or for testing for fraud, Azerbaijan is still in need of well-equipped accredited labs. Therefore, to develop the scientific structure for surveillance and to support research work, laboratories need to be either established or upgraded for testing:

1. soil and plant nutrients;
2. water and air quality;
3. contaminants (pesticides, heavy metals, mycotoxins etc.), additives, growth regulators, and antibiotics for products of plant and animal origin; and
4. genetic modification (GMOs).

Since many pesticides are banned or severely limited in organic agriculture, the detection and quantification limits should be as low as achievable in analytical labs. This will also contribute to the development of the surveillance system for the local market to prevent breach of law and principles.

3.3.5. Non-governmental organizations and the private sector

GABA (Ganja Agribusiness Association) is the leading NGO involved in organic agriculture and IFOAM member since 2002. GABA was the first pioneer organization in Azerbaijan which participated in the globally well-known BioFach World Organic Trade Fair in Nuremberg, Germany, in 2010. Six organically produced and certified commodities were exhibited at the fair and aroused great interest among many international companies. The first organically certified commodities were pomegranate, quince, figs, cornel, persimmon, and plum spread. GABA provided translation of the well-known standards and contributed to the development of the organic-related legislation. GABA has been publishing the Organic Agriculture magazine since 2006. Due to financial restrictions, lately it is published twice a year. They offer farmers' training, as well.

3.3.6. Education and training on organic agriculture

In Azerbaijan, the average level of adult literacy (age >15) was 99.81% in 2015 (World Data Atlas, 2017). The net secondary school (7 years) attendance rate is similar among both sexes as 84.2%. This is an advantage for professional training programmes on agro-food production since the overall employment rate in the country was 63.2% in 2014 (World Data Atlas, 2017). Several projects supported by EU, GIZ, USAID and TIKA have offered short training programmes related to environmental protection and organic agriculture.

In Ganja, there is a higher education institute, Azerbaijan State Agrarian University, which has a department on organic agriculture. They offer training courses in the sphere of organic agriculture. The demand for the Agricultural University is generally quite low. MoA initiated special programmes for students in 2017 to raise interest for higher education in the field of agriculture. MoE together with MoA prepared a booklet to raise awareness on organic agriculture among primary school children.

The Project GCP/AZE/006/TUR: Development of Organic Agriculture and Institutional Capacity Building in Azerbaijan emphasizes training and

raising of awareness in organic agriculture. The focus is on the training of trainers, producer trainings, and the development of training tools. Special attention is paid to the general aspects of organic management, inspection and certification as well as to conversion to organic production of the products that have priority for Azerbaijan. The organic plot established at the Vegetable Research Institute in Absheron aims to serve as a demonstration field for practical training sessions.

Value chains and domestic market 4

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4. Value chains and domestic market

4.1. A generic value chain

A value chain consists of all the actors involved in the production, processing, trading and selling of a specific product (Figure 7). Because it is only as strong as the weakest link, when the weakest breaks, the whole chain becomes ineffective. In order to produce any commodity in the agricultural sector, inputs supply is among the requirements for the better management. For example, organic propagation materials, soil amendments, fertilizers, irrigation, and plant protection agents and locally adapted methods are needed to grow an organic commodity. Once inputs including knowledge are provided, production takes place in the field or any other ecosystem. Although many products are marketed directly to customers for table consumption, in order to increase form, time, place and/or ownership utility of agricultural products, various processing strategies are inevitable. This process probably adds value to products being processed and contributes to every stakeholder involved in all stages of this process. In certain cases, processing also increases durability providing longer shelf life, which then eases year-round marketing. In order to reach the final consumers, every commodity needs delivery and marketing. The easier is the access of the consumers to commodities, the more likely they will purchase and consume them. Therefore, marketing channels are very important to reach all consumers, especially the hard ones to reach. These processes also increase the value of the products and contribute to stakeholders involved in every single stage.

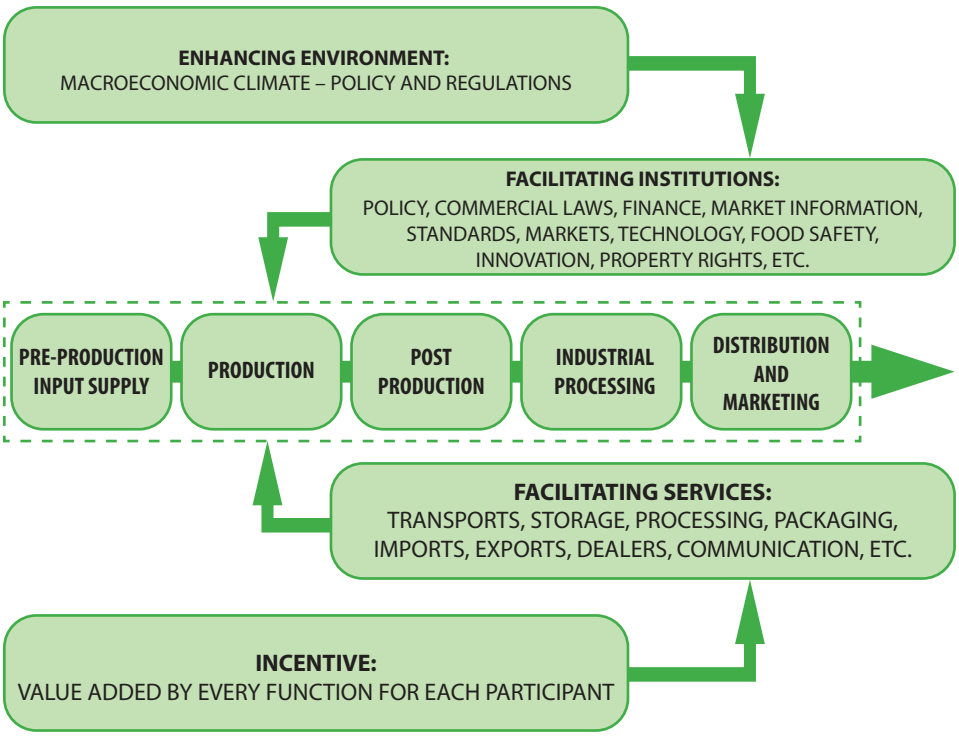
Value chain requires facilitating institutions which must implement policies and enforce commercial laws. These institutions must develop financial instruments, market information, standards, markets, technology, food safety, innovation, and property rights. On the other hand, facilitating services such as transports, storage, processing, packaging, imports, exports, dealers, communicators, etc. are needed. Moreover, incentives for individuals who add value to products in different stages consists a major part of the value chain.

4.2. Major value chain constraints for organics

4.2.1. Pre-production and production stages

The main objective of organic agriculture is to rely on on-farm inputs rather than external inputs. Organic operators must accept that conversion from

Figure 7. A generic value chain



Source: United Nations Industrial Development Organization, 2009

conventional to organic is not solely replacing synthetic chemicals with their organic alternatives. However, in practice many farmers either because of their strong conventional past, lack of knowledge or intrinsic nature of the farm would like to see organic inputs available in their vicinity as a management tool. Due to this, legislation on organic agriculture contains positive lists/rules on organic propagation material (seeds, seedlings and samplings), organic soil amendments and fertilizers, plant protection preparations and processing aids, or on other inputs and methods. In the case of intensive production systems, availability of organic inputs/knowledge plays a crucial role during transition. On the other hand, transition from a low-input system to organic helps farmers in their management of pests/diseases and soil fertility; however, it may create problems in the market due to a bigger volume of organic production flowing to the markets.

Azerbaijani operators initiated organic production first as based on certification of wild-areas and harvesting of wild berries, fruits, medicinal

and aromatic plants, and nuts destined to the export markets. In addition to wild harvest, cereals, citrus fruits, temperate fruits, tropical and subtropical fruits, grapes, oilseeds, olive, protein crops, vegetables and honey are produced and certified as organic. Most of the area reported as organic are still in conversion, however, there are certain areas (even if small) of these products fully converted to organic. The data presented by Willer and Lernoud (2017) imply that Azerbaijan will probably increase the area under organic production, the number of farmers converted to organic, processors and commodities produced organically. Even if these statistics are not official, the organically certified area did not increase significantly due to the constraints phased at different stages of the value chain. The FAO Project "GCP/AZE/006/TUR Development of organic agriculture and institutional capacity building in Azerbaijan" aimed to identify these constraints in order to further develop organic agriculture in the country. The most important constraints in pre-production and production periods are derived through the interviews and identified as follows:

- ***Lack of awareness about organic agriculture among farmers.*** Long-term vocational training programmes are needed to increase the number of organic producers and commodities, planted area, and amount produced. Extension programmes must firstly concentrate on raising awareness among farmers. At this stage, mass media means can extensively help to inform many farmers within a short period. In the later stages, farmers need to have an increasing interest, and they must seek more information about organic farming. They have many questions in mind about whether or not converting to organic farming will increase their profit or will cause them to lose money. In order to convince farmers, special extension programmes are needed. Regions or commodities have to be prioritized for dissemination activities. Regular visits and intensive training activities must be organized for the priority regions and priority crop producers.

- ***Uncertainty about successful transition to organic.*** Farmers need to be persuaded that they will have a successful transition and generate more or adequate income when adopting organic farming. Success is closely linked to the information available and the access of farmers to this information. Once GoA decides to promote organic farming, training tools, demonstration plots, farmer to farmer visits and various awareness and interest raising campaigns must be organized. Their losses (especially during the initial period) must be compensated through state programmes.

- ***Gaps in Legislative Infrastructure.*** Although the Law of the Republic of Azerbaijan on Ecologically Clean Agriculture (13 June 2008) describing general guidelines of organic farming in Azerbaijan, the decision of Council of the Ministers defining the rules and regulations of organic farming (8 January 2009), the President's decision declaring additional measures for the application of the organic law, and the Council of the Ministers' decision (30 August 2010) on constructing adequate scientific infrastructure for organic farming provide sufficient infrastructure for organic farming, the problems mostly appear with the leading/ coordination of functions required for the implementation of the law and regulations. The interviews showed that except the businessmen directly involved in organic farming, processing and marketing, the majority of farmers and other stakeholders are not aware of these rules and regulations despite the years of gaining the relevant experience.

- ***No governmental subsidies specific for organic farming exist.*** Development of organic agriculture is envisaged in the Strategic Road Map on Agricultural Production and Processing in the Republic of Azerbaijan (Article 7.7.4, Priority 7.4). The Government decided to increase state support for the development of agriculture in the country in 2015, and resolved to increase discounts for synthetic chemical fertilizers sold to farmers from 50% to 70%. Discounts applicable to fertilizers are also applicable to bio-humos. The upper limit of the preferential sum was raised from 50 AZN/ha to 100 AZN/ha. The Government also provided fuel subsidies for farmers. Because Azerbaijan is mainly a crude oil producing country, increased fuel subsidies for farmers have limited effect to the entire economy. However, subsidizing synthetic fertilizers increased imports in comparison with previous years from 85,000 tons to 150 000 tons. In order to promote organic production, the specific subsidies must be initiated for organic production. These may be considered as area-based subsidies, and/or input subsidies.

- ***Organic farming is not among the priority objectives of the Ministry of Agriculture.*** The primary purpose of GoA is to provide food security with domestic production and achieve self-sufficiency. For this reason, it mostly subsidizes conventionally grown crops with comparative advantages such as wheat, barley, rice, and other cereals; cotton; hazelnut; fresh fruits and vegetables. On the one hand, organic farming provides public services through protection of the environment, and on the other hand, sustainable use of natural resources to create the added value.

- ***Lack of inspection and certification bodies.*** In Azerbaijan, mainly European companies are supplying the inspection and certification services and certify exported organic products. This process results in higher inspection and certification cost, thus higher production cost. Additionally, communication with the organic operators is more limited due to the language and communication barrier.

- ***Export oriented organic farming initiated by private sector.*** Organic agriculture started mainly towards export markets and has faced many obstacles in recent years. The most common organic products are those collected in the wild. Developing the domestic market must be accepted as a priority, in which case a different product range needs to be considered. In general, there is high potential for organic production in Azerbaijan. However, in order to utilize this potential, relative advantages of different regions must be taken into consideration, and adequate infrastructure for organic farming must be developed. This infrastructure may consist of such issues as determination of priority regions and products to be produced organically, communication with the producers and consumers, preparation of a strong legislative infrastructure, increase in availability of inputs/methods for organic farming, training and continuous extension services for organic farmers/processors, and support for accredited inspection and certification bodies.

4.2.2. Post-harvest and processing stages

- ***Lack of modern storage and processing facilities.*** This is a general weakness. For organic value chain, there is a need in precautions for intermingling of organic products with conventional ones. For organic products, all of the facilities, methods and inputs/processing aids during post-harvest handling and processing must have the qualifications stated in the relevant standards. Ingredients, cleansing agents or materials not allowed in organic agriculture should receive special attention in these facilities. For this reason, buildings where organic products are stored, processing facilities, ingredients used, equipment, product packaging, and final products storage buildings must all meet specific standards.

- ***High cost and poor maintenance in cold storages.*** There have been problems between storage owners and farmers. Many times farmers complain about the high costs and poor maintenance conditions of storages that result in high costs and/or losses.

- ***Lack of site-specific knowledge and research.*** As in post-harvest handling and processing of conventional products, the value chain must be managed as a whole. There is a ban or limitation on use of certain methods – e.g. post-harvest pesticides, cleaning chemicals, irradiation of food, etc. Thus, pre-harvesting, as in the case of resistant varieties or field hygiene, becomes of utmost importance to provide durable products. In this regard, research is required to provide information for all organic operators.

4.2.3. Distribution and marketing stages

In order to develop a sustainable distribution and marketing system for organic products, firstly, there must be a sufficient number of consumers purchasing organic products. In Azerbaijan, organic food products/shelves or shops selling organic cosmetics are present in supermarkets in Baku; however, there is lack of awareness among domestic consumers regarding what organic is. In addition, the following limitations were identified during the interviews:

- ***Lack of awareness and information flow about organic products among all stakeholders involved in organic products' distribution and marketing stages;***
- ***Lack of supermarkets selling organic products;***
- ***Lack of regional organic bazaars;***
- ***Lack of sustainable organic supply;***
- ***Lack of short distribution channels between producers and consumers; and***
- ***Lack of data collection and production and market data about organic products.***

4.3. Domestic markets

A domestic market is an internal market where all of the processes of production, transportation, storage, distribution, consumption and security of goods and services occur only within the country's internal borders. Although there are more limitations when competing in domestic marketing in comparison with international marketing, there are fewer barriers in domestic marketing, particularly in following consumer taste and preferences, and in obtaining data on consumer demands and marketing trends. This provides companies with a basis to develop more effective marketing strategies and to make more accurate decisions about their

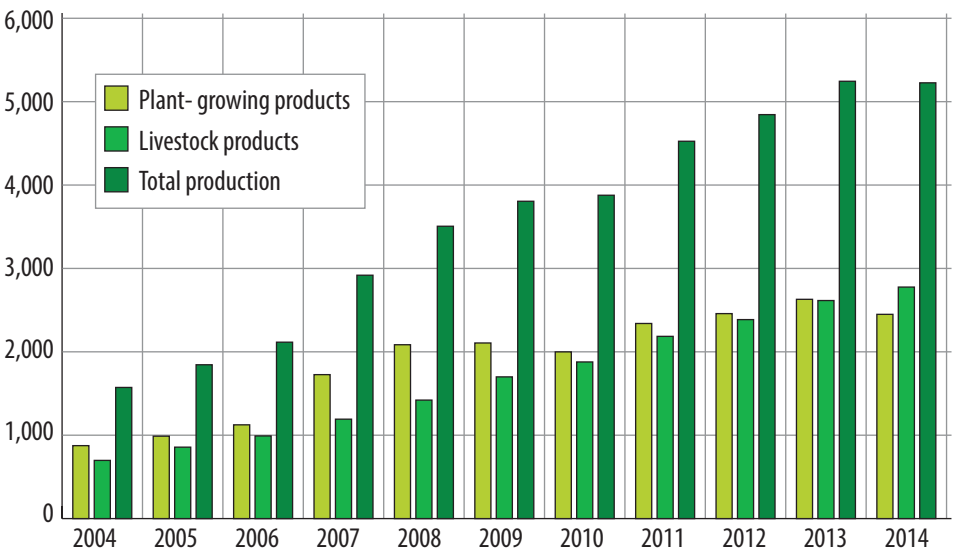
future. Domestic markets are considered as less risky and requiring lesser financial resources compared to international markets. For the last few years, there have been shops or supermarkets displaying imported certified organic food, beverages, cosmetics and textiles in Baku. All of these factors indicate that carefully analysing domestic markets will make it possible for agro-industry to develop domestic demand, increase competitiveness, and strengthen the value chain in many commodities. Since organic agriculture started as export oriented in Azerbaijan, there is a need in development of a strategy for promotion of the domestic market for organic products.

4.3.1. Production and supply of agricultural commodities

Domestic production of agricultural commodities is considered as the main source of supply. Azerbaijan's gross output of agricultural commodities valued 1,844.8 million Manats in 2014 and increased to 5,225.8 million Manats in 2014, showing an increase of more than threefold in ten years. Value of livestock for the first time exceeded the value of plant-growing products in 2014 (Figure 8).

Crop production data are presented in Table 7. It can be seen from the Table that the only commodity which showed a dramatic decrease starting

Figure 8. Azerbaijan's gross output of agriculture by actual prices (mln manats)



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Plant- growing products	874.8	988.2	1,124.4	1,726.4	2,084.9	2,106.0	1,999.2	2,339.8	2,458.2	2,629.6	2,449.4
Livestock products	697.9	856.6	991.1	1,192.2	1,421.0	1,699.5	1,878.5	2,185.4	2,386.4	2,615.0	2,776.4
Total production	1,572.7	1,844.8	2,115.5	2,918.6	3,505.9	3,805.5	3,877.7	4,525.2	4,844.6	5,244.6	5,225.8

Table 7. Volume of agricultural crop production in Azerbaijan (1 000 tonnes)

Years	Cereals and food legumes	Cotton	Tobacco	Potatoes	Vegetables	Watermelons and melons	Sugar beet	Sunflower for seed
2003	2,057.8	99.6	4.7	769,0	1,046.3	356.7	128.9	18.3
2004	2,158.2	135.7	6.5	930,4	1,076.2	355.3	56.8	14.3
2005	2,126.7	196.6	7.1	1,083.1	1,127.3	363.8	36.6	16.1
2006	2,078.9	130.1	4.8	999.3	1,186.4	362.1	167.2	15.9
2007	2,004.4	100.1	2.9	1,037.3	1,227.3	417.6	141.9	13.4
2008	2,498.3	55.4	2.5	1,077.1	1,228.3	407.7	190.7	16.5
2009	2,988.3	31.9	2.6	983.0	1,178.6	410.8	188.7	14.4
2010	2,000.5	38.2	3.2	953.7	1,189.5	433.6	251.9	15.5
2011	2,458.4	66.4	3.6	938.5	1,214.8	478.0	252.9	19.6
2012	2,802.2	57.0	4.3	968.5	1,216.2	428.0	173.8	19.7
2013	2,955.3	45.2	3.5	992.8	1,236.3	429.8	187.9	17.7
2016	3,065.1	89.4	3.6	902.4	1,270.6	464.8	312.6	16.7

Source: State Statistical Committee of the Republic of Azerbaijan

Table 8. Areas sown with vegetables by types (1 000 ha)

YEARS	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Vegetables sown in open fields – total										
Cabbage	6.3	6.4	7.3	6.7	6.6	6.1	6.4	6.4	6.4	5.6
Cucumber	12.8	13.4	13.8	14.0	14.7	14.7	13.9	13.6	13.6	13.2
Tomatoes	25.1	26.1	26.4	26.6	25.3	25.7	26.6	24.6	25.0	24.6
Beet root	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5
Carrot	0.6	0.7	0.5	0.6	0.7	0.7	0.8	0.8	0.8	0.9
Onion	14.6	14.9	15.5	14.6	12.9	12.9	13.1	11.6	11.1	11.8
Garlic	2.5	2.7	2.7	2.6	2.6	2.6	2.2	2.5	2.5	2.4
Peas, Green	0.6	0.5	0.1	0.1	0.2	1.3	1.1	1.1	0.4	0.4
Other vegetables	15.1	14.1	17.2	16.5	16.1	15.3	15.2	15.7	15.8	15.0
Subtotal	77.9	79.2	83.9	82.1	79.5	79.7	79.7	76.8	76.0	74.4
Vegetable under protective cover – total										
Cucumber	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7
Tomatoes	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.9	1.0	0.9
Other Vegetables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.9	1.0	1.1	1.1	1.4	1.4	1.4	1.5	1.6	1.6
TOTAL	78.8	80.2	85.0	83.2	80.9	81.1	81.1	78.3	77.6	76.0

Source: State Statistical Committee of the Republic of Azerbaijan

from 2007 was cotton. Decrease rate was more than 50%. Although production levels of other commodities showed some fluctuations from year to year, slightly increasing trends can be observed in cereals and dried pulses, vegetables, watermelons and melons, and tobacco.

Table 9. Fruits and berries: cultivated areas, gross harvest and yield

Years	Cultivated area	Fruit bearing	Gross harvest	Yield per ha
	1,000 ha		1,000 t	100 kg
2004	89.7	82.5	424.6	51.4
2005	93.0	84.3	625.7	73.9
2006	110.7	86.6	662.4	76.2
2007	114.0	93.7	677.8	71.9
2008	119.9	96.2	712.8	73.4
2009	125.0	99.0	718.2	71.9
2010	127.7	102.5	729.5	70.6
2011	130.5	106.0	765.8	71.7
2012	133.5	108.8	810.0	73.8
2013	134.2	113.9	853.8	74.3

Source: State Statistical Committee of the Republic of Azerbaijan

Table 10. Livestock (as 1 000 heads).

Years	Cattle	Buffaloes	Sheep's	Goats	Pigs	Poultry	Bee families
2005	2,007.2	308.6	6,887.4	601.4	22.9	18,253.3	95.7
2006	2,067.0	302.8	7,074.8	593.7	22.9	19,036.0	105.0
2007	2,123.0	298.9	7,222.1	577.8	21.3	18,760.6	115.6
2008	2,188.1	298.7	7,446.0	586.5	18.7	20,754.0	126.4
2009	2,255.0	288.4	7,609.2	590.6	10.3	22,352.9	142.5
2010	2,299.7	282.7	7,723.9	607.3	5.3	22,041.6	164.0
2011	2,336.6	277.1	7,784.8	620.2	6.3	22,432.3	193.2
2012	2,378.5	269.4	7,847.4	626.9	6.1	23,162.0	212.7
2013	2,412.3	265.9	7,924.6	644.8	6.5	24,581.4	225.4
2014	2,442.4	260.9	7,979.4	651.1	6.7	25,172.7	238.4
2015	2,445.2	252.3	7,987.3	658.1	6.1	28,851.7	243.0

Source: The State Statistical Committee of the Republic of Azerbaijan

Sown areas under vegetables by types are shown in Table 8. The area of vegetables sown in open fields was 77.9 thousand ha in 2005, and decreased to 74.4 thousand ha in 2014. On the other hand, the areas of vegetables under protective cover occupied 0.9 thousand ha in 2005, and reached 1.6 thousand ha in 2014. Tomatoes, cucumbers, and onions are the three most widespread vegetables sown in open field.

Land allocated to fruits and berries, gross harvest and yields are presented in Table 9. It is clear from the Table that there is an increasing trend in cultivated areas and gross harvest. Excluding the 2004 figures, no dramatic change was observed in yields per ha.

Livestock numbers are shown in Table 10. The figures signify an increasing trend in the numbers of cattle, sheep, goats, poultry, and bee families; however, there has been a decrease in buffaloes, and pigs.

4.3.2. Present and potential supply of organic products

In order to analyse a country's potential for supply of organic products, first of all, the availability of natural resources, particularly agricultural land and climatic conditions, is important. From the interviews, it was obvious that naturally Azerbaijan has a relative advantage in producing many organic products. Additionally, the farming system is mostly of low-input nature, and the interviewed experts believed that the taste and flavour of these products cannot be found anywhere else. They also believed that the problem in the country is how to utilize this potential and make organic farming a sustainable sector and a real alternative as a non-oil income source for the country. The main commodities organically produced in Azerbaijan are cereals, citrus fruits, temperate fruits, tropical and subtropical fruits, grapes, oil seeds, olives, protein crops, vegetables, wild collections, vegetables, honey and aquaculture (Willer and Lernoud, 2016; 2017). Currently, organic pomegranate products, fruit juices, medicinal and aromatic plants, and hazelnut are mainly directed towards the export markets. To supply the domestic organic market, it is necessary to maintain a wide range of products including animal-based ones, such as eggs, milk, meat and their products. The staple food products, such as wheat, fruit and vegetables, should be taken into account as a priority.

Azerbaijan's world share of organic agricultural land is 0.05%; its share of organic agricultural land in Asia is 0.216% (Table 11). It is listed among the top ten countries with the highest share of organic in total agricultural land.

Table 11. Organic land in Azerbaijan, its share in the entire continent of Asia

Country	Agriculture (ha)	Aquaculture (ha)	Forest (ha)	Wild Collection (ha)	Total (ha)
Azerbaijan	23,331		123	937	24,391
Asia	3,425,939		123	7,794,340	11,265,703
%	0.68%		100	0.012%	0.216%

Source: Willer & Lernoud, 2016; 2017

As of 2013, there were 288 producers and 14 processors. No importers or exporters are reported. As of 2011, domestic sales of organic products were about 3 million Euros, approximately 0.3 Euro per person (Willer and Lernoud, 2016). Since there is no reliable data collection system available in Azerbaijan, these figures may give some clue but has to be updated and based upon trustworthy data sources.

Azerbaijan has already started to produce certified organic products and exports them mainly to the EU and USA. Considering the areas under conversion, it can be foreseen that organic production will have an increasing potential, mainly in cereals, fruits, and vegetables. Although no statistical indicators were encountered, it was determined from the interviews that Azerbaijan has remarkable potential in organic animal husbandry, particularly in big and small ruminants as well as poultry and beekeeping. The experts stressed that meat produced in Azerbaijan has a unique taste coming from the pastures and meadows with a large variety of plants which are not contaminated with chemicals and/or industrial wastes. Dairy products, wild collections, and bee products are also considered as more promising natural products. In some areas, many of these products are considered as non-certified organic ones, but since no certification work has been carried out, these products cannot reach the markets.

Azerbaijan is rich in natural vegetation, especially in forest areas. MoENR is in charge of forests including agro-food production in areas under their governance. These areas include national parks (9, totalling 220,000 ha) and protected areas (17, in total of 117,000 ha). Some of the agro-food products obtained in these areas are watermelon (2,000 t), honey (3,000 kg), pomegranate (300 t), chestnut (100 t), hazelnut (200 t), persimmon (80 t), walnut (80 t), potatoes (50 t), and others. These products do not receive any synthetic inputs and are marketed through MoENR. Some of these products can be converted to organic and certified if a certain production area(s) is chosen with a high production capacity. MoENR gives certificates to wild harvested medicinal and aromatic plants for their quality and origin.

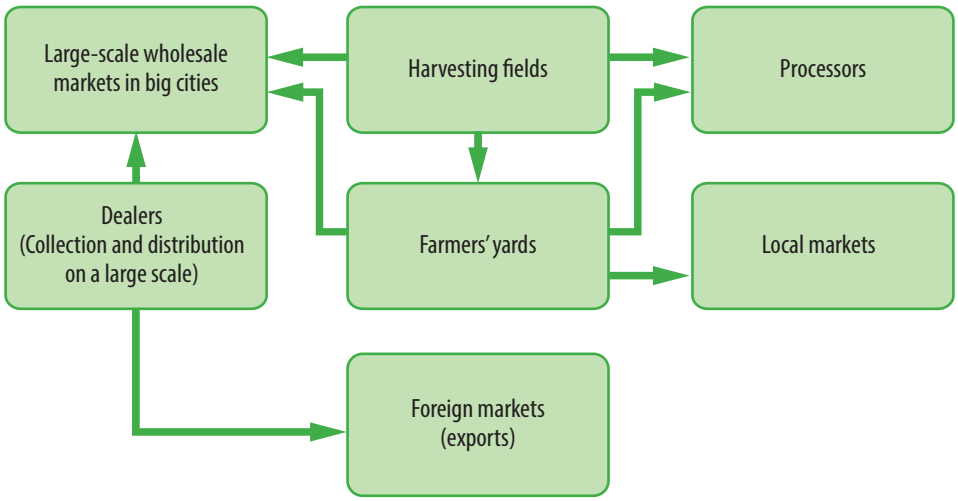
A short survey of supermarkets showed that there are organic certified and labelled products either displayed on a specific shelf or presented as dispersed products imported from various European countries. In Baku supermarkets, organic products range from pasta from Italy and olive oil from Greece to ketchup from Poland. The retail sales value was calculated as 2.6 million Euros, and consumption per person as 0.3 Euros per capita in 2011 (Willer and Lernoud, 2014). A similar rough figure of 3.0 million Euros is given for 2014 and 2015 (Willer and Lernoud, 2016; 2017). Cosmetic shops selling various imported organic cosmetic products are more trended (Figure 9). Some international brands have garments made from organic cotton in their display. All these products are certified and labelled; however, the general consumer perception is not fully developed yet for organic products.

4.3.3. Domestic marketing chains for agricultural commodities

A domestic marketing chain for agricultural commodities is presented in Figure 10. Agricultural products are directly sold from harvesting fields to large-scale wholesale markets in big cities, processors, or brought to farmers' yards. From farmers' yards, they are also sold to large-scale wholesale markets in big cities, processors, and local markets. Dealers collecting and distributing products on a large scale also target at foreign markets.

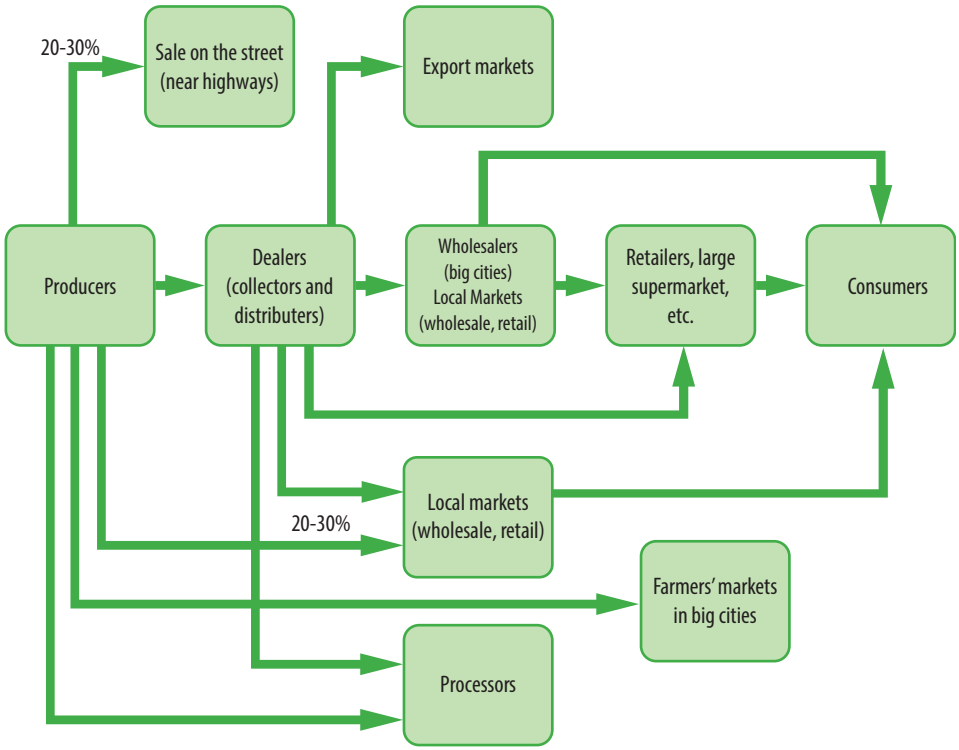
Figure 9. A shop selling imported organic cosmetics in Baku

Figure 10. Domestic value chain for agricultural commodities



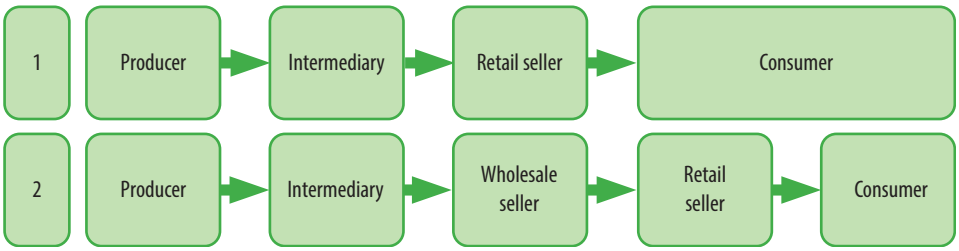
Source: Khalilov, Shalbuzov, and Huseyn, 2015. Country Report: Azerbaijan

Figure 11. Major distribution channels for fruits and vegetables in Azerbaijan



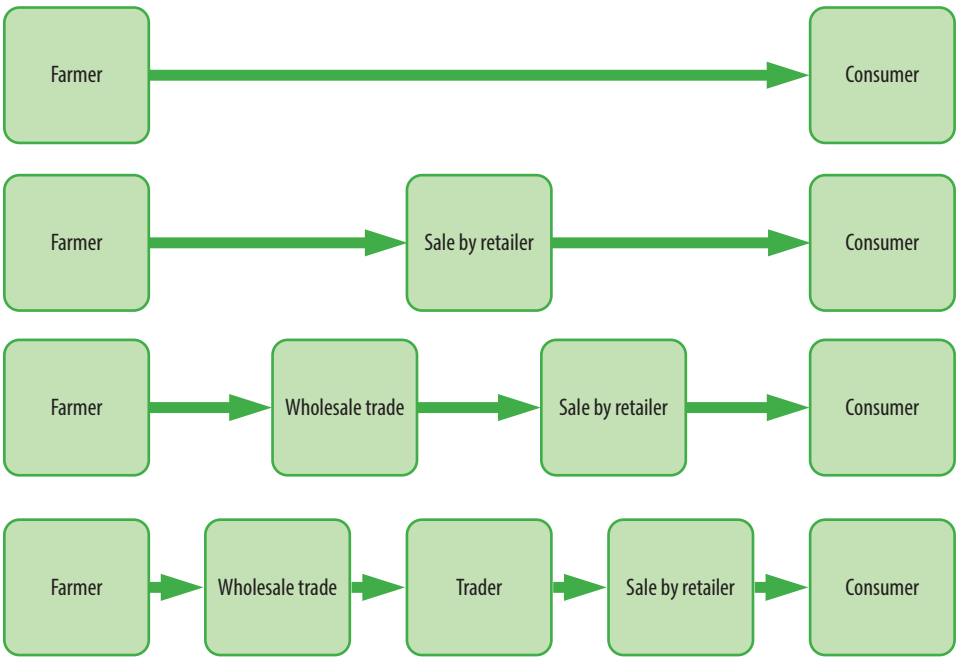
Source: Khalilov, Shalbuzov & Huseyn, 2015. Country Report: Azerbaijan

Figure 12. Channels for livestock products



Source: Khalilov, Shalbuzov & Huseyn, 2015. Country Report: Azerbaijan

Figure 13. Organic marketing chain in Azerbaijan



Source: Babayev, 2012

Major distribution channels for fruits and vegetables in Azerbaijan are presented in Figure 11. Producers have access to five different channels to sell their products. These are as follows: direct sales in the streets near highways, dealers who are collectors and distributors, local markets (wholesale or retailers), farmers' markets in big cities, and processors. Approximately 20-30% of the commodities are sold in the streets near highways. Dealers can sell their products to wholesalers, local markets,

processors and/or exporters. Consumers, on the other hand, can buy fruits and vegetables from wholesalers in big cities, local markets (wholesalers and retailers), and retailers (supermarkets, grocery stores, shops, etc.).

Livestock products (milk, meat, eggs) and live animals are mainly sold through 2 channels as shown in Figure 12. In the first channel, products come to an intermediary from producers and go to retailers who sell it to the final consumers. In the second channel, there is one additional link between wholesaler and retailer. As the marketing chain extends, marketing margins may increase and consumers may pay higher prices for livestock products, whereas producers may receive lower prices.

4.3.4. Domestic marketing chain for organic products

The studies show that domestic marketing chains in Azerbaijan function through four different channels. The first one is marketing organic products directly from farmers to consumers. Although this way of marketing may provide benefits both for farmers and consumers by reducing marketing margins and increasing freshness, it has limitations, especially in case of long distances and/or inadequate infrastructure linking production and consumption areas.

In the second channel of marketing, retailers purchase the products from farmers and sell them to consumers. There are two different mediators – wholesalers and retailers – in the third form of marketing chain (Figure 10). In this system, wholesalers purchase the product from farmers and sell it to retailers who then re-sell it to consumers. In the fourth system, there are three mediators: wholesalers, traders, and retailers, until the products reach consumers. This form probably has the highest marketing margins, which reduces farm level prices and increases consumer prices. In addition, the post-harvest handling becomes a real issue, as the initial product quality should not be lost. If the chain has some shortages or bottle-necks, the whole system is affected and sustainable marketing is threatened.

4.3.5. Market size and market growth potential

Market size for a specific commodity refers to the present sales of that commodity. However, if the commodity has an increasing trend of consumption, and the use of the product is expanding, the future sales can also be accounted for as a potential market size. For this reason, in order to promote the production and consumption of organic products and develop a sustainable marketing chain, the potential market size

must be taken into account. Although there are many factors influencing potential market size, the present population and its increasing trend can offer some information to base future plans on.

4.3.5.1. Population growth and consumers' characteristics as a demand-increasing factor

Population of Azerbaijan was 7.1 million in 1990 and reached 9.5 million in 2015, with an approximate increasing rate of 1.3%. During this period of time, the proportion of rural and urban population showed no significant changes indicating that slightly more than half of Azerbaijani people live in urban areas, while less than half live in rural areas (Table 12).

Although demand for many commodities depends not only on population growth but also on the price of the commodity, prices of alternative and complementary goods, income of the households, consumers' tastes and preferences, and consumer expectations, population growth have higher impact on demand of agricultural commodities because they are necessary goods. For this reason, the higher is the population growth, the higher is the demand for farm commodities. Organic products face higher demand when consumer preferences increase parallel to the increase in their awareness on health and environment, but this increase in demand is expected to slow down if the prices of organic goods are considerably higher than those of conventional products as well as if the income of consumers is low.

Urban, well educated, and upper class households may have higher tendency of consuming organic products. Almost throughout the world, consumers buy organic food with health concern. Thus, families with children, expectant

Table 12. Population Trend in Azerbaijan between 1990 and 2015.

Years	Population size -total	Total annual Increase		Including:		as % to total population	
		as thousand persons	%	urban	rural	urban	rural
1990	7,131.9	86.6	1.2	3,847.3	3,284.6	53.9	46.1
1995	7,643.5	82.7	1.1	4,005.6	3,637.9	52.4	47.6
2000	8,032.8	81.5	1.0	4,107.3	3,925.5	51.1	48.9
2005	8,447.4	105.7	1.3	4,423.4	4024	52.4	47.6
2010	8,997.6	113.5	1.3	4,774.9	4,222.7	53.1	46.9
2015	9,593.0	X	X	5,098.3	4,494.7	53.1	46.9

Source: The State Statistical Committee of the Republic of Azerbaijan

mothers and adults facing health problems are generally the first group to consume organic products (Huber et al., 2011). In rural areas, on the other hand, many people believe that they are already consuming natural products which they produce in their own fields or purchase from neighbouring farmers. In the case of the urban population, the more education and income level of consumer goes up, the more they will probably search for organically certified commodities. Although Azerbaijan's population statistics showed an urban population of 53%, the recent developments indicate that a large amount of migration is expected from country sites to big cities, particularly to the capital city of Baku[6], which has better education and employment opportunities to offer. Therefore, demand for foodstuff, particularly for organics, will be expected to increase in the future.

A consumer survey in Azerbaijan showed that the main consumers of organic products consist of upper-class households (37%), foreigners (31%), housewives (21%), academic elite (10%), and students (1%) (Babayev, 2012). In the same research, organic products had significantly higher prices as compared to conventional goods. The study concludes that even such higher prices do not reduce the sales of organic products because consumers are willing to pay higher prices for organic commodities. The results of the above study may be valid for high-income and well educated consumers. In order to expand organic markets and make organic commodities available for low income level consumers, extra charges must be eliminated and prices must be lowered as much as possible to enlarge the domestic market with locally grown organic products. The devaluation of the Azeri Manat exerted marked effect on prices of imported agro-food products.

4.3.5.2. Availability of wholesale and retail markets

Wholesale markets improve efficiency in agro-food distribution by encouraging competition through creating conditions for transparent prices at relatively low costs and by enhancing access to market information for various actors. No wholesale markets, with price transparency undermined and with rising transaction costs (the cost incurred by market participants in obtaining market information), lead to multiple equilibrium prices occurrence for a single commodity. Under such conditions, retailers have to deal directly with a large number of farmers, thus losing gains from scale economies (Tracey-White, 1994). Wholesale markets, therefore, play a crucial role in the vertical coordination of food markets, equilibrating supply with demand and facilitating price

[6] 41.4% of the total population live in metropolitan Baku in 2015.

Table 13. Number of wholesale and retail markets for farm commodities

Type of market	City	Number of markets
Wholesale market for livestock	Baku	10
	Sumgayıt[7]	3
	Other cities (One market in each city)	23
Wholesale market for fruits and vegetables	Baku	3
	Other cities (One market in each city)	27
Retailer markets for all farm commodities	Baku	16
	Ganja	6
	Shamkir	4
	Astara	3
	Göyçay	3
	Xaçmaz	2
	Sumgayıt	2
	Goranboy	2
	Tovuz	2
	Gazakh	2
	Kürdemir	2
	Jalilabad	2
	Masallı	2
	Other cities (One market in each city)	39

formation. They reduce marketing costs per unit, promote stable markets for local production and encourage increased output and productivity.

Azerbaijan has a total number of 63 wholesale markets and 87 retail markets for agricultural commodities across the country. In more populated areas, such as Baku, the number of markets – both wholesale and retail ones – goes up. Although these markets were established for conventional farm products, it is possible to use them for organic products as well. Traders and mediators play an important role between wholesalers and consumers, but they increase marketing margin, which makes consumers pay higher prices and lets producers receive lower prices for their products. In retail markets, on the other hand, consumers have easier access to market, and lower marketing margins make it possible for them to purchase goods with lower prices.

[7] Sumgayıt is the second largest city after Baku.

Table 13 presents information about the numbers of wholesale and retail markets for farm commodities in Azerbaijan. It can be seen that markets are well distributed all over the country. More populated cities have more wholesale and retail markets.

4.3.6. Potential of domestic markets for organic products

4.3.6.1. How to increase the potential of organic markets?

Most of consumers in Azerbaijan are familiar with the concept of "Ecologically clean products", and they believe that these products are naturally produced and quite healthy. They have general concern/ understanding on food safety. The sales of these products take place in wholesale markets, retail markets, and even in supermarkets, and small grocery stores. Although there is no certification for these products, there is mutual trust among producers, processors, traders, mediators. Consumers have unlimited trust for farm commodities, particularly grown in ecologically safe and well known areas. There is a lack of women's trust for the food cooked in restaurants. They prefer to purchase ecologically clean commodities and prepare their own food at home even if dining out is a widespread tradition.

Some imported organic products are sold in supermarkets with limited amount and product range. Some of the products are imported not because they are organically produced, but because they are considered as a gourmet or specialty food. In some supermarkets in Baku, organic dairy products imported from Germany are sold with the label "Bio". However, there are no specific descriptions for these products, and their ingredients/ composition/contents cannot be differentiated by the consumers.

Some limitations in the marketing of organic food, or as currently stated as "ecologically clean" according to the valid legislation in Azerbaijan are identified and listed below:

- Consumers' awareness activities are inadequate;
- There is a lack of advertisements specific for ecologically clean products;
- The volume and range of ecologically clean products in supermarkets is not adequate, and the range does not supply the core food-stuff;
- There is lack of information and data about agrarian markets, particularly data on the amounts of wholesales and retail sales is insufficient;
- There is lack of information and data about the profitability of ecologically clean products and imported organic products. This situation discourages businessmen to initiate their business;

- There is lack of control in local bazaars. Any producer may have access to these bazaars. No residue control and traceability system is available;
- There is lack of legislation determining the rules and regulations of trade and transactions between farmers' representatives and retailers. Relations mostly depend on bilateral trust and commitments.

These limitations are common in almost all developing countries at the initial stage of domestic market development. In Azerbaijan, if consumers believe that food commodities are healthy and safe, they are willing to pay higher prices even if they have low monthly income. To a certain extent, it derives from lack of trust for food safety. They are ready to sacrifice from other expenditures and pay higher prices for healthy and safe food. The number of people shopping from local bazaars is decreasing because mainstream retailers and supermarkets started to open branches in every neighbourhood, and goods and services came closer to customers. They do not need to drive, take a bus, or walk long distances to buy food items unless it's necessary. Consumers prefer to purchase domestic ecologically clean products. They believe that imported food items are less tasty. Mainstream retailers and supermarkets started to establish cooperation with farmers' unions and cooperatives. Although farmers don't have direct contacts with mainstream retailers, they are able to sell their commodities through their representatives, which may be farmers' unions or cooperatives that progress.

4.3.7. Constraints of sustainable supply for organics

To achieve the expected outputs of the FAO Project GCP/AZE/006/TUR, several workshops and focus group meetings were organized with experts working for GoA or for the private sector, and adequate information to list the following constraints was assembled. Recommendations were developed to overcome these constrains.

Azerbaijan is currently struggling to prepare the necessary infrastructure for organic agriculture. The Law on Ecologically Clean Agriculture (13 June 2008) sets up general rules to develop organic agriculture in Azerbaijan. It covers almost all subjects related to organic farming including general principles and state functions of various state organs. Organic requirements applied in plant growth and animal husbandry, procedures to be applied in transition period, certification, standards for organic

farming and food products, marketing, storage, transportation, import and export, financial and scientific provision for organic food products are also developed. Although the legislation related to organic agriculture was issued in a comparably recent period of time – starting from 2008, the gaps in governance and coordination hinder the smooth functioning of the organic system and implementation at national level. During this phase, despite the legislation, no substantial achievements were obtained in implementation, farmers' training, raising of awareness, inspection and certification, research or data collection. The number of farmers engaged in organics and the area under organic management, even if foreign standards are taken into account, have not displayed a remarkable increase. The major reasons for this situation can be diverse.

According to the Cobweb theory, farmers make their production decisions considering the previous years' prices. If they observe higher prices in some crops, they tend to increase their share of production. This happens if markets are operating under free market conditions and governmental production plans and pricing policy do not exist. For this reason, in order to convert their farming system from conventional to organic, farmers, particularly in developing countries, are reluctant to take risk that may cause them to run out of business if the market is not stable. If farmers believe that their income will go up, they can easily be convinced to convert their farming system into an organic one. After conversion, from 2 to 3 years are required to obtain fully organic status. From the farmers' point of view, the major problem here seems to focus on ensuring a higher or adequate income within prevailing conditions.

The experience of many countries showed that specific support and subsidies made it possible for many farmers to convert and continue as organic producers. In Azerbaijan, there are subsidies for fuel and chemical fertilizers, but there is no specific subsidy for organic production or for organic inputs except the late support for biohumus. Therefore, specific subsidies must be initiated in order to increase organic production.

Other policies that have to be implemented are training of farmers and trainers employed at the training and extension services. The MoA must form organic expert teams in every region. These teams must control and follow up farmers' activities and provide continuous information flow to solve technical, economic and market related problems.

4.3.8. Constraints of sustainable demand for organics

In order to improve organic farming, firstly, there must be consumers willing to purchase these products even at the relatively high prices. Consumers are expected to make this decision only if they believe that the commodity they buy would provide additional utility in comparison with conventional food items. Although in developed countries consumers highly caring about health and environment are more numerous, the priority for consumers in developing countries is to provide foodstuff for their families at reasonable prices. However, in varying ratios from one to the other country, national income is not evenly distributed among the income segments of the society. Additionally, the level of awareness of the benefits provided by organic production should be taken into consideration.

There are always wealthier customers willing to allocate higher shares for agro-food purchases, including organic products. By making these products available for these customers today, mainstream retailers may play a major role at the initial stage. Sustainable supply can be increased if mainstream retailers are ready to support the organic sector, because most of the agro-food purchases are going through these chains, and they are willing to increase their product range to meet domestic demand.

In Azerbaijan, organic products are mostly consumed by foreign embassies, hotels, and high-income and well educated families. The average consumer has no chance to enjoy organics due to their unavailability in the market or relatively higher prices in comparison to conventional products. There are no organic products in many supermarkets. It is possible to find imported organic food items, such as milk, cheese, fruit juice, and pulses, and they are mostly sold in their own shelves together with non-organic foods. Thus, consumers pay little attention that they are organic. If many organic products were sold in a separate designated corner in supermarkets, this may have helped to attract consumers' attention and increase awareness, especially at the initial stage.

The reasons for organics being more expensive than conventional food were mentioned as below:

- In small scale farms, information on organic methods and allowed inputs is very restricted; input availability is very limited, and is leading to yield and quality losses;

- Organic products require third party certification, which is provided by foreign CBs that increase their cost;
- Organic farms tend to be located far away from big cities, so their products must be transported, which results in higher post-harvest losses and further increase of their consumer prices;
- Governmental subsidies are mostly given to conventional farming that intensively uses inputs and lower production costs. This increases the gap in prices with organic production. In the case of organic production, generally fewer and mostly on-farm inputs are used; however, labour takes an important part in the production cost;
- During the conversion phase, yields may be reduced, especially in transition from intensive farming systems. This yield reduction is more severe in the cases where experience and knowledge on organic management is not in place;
- The supply chain is established for the organic products destined for the export; such a system does not exist for the domestic market;
- There are imported organic products already sold in the market.

Because of a variety of reasons, organic food is typically more expensive than its conventional counterpart. In general, consumers are willing to pay higher prices for organic products to provide compensation for lower yields or higher production costs. However, if the farmers are supplied with necessary technical and market information and a sustainable marketing chain from pre-production to the final consumption, the losses will be less and prices will probably be cheaper.

Analysis of the export market 5

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5. Analysis of the export market

5.1. Role of agriculture on export markets

Azerbaijan's economy heavily depends (92.8%) on petroleum exports (Table 14), which can be easily affected by an economic crisis and decisions made by global actors such as the OPEC. The income generated by agro-food exports is very low (Tables 15 and 16). The January 2016 economic crisis and high-rate devaluation showed that income sources other than crude oil and stronger agro-food and related sectors depending on domestic production are needed. The exportation of fresh products is destined mainly to the neighbouring countries, when more durable ones are exported to distant markets (Table 17). Producing and exporting organic commodities can be counted as one of the opportunities Azerbaijan possesses since there is suitable ecology and natural re- sources, and may reach to more difficult markets with a price premium. When export/ import ratios are considered, the total amount of imported agricultural commodities is higher than the export, signifying higher dependency on imports. Azerbaijan's top three import partners for different animal and plant commodities include the following: live bovine animals – Georgia, Russian Federation, Ukraine; live poultry – Islamic Republic of Iran, Turkey, the Netherlands; meat of bovine animals – India, Ukraine, Brazil; poultry meat and additional meat products – United States of America, Brazil, Turkey; fresh and frozen fish – Vietnam, Iceland, Russian Federation; milk

Table 14. Top Azerbaijan exports in 2014

Rank	Product	Amount ($)	%
1	Oil	20.2 billions	92.8
2	Sugar	221.4 millions	1
3	Fruits, nuts	192.2 millions	0.9
4	Animals, vegetables fats, and oils	190.3 millions	0.9
5	Plastics	157 millions	0.9
6	Vegetables	98.9 millions	0.5
7	Aluminium	86.8 millions	0.4
8	Organic chemicals	49.5 millions	0.23
9	Machinery	39.1 millions	0.18
10	Iron or steel products	34.8 millions	0.16

Source: http://www.worldsrichestcountries.com/top-azerbaijan-exports.html

Table 15. Structure of exports by products (1 000 US Dollars)

Groups of products	2010	2011	2012	2013	2014
Live animals animal products	547.3	657.1	682.3	1,851.1	3,306.1
Vegetables and products	190,337.2	268,816.9	308,055.5	301,706.8	331,106.3
Animal or vegetable fats and oils	188,255.5	173,756.9	221,766.0	227,883.6	190,334.7
Processed foodstuffs; beverages spirits and vinegar; tobacco	214,202.9	273,849.4	301,703.3	346,815.2	316,050.9
Other products	20,766,867.3	25,853,818.0	23,075,776.6	23,097,160.1	21,634,968.0
Total	21,360,210.2	26,570,898.3	23,907,983.7	23,975,416.8	21,828,608.9

Source: State Statistical Committee of the Republic of Azerbaijan

Table 16. Structure of exports by products (per cent)

Groups of Products	2010	2011	2012	2013	2014
Live animals. animal products	0.0	0.0	0.0	0.0	0.0
Vegetables and plant products	0.9	1.0	1.3	1.3	1.5
Animal or vegetable fats and oils	0.9	0.7	0.9	1.0	0.9
Processed foodstuffs; beverages. spirits and vinegar; tobacco	1.0	1.0	1.3	1.4	1.4
Agricultural commodities total	2.8	2.7	3.5	3.7	3.8
Import of other products	97.2	97.3	96.5	96.3	96.2
Total	100	100	100	100	100

Source: State Statistical Committee of the Republic of Azerbaijan

and cream – Ukraine, Russian Federation, Belarus; butter and other fats and oils derived from milk – New Zealand, Lithuania, Belarus; cheese and curd – Denmark, Russian Federation, Germany; eggs – Turkey, Czech Republic, Islamic Republic of Iran; potatoes – Russian Federation, Islamic Republic of Iran, the Netherlands; fresh vegetables – Turkey, Islamic Republic of Iran, Uzbekistan; fresh fruits – Equator, Islamic Republic of Iran, Thailand; tea – Sri Lanka, India, Islamic Republic of Iran; wheat – Russian Federation, Kazakhstan, Turkey; rice – Russian Federation, India, Thailand; wheat flour – Russian Federation, Kazakhstan, Turkey; vegetable oil – Indonesia, Russian Federation, United States of America.

5.2. Organics as potential export sources

Export of organic products in Azerbaijan is driven by the private sector. There are several companies that initiated organic production of pomegranate and some other fruits. They also have modern processing facilities

Table 17. Export of Azerbaijan, agro-food commodities and importing countries

Commodity	Importer(s)
Potatoes	Russian Federation, Kazakhstan, and Georgia
Fresh vegetables	Russian Federation and Kazakhstan
Fresh fruit	Russian Federation, Ukraine, Kazakhstan, Germany, Italy, and Georgia
Tea	Iraq, Russian Federation, Georgia, Ukraine, and Kazakhstan
Vegetable oils	Iraq, Georgia, Tajikistan, Turkmenistan
Margarine and other foods	Iraq, Georgia, Turkmenistan, and Uzbekistan
Sugar	Afghanistan, Turkmenistan, Kyrgyzstan, Uzbekistan, and Iraq
Pasta	Georgia, Afghanistan, and Russian Federation
Canned fruit and vegetables	Russian Federation, Georgia, Turkey, Kazakhstan, Germany, Iraq, Turkmenistan, China, United Arab Emirates, United States, Uzbekistan, Israel, and Austria
Fruit and vegetable juices	Russian Federation, Poland, Belarus, Turkmenistan, United States, Ukraine, Estonia, France, Lithuania, Italy, Germany, Austria, New Zealand, Malaysia, and Greece
Wine	Russian Federation
Tobacco	Belarus, Russian Federation, Belarus, Georgia, and Islamic Republic of Iran

producing and exporting organic fruit juice which meets international standards. This competitive advantage brings an opportunity to move up the value chain by producing export-oriented canned goods and products with longer shelf-life (Anonymous, 2011).

Organic production and exports in Azerbaijan started with GABA, a regional non-governmental association whose mission is to promote sustainable development of the country's agrarian sector through human potential development, knowledge and resource transfer. Established in 1996, GABA has tried to utilize Azerbaijan's natural and human resources to produce and export high value organic products and contribute to national economy.

The second pioneer agro-industry company in Azerbaijan is the AZERSUN Holding which has been the first foreign private company in Azerbaijan. AZERSUN Holding tries to produce farm commodities and expand its market share particularly in neighbouring countries. It operates on a total of 10,000 ha of agricultural land and grows soybeans, barley, wheat, green peas, maize, sunflower, tomatoes, cucumbers, eggplants, peppers, and other vegetables under the Global GAP certificate. They also planted more than 400,000 pomegranate and quince trees and established an organic farm for growing vegetables and gourds within the area. For their bio-horticulture farm, they use only organic fertilizers from their nearby

Table 18. Structure of imports by products (1,000 US Dollars)

Groups of products	2010	2011	2012	2013	2014
Live animals, animal products	86,215.9	118,678.7	113,791.2	128,862.8	149,568.3
Vegetables products	437,424.0	519,598.0	500,125.7	548,446.9	427,030.2
Animals or vegetable fats and oils	93,706.1	95,064.2	107,217.3	75,563.1	88,110.0
Processed foodstuffs; beverages, spirits and vinegar; tobacco	616,372.1	659,761.8	721,279.1	813,625.8	888,995.6
Agriculture total	1,233,718.1	733,340.9	1,442,413.3	1,566,498.6	1,553,704.1
Import of other products	5,366,893.5	9,022,627.8	8,210,457.3	9,146,003.9	7,633,993.5
Total	6,600,611.6	9,755,968.7	9,652,870.6	10,712,502.5	9,187,697.6

Source: State Statistical Committee of the Republic of Azerbaijan

Table 19. Structure of imports by products (per cent)

Groups of products	2010	2011	2012	2013	2014
Live animals, animal products	1.3	1.2	1.2	1.2	1.6
Vegetables and plant products	6.6	5.3	5.2	5.1	4.6
Animals or vegetable fats and oils	1.4	1	1.1	0.7	1
Processed foodstuffs; beverages, spirits and vinegar; tobacco	1.4	1	1.1	0.7	1
Agriculture total	10.7	8.5	8.6	7.7	8.2
Import of other products	89.3	91.5	91.4	92.3	91.8
Total	100	100	100	100	100

Source: State Statistical Committee of the Republic of Azerbaijan

plant. Produce is then processed at a canning facility located next to the cultivation area. Another significant contribution of AZERSUN to viable value chains in agriculture is the hazelnut processing facility in the northern district of Zagatala with an annual processing capacity of 15,000 tons.

The Gabala Canning Plant Ltd., a subsidiary of Gilan Holding, is the largest manufacturer of natural juices, nectars, and concentrates in Azerbaijan and in the entire Caucasus region. Gilan Gabala Canning Plant Ltd. products are winners of various international food awards, including ProdExpo and World Food. The company manufactures the following products: natural fruit and vegetable juices and nectars; juices and nectars for dietary purposes and for those with diabetes; ice-tea with lemon, mango, and peach flavours and with fruit slices; organic pomegranate juice concentrate of superb quality.

The MIRI GRAND Co. Ltd is a leader company in the exports of natural pomegranate juice. Annual production has amounted to 3 million litters per year. In addition to pomegranate juice, the company also produces natural juices from quince, cornelian cherry, feijoa, sea buckthorn, and dog rose. These juices are made in much smaller volumes than pomegranate juice. The total volume of juices extracted from different fruits can be considerably increased with big wholesale orders. Presently, the company easily exports its products to the Russian Federation, Germany, Ukraine, Belarus, Estonia, and the UAE. It plans to expand its markets to the Islamic Republic of Iran, USA, Europe, Turkey, China, Japan and Australia.

Another company involved in organic pomegranate products is Sarkhan LLC Company. This company mostly exports pomegranate juice, pomegranate concentrate, organic pomegranate juice, pomegranate sauce, pomegranate wines, wines, tea, and herbal teas.

Azerbaijan has a chance of increasing its exports in organically produced goods, particularly to Russia. Since Russia puts more restrictions and limitations to the import of agricultural commodities, particularly from western European countries and from Turkey, Azerbaijan's agricultural sector has faced new opportunities within Russian markets. Azerbaijani authorities believe that their agricultural products have a better chance in the Russian markets than any other European products because they are less contaminated, especially with pesticides.

Advantage of organic production in priority crops/regions

6

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6. Advantage of organic production in priority crops/regions

Azerbaijan has identified 11 economic regions including Nakhchivan autonomous region. Some regions have more advantages in agricultural production in terms of prevailing paedoclimatic conditions. In order to determine which agricultural commodities are dominating in different parts of Azerbaijan, and which regions may have a relative advantage in the production of these major groups, fourteen years' (2001-2014) yields were averaged, and the results are presented in Tables 20 and 21. For some products, figures were not available for some years; therefore, the average values of these products were calculated considering less than fourteen years. Since there were no statistical data for organic products of these economic regions, a preliminary assumption was made to interpret these figures as in economic regions with higher yield and productivity for a certain conventional product. Farmers may also be ready for conversion to organic in case of demand.

With this assumption, Nakhchivan, Ganja-Gazakh, and Aran economic regions seem to have relative advantages in terms of cereals and dried pulses (Table 20). For vegetables, Lankaran, Guba-Khachmaz and Ganja-

Table 20. 2001-2014 average yields of selected commodities by economic regions (100 kg/ha)

	Cereals/dried pulses	Vegetables	Sugar beet	Fruits	Grapes
Total in the Republic	26.0	141.8	283.2	69.3	65.5
Baku city	4.5	133.5	159.1	45.2	24.1
Absheron economic region	14.0	87.3	149.8	7.7	24.0
Ganja-Gazakh economic region	29.4	154.5	184.6	108.3	89.0
Sheki-Zagatala economic region	23.8	96.8	286.5	29.8	64.5
Lankaran economic region	21.9	215.9	283.4	110.8	46.9
Guba-Khachmaz economic region	23.0	197.5	228.6	68.6	79.5
Aran economic region	28.6	113.3	286.5	94.7	65.9
Yukhari Garabagh economic region	26.0	129.9	283.4	68.3	49.3
Kelbajar-Lachin economic region	24.5	102.3	228.6	–	–
Daghlig Shirvan economic region	21.6	75.0	172.2	73.9	50.0
Nakhchivan economic region	32.7	99.1	209.8	135.4	130.3

Source: State Statistical Committee of the Republic of Azerbaijan

Gazakh economic regions display relatively higher yields. Sugar beet has higher average yields in Sheki-Zagatala, Aran and Lenkaran economic regions. Fruits have relative advantage in Nakhchivan, Lenkaran and Ganja-Gazakh economic regions. For grapes, Ganja-Gazakh, Guba-Khachmaz and Aran economic regions showed higher average yields.

The greater part of hazelnut production in 2014 (23,486 tons, 78% of total production) took place in Sheki-Zagatala economic region (Table 21). According to 14 years' statistics, average yield per ha in this region was not the highest in the country. The other constraint was the high cost of animal manure; therefore, specific training sessions on composting as a low-cost nutrient source should be organized. Organic hazelnut production still must be encouraged and supported in this region due to the initial interest and satisfaction of the pioneering farmers.

Another important product which has a remarkable potential for organic production is pomegranate. In 2014, total production in Azerbaijan was 153,423 tons, 121,654 tons (approximately 79%) of which were produced in Aran economic region (Table 23). However, long-term production per ha is higher in Ganja-Gazakh, Nakhchivan and Lenkaran economic regions. It means that productive pomegranate orchards can be established and managed organically in these regions as well.

Table 21. 2001-2014 average yield of selected perennial crops by economic regions (100 kg/ha)

	Hazelnut	Pomegranate	Olive	Orange	Green tea
Total in the Republic	11.5	91.0	7.4	173.7	5.6
Baku city	17.7	57.0	12.5	*	*
Absheron economic region	23.2	15.7	6.3	7.5	*
Ganja-Gazakh economic region	33.8	147.8	26.5	34.2	*
Sheki-Zagatala economic region	10.7	68.0	*	*	7.4
Lankaran economic region	41.4	93.4	*	174.0	5.6
Guba-Khachmaz economic region	13.0	32.7	15.0	*	*
Aran economic region	24.7	91.5	87.7	100.8	*
Yukhari Garabagh economic region	28.4	87.0	30.0	*	*
Kelbajar-Lachin economic region	-	-	-	-	-
Daghlig Shirvan economic region	26.8	57.9	171.4	*	*
Nakhchivan economic region	37.2	139.0	22.9	52.5	*

Source: State Statistical Committee of the Republic of Azerbaijan (* No data available)

Table 22. Production of hazelnuts (tonnes)

	2011	2012	2013	2014	2016
Ganja-Gazakh economic region	997	1,121	1,153	1,173	757.1
Sheki-Zagatala economic region	25,819	23,854	24,906	23,486	24,265.8
Balaken region	3,560	3,700	3,873	3,963	4,010.2
Zagatala region	10,952	9,460	9,895	8,953	8,910.0
Gakh region	3,765	3,012	3,393	3,002	3,152.0
Sheki region	596	596	597	599	1,123.7
Oghuz region	934	971	1026	846	862.9
Gabala region	6,013	6,115	6,122	6,123	6,207.0
Lankaran economic region	290	281	286	294	135.8
Guba-Khachmaz economic region	4,598	3,084	3,644	3,758	8,294.1
Aran economic region	602	618	641	635	204.8
Yukhari Garabagh economic region	261	295	184	368	169.9
Daghlig Shirvan economic region	223	232	241	242	268.3
Nakhchivan economic region	127	132	134	73	170.3
Total in the Republic	32,922	29,624	31,202	30,039	34,270.7

Source: State Statistical Committee of the Republic of Azerbaijan

Table 23. Production of pomegranates (tonnes)

	2011	2012	2013	2014	2016
Ganja-Gazakh	17,680	18,327	18,415	16,508	16,141.8
Sheki-Zagatala	1,279	1,348	1,378	1,340	1,707.1
Lankaran	1,012	1,087	1,093	1,090	734.3
Guba-Khachmaz	591	506	534	932	754.1
Aran economic	107,464	111,717	117,949	121,654	113,201.1
Yukhari Garabagh	2,063	2,135	1,719	1,656	2,153.9
Daghlig Shirvan	4,607	4,971	7,180	8,904	9,577.5
Nakhchivan	407	414	419	244	176.5
Total in Republic	135,406	141,641	149,826	153,423	145,140.7

Source: State Statistical Committee of the Republic of Azerbaijan

In 2014, total production of olive was 847 tons, 549 tons of which were produced in Absheron economic region (approximately 65%). Although average production per ha appears quite high in Daghlig Shirvan economic

region, this was the only figure of production which belonged to the year of 2009. Lankaran economic region produces most of the oranges and green tea leaves in the country (Table 21). Productivity level of oranges is the highest in this region; however, productivity level of green tea leaves is higher in Sheki-Zagatala economic region, which is the second production region of this product in terms of the produced amount.

Azerbaijan has suitable soil and climate conditions to produce many agricultural products. However, some regions have relatively more advantages in comparison with the others. As shown in Table 24, Sheki-Zagatala economic region is suitable for chestnut, hazelnut, walnut, cranberry, cornel, loquat, pear, cherry, plums, apples, and fig production, while Aran economic region

Table 24. Types of plant and livestock production in economic regions

Economic region	Crops, fruits and vegetables	Livestock
Absheron	Fruits and berries (olives, pistachios, walnut, almond)	Poultry (meat, eggs), sheep (wool)
Ganja-Gazakh		Sheep (wool), cattle (milk, meat)
Sheki-Zagatala	Fruits and berries (chestnut, hazelnut, walnut, cranberry, cornel, pear, cherry, plum, apple, loquat, fig, quince), cereals and pulses (barley, wheat, maize, beans), vegetables (cucumber, cabbage, grapes)	Poultry (eggs)
Lankaran	Fruits and berries (feijoa, orange, kiwi, lemon, nuts, medlar, fig), cereal and pulses (beans), vegetables (tomato, cucumber, onion)	Sheep (wool), cattle (milk), poultry
Quba-Khachmaz	Crops: fruits and berries (apple, cherry, pear, walnut, plum, peach, medlar, nuts, dates, cranberries, cherries, figs, olives), vegetables (tomato, cabbage, cucumber), grain and pulses (wheat, barley)	Sheep (wool), poultry (eggs), cattle (milk, meat)
Aran	Fruits and berries (walnut, jujube, pear, pomegranate, quince, plum, fig, cherries, dates, pistachio, medlar, apricot), cotton, cereals and pulses (barley, wheat), vegetables (head onion, cucumber, tomato, cabbage)	Sheep (wool), poultry (eggs), cattle (milk, meat)
Yukhari Garabagh	Vegetables (onion), cereals and pulses (wheat), fruits and berries (pear), cotton	Sheep
Kalbajar-Lachin		Sheep
Daghlig Shirvan	Cereals and pulses (barley, wheat, pulses), grapes, fruits and berries (walnut, pear, pomegranate, fig, jujube), vegetables (cucumber)	Sheep (wool), cattle (milk, meat), poultry (eggs)
Nakhchivan	Fruits and berries (almond, apricot, peach, pear, oleaster, walnut, plum, quince, sweet and sour cherry, apple), cereals and pulses (pulses, wheat), grapes, melons, vegetables (tomato, cabbage)	Sheep (wool), cattle (milk), poultry (eggs)

Source: Report (Research Institute of Economic Reforms of the Ministry of Economy of the Republic of Azerbaijan, 2016)

is favourable for walnut, jujube pear, pomegranate, quince, plum, figs, cherries, dates, pistachio, medlar, and apricot production. Lankaran, Quba-Kachmaz and Aran economic regions seem to have advantages in different vegetables such as tomatoes, cucumbers, cabbage, and head onions.

In terms of livestock production, almost all economic regions are suitable for sheep production.

Conclusions and recommendations 7

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7. Conclusions and recommendations

Azerbaijan is one of the countries with favourable soil and climatic conditions to produce a wide range of agro-food commodities with proximity to markets, being located in western Asia with a part in Europe. During the pre-independence period, monoculture cropping and mismanagement of agroecosystems resulted in environmental problems, which further reduced productivity and competitiveness of the agricultural sector. Increasing oil fields and extension of related sectors also add environmental pollution on the pile. During the last decades, high share of oil-based sectors in national economy shifted the focus from domestic production to importation of agro-food commodities. Low oil prices, accompanied by elevated food prices, have recently led the decision makers to reconsider the importance of increasing sufficiency levels in agro-food sector. Developing organic farming and creating sustainable value chain starting up from legislation and pre-production, including all the technical and economic requirements of production, certification, post-harvest handling, processing, and marketing, and ending with sustainable demand and exports will probably help to develop high-value agro-food products. Focusing on the information gained from the interviews and supplementary research has helped to reveal the following specific conclusions on which recommendations were developed.

The basic legislative infrastructure had been established with the Law on Ecologically Clean Agriculture in 2008, followed by supplementary regulations/decisions, and certified production. Still there are gaps that hinder full implementation of the legislation. In addition to the initial legislation, even if in small areas with few farmers/commodities, organic agriculture was initiated almost two decades ago by GABA, being destined for the export market. As in many developing countries, this initial impulse came from a pioneering group and demand from abroad, but continued stagnating. A set of policies, by-laws and governmental programmes bringing together all stakeholders must be implemented to create a suitable environment and to ease sound and rapid development of organic food and farming. Presence of a monitored system supported by a complete set of regulations should promote investment. The organic movement should embrace a wider public, including producers, consumers, educational and research organizations. In this regard, capacity building at all levels is significant. Few attempts were made to introduce organics to school children and to train trainers and farmers. These activities are rather

dispersed in time and location. Some were performed within projects. They have to be continuous, implemented through a plan approved and supported by the decision makers.

To make plans or decide on investments, availability of reliable and updated data is a prerequisite. The SSC of the Republic of Azerbaijan collects and publishes a large variety of agricultural statistics and Customs Committee gathers import and export data according to the existing nomenclature. In order to provide accurate and updated data to decision makers, farmers, investors, politicians, and researchers, a comprehensive database including farm and market level data on organic farming and food is needed. Because private companies may collect their own data and keep it confidential for trade purposes, the government must urgently initiate a common data system focusing on farm and market level data related to organics.

Production and supply of organic products are mostly export-driven and initiated by the private sector. Companies such as GABA and AZERSUN have quite enough experience in organic production, handling, and exports. However, they face restrictions/limitations in their efforts to increase the number of organic commodities and contribute to expansion of the domestic market. In order to convince more producers to convert their production into organic, awareness-raising campaigns must be organized with the collaboration of MoA and farmers' organizations at local levels. Beside economic benefits, long-term environmental protection and sustainability aspects of organic farming must also be emphasized in these campaigns.

Rich flora of Azerbaijan enables quick transition of products harvested from nature to the category of certified as organic. Close monitoring by the Forestry Department facilitates market access to these products. Pomegranate and hazelnut that are already certified as organic are the two main commodities having the highest power of competition in international markets, mainly due to their health properties preferred in organic markets. Concentrating on these products in advance may encourage more farmers, if they expect and experience higher income, to convert their farming systems into organic for the export market.

Azerbaijan has enough raw materials and technical capacity to produce organic inputs (mainly fertilizers and composts). Domestic production of organic fertilizers may provide relative advantage to domestic producers,

especially in livestock-free systems or in the cases where animal manure prices are high. Similar attempts are needed to be made to produce biological and biotechnical pest control agents allowed in organic agriculture, such as the rearing of beneficial insects and traps. It was identified that the most difficult issue of converting conventional organic pomegranate production to organic is utilizing pest and disease management methods permitted in organic agriculture, maintain productivity and quality. In other pomegranate-producing countries, there are easy solutions that can be transferred by intensive training programmes. If these objectives are achieved, organic production will be more competitive in the markets, and available organic products will increase in volume and in numbers.

Domestic demand for organic products can be increased with consumer awareness campaigns and availability of a wide range of organic products throughout the year in the markets. Presently, there is demand even for imported organic commodities that have relatively higher prices and are found less delicious by domestic consumers. This implies that making domestic organic food items available to the customers may expand the domestic demand.

Organic farming practices can be adopted by farms at all scales and generate benefits if the farm planning is properly made. One additional advantage that may be provided by organic farming is the creation of more jobs. This can be an opportunity in areas where the unemployment rate is high. Organic farming in larger-scale farm operations will reduce production costs and provide advantages for the export markets. However, governmental programmes and subsidies that will trigger conversion to organic and expand exports and the domestic market are essential.

Organic agriculture respecting nature and focusing on human health can be an opportunity for sustainable agricultural and rural development in Azerbaijan. This requires mid- and long-term planning accomplished by multi-stakeholder participation and close follow-up of the action plan by decision makers.

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