

KREI

Joint Research for 2021 KAPEX with Armenia

The Development of a New Pricing System for
Primary Agricultural Products in the Armenian
Agri-Processing Sector

Korea Rural Economic Institute

AgriConcept

Ministry of Economy



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“AgriConcept” Closed Joint-Stock Company together with Ministry of Economy of Armenia crafted a joint research project with the Korea Rural Economic Institute (KREI) entitled “Development of New Pricing System for Primary Agricultural Products in Armenian Agri Processing Sector.” This research aims to analyze regulatory framework of 3 primary value chains (milk, grape and tomato) in agriculture of Armenia, and propose policy recommendations for solid pricing system to enhance quality production and fair relationships between farmers and processors. The project output is expected to encourage farmers and other industry players to improve the quality of value chains, increase farmers' income and develop a pricing system.

The research project started with desk study and conduction of the primary data. In this section the used methodology of the research was presented followed by the analysis of the current status of the Agriculture in Armenia and the main issues the agriculture faced, particularly related to grape/wine, dairy and tomato value chain.

In Domestic Policies and Agricultural Status Analysis section, the relationship of the current research with the SDG 2 is presented. In addition, general national development strategies and policies is presented followed by the policies and strategies in Agricultural sector. Moreover, the Agricultural political environment, laws and information on institutions are summarized in this section. While analyzing the agricultural current status, the analysis of desk study and in depth interviews were conducted to

identify the lessons learned from past related projects. In addition, the stakeholder analysis was conducted and the stakeholder mapping is presented in this section. Moreover, the value chain analysis for 3 selected agricultural products is presented here with the detailed SWOT analysis for each sector. This section is summarized with the information on the general status and the prospect in agriculture and food industry. In this context, the short information on state support programs is presented, followed by the description of the role of the private sector in the selected value chains.

The report also includes section on Policies and experience in Korea: In this section, the description of the agricultural products quality management system in Korea is presented. In addition, short information on policies and supporting system in Korean agriculture sector is presented. Moreover, the information on the lessons learned from past related projects, policies and systems, as well as Korean agricultural experience is presented. This section is summarized by the information on general status and supporting systems for Korean Companies.

AgriConcept CJSC developed initial Project Plan which was founded on the bases of joint research. The concept contains information on project description and implementation structure, budget, etc.

In addition to these four sections, this report contains information on standards for raw cow milk, fresh grape and Tomato, which are presented in Annex 1. The survey tools used during the study is presented in Annex 2.

Acknowledgments

Korea Rural Economic Institute

“AgriConcept” Closed Joint-Stock Company and Ministry of Economy of the Republic of Armenia wish to express gratitude and appreciation to all the partners who actively participated in conduction of this Research. We would like also to acknowledge the outstanding work carried out by National and Korean Experts.

Last but not least, we are deeply grateful to the Korea Rural Economic Institute for the continuous and unwavering support throughout all the project.

List of Abbreviations

MoE	Ministry of Economy
GoA	Government of Armenia
RA	The Republic of Armenia
SDG	Sustainable Development Goals
PPT	Private–Public Partnerships
VAT	Value Added Tax
ODA	Official Development Assistance
UNDP	United Nations Development Programme
ANAU	Armenian National Agrarian University
SWOT	Strengths, Weaknesses, Opportunities and Threats
AMD	Armenian Dram
GAO	Gross Agriculture Output
GDP	Gross Domestic Product
PDM	Project Design Matrix
CARD	Central for Agribusiness and Rural Development Foundation
APQA	Animal and Plant Quarantine Agency
MAFRA	Ministry of Agriculture, Food and Rural Affairs

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Joint Research Outline

1.1. Joint Research Background and Purpose

The agricultural sector is one of the key sectors of Armenia's economy. As of 2017, the industrial structure of Armenia consisted of service industry 55%, manufacturing 28%, and agriculture 17% (Eximbank 2020). It is significant not only as an important contributor to the nation's economic well-being, but also as one that affects the country's security, productivity of land use, as well as the population's health, nutrition, and quality of life.

The agricultural sector's transition from traditional small-scale production towards modern, technology-enabled, market-driven, and value-added agriculture is part of the Government's overall vision for strengthening the agri-food sector of Armenia.

This research aims to analyze regulatory framework of 3 primary value chains (milk, grape and tomato) in agriculture of Armenia, and propose

policy recommendations for solid pricing system to enhance quality production and fair relationships between farmers and processors.

The current study touches issues related weak processor-farmer relations. The imperfection of this relationship comes from factors which can be classified as follows:

Small scales of production. As it is described above, agricultural production is highly fragmented, which lowers bargaining power of farmers leaving them powerless in front of large producers, which dictate market prices. This is also the main reason of low quality production, as instability of prices and micro level of production does not motivate/allow farmers to invest in quality improvement.

Poor sector regulation. This particularly refers to improper price formation mechanisms between farmers and processors, unregulated import of raw materials (e.g. milk powder is largely used in dairy production which leaves milk producing farmers out of competition and lowers milk price and demand significantly), poor standardization of sector (this leads to unfair competition in the market for high and low quality produce) and limited support to all producers.

Changing the scales of production (e.g. elaboration regulatory framework promoting consolidation of lands and supporting large scale production) may lead to social problems, as these small-scale land lots feed families in rural areas, and leaving them with nothing may cause socio economic problems with not less negative impact. This is something to be well analyzed and strategically defined in national documents, however tackling problems in farmer-processors relationships may lead to short term sector improvements. It is worth to mention here that many advanced

economies and countries live with highly fragmented production, however due to efficient regulatory framework they achieved outstanding results and advanced level of agricultural production.

Milk, grape and tomato are among the primary value chains in Armenian Agriculture. They comprise a substantial and important share of the Agricultural commodities in Armenia. Identifying the needs for the chain and opportunities for development, in particular the efficient cooperation with processors, will be crucial for further growth of the sector.

Grape

Grape is one of the high-profile crops in the Republic of Armenia. Armenia has six viticultural regions. 70.000 enterprises are registered in these regions, involved in grape growing. The viticultural area comprises 16 thousand hectares. The total harvest in 2020 was 283.2 thousand tons, of which 83% was processed.

Around 90 % of the grape harvest is used for brandy production, the rest for wine. During the last years there have been boost in wine production in Armenia, of which 20% is exported, Russia being the largest destination. As the country's wine culture is starting to revive, Armenia's export geography is also dynamically expanding, from 15 countries in 2015 to 32 countries in 2019.

Alcoholic beverages account for approximately 30 % of all agriculturally based exports from Armenia.

These new investments and modernization of existing productions have led to noticeable improvements in the quality of the produced wine, resulting in increased exports and references in international and reputable publications.

However, the procurement price for grape is normally determined for a kilogram of a the grape and does not generally depend on the grape quality indicators. This is viewed as an impediment for high quality grape growing practice which in turn impacts the development of the sector and further expansion of export geography.

Tomato

Tomato is the most common vegetable cultivated in Armenia with a 25-30% share in the total sown vegetable area. Sown area has been fluctuating each year depending on results of the previous year (price and harvest).

Tomato cultivation area comprised 4736 ha in 2020. The tomato harvest as of 2020 was 183.7 thousand tons. Twenty-five percent of the harvested tomato is utilized for processing purposes.

Tomato productivity is low (around 40 tons/ha), which indicates an inefficiency of the crop cultivation process: irrigation technology and volume depend on weather conditions, evaporation, altitude, and the slope of the cultivation area. Sources of future sector growth include emerging exports of tomato paste and juices to CIS markets, especially to Russia. The dry matter and safety/quality indicators are not considered for tomato pricing.

This research aims to analyze regulatory framework of 3 primary value chains (milk, grape and tomato) in agriculture of Armenia, and propose policy recommendations for solid pricing system to enhance quality production and fair relationships between farmers and processors.

Furthermore, increasing agricultural and food exports requires entry to

new markets, particularly those with higher prices. Russia's dominance as a market for Armenia's agricultural and food exports means exports currently respond to consumer requirements there. Entering new export markets means meeting different requirements for varieties and products, product characteristics, and timing. This demands knowledge of export opportunities in other markets, as well as compliance with requirements and procedures in these markets.

The objective of this study is evidence-based policymaking for new market development and export promotion for fresh, chilled, and processed food product exports from Armenia. This report provides the information relative to the identification of potential new markets, particularly in China, Japan and Vietnam, the assessment of the feasibility to access such markets, and will develop recommendations for the development of such export streams. In doing so, the assignment will review the full range of chilled and processed food products produced in Armenia, and those related to fruits and vegetables.

1.2. Joint Research Contents

This report consists of main four parts.

Joint research results: In this section the used methodology of the research was presented followed by the analysis of the current status of the Agriculture in Armenia and the main issues the agriculture faced, particularly related to grape/wine, dairy and tomato value chain.

Domestic Policies and Agricultural Status Analysis: In this section, the relationship of the current research with the SDG 2 is presented. In addition, general national development strategies and policies is presented followed by the policies and strategies in Agricultural sector. Moreover, the Agricultural political environment, laws and information on institutions are summarized in this section. While analyzing the agricultural current status, the analysis of desk study and in depth interviews were conducted to identify the lessons learned from past related projects. In addition, the stakeholder analysis was conducted and the stakeholder mapping is presented in this section. Moreover, the value chain analysis for 3 selected agricultural products is presented here with the detailed SWOT analysis for each sector. This section is summarized with the information on the general status and the prospect in agriculture and food industry. In this context, the short information on state support programs is presented, followed by the description of the role of the private sector in the selected value chains.

Policies and experience in Korea: In this section, the description of the agricultural products quality management system in Korea is presented. In addition, short information on policies and supporting system in Korean agriculture sector is presented. Moreover, the information on the lessons learned from past related projects, policies and systems, as well as Korean agricultural experience is presented. This section is summarized by the information on general status and supporting systems for Korean Companies.

Project plan: In this section, the short concept of ODA project is presented, which was founded on the bases of joint research. The concept

contains information on project description and implementation structure, budget, etc.

In addition to these four sections, this report contains information on standards for raw cow milk, fresh grape and Tomato, which are presented in Annex 1. The survey tools used during the study is presented in Annex 2.

1.3. Joint Research Results

1.3.1. Research Methodology

This research was conducted during the period of July–December 2021. A desk study and the primary data collection was conducted. Total 10 in-depth interviews, 3 expert-interviews and 1 key-informant interviews were conducted. The research toolkits are attached in the Annex 2.

〈Table 1〉 Method of Data Collection

Method of data collection	
Desk Study	Implemented studies on dairy sector Implemented studies on grape sector Implemented studies on tomato sector
In-depth Interviews	Dairy producers and processors Tomato producers and processors
Expert Interviews	Wine and vine foundation CARD and ICARE foundation Primary production department of Ministry of Economy
Key-informant Interviews	Deputy of the Minister of Economy

The information obtained from the qualitative research is presented in the corresponding sub-sections.

1.3.2. Overview of Agricultural Sector

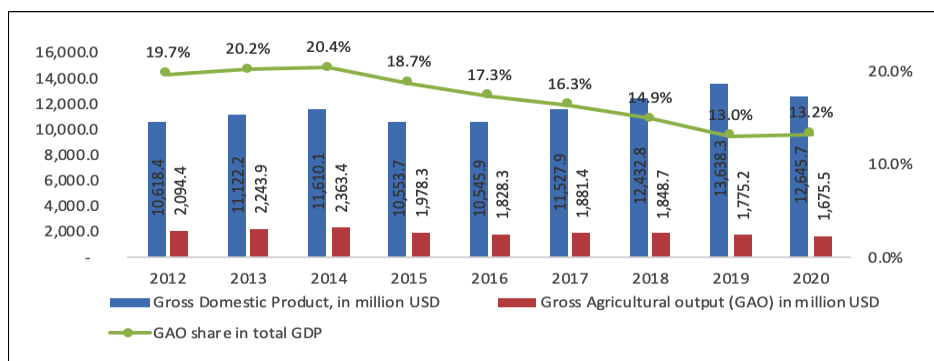
Armenia's agricultural sector has the opportunity to build on several unique competitive advantages. Among them, are a history and geographic location that offer privileged access to the large Eurasian Economic Union (EAEU) market; a compact geographic footprint with close proximity between urban and rural markets; long-lasting vegetation period for high-value plants, favorable agri-climatic zones with long growing seasons and early harvest dates for agricultural products; a rich agronomic legacy as the global birthplace of viticulture and products such as apricots and cherries; and – most importantly – advantaged ecological conditions with high quality water and high altitude lands which lend themselves to the production of uniquely tasty and natural produce.

On the other hand, the Armenian agriculture sector suffers from low productivity due to multiple factors, including limited irrigated land, inadequate infrastructure, limited access to finance, a lack of efficient technology, vulnerability to natural hazards and underdeveloped market mechanisms.

The overall trend in Armenia's economic development before the COVID-19 pandemic has been positive, with a high economic growth rate, a steady increase in exports, decreasing unemployment and increasing GDP per capita in most regions (UNDP, 2020). Following robust growth in the past three years, which continued also in the first two months of 2020, the situation has been changed after the COVID pandemic. According to the publications of the National Statistical Committee of RA, the GDP in 2020 decreased by about 5.8% compared with GDP in 2019. It is undeniable

fact that agriculture in Armenia is the most important sector for the rural environment and in terms of contribution to the country's Gross Domestic Product (GDP). However, like total GDP, the gross agricultural production value was decreased by 4% in 2020 compared to 2019 (see Figure 1). Overall, in 2020 the GAO amounted to 1,675.5 million USD, where crop production comprised 46.8% of GAO and animal husbandry 53.1% of GAO. It is worth mentioning that due to the favorable climatic conditions, Armenia has well-established fruits and berries also the vegetable production sector. Armenian is a mostly self-sufficient country in terms of agricultural products.

〈Figure 1〉 Volume of GDP and Gross Domestic Product



Source: Statistical Committee

1.3.3. Current Issues on Agriculture Sector

The agricultural sector in Armenia has a huge development potential; however, the existing challenges and problems do not allow to use all opportunities of the sector's development. The following are the main

challenges and problems hampering development of agriculture sector in Armenia

Low level of productivity and efficiency

The level of efficiency in using the resources available in the agricultural sector is quite low. This is evidenced by the comparison of the indicator of productivity of those engaged in agriculture, the indicator of milk yield of cows, and the indicator of the yielding capacity of wheat with the related indicators in developed countries.

The reasons behind the low productivity and low efficiency of resource utilization are numerous: low level of application of automatic systems, modern technologies and innovative solutions, still poor feasibility of empowering the expanded reproduction and value chain, small sizes and fragmentation of farm holdings, insufficient number of large farms, lack of professional knowledge and skills of identifying and applying efficient agricultural solutions and opportunities, and others.

Problems in registration and cultivation of agricultural lands; small share of cultivated lands

According to 2018 statistic data from 445.6 thousand ha of arable land only 242.8 thousand ha or about 54.5% was used on target, which is a quite low indicator. There are a number of reasons why the agricultural lands are not used: inaccessibility or insufficient supply of irrigation water, lack of agricultural equipment, low soil fertility, absence of land user or land owner, low profitability, insufficient working capital, etc.

Irrigation of agricultural lands is seen as one of the most important issues

of the agriculture sector in Armenia. Not only the accessibility of irrigation systems but also their management is a problem; in particular, the problem is not so much the lack of water resources but the lack of the right water distribution mechanisms, such as application of more efficient and modern systems. Other reasons for the zero or low- efficiency cultivation of agricultural lands include but not limited to: absence of the land owners from the country or their employment in other sectors, lack of irrigation facilities and expensive water, fragmented and small size farmlands, the poor condition or nonexistence of the roads taking to the arable lands, etc.

Domestic market orientation

Key obstacle that hampers development of agriculture sector is absence of export- oriented stimulus and lack of proper procedures. As a result, farmers prefer to sale products at home market. Furthermore, realization of products at home market do not require specific marketing skills and experience besides that market risks are significantly low in contrast with external market. While the Armenian agricultural market is considered to be one of the most liberal ones, nonetheless, from the standpoint of assuring access, there is no liveliness in relation to providing access of the agricultural produce to the export market. Commitment to the domestic market is mainly due to the fact that the international markets are more developed and fastidious about the quality of the commodities, in addition to requiring large volumes and stable supply, as well as involve high currency risks. These are the main reasons explaining the rather narrow geography of the export of Armenian agricultural products, with the Russian Federation, Georgia, Ukraine, Belarus and some other countries

being the main importers of the Armenian agricultural goods. This means, not only the volumes of export of agricultural products should be addressed but also the geography should be expanded with more diversification toward the EU countries, Middle East, North America, Japan, Singapore, Vietnam, etc.

Poorly developed infrastructures

The poorly developed infrastructures are another serious obstacle hindering the sustainable development of the sector. The following can be observed as the core problems: poorly developed irrigation network; insufficient number of anti-hail systems/stations and the low efficiency of the existing ones; lack of agricultural product collection centers; poor condition of inter-village roads; issues related to storage of water stocks as well as poorly developed distribution systems; application of possible alternative energy sources, availability of up-to-date transportation network, etc.

Large-scale application of traditional methods and technologies of agricultural activities

One of the critical directions of solution of problems related to the scarcity of resources existing in the country, the low level of productivity in agriculture, comparatively high production cost and other similar systemic problems is the intensive application of innovative technologies. Introduction of innovative technologies in Armenia is still in its early stage. Modern technologies and innovative solutions are mainly fragmentary. Their large-scale efficient and intensive implementation is impeded by

essential constraints: a) lack of necessary funding resources, b) low level of farmers' knowledge, and c) small size of farms, etc. In addition, the lack of experience in introduction and operation of innovative technologies and the low level of dissemination and outreach of the existing cases of best practices is another essential obstacle for introduction and further development of modern technologies and innovative solutions in different subsectors of agriculture

Low level of technical re-equipment and upgrades Low

One of the preconditions for the overall development of agriculture is upgrading the level of mechanization of agricultural operations. This is a core precondition in particular for enhancing the competitiveness of the sector, increasing the volume of agricultural produce and fully using the production potential in the sector. The existing agricultural equipment and machinery are low-efficient, costly, high wear and tear, low level of fitness, and therefore requiring additional expenses needed for repair.

Modern and highly productive agricultural machinery and equipment as well as transfer of the relevant knowledge on their operation is definitely one of the solutions in achieving high productivity and continuous development in the sector.

Poor professional development

To promote the agricultural sector and integrate the latest technologies, it is important to provide the sector with professionals equipped with modern agrarian knowledge and skills. The level of agrarian education is low and insufficient; there is often even absolute lack of agrarian

knowledge and professional skills, which directly affects the implementation of effective and up-to-date practices in the sector. To ensure the strategic development of agriculture, first and foremost, it is necessary to equip the sector with professionals with quality agrarian education.

Another serious challenge is the lack of qualified personnel or their low qualification in the responsible state agencies. The state agencies responsible for the sector are still not attractive for qualified specialists due to the low salaries.

In this context, another important issue is related to the young specialists from rural areas who get education in the capital city and do not return to their villages.

Inefficient mechanisms of assistance and coordination from international agencies

Considering the strategic importance of the agricultural sector in the context of development of the Armenian economy, the RA Government is constantly implementing projects aimed at development of the sector, which are implemented both through the Government's own investments (including state subsidies) and with support from international organizations. A number of development project are supported by such international agencies as UN, EU, USAID, ADA, and others. Since 2010, with the support of international agencies, over \$200mIn worth of agricultural projects have been implemented in Armenia, which were overseen and implemented by both international agencies and the RA Ministry of Agriculture. It should also be noted that a number of projects

are still being implemented with low efficiency, with the main reasons being the gaps in coordination by the relevant state agencies and the lack of clear mechanisms for cooperation between them.

Assurance of food security

The role of agriculture is critical especially from the standpoint of the country's food security and food safety.

From the standpoint of food security, it is particularly important to assurance of physical and economic accessibility of food and enhance the level of self-sufficiency. The country has a high self-sufficiency level for potato, vegetable and melon crops, fruits, grape, lamb, and eggs; an above average level of self-sufficiency for beef, milk and dairy products; while that of wheat, poultry and pork, and legume crops remains low. The level of self-sufficiency for wheat is 33.2% (2017), pork: 58% (2017), and poultry: 22.5% (2017). In this context, the urgent need for import substitution for the mentioned agricultural products is now a subject of strategy discussions, with encouragement of and assistance to the production of these products based on the needs of the local market being now among the primary strategic issues

Low level of food safety

Food safety is one of the most important and urgent problems in Armenia that requires solutions based on modern requirements and standards. The food safety system in the Republic of Armenia does not yet fully guarantee safe and high-quality food for consumers as well as enhanced competitiveness of locally produced food products in export and domestic

markets. Compliance with food safety standards will also enhance the overall competitiveness of agriculture, particularly in the export context.

In the context of food safety, ensuring the safety of livestock products at the farm level as well as at the level of the last point in this particular value chain — processing (production of dairy and meat products) is of particular importance. For example, currently in Armenia brucellosis is the most important disease that transfers from animals to humans, which is a threat from the food safety point of view, in terms of diseases transferable from milk and dairy products to humans.

Tax regulations

Although the existing tax policy in the agricultural sector is assessed as privileged (due to profit and income tax exemptions for agricultural producers, preferential regulations for value added tax (hereinafter referred to as VAT) payers, VAT exemption for import and further sale of various commodities in the sector, preferential regulations for property taxes, etc.), tax legislation continues to contain certain restrictions that limit possibilities to achieve the strategic goals of development in agriculture. To minimize the impact of such restrictions, it is necessary to discuss and review those tax regulations that limit the aggregation and commercialization of agricultural outputs, slow down the commodification process of agricultural production, and limit the development of high value-added behavior in rural farms.

In order to minimize the existing barriers and constraints for the development of the sector, and to achieve the objectives of this Strategy, such tax regulations should be presented for discussion that will offer

effective solutions for increase of the competitiveness of agriculture in Armenia, including:

- a) introduction of a special system for documentation of transactions for VAT for agri- food products;
- b) improvement of tax regulations for entities producing primary agricultural goods;
- c) defining incentives for processing and exporting agricultural products.
- d) improvement of property tax regulations and other ways.

2

Domestic Policies and Agricultural Status Analysis

2.1. Consistency with Sustainable Development Goals (SDGs)

This current research is in line with the SDG 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture: Sustainable development of agriculture.

Over the past decade, the agriculture growth rates have seen significant fluctuations. Still, the agriculture has maintained its key importance with regard to employment and revenues of the rural population, as well as local food supply; also, it is a source for food and beverages export expansion.

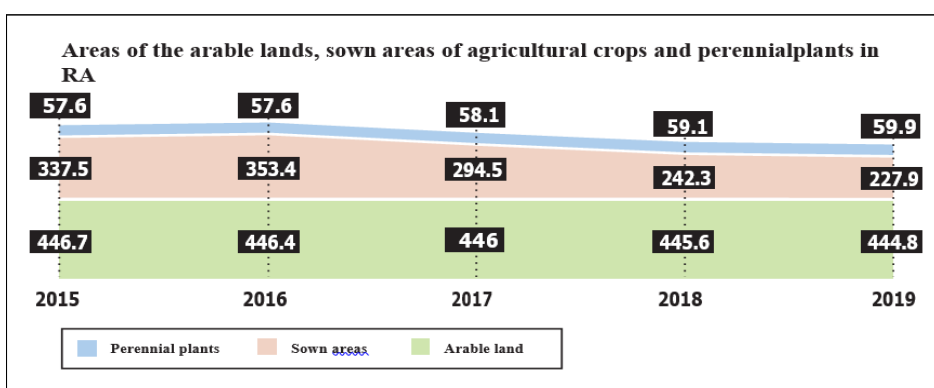
Indicators:

According to the Strategy of the Main Directions Ensuring Economic Development in Agricultural Sector of the Republic of Armenia for 2020-2030, value created by an average farm in 2018 was worth 2.82

million AMD. According to strategic planning, this value is expected to triple by 2029 amounting to 7.45 million AMD.

According to the above-mentioned strategy, the average income per farm in Armenia was 0.640 mln AMD in 2019. It is expected to total 2.0 mln AMD in 2024, and 5 mln AMD in 2029.

〈Figure 2〉 Areas of the Arable Lands, Sown Areas of Agricultural Crops and Perennial Plants in RA



Source: Voluntary National Review, 2020

Implemented actions

The issue of targeted and efficient use of agricultural lands, in particular, arable lands and perennial plant areas is increasingly getting much importance in Armenia. Over the past years, the purposeful use of arable lands has significantly decreased, and the Government will undertake active steps to utilize the unused arable lands purposefully, through development of corresponding incentives and mechanisms.

In 2018, farms have introduced drip irrigation systems in 164 ha areas, while in 2019 this area got 1.75 times larger (280 ha). In 2019, the RA Government launched the programme for subsidizing interest rates for

loans thus helping economic entities in pedigree stockbreeding; as a result, hundreds of cattle were purchased.

According to the state agricultural assistance report submitted to the Eurasian Economic Commission, Armenia's state assistance in the sphere of agriculture totalled 9.3 billion AMD in 2018. The RA Government and the United Nations World Food Programme (WFP) stepped up its cooperation with the following common goals:

- a) to end hunger in Armenia by 2030, achieve food security and improved nutrition;
- b) to strengthen the means of implementation and revitalize the global partnership for sustainable development.
- c) To achieve its goal in Armenia, WFP and its strategic partners focus their efforts on implementation of programmes and initiatives aimed at:
 - d) enhancing food security and nutrition;
 - e) strengthening national capacities and systems

WFP will continue investing in human capital to further improve health, education, social protection and productivity in Armenia, primarily but not exclusively via its School Feeding Programme platform. WFP is also investing in Food Value Chains so as to stimulate access and availability of nutritious foods and stimulate local economy, as well as investing in nutrition education and launch social behaviour change communication with the Government and partners to increase awareness of and demand for adequate healthy diets behaviours. Finally, WFP aims to support

increased resilience to shocks be it price shocks on food commodities, natural or man-made disasters or any type of shocks including pandemics (such as COVID-19) hampering the access to food and nutrition security for the population residing in Armenia.

In order to maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species (Target 2.5) by 2020, the RA Government has circulated the draft bill on genetically modified organisms; also, the scientific centers have genetic banks aimed to preserve the seeds of cultivated plants, their related wild species and other aboriginal plants.

The Food and Agriculture Organization of the United Nations (FAO) in Armenia implemented the “Grape genetic resources conservation and sustainable use in Armenia” project within the framework of which 1.36 hectares of collection vineyard for local grapes varieties have been established.

In order to preserve the genetic resources of fauna, “RA cattle-breeding development programme for 2019-2024” and “State assistance programme for sheep-breeding and goat breeding in the Republic of Armenia for 2019-2023” are implemented; they have already helped the economic entities to purchase 375 heads of large pedigree cattle and 203 heads of small cattle. There is also the “Programme for preservation and improvement of genetic fund of livestock breeds in Eastern Europe”. The programme mainly aims to preserve and improve the gene stock of Brown Caucasian breed in the country. To this end, stock-taking of the current Brown Caucasian breed is planned, along with creation of a database and further development of a concept for coordinated breeding.

In the framework of United Nations Development Programme (UNDP) “Integrated Support to Rural Development: Building Resilient communities” project (2015-2020) support was provided to the local population of 45 bordering settlements of Tavush marz stimulating self-employment in agricultural sector (small greenhouses, fruit dryers, wineries, fruit orchards), developing new models for alternative income generating opportunities and strengthening livelihoods. The Project pioneered an innovative model of community asset management through community development funds. Overall, over 400 jobs were created through establishing over 42 ha of new orchards, 126 greenhouses, 40 small agriprocessing units, collection centers and agrimachinery pools, vegetable seedling production, legume production, and horticulture development centers, and livelihoods strengthened through introducing 34 ha of drip irrigation systems, constructing over 30 km of energy-saving street lighting systems, repaired irrigation system on 71 ha of land, and reconstructing a drinking water system (Armenian voluntary report).

2.2. National Development Strategies and Policies

Consumer price increase (12 months) in 2008-2013, amounted to an average annual of 5.8 percent, compared to the planned annual 4 (+/- 1.5) percent. Price increase was mainly result of the global financial and economic crisis and the rapid changes of natural climatic conditions impacting the agricultural sector, as well as due tariff increase for energy

resources. In 2008, the main reason for deviation from the forecasts of price rises was the price increases of food, including cereals and vegetable and animal fat, as well as fuel, especially in the first nine months, while in 2009, despite the price drops recorded in the first nine months, price rises were the result of higher prices of food and non-food goods in the international markets because of the more active global economy at the end of the year and the impact of the implemented expansive monetary-credit and tax-budgetary policies. And the consequences of these developments continued in 2010. Characteristically, the environment of price rises further worsened in 2010, because of the reduced demand for agricultural products and higher tariffs for certain utility services. As a result, only 7.5 percentage points of the 9.4 percent price increase (12 months) in 2010 was due to food price rises, where around five percentage points of price rise was recorded due to higher prices of domestic agricultural products and more than two percentage points of price rise was recorded due to higher prices of imported food products.

Nonetheless, in 2011, especially at the end of the year, the price rise environment became softer, as a result of which the price rise for the 12 months of the year was within the target value. Contributing factors were the reduced international prices of basic raw material and food products due to slower global economic growth and deepening of debt problems in the Eurozone, stricter monetary-credit conditions introduced at the beginning of the implemented year and the preventive tax-budgetary policy, as well as larger supply of agricultural products. 2012 was favorable in terms of inflationary developments as 12 months' inflation was around the midpoint of the target and its corridor's lower bound – 3.2 percent. In

2013 increase in energy tariffs brought it inflationary pressure in the first half of the year which was mitigated in the second half also due to mild contractionary macroeconomic environment and inflation was close to its target's upper bound - 5.6 percent.

2.3. Policies and Strategies in Agricultural Sector

2.3.1. Agricultural Development Strategy of Armenia for 2020–2030

The Government's 10-year vision is to have a happier population living in comfortable conditions, in a harmony with the environment and with Armenia's rich cultural heritage, and with a significant number of small and medium-sized enterprises producing competitive, high-quality agricultural products, supported by cutting edge digital and agricultural technologies.

The Government seeks to create equal conditions and opportunities, as well as an honest, competitive, and sustainable enabling environment for all individuals and businesses that are working to advance a qualitatively improved and more modern agricultural sector.

This vision is reflected in the Strategy of the main directions ensuring economic development in agricultural sector of the Republic of Armenia for 2020-2030 (hereinafter referred as "the Strategy", the summary of the "Strategy" can be downloaded [here](#)).

The priorities, objectives and measures of the strategy are as follows:

Priority 1: Increase Agriculture Competitiveness and Enhance Efficiency

- a) Objectives and Measures
- b) Reduce uncultivated land and develop land market
- c) Improve irrigation in Armenia
- d) Develop the credit market
- e) Support risk mitigation and climate change adaptation
- f) Improve economic viability of agricultural producers and processors in priority value chains
- g) Improve access to agriculture equipment and machinery

Priority 2. Ensure Food Safety

Objectives and Measures

- a) Introduce internationally recognized food safety risk management systems
- b) Increase the level of veterinary service
- c) Improve plant protection system regulations and enforcement
- d) Strengthen laboratory capabilities and conduct International Standard-based tests in food safety, animal health, and phytosanitary control
- e) Introduce flexibility rules in food safety based on best international practices

Priority 3. Improve Food Security and Nutrition

Objectives and Measures

- a) Ensure minimum level of food availability and self-sufficiency of nutritionally diversified food
 - Increase the production of vital local foods
 - Improve the trade balance for selected commodities where import substitution is economically viable
- b) Increasing the access to nutritionally diversified food
 - Establish, maintain and replenish public food storage
 - Monitor and prevent food waste and lost
 - Establish close partnership with the partner to ensure synergies with other initiatives, such as school feeding, nutrition education
- c) Monitor food security
 - Improve systems of monitoring food security
 - Identify criteria, develop less favorable areas and measures.

Priority 4. Develop Local Markets and Increase Export Possibilities Ensure Food Safety

Objectives and Measures

- a) Support market opening, investment attraction, and export promotion
- b) Develop tools to increase agricultural investment opportunities
- c) Develop and implement adding value to the products program

- Establish quality scheme legislation and capacity for implementation at the national and regional level
 - Develop and implement measures for increasing organic production, geographical indications, and other quality schemes
 - Develop Armenian quality food label
 - Introducing a new milk, grape, etc. pricing system that will be based on the quality standards of milk(grapes)
- d) Promote well-organized agro-wholesale, retail and farmer markets
- e) Foster cooperation, aggregation, and value chain integration

Priority 5. Develop Institutional and Human Capacity in Agriculture

Objectives and Measures

- a) Improve institutional analytical capacities at the Ministry aimed at increasing and making more policies targeted, ensure monitoring and evaluation of state supported projects
- Improve the organizational structure of the Ministry
 - Develop capacity at the policy department level
 - Introduce comprehensive data collection and management systems
- b) Improve targeted policy engagement, payments and communications with farmers
- c) Improve transparency and efficiency of Ministry payments
- d) Ensure access to information and two-way communication with farmers

- e) Improve effectiveness and efficiency of knowledge and experience transfer
- f) Improve effectiveness and efficiency of donor coordination
- g) Develop farmer segmentation framework and clarify farmer status

Priority 6. Support Sustainable Rural Development

- a) Develop measures to encourage rural entrepreneurship
- b) Rural agricultural infrastructure development
- c) Maintain good agricultural practices, biodiversity, and environmental sustainability programmes
- d) Build up community driven capacity for implementation of local strategies

Priority 7. Promote Digital Agriculture and Technology Innovation

- a) Invest in national digital agricultural platforms and digitalization initiatives
- b) Promote broader (non digital) agriculture technology innovation and uptake
- c) Digitalize Government agriculture systems and develop Ministry digital capacity
- d) Build farmer and education system capacity on digital agriculture and innovation

Additionally, the Action Plan has been developed, which provides the

concrete measures for 2020-2022 to be implemented according the Strategy.

2.4. Agricultural Political Environment, Laws and Institutions

The summary of the main legislative framework for agriculture and rural development is summarized in the table below:

〈Table 2〉 The Summary of Main Legislative Framework for Agriculture and Rural Development

Name of the Law/Policy/Standard	General Description Summary	Institution
Land Code of RA	The Land Code defines the basic directions of State regulatory system improvement concerning land relations, development of various organizational and legal forms of land economy, fertility of land, land use efficiency raise, protection and improvement of an environment – favorable for human vitality and health and the legal framework concerning the protection of the rights on land. Ownership, use and disposition of land must not harm the environment, security and defensibility of the State; must not violate rights and legally defined interests of citizens and other entities.	Ministry of Economy of RA
Forestry Code	The Code regulates relations connected with sustainable forest management – guarding (Forstwart), protection (Forstschutz), rehabilitation, afforestation and rational use of forests and forest lands of the Republic of Armenia as well as with forest stock-taking, monitoring, control and forest lands.	Ministry of Environment of RA
Water Code	The Code oversees the conservation of the national water reserve, the satisfaction of water needs of	Ministry of Territorial

Name of the Law/Policy/Standard	General Description Summary	Institution
	citizens and economy through effective management of usable water resources, securing ecological sustainability of the environment.	Administration and Infrastructure
Law "On Agricultural Census"	<p>This Law regulates relations on preparation, organization and conduction of a products) producer's census in the Republic of Armenia processing, summarizing, publishing, storing and use of derived results.</p> <p>Objectives of Agricultural Census</p> <p>The objectives of agricultural census are as follows:</p> <ol style="list-style-type: none"> 1) collection of information on agriculture structure, agricultural land, 2) formation of complete statistical data system on agriculture 3) formation of statistical register for agricultural holdings 4) ensuring comparability with international statistical data 	Ministry of Economy
Law "On Organic Agriculture"	The Law regulates relations concerning production, storage, processing, transportation and trade of organic agricultural commodities and raw materials, and also lays down legal grounds for organic agriculture, sets forth mandatory requirements for circulation of organic agricultural commodities with a view of granting public support thereto, establishing the duties of the authorized state body in the aforesaid sphere.	Ministry of Economy of RA
Law "On Seeds"	<p>The law regulates the relations related to the registration, production, reproduction, certification, transportation, storage, sale and use of plants as well as defines the main challenges of seed cultivation.</p> <p>The law defines the classes of seeds (pre-basic, basic, and reproduced seeds), the procedures for issuing permits for the use of varieties, production of seeds, certification, import and export, distribution of responsibilities, scientific support of the sub-sector, characteristics of determining the quality of seeds, etc.</p>	Ministry of Economy of RA
Law "On Assurance of Food Security"	<p>The law regulates the relations in the sphere of food security of the Republic of Armenia, as it defines the main directions of the state policy of regulation of that sphere.</p> <p>The main directions of the state policy in the field of food security are:</p>	Ministry of Economy of RA

Name of the Law/Policy/Standard	General Description Summary	Institution
	<ol style="list-style-type: none"> 1) promotion of local production of vital raw materials, 2) Ensuring the quality characteristics of food in accordance with the norms defined by the legislation of the Republic of Armenia. 3) Implementation of measures aimed at improving the macroeconomic situation of the Republic of Armenia. 4) Accumulation of food resources in the state reserve of the Republic of Armenia and their effective use. 5) Implementation of measures aimed at regulating the food market. 	
Law "On Food Safety"	<p>The law governs the relations with respect to the safety at stages of import, export, manufacture, processing, packaging, labelling, transport, storage and placing on the market of food, materials in contact with food and food additives, as well as at stages of trading and mass catering. This Law shall not apply to: (a) domestic preparation, handling or storage of food for private or domestic consumption; (b) transit transfers of foodstuff.</p> <p>In addition the sector is also regulated by the RA laws On State Control of Food Safety, On Veterinary Medicine, On Ensuring Sanitary and Epidemiological Safety of the Population of the Republic of Armenia, On Standardization, On Protection of Consumer Rights, On Trade and Services, On Organizing and Carrying out Inspections in the Republic of Armenia, On Phytosanitary, On Feed, the Code of the Republic of Armenia On Administrative Offenses, as well as a number of other laws, about 100 bylaws.</p>	Ministry of Economy
Law "On Veterinary"	<p>The law regulates legal relations in the field of veterinary medicine between the authorized state governing body and the institutions, enterprises, organizations, sole entrepreneurs operating in the Republic of Armenia, as well as the citizens.</p>	Ministry of Economy
Law "On Small and Medium Entrepreneurship State Support"	<p>The purpose of this law is to define small and medium enterprises Criteria of entities, the main state support directions and the principles for implementation of state policy in that sphere.</p> <p>In the field of small and medium enterprises relations are regulated by this law as well as by other laws and legal acts.</p>	Ministry of Economy

2.5. Lessons Learned from Past Related Projects

Pricing systems of agri-food sector in Armenia is somehow poor developed without any interactions by the Government. The prices are somehow regulated by demand and supply in the market, which is highly seasonal. There are not any quality standards set for pricing policy by the Government, however, according to experts, there is a need for proper pricing systems. Desk study revealed that there is no any such kind of study for setting a pricing policy based on the quality of the agricultural produce. Moreover, the interview with the representative of the Ministry of the Economy revealed, that no any organization in Armenia conducted a project to identify the standards for the quality of milk, grape and tomato for setting a price ceiling or floors for making the industry competitive. Some organizations did project related to the analysis of the current regulatory framework related to the agriculture, however none of them did “price formulation based on the quality standard” related project in the Country.

According to the interview, the prices are set mainly based on the contracting procedures between farmers and processors or based on the current local prices regulated by demand and supply. According to the MoE representative, there is a huge gap in the pricing policy, hence there is a need for setting a quality standard according to which the farmer can sell the produce. For instance, in Armenia, processors pay for the milk based on the fat content without considering the somatic or bacterial cells in the Milk.

According to the different experts, there is a need to formulate a quality

standards and appropriate pricing scales for the tomato, milk, and grape. This can help the industry to become more competitive and motivate farmers to produce high quality products. Some detailed information on the research topic of each value chain from in-depth (expert) interviews is presented below sub-sections.

2.5.1. Interview with Milk Processing Projects Director of CARD Foundation

While tasting Armenian dairy products for the first time, consumers from other countries feel the strong, off -smell and off-taste. This smell can be characterized as a smell of a barn. Unfortunately, this is a common occurrence in most dairy producers in Armenia. A very interesting fact testifies that local consumers got so much used to the smell of the milk that if it is absent they think the milk is not natural. Why does the local milk differ so much from the imported ones? The simple reason is the absence of proper milking practices. Breaking the rules of hygienic milking practice, the general contamination of barns, the absence of disinfection – all these factors affect the taste and smell. This can certainly lead to the high content of microorganisms. This increases the risk of infectious diseases, thus affecting the growth in the number of somatic cells, which is the protective reaction of cows. Therefore, the number of somatic cells may serve as an indicator for milk cleanness. The sanitary quality of raw mixed milk and its sales price is determined by the number of somatic cells, and their high concentration should become a signal for possible mastitis

of cows. In EU countries the number of somatic cells should not exceed 50 thousand in one liter of milk. According to our last research conducted in Armenia, this indicator varies from 300 thousand up to 800 thousand on an average.

However, if we compare today's milk quality with that of 10 years ago we see dramatic improvement in milk quality. Enterprises are interested in receiving high-quality milk and making big investments in this business.

Dairy production is one of the most unstable ones in the agro-industrial sector. Despite the support measures provided by the state, the industry is affected by the rise in prices and the dominance of adulterations. The relations between milk producers and processors are always tense.

The cost of milk is high in Armenia, with low profitability and poor quality of milk. At present, a long-term strategy for the development of the dairy industry is needed to observe the interests of all the participants in the dairy market, including raw milk producers, processors, and consumers of finished products.

Milk production is mainly carried out by small farmers, keeping an average of 4-20 heads of cattle. As a result of the fragmented production, a number of problems are encountered, hindering the development of the sector. Among them are the inefficient transfer of knowledge and technologies, lack of quality materials used in production, failure to manage the production seasonality and control the diseases, low bargaining power. The sector fragmentation leads to problems related to milk collection, proper milk quality and its stability.

Quality animals and feed alone do not guarantee the high quality of milk. Four main factors can be defined here: proper technology, appropriate

cowsheds, sufficient forage, and high-quality veterinary service. The availability of all the mentioned factors secures up-to-date agriculture. In other words, our cow will produce at least 6,000 liters of milk a year instead of 2,000. In the best countries of the world, 10-12 thousand liters of milk is received from a single cow.

Fragmented milk production, combined with the small number of large milk processing companies, weakens the bargaining power of farmers in the market and makes them highly dependent on the market price defined by the processors. In addition, the relationship between milk producers and processors is most of the time non-contractual, and farmers often have difficulty collecting payments for milk from processors.

Improper milk pricing practices, implying the specification of the milk price based on the level of fat content, disregarding the presence of bacteriological contamination, somatic cells, and antibiotics, lead to the carelessness of farmers in the quality of milk. Low-quality milk results in lower quality dairy products, hence reducing the profits of processors. On the other hand, milk processors use milk powder intensively in the production process, thus having higher bargaining power compared to the milk producers.

The seasonality of milk production conditions the production of milk during the summer period mainly through the use of pastures and ensuring low production costs, resulting in a high volume of milk supplied during that period and, therefore, a lower price.

In such a situation, some small farmers try to sell milk and homemade cheese to the final consumers directly or through intermediaries, through outright sales on city streets, generating significant food safety risks, and

distorting fair competition by lowering the price of dairy products in the market.

In addition, dairy companies use milk powder as an alternative to milk, and the purchase price of milk is derived from the milk powder price. Hence, the high price of milk powder leads to the high purchase price of milk, accordingly, the low purchase price of milk powder results in a lower purchase price of milk. In this context, the abrupt increase in the purchase price of milk in 2021 is quite reasonable.

In 2020 the volume of milk powder imports exceeded 5870 tons (making about 41090 tons of milk). Farmers, involved in the industry note that large volumes of low-cost imported powder distort the local market and significantly reduce the price of fresh milk.

Low quality standards for finished dairy products and improper food safety practices lead to negligence of milk quality. The lack of a practical relation between the quality characteristics and milk pricing confines the investments in up-to-date technologies by farmers and processors.

The existence of milk collection units has to some extent solved the problem of creating a milk collection chain, but they are not sufficient for establishing effective relations between producers and processors and ensuring the necessary level of milk quality and milk production efficiency.

In the dairy factories, operating all year round, there is a huge difference in the volumes of milk procured in the winter and summer months, with the ratio of 1/7, sometimes even 1/10. Some companies procure milk from all over Armenia. No rational collection scheme is in place, the only goal being the collection of milk to the greatest degree possible. Outcomes: high cost for all enterprises, especially in winter, when the collected

volumes are small. Milk producers sell their products to the highest bidder during the lowest productivity season. However, due to volume problems, milk of any type is procured. The quality control of producers' milk quality is carried out by enterprises. It is often accepted solely by quantity, without taking into account the fat content.

Some companies have developed their own milk criteria and pay suppliers according to them. The fat content of milk, the degree of milk adulteration with water, and acidity are mainly taken into account. There are companies that consider the mechanical purity of milk as well, which is an indirect indicator of microbiological contamination of milk.

The first organization to assist producers in milk pricing was the USDA MAP. In 2003, an expert from the USA was invited to Armenia to work on milk pricing. The milk payment scheme developed by him provided for a quality surcharge, as well as a fine for low quality. The application of the payment scheme was tested in three large dairy processing companies, Ashtarak Kat CJSC, Dustr Melania LLC, and Elola LLC. Unfortunately, all three companies refused such a scheme a week later.

The financial reward for the quality of milk was highly welcomed by the farmers, but the majority disagreed with the reduction of the price due to poor quality. Many of these farmers started selling milk to other factories. The lack of milk forced the above-mentioned three companies to refuse this program and return to their milk suppliers.

Several solutions to the problem can be suggested, bearing in mind that any solution lacking self-regulation mechanisms can have short-term effects and doubtful results.

High standards for the quality of milk production need to be set and

promoted, raising the level of awareness about those standards and effectively implementing them. This will enable the market to achieve effective pricing, i.e., the price will be based not only on the fat content of milk but also on the content of protein, somatic cells, and the presence of antibiotics. At the same time, it will ensure the control of the milk quality through milk collection units. If higher price is offered for high-quality milk, farmers will be interested in producing higher quality milk.

The dialogue between milk processors and farmers is hard due to the lack of intermediaries. A functional organization should be founded to solve such problems.

Quality and safety requirements must be applied equally and effectively to imported milk powder to reduce or prevent the import of low-quality, hazardous and cheap powder that could disrupt the market.

Nevertheless, the application of dairy labeling criteria and effective control is important. Dairy producers must clearly indicate the presence of milk powder in the composition of the dairy products so that consumers can make a decision based on accurate information. This will ensure effective differentiation of products and appropriate pricing. Much higher fines for labeling violations than the ones applied today need to be defined which will make larger companies more alert.

Large companies impact the State Service for Food Safety by different means, selling the dairy products produced from milk powder as natural milk products, further increasing their market share. Following the inactivity of the State Service for Food Safety, the dairy products from milk powder are sold as natural milk products and nothing changes. This is where the role of the executive and the judiciary authorities becomes crucial.

2.5.2. Interview with Executive Director of Vine and Wine Foundation of Armenia

The area of actual vineyards in Armenia in 5 vine-growing regions is about 13,000 hectares. The average area of the vineyard is 0.6 hectares, which indicates that the vineyards are very fragmented. There are around 400 native grape varieties from which 55 are cultivated nowadays. Mainly technical varieties are cultivated, about 70% of grapes (mainly white grape varieties) for brandy production, 15% for wine production and 15% table grape varieties. Mostly Armenian indigenous and selective varieties are cultivated, to some extent also international varieties.

The problems identified in the field are as follows:

- Less application of modern approaches to vineyard cultivation
- Scarcity of irrigation water
- Low level of knowledge of diseases and pests spread and preventive measures
- Low level of farmers' skills in sustainable farming

During the interview it was found out that there haven't been any targeted attempts to introduce grape pricing, however, it is worth to mention that some companies apply pricing mechanisms such as Yerevan cognac factory (see Grape Value chain part).

Generally, while purchasing the raw material sugar content and healthy grapes are considered. It can vary from the winemaking companies' requirements. In addition, Technical Specifications and Standards development and implementation demand is now increased in the Republic of Armenia. (See in Annex 6.2: GOST- 31782-2012 Fresh grape of

combine and hand harvesting for industrial processing). However, in general, each processing company applied its own criteria for purchasing the raw material. The main challenges in purchasing raw material are as follows:

the variety of grapes is uncertain

poorly cultivated grapes

unscrupulous farmers

Since not every company has a contractual relationship with farmers, sometimes the purchase price is not determined even a month before the purchase date. With the exception of a few companies that sign a contract before the grape growing season and fix the minimum price of grapes. The price can be changed by Grape quality, variety and its demand in the market as well as the price can be reduced by the quality (degree of maturity, degree of infection, cultivation method), unfair competition between grape processors, abuse of a dominant position by some producers. Mainly sugar content and total acidity are measured for the brandy production and the same for wine production, some producers in addition check phenolic compounds as well. Some producers are constantly cooperating with grape growers, by a system of long-term contractual relationships. Quality requirements are set by the producers, based on which the farmer is provided with the necessary substances (nutrients, pesticides, herbicides, etc.) and consultation during the whole agronomic process on a yearly basis. Contracts can be concluded for both long-term and one-year. In order to apply mutually acceptable efficient criteria for raw material purchase pricing the respondent suggested to study existing well established grape pricing and purchasing mechanisms

of some grape processing companies in Armenia and apply that kind of systems in the rest companies of the country.

2.5.3. Interview with the Head of the Food Security and Agro-Processing Development Department of the RA Ministry of Economy

As there were no comprehensive studies on the relevant topic, in depth interview was conducted with the head of department of agricultural primary production of Ministry of Economy of RA, Mr. Gevorg Ghazaryan with the aim of revealing key principles of tomato pricing system in Armenia.

Before conducting the interview, a list of relevant questions was prepared (see Annex 6.6).

The record of the interview included the following key points:

- Unfortunately, no studies were conducted in Armenia on pricing policy issues in the framework of tomato value chain.
- Government as one of the stakeholders does not yet have any regulatory functions during pricing establishment processes, however, the Action Plan 2020-2022 for the implementation of the strategy of the main directions ensuring economic development in agricultural sector of RA for 2020-2030 has separate actions under the main objective to introduce a new pricing system that will be based on the quality standards:

- a. Selection of products for introduction of new pricing systems,
 - b. Study of international experience
 - c. Processing of pricing systems
 - d. Processing of legislative framework
 - e. Implementation of set pricing system
 - f. Monitoring of set pricing system.
- Based on the practical experience the producers make supply demand analysis in the market and taking the competitive consumer prices as a baseline make proper calculations for defining the price of tomato purchasing from the farmers.
 - The most applicable two scenarios for Armenia to achieve the effective and fair solutions for pricing mechanisms which will reduce the risks for both producers and farmers are as follows:
 - a. The Ministry of Economy shall draft a Law on Agriculture which will authorize the Government to apply annually a new toolkit for defining a minimum baseline price for the tomato purchasing. For example, at least 4.5% can be defined for the dry matter content (DMC) of tomato and per additional value the price will be adjusted accordingly. The Law shall also provide the relevant standards for tomato processing which should be strictly followed both by farmers and producers. Before drafting the Law, the Ministry of Economy shall establish a Committee on pricing issues which will be followed by meeting of Committee members, producers, cooperatives, farmers. The outcome of the meeting shall be the establishment of the baseline price on consensus.

b. To strengthen the producer-farmer relationships via enhancing the capacities of cooperatives within community development programs. This will serve as a cornerstone for farmers to be able to negotiate with the producers to establish a price mutually profitable for both. In addition, more cooperatives shall be established which will integrate the majority of the farmers so as the preliminary agreement reached by the cooperative and producer is duly followed.

There are several state support agricultural programs targeted at lowering tomato cost price such as “Co-financing the introduction of modern irrigation systems”, “Subsidizing the interest rates on loans provided for introduction of hail protection nets in the agricultural sector of the Republic of Armenia”, “Subsidizing the interest rates on loans provided to the agricultural processing sector for purveyance (acquisition) of agricultural raw materials” “State assistance of leasing for financial lending of agricultural machinery in the Republic of Armenia”, “State assistance for introduction of small and medium-sized greenhouses”.

2.6. Stakeholder Analysis

In this section of the report, the possible stakeholders related to the pricing policy of different value chains are identified and analyzed. In this section, a “Stakeholder” considered as a party, who has an interest in an

intervention and can either affect or be affected during any interventions related to the pricing policy. In the following subsections, the identified stakeholders and their analysis are presented

2.6.1. Stakeholder Related to Grape Value Chain

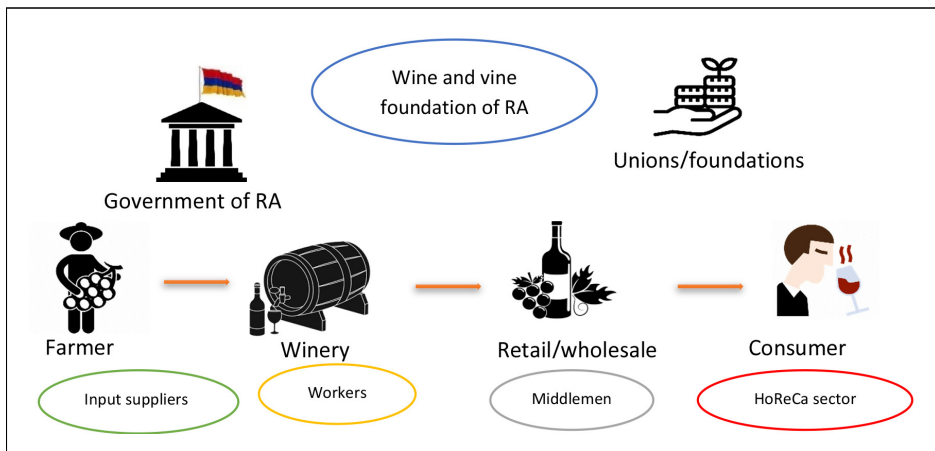
Grapes are the fruits with diversified benefits and livelihood impacts. Like in other food value chains, the grape value chain can be defined as a network of stakeholders involved in growing, processing, and selling the grape, i.e. from farm to table (from vine to dine).

The main identified stakeholders for this value chain are as follows:

- Primary producers (including farm workers)
- The Government
- Unions, including Wine and vine foundation
- Processors
- Middlemen (wholesalers, retailers, including exporters)
- Consumers (both for grape and wine)

Actors of its value chain are faced with various constraints, despite the potentiality of the crop. The complex nature of grape value chain, which comprises numerous stakeholders and flows (i.e., products—services—information, see picture below), entailing knotty interactions and interdependencies, makes any research direction questionable in terms of its effectiveness.

〈Figure 3〉 Flow of Grape Value Chain and Stakeholder Groups Involved



According to the conducted interviews, the grape buying agreements are mainly based on quantity and trust, not including quality criteria. The current state are mostly informal, oral one-year agreements usually before harvest, but mostly repetitive during the years. The case of not observed contracts was also found in Armenia and lead to mistrust. Training of farmers is not common, but financial aid and checks of the vineyard before harvest are common practice.

There are around 50 companies acting in grape processing industry in the republic, 12 out of which are relatively large ones. Around 80% of the total volume of the grapes is purchased by these large companies. One of the main preconditions for regulating grape purchasing process is the signing of contracts on harvest procurement and expansion of mutually beneficial contractual relations between the purchasing organizations in advance, before starting the purchasing process.

There is a positive experience of the Yerevan Brandy Company in terms of developing contractual relations, which can be copied and introduced

by other purchasing organizations as well. The Yerevan Brandy Company – bought by Pernod Ricard in 1998 shortly after the collapse of the Soviet Union – was the first company introducing control contracts. Yerevan Brandy Company annually signs short and long-term contracts on harvest procurement with more than 2500 viticulturists. Within the contracts the partner viticulturists are provided with technological consultation, high quality medicines, as well as other agricultural tools in the form of prepayment.

These contracts included taking samples of grapes to meet certain defined quality criteria, dictating time of harvest, sugar level, ripeness levels, setting standards e.g., for pesticides, fertilizer and implementing trainings e.g. how to prune for farmers fostering overall the quality production. If farmers do not meet the quality criteria or if they are found to be cheating, the grapes are returned. A few companies followed the role model of Yerevan Brandy Company establishing contractual agreements as well.

A few more grape processing organizations also work based on contractual relations, however, the number of such organizations is quite limited, which causes serious problems for viticulturists in terms of harvest sale and for the RA Government in terms of implementing regulatory measures.

One of the impediments for the establishment of contractual relations in Armenia is the absence of a stable market for selling the products of processing companies, which doesn't allow to plan production volumes and to sign raw material purchasing contracts. In order to sign a contract in advance, a very smoothly running supply circle and annual demand

projection should be in place. There are few organizations in Armenia, which are able to carry out long-term planning for their production volumes.

The grape value chain includes three groups with specific functions, rules, and strategies, linked within the whole network of production group members, national market distributors, and international distributors:

- Production group includes: the grape grower, the wine/cognac producer, the bulk wine/cognac distributor, the transit cellar and the filler/packer. Upstream, the group maintains relationships with the raw material suppliers, and downstream, the group manages cellar door sales. This grouping varies across countries with different combinations of grape grower–wine producer–filler/packer triads.
- Distribution in the national market involves: the finished good distributor, the wholesaler and the retailer. Upstream, the group maintains relationships with the filler/packer and downstream, the group maintains relationships with the end consumer. This modelling of the distribution group, related to the national market, varies among countries and may include the distributor–end consumer, retailer–end consumer, wholesaler–end consumer, or cellar door sales–end consumer dyads, or the distributor–retailer–end consumer, distributor–wholesaler–end consumer, or wholesaler–retailer–end consumer triads.
- Distribution in the international market includes: the freight forwarder, the freight operator and the importer. Upstream, the group maintains relationships with the filler/packer and downstream, the

group maintains relationships with the end consumer. In the case of the international market, the wine/cognac is distributed via importers. The freight forwarder can be a conventional freight forwarder or a logistics service provider.

The detailed definition of each stakeholder is presented in table below:

(Table 3) The Stakeholders of Grape Value Chain

Name of the Stakeholders	Definitions
Raw material supplier	Raw material suppliers provide wine producers and fillers/packers with all the supplies needed for wine-making or filling and packing. The main activities are: receive new orders from wineries and/or fillers/packers, prepare orders, send supplies to the wineries and fillers/packers, store supplies, etc.
Grape grower	Grape growers are responsible for the production and harvest of the grapes. The main activities of grape growers are: planting the grapes, cultivating and pruning the vines, eliminating the inadequate vineyards, fertilizing the vineyards, controlling plagues, harvesting grapes, etc.
Wine/COGNAC producer	Producers are responsible for receiving grapes, the elaboration, manufacture and/or blending of wine products. In general, the main activities are: receiving and weighing the grapes, crushing, stemming and pressing juice, addition of sulfites and decanting, addition of yeast, fermentation, refrigeration, clarification and stabilization, temperature control, preparation for bottling, maturation in bottle, etc.
Cooperatives	A group of grape producers join their resources maximizing the production volume. Grape producers bring their grape at the cooperative which commercializes their products to numerous customers: trader, restaurateur, retailer and mass market distribution industry.
Bulk wine/COGNAC distributor	Bulk wine/cognac distributors are responsible for reception, storage, dispatch, processing, sampling and analysis of bulk wine. They receive bulk wine/cognac from the wine producer.
Transit cellar	Transit cellars are responsible for the reception, storage, dispatch, processing, sampling and analysis of bulk wine. They can be part of the filler/packer company (geographically separated or not) or can be outsourced. The transit cellar receives bulk wine from bulk distributors in different kinds of containers. During the transit cellar stage, the wine is prepared for onward sale and filling. It is loaded for transit to the customer and is accompanied by all the appropriate documents.

Name of the Stakeholders	Definitions
Filler/Packer	Fillers/packers are responsible for the reception, analysis, filling, packing and dispatch of finished goods. The filler/packer receives containers of bulk wine from the wine producer, and then the wine is filled into different kinds of packages. Consumer units, such as bottles, bag-in-box, tetra packs, etc., are produced from. The wine batches supplied.
Freight forwarder	Freight forwarders organize the shipment planning, which is the process of choosing shipment frequencies and deciding for each shipment which orders should be assigned. It also includes the safe and efficient movement of goods on behalf of an exporter, importer or another company or person, sometimes including dealing with packing and storage. Typical activities include: researching and planning the most appropriate route for a shipment (considering the nature of the goods, cost, transit time and security), arranging appropriate packing (taking into account climate, terrain, weight, nature of goods and cost) and delivering or warehousing of goods at their final destination.
Freight operator	Freight operators supply service for transporting goods from the winery to the importer or to other actors (distributor, wholesaler, retailer, etc.), by air, through airline services, by sea through shipping lines or by road and rail through different operators. The courier could be an express/parcel carrier trucking company, an ocean liner, a railroad or an air carrier/integrator.
Importer	Importers buy goods from the wine producer and are responsible for the reception, storage, inventory management and dispatching of finished goods, which receives from the freight forwarder through the freight operator. The importer sales and delivers finished goods to the wholesaler or distributor of the destination country depending on the distribution channel used in the country.
Finished goods distributor	Finished goods distributors are responsible for the reception, storage, inventory management and dispatching of finished goods, as well as re-packing and re-labelling as per specific customer requirements required.
Wholesaler	Wholesalers receive pallets and cartons from the finished goods distributors and pick and dispatch goods to the retail stores. They put new orders to the finished goods distributor, to the importer and may also buy directly from the winery.
Retailer	Retailers receive finished goods from finished goods distributors or wholesalers depending on the distribution channel. They sell consumer units (bottles, cartons) to the end consumer. The different sales' channels are: hyper/supermarket, liquor stores, drugstores, specialist store, hotels, restaurants, catering, clubs, etc.
End consumer	End consumers are the final actors of the supply chain. They may buy finished goods directly from some wineries, or they can make an indirect order of new products when they go to the store or supermarket and choose some kind of wine/ cognac.

Grape growers: Unlike cereals, legumes and other crops, the grape growing needs special soil, a favorable climate and a long period of courtship and preparation, including pruning, pest control, etc. Hence a grape grower needs to have a diligence and patience, because the first harvest can be got only once a year, and also between the moment he plants a grape and the moment he can transform it into a good wine, it can take 3-10 years or even more.

The grape value chain can be short if a grape grower has own private winery and sell own wine right on the spot. But most of small grape growers don't produce or sell own wine. For market entry and survival in a highly competitive environment they are united in cooperatives or sell their harvest as a raw material to winemaking companies. The largest grape estates make their own wine and sell it at the market under own brand.

So we can distinguish three types of grape growers:

- small grape growers united in cooperatives
- grape growers sold their harvest as a raw material to winemaking companies
- grape growers made their own wine and sell it on the spot (in touristic region) or at the market (large estates).

Producers: This step includes wine/cognac production operations such as stemming, crushing, the fermentation and storage. All these operations can be made by the following actors:

- winemaking companies that don't have own vineyards
- wine cooperatives uniting grape growers and winemakers
- private wineries that have own vineyards

All of them have the necessary equipment, facilities, production and management personnel. Usually, they also implement packaging operations including: bottle filling, corking, capsuling, labelling, box filling, placement on pallets etc. All these operations need a participation of other stakeholders, e.g., cork suppliers, bottle suppliers, printing houses etc. They also form a part of the wine value. Wine production step can last from a few months to many years and moves to the distribution step.

Distribution stakeholders: The distribution step is a mainly transport-related one and can be referred to at a local, regional, national or international level, depending on the strategy and production capacity of the firm. The largest estates may distribute their products by themselves. Actually, large companies control the full value chain, extracting margins at every level and retaining bargaining power. The other producers pass distribution operations to specialized companies, which focus on the wine/cognac distribution. They mainly benefit from the economies of scale. Therefore, all distribution operations can be made by the following actors:

- large companies that control the full value chain
- specialized distribution companies: wholesalers, merchant traders, auctioneers, etc.

Retailers: Retailers connect distribution companies with the consumers. So, they are all there, where people can buy and drink wine/cognac: supermarkets, restaurants, wine bars, specialty shops, etc. All of them make the final products available for the final consumer.

Government: In different agricultural zones of the Republic of Armenia due to climate peculiarities, varieties of processed grapes, low intensity of viticulture and product cost price, yield, limitations existing in the sphere of grape sales and other factors, there are unequal competitive conditions amongst large, as well as small and medium economic entities engaged in viticulture and grape processing. The state regulatory tool in such a situation is the regulation of grape purchasing process, the targeted application of which will promote future development of viticulture and winemaking sectors.

The role of the Government in grape procurement is creating preconditions for systematized policy implementation:

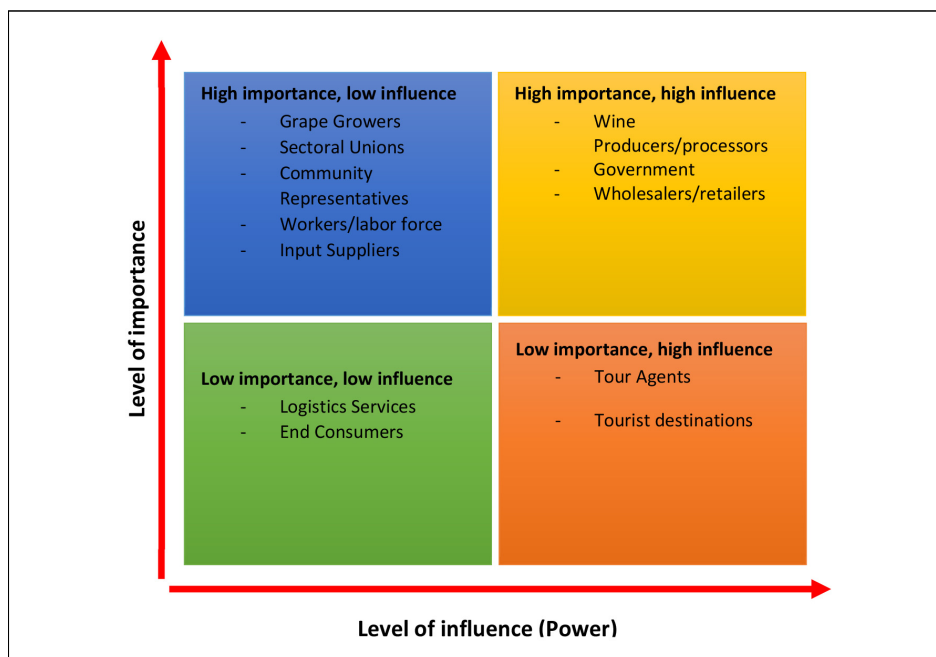
- Improving the legal framework regulating the wine sector and bringing it in line with international requirements
- Complete state control over equal competitive environment, as well as the quality and safety indices of produced and imported wine-making products
- Establishing a register of vineyard areas
- Implementing measures aimed at promoting winemaking products for increased export volumes
- Implementing partial loan interest rate subsidy program provided to the agro-processing sector for purchasing (procuring) agricultural raw materials and grapes
- Implementing measures aimed at deepening contractual relations on grape procurement.

It should be stated, that the Government support programmes have the same objective. E.g. the grape purchase loan is not provided to the organization, but is paid to the farmer based on the contracts. The aim of those purchase loans is not only ensuring available turnover fund for the processor, but also for the latter to be able to pay the farmer for procuring grapes soon after the sale: this is one of the main state aid provisions. It should also be stated that in 2020 AMD 18.7 billion funding was provided only for grape procurement under the state programme. Parallel to the inventory of vineyards and available varieties, financial resources for vineyard establishment are provided under the most favourable conditions existent in agricultural sector - 5 years of grace period, 8 years of general period, 0 % interest rate.

Parallel to the suggested tools to the gardeners for establishing vineyards the Government also takes measures towards meeting the demand: the AMD 100 paid per each litre of brandy spirit exceeding 100,000 litres while exporting - the state fee paid for the right to sell the batches - is returned, thus reducing brandy spirit cost price in foreign market. Besides, in order to mitigate the losses suffered by winemakers and brandy makers during the previous year, the Government has amended the interest rate subsidy program for procurement loans, thus increasing the limit of loans provided for grape purchase from AMD 3 billion to AMD 4 billion, the loan repayment period has been extended from 1 year up to 3 years, and the grace period for loan principal repayment has become 1 year, instead of the previous 3 months. For the first time within the programme, 50% state guarantee will be provided to the processors.

Sectoral unions: The problems related to the export of winemaking products and purchase of grapes show that besides objective economic reasons, they also occur due to the fact, that the sector unions registered in Armenia are not able to support the implementation of a common policy aimed at the development of the sector. Besides, it's worth mentioning that both the executive power and sectoral unions have not found efficient ways to increase the product quality, to expand the product varieties, to form a unified Armenian brand and raise its awareness Whereas, these are the main ways contributing to the increased sales volumes of the product, therefore to the further development of the sector. The stakeholder mapping based on the level of the influence of each stakeholder and importance in this value chain is presented in below graph.

〈Figure 4〉 Grape Stakeholder Mapping



2.6.2. Stakeholder Related to Dairy Value Chain

The dairy sector in Armenia is an economically important sector providing employment and a source of income value chain actors. Although demand for milk and dairy products is high and increasing, sector growth is constrained by milk quality issues stemming from physical-chemical composition, microbial contamination and adulteration which pose a risk to human health.

In the present study, stakeholder analysis is crucial. This is because it helps to characterize and map stakeholders in the dairy value chain, identify relationships between different stakeholders and pattern of interactions, better target interventions, and start understanding the needs and interest of the key stakeholders.

The objectives of this research were to identify which stakeholders in the Armenian dairy sector play a role in determining milk quality, and to explore whether roles are affected by power relationships between stakeholders.

A stakeholder can be defined as an agency, institution, group or individual with direct or indirect interest in the dairy value chain.

Results show that the dairy sector is a multi-layered network of stakeholders, encompassing stakeholders from both the formal and informal dairy value chains. Farmers, cooperatives and processors play a key role in determining the quality of milk and dairy products, while cooperatives, processors, government agencies exert influence over milk quality as the most powerful stakeholders in the network. Stakeholder

relationships in the formal value chain are more conducive to the enforcement of regulation and standards, and thus the production of high quality milk and dairy products, than those in the informal value chain.

The dairy sector is a multi-layered network of stakeholders, comprising actors along the dairy value chain that are involved in the production, handling, transportation, storage, packaging and marketing of milk and dairy products. Smallholder farmers, input suppliers, service providers (feed suppliers, breeding organizations and veterinary services), and processing and marketing actors (milk collection centers, transporters and private processors) can be categorized as either formal or informal value chain stakeholders, based on their business arrangements with each other.

Although formal dairy value chain stakeholders operate within a legal framework, research has shown that milk traded in the formal dairy value chain in Armenia is not always of high quality and that milk traded in the informal dairy value chain is not necessarily of poor quality. Informal value chain stakeholders have been accused of poor adherence to food safety and quality standards. Despite increased provision of training and increased certification, the informal dairy value chain continues to provide a market channel for the trade of low quality milk which does not meet food safety and quality standards and poses a risk to human health due to its high bacterial count, aflatoxin and antibiotic residues, and the presence of zoonotic pathogens.

Recognizing that stakeholders have complementary and competing interests and exert power to increase individual advantage and realize desired outcomes, this research explores and deconstructs the power relationships which exist, to determine the impact of stakeholders' actual

and perceived power on the quality of milk and dairy products produced and traded in formal and informal dairy value chains in Armenia.

Stakeholders' relative power stems from their positions within a stakeholder network, with core stakeholders having extensive relationships with other stakeholders, and peripheral actors having few relationships despite some playing an integral part in the network. The degree to which activities and processes in the sector are horizontally and vertically integrated, are therefore key indicators of the extent to which stakeholders are in a position to leverage and strategically maneuver in their interactions with other stakeholders.

Dairy sector stakeholders engage in horizontal integration (joint sales, marketing, joint input procurement and promotion) to mitigate the market-related consequences of small-scale production and heterogeneous product quality, and in vertical integration to control the supply or distribution of a product, thereby increasing its power in the marketplace, reducing costs and earning a higher income. Stakeholders in dairy value chain operate in an institutional environment characterized by poor resource availability, infrastructure constraints, market access restrictions, challenges in coordination and governance structures, and institutional gaps. The dynamics of relationships and positions relative to each other stem from flows of capital, information, advice and trust within a stakeholder network.

A diverse group of stakeholders are involved in the dairy sector in Armenia, from farmers to cooperatives, private sector actors (processors, input providers, consultation providers, transporters, traders), public sector actors (consultation providers, regulatory authorities), civil society

stakeholders (non-governmental organizations and development agencies) and consumers. Centrality measures (degrees and closeness of centrality) revealed that the core actors in the dairy sector are farmers, cooperatives and processors as they had the most connections to the other stakeholders and occupied the most central roles in the formal and informal value chains. The formal value chain is dominated by few large processors and cooperatives which bulk and market milk on behalf of farmers, while the informal value chain involved farmers, transporters and traders selling raw milk and occasionally pasteurized milk directly to consumers, hotels and shops. There was little or no value addition to the milk in the informal value chain, and the volume of milk traded was small and sold at a low price.

Discussions revealed that, in both the formal and informal value chain stakeholders were connected by milk trade, provision of information, inputs and services, training, enforcement of regulations and other value chain activities. The formal value chain had horizontal integration at the level of farmer groups and dairy cooperatives, and vertical integration between cooperatives, processors, service providers and financial institutions, and - to some extent - government agencies. The dairy cooperatives that bulked and marketed milk on behalf of farmers faced challenges in realizing integration, and had to supply several processors to avoid becoming dependent on one processor. Dairy cooperatives acted as intermediaries between farmers and financial service and input providers, as well as between farmers and small traders and processors, facilitating milk trade by collecting, bulking and selling milk at a negotiated price. In contrast, there was low horizontal and vertical integration and

coordination in the informal value chain which made it difficult to address milk quality issues. The informal value chain is mainly spot markets (transactions happening on spot, and no contractual engagements) that utilizes verbal contracts and payments are done immediately.

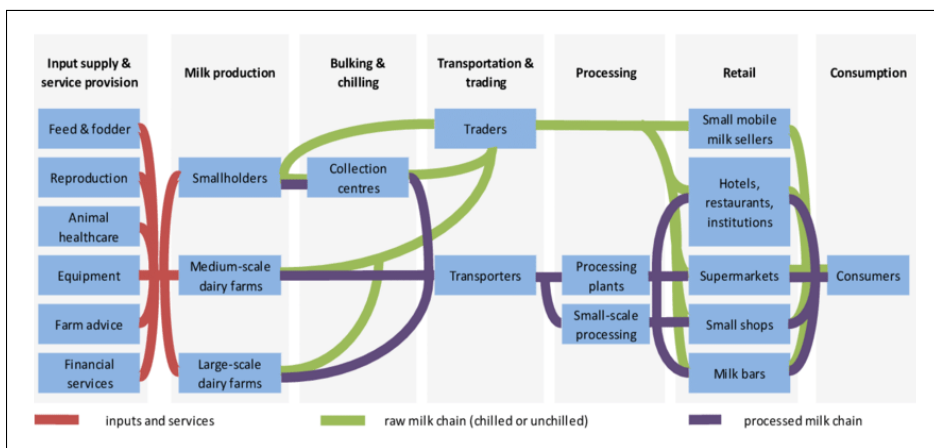
The study exercises disentangled the four types of linkages between stakeholders in the dairy sector:

- milk trade
- information exchange
- regulations
- input and financial supplies

It revealed that there were more elaborate relationships in the formal value chain, than the informal value chain, as actors were more integrated. The findings revealed that stakeholders varied in the levels of power exerted and influence over milk quality. Dairy cooperatives, processors, regulatory authorities and consumers had the most power when it came to determining milk quality and influencing other stakeholders to change or improve the quality parameters of the final product reaching consumers had the power to determine milk quality through their purchasing habits. Farmers were the core stakeholders in the dairy sector, with links to input providers, extension providers and financial institutions offering services necessary for dairy production. In the formal value chain, farmer groups (producer organizations) and dairy cooperatives sold milk in bulk and negotiated prices on behalf of farmers. Farmers were also linked to transporters who collected and bulked milk on behalf of cooperatives and

processors or as informal traders. In the informal value chain, farmers were linked to informal traders selling milk at informal markets.

〈Figure 5〉 Flow of Milk Value Chain and Stakeholder Groups Involved



2.6.3. Stakeholder Related to Tomato Value Chain

Tomato value chain in Armenia is already established and functioning. However, there are specific weaknesses characteristic of each value chain participant that they can and should overcome in order to strengthen the value chain to reach self-sustainability.

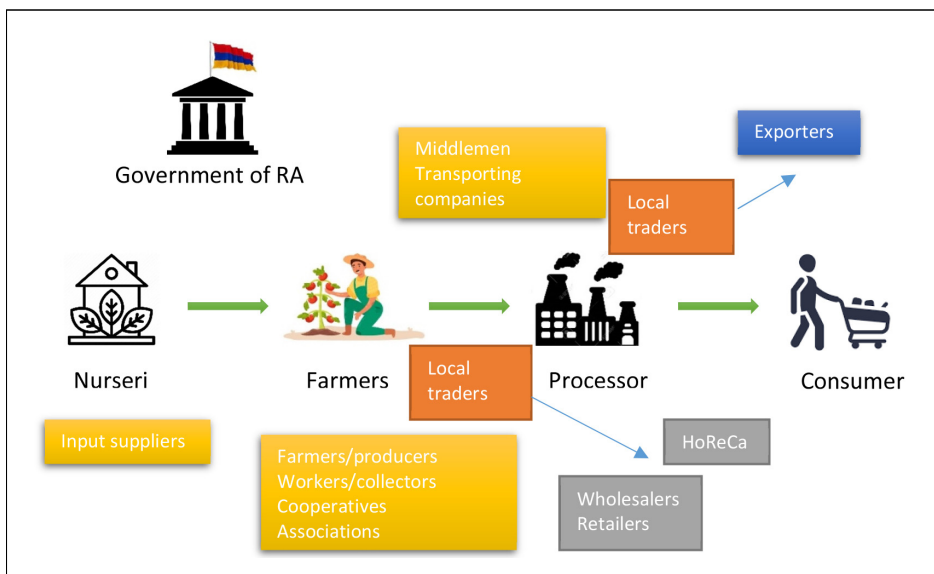
Value chain mapping enables to visualize the flow of the product from production to end consumer through various actors. It also helps to identify the different actors involved in the tomato value chain and to understand their roles and linkages.

The value chain describes the full range of activities that firms and workers perform to bring a product from its beginning to end use and

beyond. This includes activities such as design, production, marketing, distribution and support to the final consumer.

The tomato value chain describes the full range of stages and actions that are required to bring tomato/tomato-products from seed, through the different phases of production (involving processing, packaging, storing, transportation, and the input of various stakeholder services, i.e., middlemen, wholesalers, and retailers) to the final consumers. Starting with the materials stage, the main actor here is the nursery, whose key inputs are the seeds, and other supplies. Next in line is the production stage, with farmers, workers, and cooperatives/associations as the key players; while the product here is fresh tomatoes. This is followed by the middlemen stage which involves, besides the actual middlemen, the collection centers, factories, and transportation actors. From this stage onwards, the product flows involve either fresh or processed tomatoes. Next is the wholesaler stage, with the wholesalers and the exporters as actors. After this comes the retailer stage, with the key actor including different types of retailers (e.g., supermarkets and groceries), distributors, and outlets like restaurants, hotels, etc. The final stage is the consumer. However, here the objective was to illustrate the overall structure of the supply chain through the representation of all its actors and stakeholders, focusing on how they were interrelated via an exchange of products and information. It provides a graphical representation of tomato as it moves from production to the consumers, passing through different stages and processors.

〈Figure 6〉 Flow of Tomato Value Chain and Stakeholder Groups Involved



As seen in the diagram, some actors perform more than one function whereas the others are confined to only one function. For example, the local traders both collect the product from the farmers and supply them to the wholesalers or processors.

The major value chain actors identified in Armenia include input suppliers, producers, collectors, farmer-traders, middlemen/brokers, wholesalers, retailers, and consumers.

Input suppliers: Farmers who own bigger orchards apply inputs supplies regularly and on time. They are able to invite the agronomists who would advise them on plant protection issues. In almost every Marz of Armenia farmers can buy necessary whole range of pesticides, insecticides, herbicides and fungicides from local input suppliers. It is farmer’s choice what type of pesticide to use in its orchard.

Input suppliers are the manufacturers of agricultural inputs such as seeds, fertilizers, pesticides, mulching sheets, etc, required for the production of raw tomatoes. Through company owned, and other company dealers they sell their products to the farmers. Moreover, they also provide technical guidance on inputs usage and timely supply of inputs to the tomato farmers. They do maintain good relationships with the farmers and acts as one of the informal sources of finance. Regarding the delivery of inputs like improved seed, herbicides and pesticides, and credit among others, public and private extension services provide extension services to the farmers. Banks and microfinance institutions provide credit and information about schemes for tomato production. Input suppliers include fertilizer, seed and agribusiness companies, Government distributors, small wholesalers and even small retail shops that sell small quantities of seed, fertilizer, and pesticide to farmers at the village level.

Supporting actors: Such actors are those who provide supportive services including training and extension, information, transportation, financial and research services. In Armenia, there are lots of highly equipped transporting companies transporting tomatoes to local and international markets.

Producers: types of the production system can be observed, subsistence production (family business mainly for own consumption), small-scale commercial production, and largescale commercial production (mainly greenhouse production). Subsistence production is carried out for household consumption and produced in small quantities. The produce

from the first category of farmers generally does not enter the market or enters in a very limited quantity especially in the local bazaar, market. Small and large scale commercial farmers sell most of their products to various market intermediaries. The producers generally deal with traders and wholesalers. In most cases, farmers depend on village level traders for price information but over the last 2-3 years, the situation has slightly changed due to easy access to communication technology and the big farmers generally have access to market information to some extent

Local Traders: Local traders are directly involved in buying and selling tomatoes from different farmers and sell to the wholesalers at a profit. They often work as commission agents of the large wholesalers or processors.

Roadside traders: Roadside traders are farmers who collect tomato from farmers at the farm gate for the purpose of reselling to retailers and consumers. Producers sell tomato to roadside traders, and roadside traders re-sell it to wholesalers, retailers, and consumers in the study areas roadside market. They play an important role and they do know areas of surplus well.

Wholesalers: Wholesalers are market participants who buy large quantities of tomato and resell to other traders. They buy the product at the farm gate, from assemblers and/or road side with a larger volume than any other marketing actors does. They relatively spend their full time in wholesale buying throughout the year. Wholesalers are mainly involved in

buying vegetables from collectors and producers in larger volume than any other actors and supplying them to exporters, retailers and consumers. Wholesalers at different levels operating in tomato marketing concentrate the various markets purchase and play significant role in price formation at local level. They provide both price information and advance payments for selected reliable clients (producers, retailers and assemblers).

Processors: Food processing sector is declared by the Armenian Government as a priority sector of economy. The sector's strengths are high quality of local agricultural produce, available but currently idle processing capacities, availability of qualified workers and relatively low labour costs. The processing industry is considered by experts to have a high development potential in particular through the establishment of foreign co-operation and investments.

The food processing sector is still export-oriented, since domestic demand for processed tomato is not satisfactory. Most of Armenia's tomato processing plants are actively looking for foreign partners to increase their quality of production and their export potential.

It is worth mentioning that in recent years' processors tend to work with farmers on contractual basis, which is an important premise for the stable procurement of agricultural produce, and yet incentive for farmers to increase the yield and improve the production processes. A few agreements are signed between processors and farmers in case if the processor is going to buy a significant volume of produce.

Recently more processors have been establishing their own orchards that would allow producers to leverage the risks related to price, quality,

timing issues created by the individual farmers/suppliers of fresh tomatoes. Seasonally these plants employ local farmers on contractual basis to work in their own plantations.

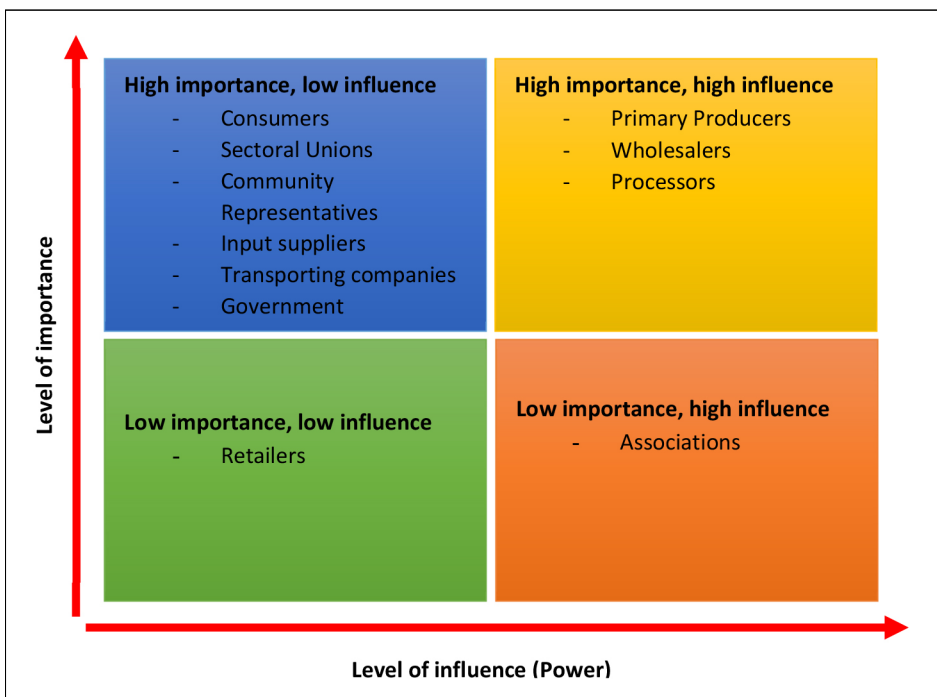
Processors are the secondary processing industries. They usually collect fresh tomatoes from wholesalers in major tomato production areas during peak season and glut in the market at cheaper prices. Big processors also purchase tomatoes directly from farmers through contract farming.

Retailers: Retailers are the sellers of tomatoes to the ultimate consumers through multiple channels such as small grocery stores, exclusive fruits and vegetable shops, supermarkets. They normally buy from wholesalers and sell both fresh tomatoes and other tomato processed products in smaller quantities with a higher profit margin. Retailers sell small quantities of tomato products either directly to individual, household or institutional consumers. This function is undertaken by a wide range of actors, depending on the point of sale along the supply chain. These may include traders at various levels (roadside and market places), shops, grocer and supermarkets.

Wholesale market in Yerevan: Many middlemen operate in Yerevan's main agricultural markets (green market) – Malatia, Komitas and Armenian agricultural market (GUM). Farmers usually have their warehouses in these markets and they sell their produce at night-time to local middlemen. Middlemen usually purchase big volumes then during daytime sell the smaller lots to retailers and/or final consumers. On average wholesalers add about 20% on the farmers' price. In the meantime many consumers

(especially low budget ones) visit those wholesale markets during night time to buy tomatoes at lowest price from farmers. Usually there are no losses to the physical product; the net profit of the middlemen is usually low but they operate on high turnovers. The stakeholder mapping of tomato value chain based on the level of the influence of each stakeholder and importance in this value chain is presented in below graph.

〈Figure 7〉 The Stakeholder Mapping of Tomato Value Chain



2.7. Value Chain Analysis on Grape, Dairy and Tomato Industry

2.7.1. Grape Value Chain Analysis

Primary production

Plantations of grapes: In 2020, Armenia produced 283 thousand tons of grape. Grape production has had a fluctuating tendency for the last six years (2015-2020). In 2019 grape production increased by 21% compared to 2018 and in 2020 by 30% compared to 2019. However, in 2020 26 thousand tons of grapes was produced, less than in 2015.

In 2020, around 69% of the total land area was agricultural (2,043.51 thousand ha). Armenia had 16.7 thousand ha of grape plantations (2020). Overall, grape plantations decreased between 2015-2017 and increased slowly from 2017 up to 2020.

Table 4 The Area of Grapevine Plantation 2020

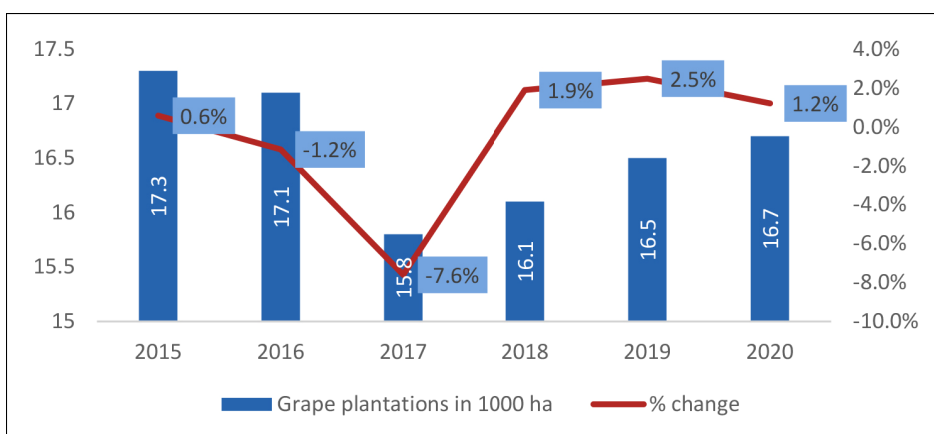
Marz	Area(ha)
Armavir	5395
Ararat	3948
Aragatsotn	568.5
Tavush/preliminary forecast	1800
Vayots dzor/ preliminary forecast	2000

Each of the tomato value chain actors adds value to the product as the product passes from one actor to another during their performance. In a way, the actors change the form of the product through improving the

produce processing or create space and time utility by transporting and keeping.

Consumers: It is the last link in the vegetable market chain; the participants and their respective functions often overlap. The most widespread combinations are the following: producers to wholesalers that collect commodity and supply it to retailers, wholesalers to retailers (wholesalers that also sell directly to consumers) and wholesalers to exporters. From the consumer point of view, the shorter the market chain, the more likely is the retail price going to be low and affordable.

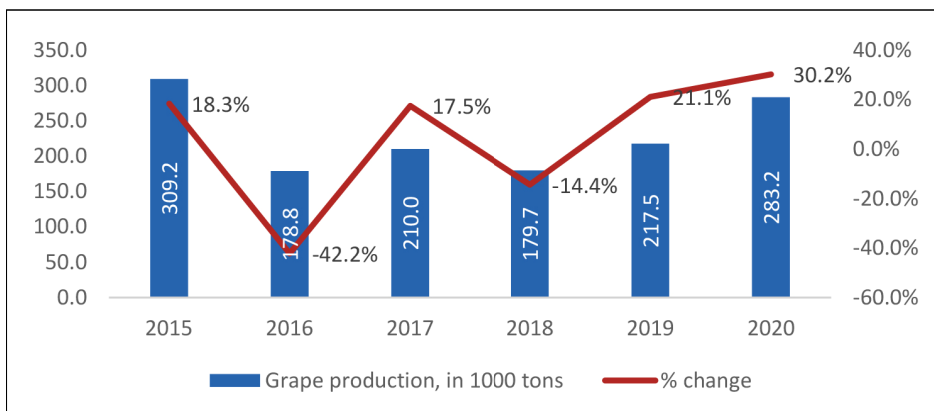
Figure 8 Grape Plantation



Source: Statistical Committee

Today Armenia has several wine regions, such as Ararat(Garan Dmak, Mskhali, Kakhet, Karmrahyut), Vayots dzor(Khatun Kharji, Tozot, Voskehat, Areni Noire), Armavir(Kangun, Garna dmak, Mskhali, Haghtanak), Aragatsotn(Kangun, Karmrahyut, Areni Noire, Voskehat) and Tavush(Banants, Lalvari, Garan Dmak, Kangun, Karmrahyut). Each of these regions are distinguished by characteristic varieties of wine grapes.

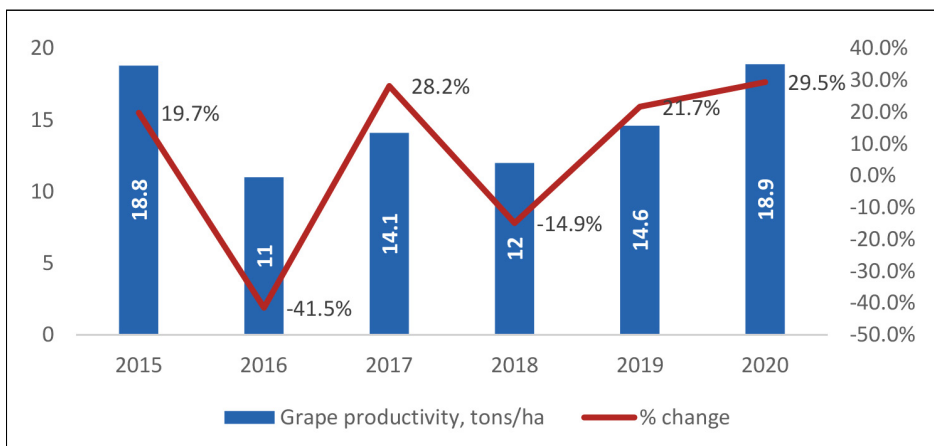
⟨Figure 9⟩ Grape Production



Source: Statistical Committee

Yield of grapes: The grape yield was 18.9 tons/ha (2020). This measure for the period of 2015-2020 also showed fluctuating trend and the measure showed increase during 2018-2020, see figure below.

⟨Figure 10⟩ Grape Yield



Source: Statistical Committee

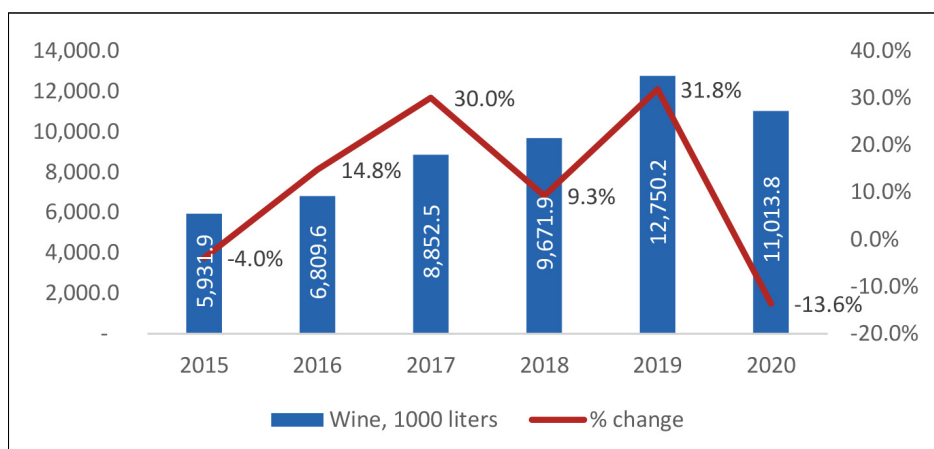
Degree of self-sufficiency in terms of grapes

In 2019, degree of self-sufficiency for grape was 103.6% (2019). This indicator over the five years 2015–2019, was always higher than 100%, meaning that Armenia produced more grapes than needed to satisfy local demand.

Processing

Wine production: Since ancient times, Armenians cultivated grapes and made wine. However, high quality wine production was on decline during Soviet times and only in the early 2000th gained momentum again. In 2020 Armenia produced 11,014 thousand liters of wine. The production volume decreased by 14% between 2019 and 2020.

〈Figure 11〉 Production of Wine

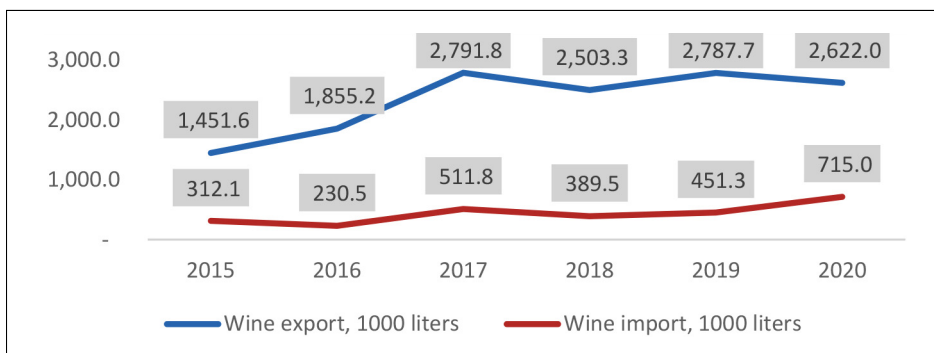


Source: Statistical Committee

According to the Customs Service of the Republic of Armenia, in 2020, Armenian wines were exported to more than 40 countries around the

World. The largest volume of exports was to Russia, Ukraine and United States. Overall, in 2020 Armenia exported 2,622 thousand liters of wine.

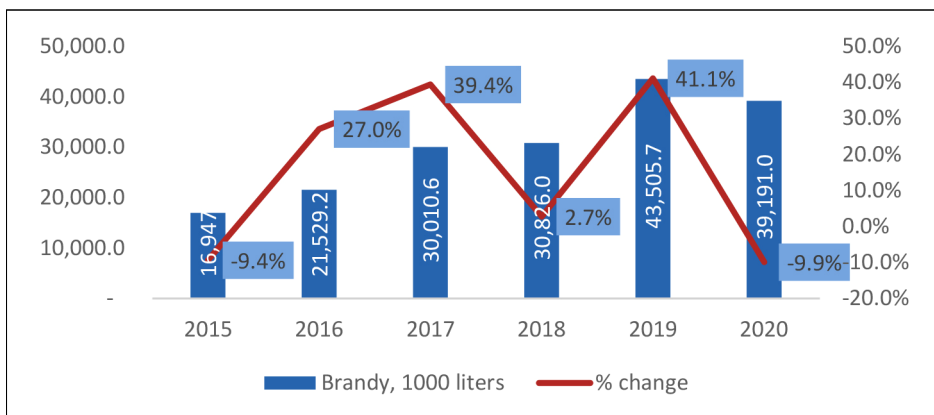
〈Figure 12〉 Wine Trade



Source: Customs Service of the Republic of Armenia

Brandy production: The first brandy production factory in Armenia was established back in 1887. Later, during soviet times, in contrast to wine, Armenian brandy was known for its quality. Today Armenia continues its tradition and produces brandy as for local market, also for export. The three largest brandy producing factories are Yerevan Ararat brandy-wine-vodka factory OJSC, Yerevan Brandy Company CJSC and Proshyan Brandy Factory LLC. In 2020 Armenia produced 39,191 thousand liters of brandy. The production volume decreased by 10% between 2019 and 2020. Meanwhile, the year before that was successful also for brandy production as it was for wine production. Brandy production increased by 41% (2018-2019). For more details, see the figure below.

Figure 13 Production of Brandy



Source: Statistical Committee

Currently, there are around 110 winemaking companies in the RA and around 40 companies are engaged in cognac production. Most of the grape harvest is purchased by these companies.

In the RA mainly, individual farms are engaged in the production of grape saplings. “WINEWORKS” company is an operating nursery farm, which has nurseries in Getap and Aghavnadzor communities of the RA Vayots dzor marz. “WINEWORKS” company produces unique saplings for Areni, Voskehat, Tozot, Khatuni, Kakhet, Movuz, Chilar grape varieties, the volumes of which can reach up to 100 000 saplings per one variety.

Besides, adjacent to ANAU “Voskehat Educational and Research Centre of Enology” branch, there is a grape nursery farm, where saplings are being grown for scientific research purposes.

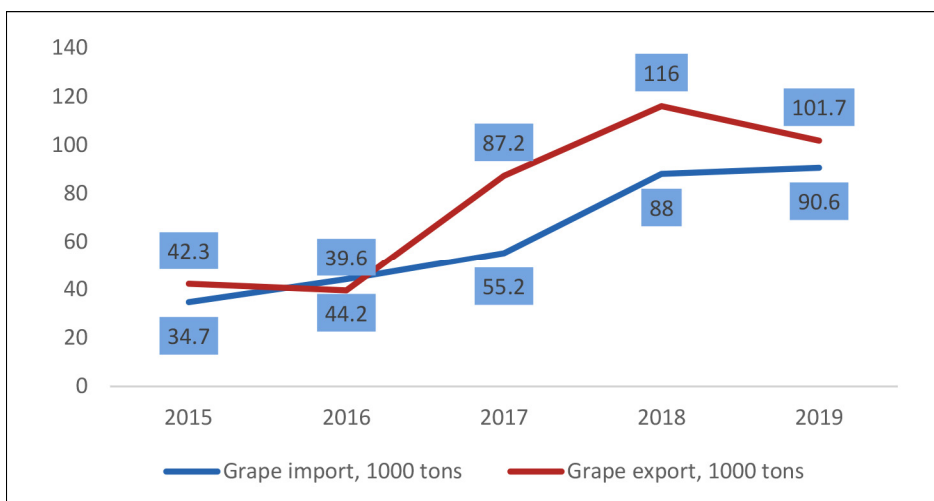
Consumption of Grapes

Per capita consumption of grape in 2019 was 4.1 kg/year. For the period 2015 and 2018, the per capita consumption decreased (from 4.7 kg/year to

3.9 kg/year). Meanwhile, this measure showed an improvement for the period 2018 and 2019.

Trade of grapes: Grape export volumes almost tripled from 2015 to 2019. For this period, the most successful year was 2016, when Armenia exported almost four times more grape than in the previous year. The main directions for Armenian grape export in 2019 were Russian Federation and Georgia. Small quantities were exported to UAE, Iraq, and Belarus. For the same period the import of grapes increased more than two times. Already in 2019 Armenia imported 8.2 thousand tons of grape. For more information, see figure below.

〈Figure 14〉 Grape Trade



Source: Statistical Committee

Swot Analysis for Wine Value Chain

Strength

- GoA recognizes the importance Horticulture sector in Armenia

- High Quality wines
- Favorable conditions for producing tomatoes clean water, intensive sunny days, fertile soil
- Comparably affordable and available labour force
- Emergence of lead farmers who already apply high-efficiency technologies
- Awareness about Armenian Agricultural products in Russian market
- Improved business environment

Weakness

- Undeveloped image of Armenia as an Agricultural Country Internationally
- Lack of business management skills
- Lack of access to markets
- Outdated technologies
- Fragmented land plots
- Low level of extension and advisory services
- Lack of access to suitable financial products
- Knowledge and skill constraints (technical and managerial)
- Underdeveloped infrastructure
- Lack of tomato cooperatives
- Informal relationships between farmers and processors/ Lack of contractual agreement
- Unfavourable tax system for processors
- Fragmented farms
- Lack of Qualified experts

- Absence of insurance mechanisms
- Lack of long-term/low-cost financing

Opportunity

- Expanding export market
- Fruit and vegetable upgrading into packaging storage
- Attracting foreign investment
- New available techniques to improve productivity and quality of crops
- Investment in processing sector

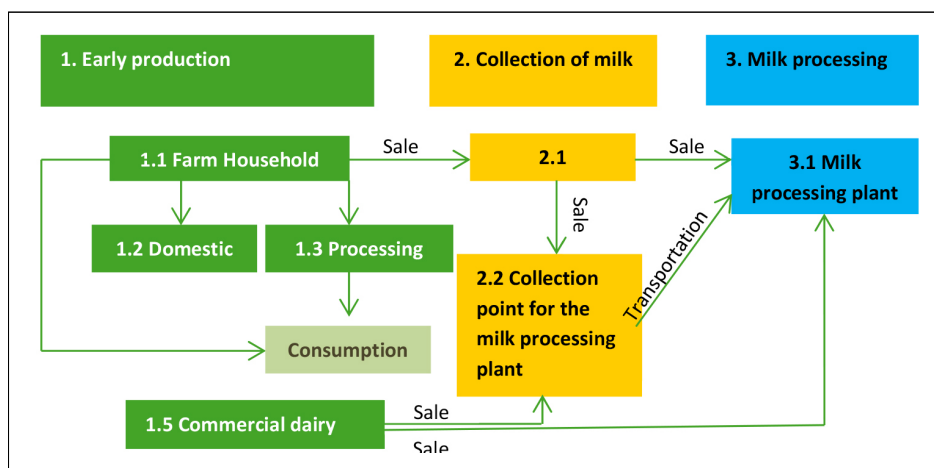
Threats

- Slow economic progress in the country
- Geo-political unstable situation
- Low quality products impacting the image of Armenian wines
- Human disease breakouts
- Grape disease breakouts
- High dependence on Russian market
- Unstable transportation routes
- Poor state regulation for the industry
- Lack of follow up on required HACCP system application
- Monopolized retail system and corruption at different levels
- High fluctuation of currency
- Supply of cheaper vegetables from outside

2.7.2. Dairy Value Chain Analysis

According to official data published by national statistical committee of Armenia, there are primarily two types of players in milk production; small-scale farm households and commercial dairy farms (only 1% share in total milk production). Apart from selling raw milk to processing plants, farm households also produce dairy products themselves and directly sell to consumers. Dairy processing companies make different types of dairy products both for local consumption and for export. In general, more than 90% of total export of dairy products was exported to Russian Federation. A small portion was exported to Georgia, United States, Kazakhstan and Israel. Moreover, cheese and curd had a major share in total export of dairy products. The milk produced and sold in the market is not compatible and processors have little chance to enter foreign markets with that type of poor-quality milk.

〈Figure 15〉 Milk Supply Chain in Armenia

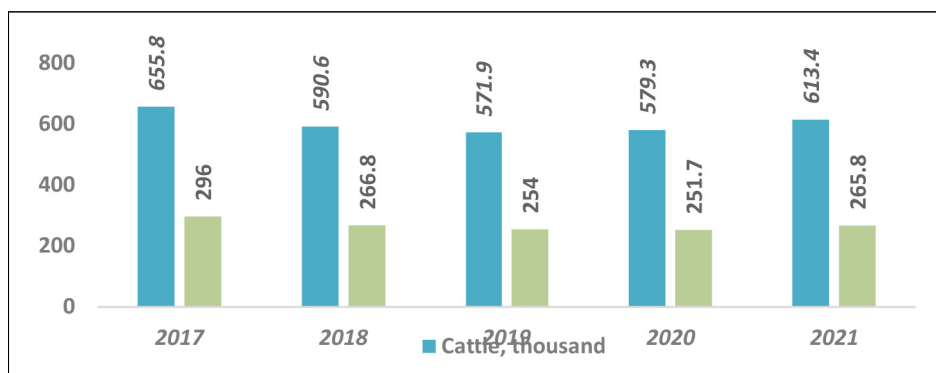


Source: National Service for Legislative Regulation

Dairy farming

As of January 1st, 2021, the total number of cattle was 613.4 thousand heads, out of which the 43.33% were cows (265.8 thousand). Both number of cattle and number of cows were increased compared to the previous three years from 2018 to 2020 (NSC, 2021).

⟨Figure 16⟩ Number of Cattle and Cows in Armenia

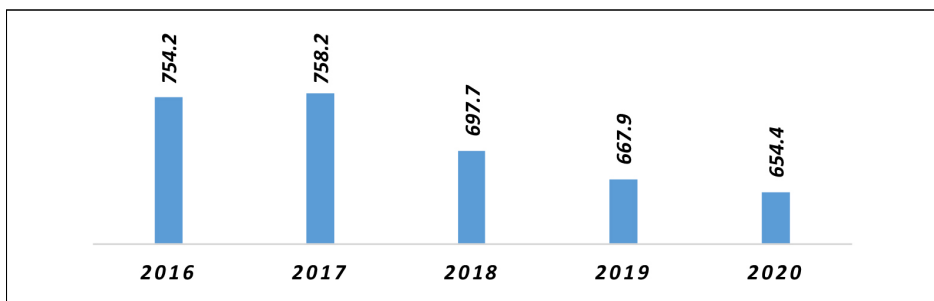


As it was true also in the previous years in 2021 also more than 99% of cattle fall to individual farmers and only 0.81% to commercial organizations. Picture is the same for cows with the following distribution: 0.86% - commercial organizations and 99.14% - individual farmers (NSC, 2021). According to the processors, the majority of small scale household farms have inconsistency in quantity of supplied milk, as well as in milk quality compared to large scale commercial organizations (ICARE, 2019).

Milk production

In 2020, Armenia produced 654.4 thousand tons of milk. This number overall decreased between 2016 and 2020 (Figure 17). Average annual milk yield per cow had an increasing trend.

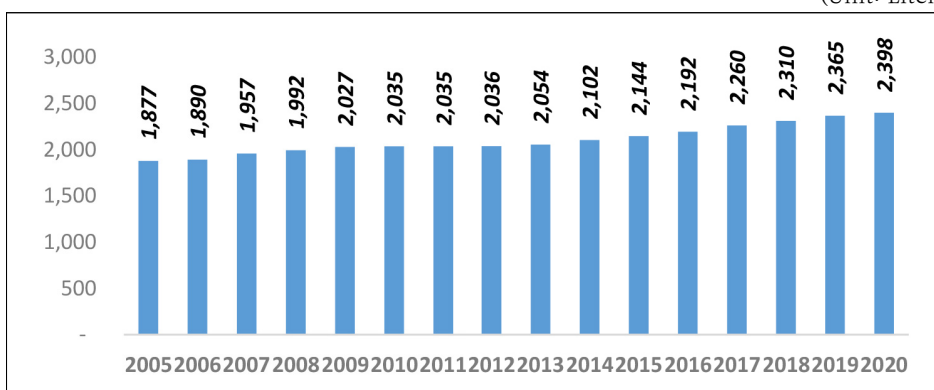
〈Figure 17〉 Production of Milk



Source: National Service for Legislative Regulation

〈Figure 18〉 Average Annual Milk Yield Per Cow

(Unit: Liter)



In the scope of the study conducted collaboratively by ICARE and CARD, the data collected from 413 farms by CARD foundation revealed that the average annual milk production was 2,009 liter per cow, a number smaller than the data reported officially. In fact, according to sector experts, this number was even lower, about 1500-1600 liter annually per cow (ICARE, 2019).

In general, the milk prices are formed based on the fat content, protein content, the quality and cleanness of milk. Sometimes the prices are set in contracts and mutual agreements.

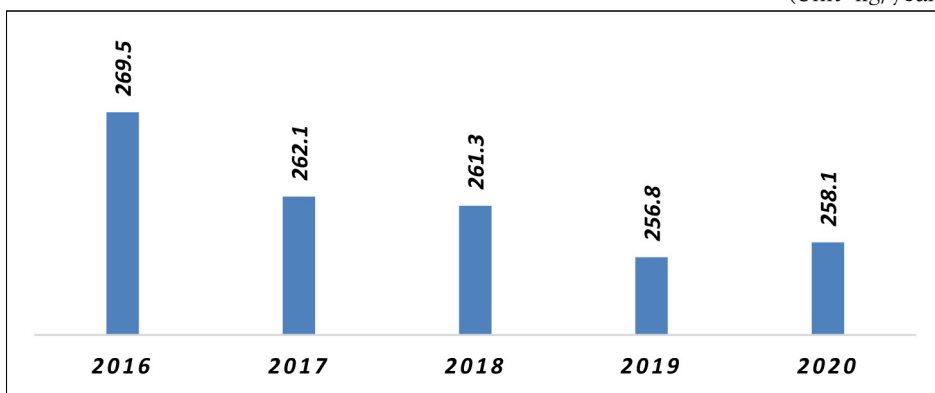
The raw milk price is impacted by the international market, farmers, and policies of procuring organizations. Sometimes, the prices are formed based on supply and demand, and the large dairy processors has huge impact on this.

Milk consumption

Raw milk is being procured by dairy producers to be processed and produce milk (mostly pasteurized), cheese, butter, sour cream, curd, yogurt, ice-cream, matsun, etc. According to National Statistical Committee per capita milk consumption in 2020 was 258.1kg/year. This number showed overall decreasing trend between 2016 and 2020. Despite the fact that the production of milk decreased between 2019 and 2020, per capita consumption of milk had a little improvement.

〈Figure 19〉 Per Capita Consumption

(Unit: kg/year)



Milk processing

Dairy processing is one of the most important agricultural sectors in Armenia. Armenian dairy market has been developed notably during the

past decade. It is currently well diversified with the largest processors producing a full variety of dairy products enough to the local consumption. In general, there are two types of players in dairy production sector: large processors, and small and medium (SME) processors. According to Ministry of Agriculture of RA, there are more than 150 milk processing factories operating in Armenia, out of which 12 processors are relatively large (“Pargev”, “Bonilat”, “Dustr Marianna”, “Multi Agro” scientific production center, “Arzni Kat”, “Tamara yev Ani”, “Biokat”, “Chanakh”, “Dustr Melania”, “Igit” LLCs, “Elola” LLC, “Ashtarak Kat” CJSC, “Arax”, etc.). The total yearly processing capacity is approximately 490 thsd. tons of milk.

The processing companies are producing a diverse range of dairy products – cheese, sour cream, curd, Matsoon, butter, etc. According to the Ministry of Agriculture, there were about 60 cheese producers in Armenia. Lori, Chanakh, Classic and Smoked Chechil in line with Suluguni, Mozzarella, Holland, Cheddar, Emmental, Tashir, Camembert, Tomme cheeses were made from cow milk. Sheep cheeses were also popular in Armenia, such as Kateh, Pemaggio, and Blue. A few companies were producing also a goat cheese. SWOT analysis for dairy value chain

The below SWOT analysis table summarizes key strengths, weakness, threats and opportunities of dairy sector in Armenia.

Strengths

- Conditions for producing milk suitable for high-end cheese production (clean water, intensive sunny days, bio diverse pastures)
- Availability of alpine zone pastures
- Increased import and usage of compound feed and feed additives

- Cheese making tradition and story around Armenian cheese
- Local high (increasing) consumption rates
- Comparably affordable and available labour force
- Emergence of lead farmers who already apply high-efficiency technologies
- Awareness about Armenian cheese in Russian market

Weaknesses

- Poor pasture management and infrastructure for feeding (condition of roads, access to water)
- Underdeveloped feed production and management capacities (forage, silage, concentrates)
- Low nutrient value of forage crops
- No feed testing laboratory services locally
- Limited access to machinery services
- Inefficient government support mechanisms
- Bad hygiene and animal comfort conditions
- Low milk yield (genetics, feeding, cow comfort)
- High milk contamination (TBC, SCC, Antibiotics)
- Inefficient milk quality control mechanism and pricing policy
- High seasonal fluctuations in milk production
- Lack of access to suitable financial products
- Knowledge and skill constraints (technical and managerial)
- Underdeveloped milk collection infrastructure
- Informal relationships between farmers and processors
- Unfavourable tax system for processors

- Fragmented farms and absence of animal identification system
- Small country, limited dairy market
- Insufficient quantity and quality of Armenian milk supply
- Not attractive for investments
- Qualified dairy experts are 60 years old and more
- Lack of high quality/diverse /packaging solutions for local dairy products
- Little diversity of dairy products and domination of salty white cheeses produced since soviet times
- Absence of insurance mechanisms
- Lack of long-term/low-cost financing

Opportunities

- High demand in export markets
- Increased demand for natural/ethnic/specialty products
- Favourable conditions for exporting (“GSP plus” regime with EU, GSP regime with Japan and Canada, ECU member, open economic relations with Iran)
- Agritourism development
- Emerging segment of quality conscious consumers

Threats

- Large amount of cheap milk powder exported from Ukraine and Russia.
- Poorly controlled sector with possibility of disease break outs
- Poor state regulation to the industry

- Single destination of export market (RF)
- Export of low quality products damaging the image of Armenian products
- Lack of follow up on required HACCP system application by RF
- Monopolized retail system and corruption at different levels
- High fluctuations of currency
- Geo-political instable situation
- Disease break outs and absence of the strong public animal health system
- Export border closure due to political reasons
- Dependence on a few big dairy processors
- Volatile dairy market and milk pricing policy
- Absence of disease control system

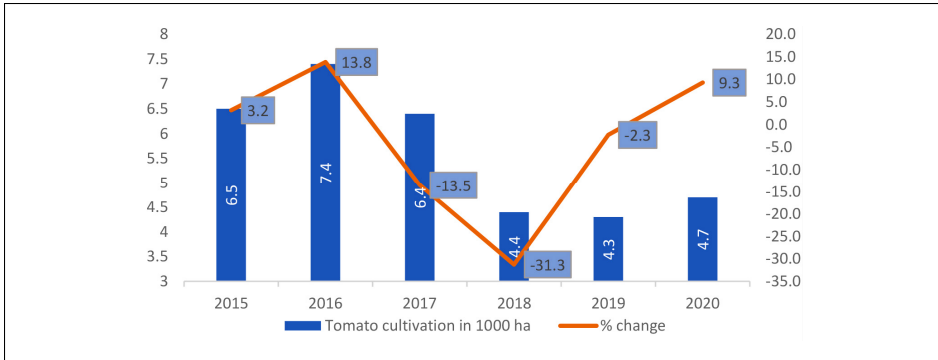
2.7.3. Tomato Value Chain Analysis

Primary production of tomato

The agri-ecological conditions, geographical position of Armenia and multipurpose use of vegetables have led to a large diversity of vegetable varieties. Tomato growing is one of the leading sectors in the Armenian agriculture. During Soviet times tomato production in Armenia was high and tomatoes were exported to other Soviet Union countries (around 100 000 tonnes annually). In Armenian households tomato is the main vegetable that is preserved in summer-time and used in food throughout the year. The importance of tomatoes in Armenia has been validated by the fact, that tomato has been the vegetable with the highest production and

consumption volumes for many years. Due to changes in agriculture, including - first of all - the land privatization, areas under tomato cultivation have been considerably increased.

〈Figure 20〉 Areas Under Tomato Cultivation

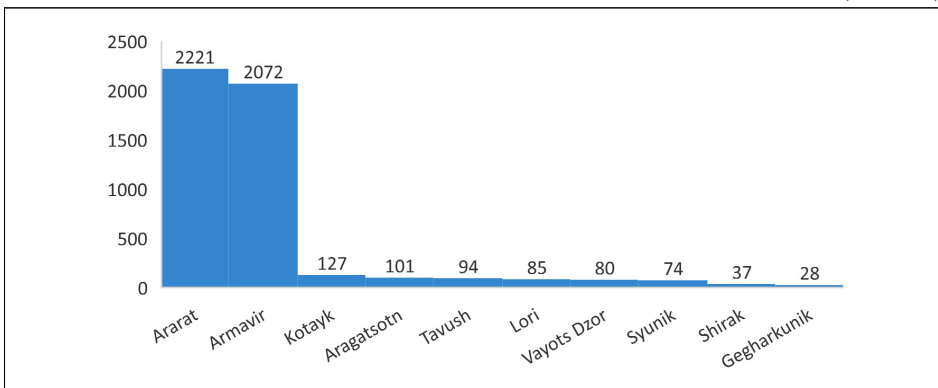


Source: National Committee, 2021

According to statistical data of 2021, the areas under tomato cultivation make 5 001 hectares. The breakdowns of the areas under tomato cultivation by regions is presented in below figure.

〈Figure 21〉 Areas Under Tomato Cultivation in 2021

(Unit: ha)

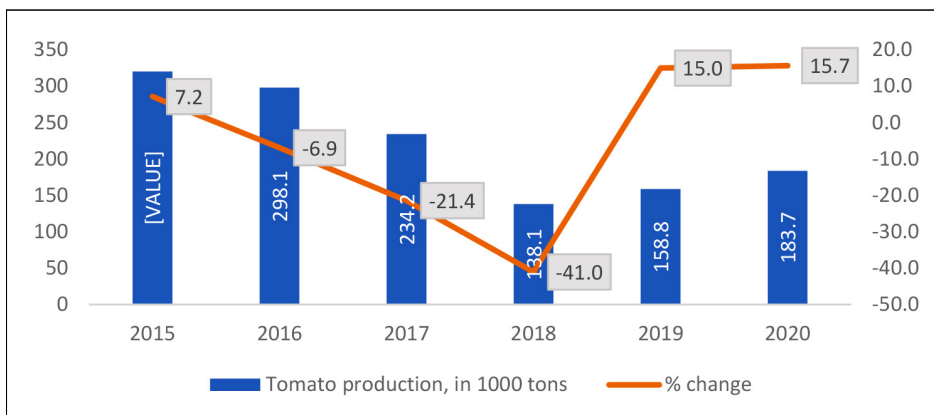


Source: National Committee, 2021

The volumes of industrial production are mainly concentrated in Ararat and Armavir regions. This, however, does not mean that it is not possible to grow tomato in other regions (tomato is very frequently harvested when still unripe for homemade marinades and other types of canned food). In Ararat and Armavir marzes the number of sunny days is quite many during the year and the average temperature is rather high for large-scale tomato production (often two sowing areas per year).

There are positive tendencies in production of tomatoes. Mutually beneficial contractual relationships are being established between producers and processors, which create prerequisites for increasing the production volumes and profitability in tomato production. Thus, based on the data provided by the Statistical Committee, tomato production increased for 33% in 2020 as compared with that of 2018.

Figure 22 Tomato Production



Source: Statistical Committee

Greenhouse crop production in Armenia is an attractive for investors sector with high growth potential in both production and export (IFC,

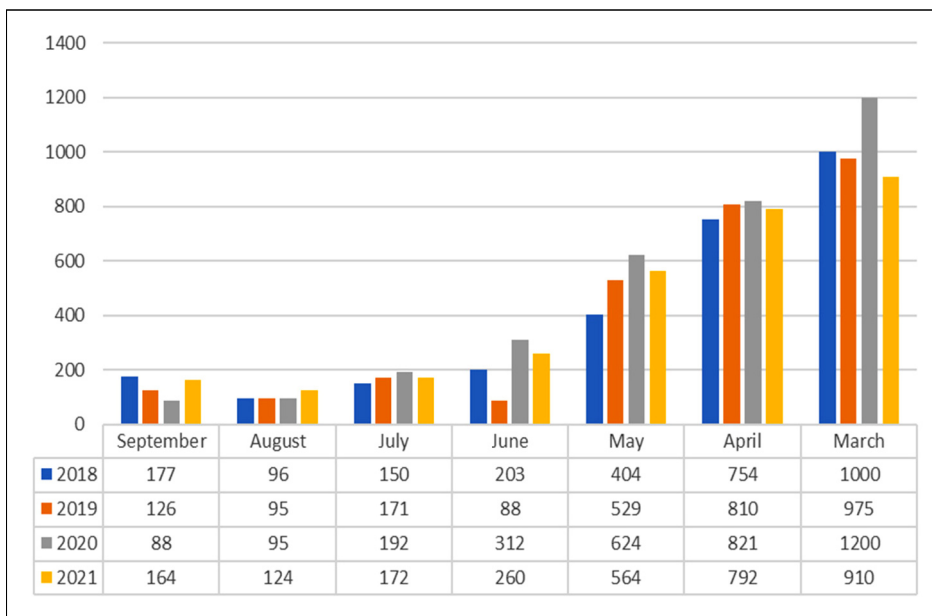
2016). The greenhouse industry—especially vegetable greenhouses—has long been a significant contributor to Armenia’s agriculture sector. Promotion of greenhouse crop production and export is important in the agenda of the Government of Armenia, as reflected in a number of its strategic documents and programs aimed at sustainable development and enhancing international competitiveness of the sector (see “Government Programs and Policy” section). To promote investments, the government exempted from VAT the import of greenhouse complexes and of a number of resources used in greenhouse crop production (IFC, 2016). In addition, the greenhouse production is exempted from profit tax. Most of the greenhouses are located in Armavir (587 ha), Ararat (199ha) and Kotayk (24 ha) regions (NSC, 2021).

According to the interview with the representative of the Greenhouses Association in Armenia, more than 60% of the greenhouses in Armenia currently producing vegetables, the tomato is having the highest contribution.

Farm gate price of tomato

The price of the tomato is highly seasonal. Based on the data provided by the Statistical Committee, the average price for 1kg of tomato sold by the agricultural producers in March-September 2021 was the cheapest in August amounting to AMD 124, whereas the cheapest price in the previous year was observed in September, equal to AMD 88. The highest price was observed in March, equal to AMD 910 (instead of AMD 1200 in the previous year).

〈Figure 23〉 Average Farmgate Price for Tomato in RA



As we can observe the retail prices of the fresh tomato can essentially fluctuate depending on the season. The prices are the highest in December-March, when the average retail prices exceed AMD 900 per 1kg. The retail prices are the lowest in July-September, when tomatoes harvested from open fields are provided to the markets in large volumes.

The production cycle of greenhouses is organized in such a way as to the main harvest is gathered during the months, when the retail prices are the highest, since tomatoes grown in greenhouses are not competitive in price with those grown in open fields.

An important component of the preparation for analysis were interviews with the stakeholders, farmers and respective specialists of tomato-processing companies, who are the main stakeholders of the process. In depth discussions were conducted with main producers, with the aim of

revealing the main strengths and vulnerabilities of the sector and identifying recent trends in domestic and international markets that could present opportunities or threats. Additionally, the interviews were used for learning more about the main sales channels and marketing tools and strategies prominent among producers.

The tomato value chain includes a highly diverse and complex number of producers (farmers) and traders characterized by widely scattered production areas and fragmented marketing facilities. This structural variety, coupled with widely differing post-harvest practices among participants posed considerable challenges for this investigation, which attempted to understand the whole value chain and its operations. Surveying and interviewing were of paramount importance in uncovering the differences in post-harvest operations among the diverse range of producers and marketers as well those linked to cultural methods in different locations required of the study.

Interviews held with the tomato producing farmers showed that in the greenhouses applying membrane technology tomato is mainly harvested starting from the second half of March till June. The optimal operation of small greenhouses is in two-phased vegetation: the first one is tomato cultivation (March-May), the second one is cucumber cultivation (September-October). Using average data, it can be stated that a 200m² greenhouse can produce around 5 tons of tomatoes. The cost price per 1 kg of tomato based on the calculations carried out by the farmers, who have taken into account the operating costs of crop growing (such as seedlings, fertilizer, fuel and electricity, water and labour force) amounts to AMD 200.

Processing of tomato

One of the tomato processing sector peculiarities in the RA is that most of the economic entities of the sector are the representatives of medium and large businesses. Based on the geography of vegetable production, most of the processing factories are located near the sources of raw material – Ararat and Armavir regions. Around 6 of the factories are located in Yerevan, 4 of them are in Kotayk region and 1 in Ashtarak (Aragatsotn region), which are also relatively close to Ararat valley. Thus, most of around 25 vegetable canneries are located 60km away from Yerevan (or in Ararat valley or very close to it). The geographic location of the factory plays an important role in its efficient operation and the closer the factory is to the source of the raw material the more competitive advantage it has.

Actually, all the factories are applying the same production and packaging technologies. Most of the companies are equipped with modern equipment and production lines (large companies), others have outdated but working equipment. No tangible difference in processing the raw material. Working processes of large companies are mainly automated whereas those of small and medium companies are mainly carried out manually. Most of the processors properly carry out quality control: with a laboratory and responsible specialist/staff, however, there is no integrated quality management system. The large processing companies are relatively good at organizing the purchase of raw materials, since they deal with larger farms, with whom they have lifelong developed relations. Meanwhile, small companies can purchase raw materials more flexibly (due to small volumes) and can change the type of production more quickly – switching from one to another. Based on the experts' opinion, there are

no serious problems in terms of meeting the raw material demand in this sector, since the main problems are in export markets.

The standardization of technological processes and the compliance of measurements are controlled by the RA Ministry of Economy and The National Institute of Standards and Technology under the Ministry of Economy. Each product should have its certificate (GOST, AST), which presents the composition of the product, nutritional value etc. On the label of each unit of product the number of certificate (GOST, AST) should be in place.

Based on their technological similarities, the cans currently produced by the tomato processing factories in the RA are classified in three main groups:

- a) Tomato paste
- b) Tomato marinade
- c) Vegetable mix.

Almost all the companies surveyed have mentioned that they do not make use of their full processing capacity for several reasons: limited marketing opportunities (mainly exporting), unpredictable business seasonality (in terms of supplied raw material volumes and prices), lack of operating assets etc.

Besides canning, tomato drying and freezing is also carried out in the RA, despite the fact that these methods of tomato processing are not so popular in Armenia and only several companies apply these technologies. The demand for dried tomato is too small in the Armenian market, that is why its production volumes are very small. Most of the production is exported, but not periodically due to the reduced demand in the

international market. Freezing is a relatively new method of tomato processing. “Tamara food” company was the first to apply this method in Armenia since 2002.

Tomato processing starts during the busiest harvest season, when the prices are the lowest. This period for tomato is August. Depending on the weather and harvesting, the processing season can last up to October (sometimes till November). All the processors have mentioned, that tomato is procured at the end of summer and at the beginning of autumn due to the increased quantity of dry matter content in them, which makes them economically more efficient for producing tomato paste.

Domestic tomato processors procure exceptionally domestic tomatoes for canned production. Although most of the raw materials are purchased by the factories directly from agricultural farms, there is also a small percent of products acquired from intermediaries and retailers as well.

The interviews conducted with tomato producers, revealed, that currently the payments for supplied products are mostly carried out right at that moment. This proves that the relations between processors and supplying farmers in this sector have been slowly developing during recent years, becoming more organized and mutually beneficial (e.g. existence of written contracts between processors and vegetable growers).

Purchasing companies state, that they reach a preliminary agreement with the farmers on the quantities, prices and quality long before the season. These agreements are mainly fixed by contracts, however, the factory representatives say, these contracts are formal, since the implementation of the contract also depends on other objective factors, e.g. climatic conditions. Besides, in case the contract is not fulfilled, it does

not assume that the farmer should be held liable. In this case the purchasing parties try to solve the problem through negotiation. At the same time, there is distrust between the two parties: tomato growers are convinced, that the processors will be trying to reduce the prices and pay small amount, and the processors are convinced, that the farmers will be taking any opportunity to avoid their responsibilities.

Tomato prices are usually being formed in the spring, before the agricultural season, which depends on several factors: weather/climatic conditions, quality of seeds and other materials, spread of diseases, availability of contracts on export signed in advance, market situation, political situation, availability of freight transportation etc.

As mentioned by the processors, tomato processors and intermediaries, as a rule, are paid at the time of supplying raw material after checking the quality of the product and acceptance, weighing and calculation processes.

Almost all the vegetable processing companies have stated, that they are ready to pay a higher market price, provided that the product meets their requirements: standard sizes, quality features – the degree of maturity, dry matter content, freshness etc.

During the survey efforts were made to have the viewpoints of both the processors and tomato growers on the improvement of their cooperation.

An effort was made to analyze the viewpoints on the problems arising between the processors and tomato growers during their cooperation. Disagreements mainly come forth on the quantity and quality of the product supplied by the farmers. Vegetable growers, at the same time, complain about the quantity of the harvest from the sowing areas and the

“low” prices of tomato purchased by the processors. The study revealed, that the biggest issue for both the producers and processors is the quantity of tomato; the second important issues might differ. Meanwhile, the farmers have recorded issues related to the primary production: low yield of sowing areas, low efficiency of rural farms in terms of the quality of the purchased materials and goods, services of agricultural machinery, labour force etc. Eventually, low productivity results in producing low quality products, for which low price is paid.

It is also interesting to compare the viewpoints of two parties on solving the issues and improving the cooperation. The answers show, that the processors are ready to take the responsibility and develop long-term relations with the vegetable growers through advance payments, providing necessary agricultural materials, signing contracts. The approaches of tomato producers a little bit vary from those of processors.

They firstly mention the prices set and paid by the processors. The necessity of signing a preliminary contract and the support from the processors before the season is of little importance for farmers.

A number of internal and external risks have been detected during the study of processing companies. One of the most important risks mentioned by almost all the companies is the quality and purchase volumes of tomato, which is usually due to bad weather conditions. In this regard, tomato is really a vulnerable crop and the reduction of its harvest volumes significantly impacts the vegetable processing industry of Armenia.

There is neither a practice of mitigating or preventing the weather impact in Armenia, nor agricultural insurance mechanisms. Some producers are well aware of the modern technologies available in Europe

and Israel. Unfortunately, such technologies are very expensive and are not applicable in a few rural farms in Armenia.

Another reason for limited purchase of raw materials, according to the processors, is the existing business habits and the vocational knowledge of the Armenian farmers.

Efficient cultivation of imported seeds and high-value crops requires application of modern methods by the farmers, relevant knowledge and skills. All this inevitably impacts the volumes and prices of raw materials suggested to processing companies. If during a fertile season the low efficiency is not so obvious, it does affect on harvest when the year is not that fertile. Those skills and knowledge are required for keeping the harvest.

In general, the processing companies have also mentioned that they encounter serious problems when there is a demand for tomato varieties and/or special variety quality for processing.

Absence of contractual business systems – when tomato producers and processors enter into formal contractual relations, which allows one of the parties to predict the expected purchase volumes of tomato, and the other party to plan the money flow from sales.

Most of the farmers and purchasers of raw materials have mentioned, that the vegetable grower-vegetable processor relations are developing slowly but steadily. Some companies have introduced an efficient/functioning system of purchasing necessary amount and quality of tomato, they have preliminary arrangements with permanent tomato growers. They sign contracts with farmers, organize meetings with them in early spring and present their plans on purchasing raw material for the given year.

The processing companies usually start purchasing tomato from August 1. This vegetable, however, is purchased at a very low price - AMD 40-100 on average. Processing companies have stated that they purchase tomato for producing tomato paste at AMD 40 per 1 kg, and at AMD 80-125 per 1 kg - for other canned tomato production. Farmers complain, since when tomato is sold at such a price, they are not able to cover even the cost price for cultivation.

Consumption of tomato

The flow of tomatoes from the point of harvest to consumption for producers and traders was documented by observing and recording the duration of each component of the system, the time taken for the fruit to move from one component to the next, including delays as well as measurable characteristics of the environment, i.e. temperature, relative humidity and time of day. The quantity handled annually and the perishable nature of the fruit have led to heightened concerns among producers, wholesalers, retailers and consumers about maintaining quality and marketing losses. Factors relating to causes, types, and magnitude of damage that lead to deterioration in quality and post-harvest losses are significant for the growth and development of the tomato industry in RA.

If we take a closer look at the volumes of tomato production in Armenia, we will see that it accounts for high production volumes. It also plays a vital dietary role for consumers. This makes both the production and consumption of tomato increasingly important. However, this sector suffers greatly from postharvest losses. Some estimates suggest that in countries like Armenia about 30-40 percent of fruit and vegetables are lost

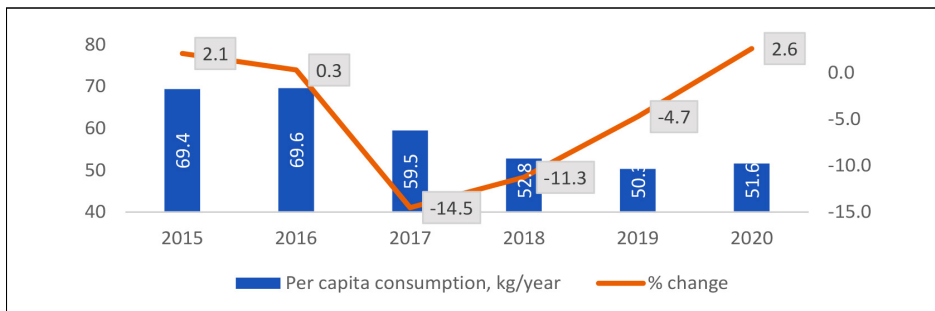
during the harvest and postharvest stages of the value chain. Some products are highly seasonal and may not be sold on the local markets for profit, while international markets may reject fruit and vegetables containing unauthorized pesticides and with inadequate labeling and packaging.

About one third of tomatoes sold in Armenia are distributed through open/fresh markets. The tomato harvesting season starts in mid-summer, and lasts until early fall, which is the hottest period in Armenia. Open markets are not equipped with refrigerators or cool areas where resellers can keep fruit and vegetables. The produce is kept in boxes in the direct sunlight, or in the best-case scenario under covered boots, which is still not enough to protect the produce. Losses reported in the agricultural production stage were due to unfavorable weather conditions in the harvest period and as a result of pests and birds. Losses during the processing stage include natural waste assumed by processing operations.

The index of final consumption (food use) is one of the key items of the food balances, which shows the amount of a commodity available for human consumption during the reference period. It is calculated as the difference between the supply and all other means of utilization.

Per capita consumption of tomato in 2020 was 51.6 kg/year. For the period 2016 and 2019 the per capita consumption decreased (from 69.6 kg/year to 50.3 kg/year). Meanwhile, this measure showed an improvement for the period 2019 and 2020.

〈Figure 24〉 Per Capita Tomato Consumption

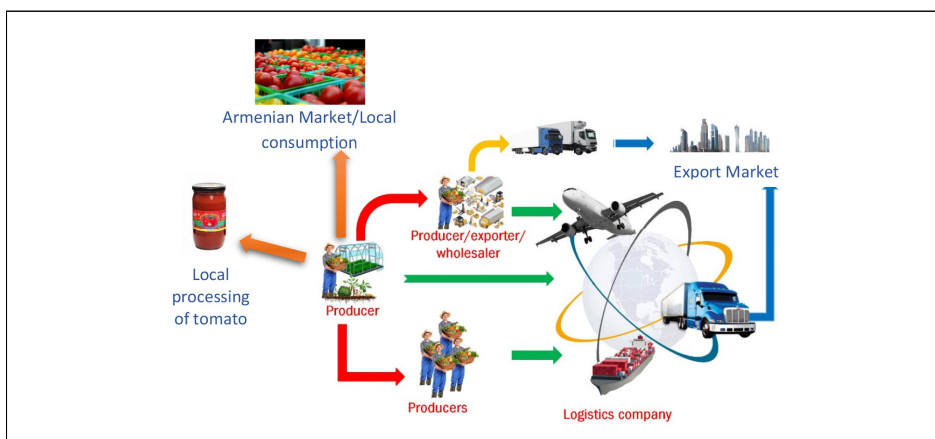


Source: National Statistical Committee

Tomato trade

As it was mentioned earlier, the majority of the tomato is produced in greenhouses. The products from small greenhouses are mainly sold in adjacent villages and towns. Large greenhouses of the RA are located in nearby communities of Yerevan. The product of these greenhouses are mainly exported, some part of it being supplied to the domestic market out of season. But this supply is mainly carried out into trade and service points of Yerevan and nearby cities. See the diagram of tomato supply chain.

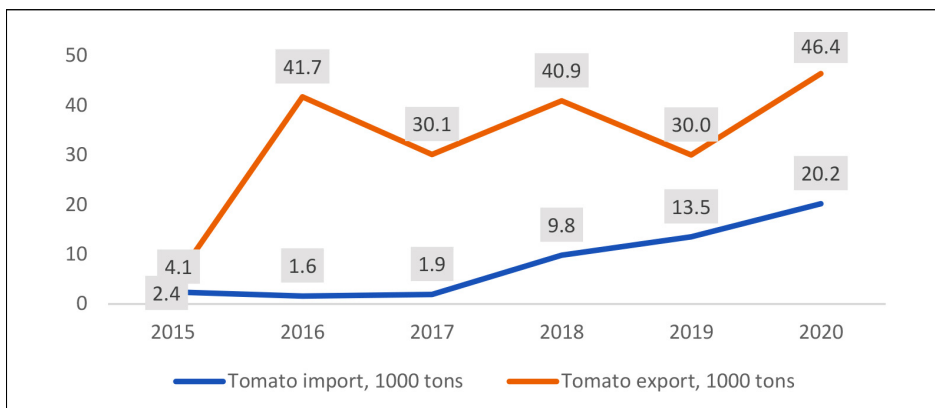
〈Figure 25〉 Supply Chain of Tomato



Since the consumption of fresh vegetables during winter season essentially reduces, especially in the marzes, it is economically not viable to deliver fresh vegetables from Yerevan to remote marzes and communities. Thus, the products of greenhouses in remote marzes are mainly consumed in local markets and are not competitive with the products of large greenhouses.

Tomatoes cannot be stored for long time. This high perishability decreases farmers' bargaining power, and all tomatoes must be sold on the market, to wholesalers or to processing plants within a few days. Armenian tomatoes are quite popular in Russia and are exported, but mostly as a processed commodity.

〈Figure 26〉 Tomato Trade



The main export market for fresh tomatoes is the Russian Federation. The export volumes have sharply increased in recent years due to the greenhouses with latest technologies established by the large companies in Armenia (Spayka Group, Armyanskiy Urazhai, Mavas Group) specialized mainly in export.

Armenia is exporting tomato with the following categories: Tomatoes, whole or in pieces, prepared or preserved otherwise than by vinegar or acetic acid (HS code 200210)

- Tomatoes, fresh or chilled (HS code 070200)
- Tomatoes, prepared or preserved otherwise than by vinegar or acetic acid (excluding whole or in pieces) (HS code 200290)

The major imports are carried out from December to March. Most of the tomatoes are imported to Armenia from Iran and Greece, as well as from Turkey, before relevant restrictions were set. The restrictions on importing Turkish product have positively affected tomato production. Shortly after the restrictions the high rates of tomato production immediately filled the gap. The decision on restriction of Turkish products revealed that the state funding for rural support spent on constructing greenhouses in Armenia was justified. Although the prices of domestic tomato are high, the forecasts say after some time the prices will decrease due to increased volumes.

Strength

- GoA recognizes the importance Horticulture sector in Armenia
- Favorable conditions for producing tomatoes (including clean water, intensive sunny days, fertile soil)
- Comparably affordable and available labour force
- Emergence of lead farmers who already apply high-efficiency technologies
- Awareness about Armenian Agricultural products in Russian market
- Improved business environment

Weakness

- Undeveloped image of Armenia as an Agricultural Country Internationally
- Lack of business management skills
- Lack of access to markets
- Fragmented land plots
- Low level of extension and advisory services
- Lack of access to suitable financial products
- Knowledge and skill constraints (technical and managerial)
- Underdeveloped infrastructure
- Lack of tomato cooperatives
- Informal relationships between farmers and processors/ Lack of contractual agreement
- Unfavourable tax system for processors
- Fragmented farms
- Lack of Qualified experts
- Absence of insurance mechanisms
- Lack of long-term/low-cost financing

Opportunity

- Expanding export market
- Fruit and vegetable upgrading into packaging storage
- Attracting foreign investment
- New available techniques to improve productivity and quality of crops
- Investment in processing sector

Threats

- Slow economic progress in the country
- Geo-political unstable situation
- Low quality products impacting the image of Armenian wines
- Human disease breakouts
- Grape disease breakouts
- High dependence on Russian market
- Unstable transportation routes
- Poor state regulation for the industry
- Lack of follow up on required HACCP system application
- Monopolized retail system and corruption at different levels
- High fluctuation of currency
- Supply of cheaper vegetables from outside

2.8. General Status and Prospect in Agriculture and Food Industry

The 2019 program of the Government of the Republic of Armenia emphasized the importance of the policy development for the Public-Private Partnership and efficient implementation of PPP projects. The objective of RA Government is to implement such PPP projects, under which the concluded contracts in the long-term perspective will effectively manage the risks allocated between the public and private partners, will contribute to building and development of infrastructures in the country

within the framework of PPP projects, as well as will ensure positive outcomes based on the quality and value of services rendered to the public. In order to achieve the specified objectives, processes aimed at developing PPP projects and forming the legislative framework for implementation have been initiated.

Within the framework of the PPP policy development, the document “The Public-Private Partnership Policy of the Republic of Armenia” was approved during the RA Government session on November 9, 2017. On June 28, 2019, the RA Law “On the Public-Private Partnership” was adopted, which defines the PPP relations, implementation criteria, procedures, the institutional framework of governance, and applicable principles.

The legislative regulation of the PPP legal relations is aimed at efficient identification, development, implementation, promotion, and management of PPP projects in the Republic of Armenia, as well as creation of a database for PPP projects and setup of an institutional environment. (Ministry of Economy)

Criteria of the Public-Private Partnership are:

- a) At least five years of project duration
- b) Construction or improvement of a public infrastructure, operation, as well as technical maintenance
- c) Risk allocation between the public and private partners
- d) Ensuring the economic profitability of the Republic of Armenia
- e) Compliance with the RA Government priorities
- f) Ensuring fiscal affordability
- g) Ensuring value for money

Based on the analysis conducted by Ministry of Economy the following directions were underlined as important aspects to emphasize in future planning: First the approach to strengthen the relationships is the provision of property by the Government (building, land) to the investor for starting business in Armenia. In addition, the Government proposes to subsidize 50% of construction of infrastructures for those who are ready to invest in relevant projects. Having said that since 2019 Armenian National Interest Fund (ANIF) has been established with a mandate to consolidate and effectively manage the ownership of Armenian state-owned enterprises, to promote export growth and investments in Armenia by providing co-financing in large-scale projects at their initial stage of development. While being a government established organization, ANIF is a non-partisan and non-political entity, whose primary stakeholders are the State of Armenia, the people of Armenia and internal and external investors. The strategy is based on the ultimate goal of creating shared value and benefits for all stakeholders. Besides providing all necessary information and communication with government and municipal agencies ANIF strives to be a good and reliable partner during the lifetime of the investment. Co-investment models provide Investors an additional capital source to make larger investments and seek higher returns.

ANIF as a co-investor carries the investment risk and is dedicated to concentrate its experience and knowledge to achieve higher result. Doubtlessly, co-investment model deepens collaborative relationships between ANIF and Investors and which not only benefits the immediate investment, but also the long-term relationship between the parties. ANIF strong management and professional team with over 15 years of

experience in finance and business management provides ongoing support and assistance throughout the lifetime of the project.

Another crucially important institution is the Fund for Rural Economic Development of Armenia (FREDA). The Fund was established on January 8, 2009 in the framework of the “Rural finance” component of the “Farmer Market Access Program in Armenia”, which is a joint activity between the Government of Armenia and the International Fund for Agricultural Development (IFAD). The Fund carries its operations since September 1, 2009. FREDA is the first investment fund in Armenia with a rural focus that makes investments in rural SMEs by providing innovative financing instruments and capital and management assistance, thus enabling the enterprises to improve their competitive position and thus contribute to accelerate rural development. FREDA’s overall objective is as to alleviate poverty through the economic development of rural areas in Armenia. FREDA is governed by the Board of Trustees headed by the Minister of Economy of the Republic of Armenia. FREDA’s investment decisions are approved by the Investment Committee, which is a collegial body operating under the Board of Trustees.

Another financial instrument for the development of the agri-food sector is the introduction of the Social Impact Bonds in the Country. A development or social impact bond is an innovative financing tool that applies a private sector’s mind-set to the commissioning of certain services. Social bonds provide investment to address social problems by funding preventive measures. When the social outcomes improve, investors are repaid their initial investment plus a return for the financial risk that they took (UNDP, 2021). Investors typically fund the delivery of

such services and get repaid together with a financial return by an outcome funder (typically a government or a donor) upon successfully delivering the services and achieving pre-defined outcomes. The services are typically implemented by social sector organizations which investors support with working capital and management resource to achieve the best outcomes. The European Bank for Reconstruction and Development (EBRD) and the United Nations Development Programme (UNDP) are initiated a pilot project to apply a commercial approach to the development of the smallholder dairy industry and focusing on both productivity and quality should result in the extension of the approach to cover farms in Shirak and other regions of Armenia (EBRD, UNDP, 2021).

2.8.1. State Support Leasing Programs

Development of Sheep and Goat Breeding in the Republic of Armenia for 2019-2023

The program “On state assistance for development of sheep and goat breeding in the Republic of Armenia for 2019-2023” was approved by the RA Government on September 19, 2019. Within the program framework, for ensuring access to acquisition of pedigree small cattle it is envisaged to provide the state assistance in two ways:

A. Partially subsidizing the interest rates on loans provided for acquisition of pedigree small cattle, in which case according to the RA Government Decree No.175-L of February 11, 2021, these loans will be

available to beneficiaries until December 31, 2021 at 0% interest rate, up to 4 years of repayment term and up to 1 year for the principal amount with preferential terms.

The state can provide co-financing at 70% to agricultural cooperatives and 30% to other business entities.

The lending process is initiated by beneficiaries by applying to financial institutions (LIST) for a loan and applying on acquisition of pedigree small cattle, whereby the application shall specify the quantity of the pedigree offspring to be purchased, location(s) of acquisition (import), timelines of acquisition. The beneficiary shall also present to the RA Ministry of Economy (hereinafter referred to as the Ministry) the verifications (certificates, cards) of the pedigree small cattle to be acquired in order to provide necessary advice to financial institutions on ascertainment of the small cattle's pedigree status for acquisition.

B. Reimbursement of expenses incurred: in this case, 23% of the amount actually paid (excluding transportation costs) will be compensated for the pedigree offspring acquired by the beneficiary at a price of up to 450 thousand AMD for each animal, and 27% will be compensated to the border settlements approved by the RA Government Decree No.1444-N of December 18, 2014, and cooperatives operating in agricultural sector for the pedigree small cattle acquired at a price of up to 450 thousand AMD for each animal.

The compensation process is initiated by business entities in agriculture by submitting to the Ministry an electronic and (or) paper-based application before starting the endeavor on acquisition (importation) of the pedigree small cattle.

The registered beneficiary, upon acquiring the pedigree offspring, shall submit to the Ministry either an electronic or paper-based request for compensation, as well as attach verifications (certificates, cards) of the animals purchased, receipts or invoices for amounts paid for the animals, veterinary certificates verifying the health status of the animals (in case of importation also the standard form issued in the exporting country), reference on number of animals registered in the community, and bank account number.

The maximum estimated value of a pedigree small ruminant acquired within the program framework is set at 450 thousand AMD. The maximum loan amount per beneficiary is set at 900 million AMD (maximum 2,000 pedigree small ruminants, including no more than 100 pedigree male offsprings (of sheep and goats)), and not more than 450 million AMD for the first year alone (maximum 1,000 pedigree small ruminants, including no more than 50 pedigree male offsprings (of sheep and goats)).

The program does not set any precondition for selection of specific breeds among pedigree small cattle according to their productivity (whether dairy, meat, or wool producing), except for their sex and maturity groups: up to 18-month-old pregnant sheep and goats, 4-16-month-old females and 6-16-month-old male offsprings (in case of importation, as of the moment of putting in quarantine in the exporting country and concluding a sales contract in the Republic of Armenia) with the ratio of 20: 1 (1 male for 20 females).

State Assistance of Leasing for Financial Lending of Agri-Food Equipment in Armenia

The main goal of the program on “State assistance of leasing for financial lending of agri-food equipment in the Republic of Armenia” is the provision of business entities operating in the agri-food industry with machinery on affordable terms, in particular, using mechanisms of financial lending (leasing) of equipment. This will create preconditions for increase of production volumes of agricultural products and their processed goods, meeting the quality and safety requirements in compliance with international standards, enhancement of competitiveness, expansion of exportation volumes, as well as replacement of imported products with the locally produced.

Within the program framework, the leasing agreement provides business entities with equipment used in the following areas:

- a) animal breeding, including breeding of cattle, sheep, pigs, poultry, bees, fish, snails, industrial fur farming,
- b) crop production, including greenhouses,
- c) refrigeration facilities, including milk storage stations and isothermal cisterns for milk transportation,
- d) operation of sorting and packaging of fresh fruits, vegetables, and grass-and-legumes, and refining of grass-and-legumes,
- e) slaughterhouse activity, mobile and portable modular slaughterhouses, as well as transportation means for transfer of carcass meat purchased by the slaughterhouse service provider,
- f) agro-processing industry,

At the same time, within the program framework the slaughterhouses, greenhouses, refrigeration facilities and business entities of agricultural significance (including the land on which the slaughterhouse, greenhouse, refrigeration facility or storage entity of agricultural significance are built), supplied with necessary equipment, can be considered by the contracting organization as a subject of leasing.

Under the program, 50% of the down payment at 20% (which is 10% of the cost) of the leased fish farming equipment (equipment to be acquired for alternative use of water resources) can be compensated by the state. The total cost of equipment purchased within the framework of the program should not exceed 1000.0 million AMD.

According to the RA Government Decree of February 11, 2021, the provided leasing program will be available to beneficiaries until December 31, 2021, on the following terms: 0% interest rate, 20% down payment, up to 8 years of repayment term. There is a preferential term defined for repayment of the principal amount of the lease, which is calculated for a maximum of 3 months from the moment the lease is granted. In addition, at the request of the lessee, the financial institutions may establish break periods for repayment of the principal amount of the lease for a period of up to 6 months per year.

Community Agricultural Resource Management and Competitiveness (CARMAC) second project

One of the successful projects carried out by Government is “Community Agricultural Resource Management and Competitiveness” Second Project. The main aim of the project is the improvement of pastures, the

productivity and sustainability of livestock system in target communities. The Project aims at ensuring the growth of the volume of products produced and marketed in selected high-value agri-food value chains. The total cost of the Project is 42.67mln US\$.

The Project includes the following four components:

- a) Community pasture/livestock management system
- b) Value Chain development
- c) Strengthening Public Sector Institutions
- d) Project Coordination and Management

Particularly, the main objective of the VCD component is to improve the ability of Armenian agricultural producers and processors to meet domestic demand and access international market opportunities in the selected food value. This will result in increase of the processing volumes of milk, meat (fish, poultry), fruit, vegetables, honey, herbal teas and high value berries. The component targets at the development of the selected food business operators and the increased quantity and value of marketed products.

Under this Component, targeted Funding amounts to not more than USD 50,000 and not less than USD 8,000 and the sub-projects are co-financed by Beneficiaries in the amount of not less than 50% of the total sub-project amount.

2.8.2. The Role of Private Companies

The role of private companies in Dairy sector

Being primary usage product, the effectiveness of milk production in Armenia has always been a priority issue for Government of RA. Recently, there were several changes and support to dairy value chains, which supported industry to enter new development stage. With the help of donor organization, there were several supports toward establishment and improvement of milk collection units, establishment of milk collection cooperatives, enhancement of milk supply both in terms of quality and quantity.

With the help of World Bank funded Community Agricultural Resource Management and Competitiveness (CARMAC) project, productivity and sustainability of pasture based livestock farms in 55 mountainous communities were improved by increasing milk production, improving pasture management, and enhancing farm sales of livestock products. The project helped to address key constraints facing these activities, including unsustainable pasture management and underutilization, persistent diseases, processing and marketing constraints. Along with this CARD Foundation has implemented a range of project directed to the development of animal husbandry in Armenia. Among those are Animal Health Management Project funded through Austrian Development Agency (ADA). There are also other local international organizations implementing project in animal husbandry sector, among them Swiss Development Agency, UNDP, USAID, etc.

Along with the international organizations, whose main role is to support

and enhance the sector, there are primary producers and processors who are playing a key role in the market. As mentioned earlier, there are more than 150 dairy processing companies, which are targeting not only the local market but also international markets. Some of the processing companies own separate dairy farm, some of them purchase a milk from the farmers. The description of some processing companies are presented below:

“Doustr Marianna”

“Doustr Marianna” company (with trademark name MARIANNA) was founded in 1997. It produces a wide range of dairy products such are whole-milk and sour milk products, milk cocktails, yogurts, cream butter, and cheeses. The company also produces dairy products living microorganisms under the brand called BIFIDO. Under the “Yerevan Kat” brand name the company produces various types of ice cream. The company 's laboratory is compatible with ISO 22000 system standards.

“Yeremyan’s Product”

In the framework of its agricultural activity, in 2020 “Yeremyan Projects” established a production of high-quality milk and dairy products. “Yeremyan Products” applies European standard technologies and methods of operating its production farms, due to which milk and dairy products are in compliance with European quality requirements. The company produces Pasteurized milk, sour cream, curd, etc.

“Ashtarak Kat”

The company was founded in 1995 in the village of Agarak, Aragatsotn marz. The company has about 500 employees and cooperates with 6000 farmsteads. 45 types of ice cream with its flavoring subspecies, 50 types of

dairy products with its subspecies, jams and confitures has been produced by “Ashtarak-Kat” CJSC.

“Bonilat”

“Bonilat” was founded in 2005, in the place of former cheese factory base in Talin, which was the only producer of “Roquefort” cheese in the USSR. Over the past years the company has managed to replenish factory with ultra-modern equipment which allows to provide high quality products with daily laboratorian control in order to fit with the appropriate milk quality and safety standards related with the production indicators. Nowadays, initiatives are underway to optimize food safety management systems and to be able to meet ISO 22000 international standard.

“Biokat”

Biokat Ltd was founded in 2003. The company produces 30 types of high quality dairy products. The company utilizes only natural milk delivered from Aragats and Aparan regions. Biokat company started ice cream production in 2010. Today, it produces 17 types of ice-cream with 5 different flavors.

“Chanakh”

“Chanakh” LLC was founded as a cooperative company in Zovq, Kotayk marz in 1991. The company is fulfilled with the newest technologies and is compatible with sanitary-hygienic standards. It produces healthy and high-quality dairy which is known all over the country.

“Igit”

“Igit” LLC was founded in Azatan, Shirak in 1995 by the Igityan family. The director, Andranik Igityan, was considered to be one of the best producers of cheese in the Soviet Union. The company is developed with

the newest technologies, which helps to produce high quality products with traditional taste.

“Daughter Melania”

The LLC was founded as a family business in Tashir, Lori marz in 1996 (known as “Daughter Melania” since 1999). The factory produces about ten types of cheese: “Sargis”- Lori, Alashkert, Lalvar, Tashir, Chanakh, String, Suluguni, Holland, etc. Due to high quality of the collected milk, traditions of cheese making and the newest technologies used, the company provides safe products.

Since 2001, the major part of the production has been exported to the Russian Federation and the USA. In 2012, the company was certified with ISO: 22000-2005 international certificate.

“Araks 2”

“Araks 2” was founded in 1990. It began to produce Lori, Lori with tarragon and spices (8 types), Gauda (with species), Chanakh (with tarragon), sheep cheese, Feta and other types of cheese since 2005.

The role of private companies in Grape/wine industry

Since ancient days Armenia has been famous for its wine-making traditions which are still kept in practice to this day. There are several key players in the market, which can be grouped in the following clusters:

Grape producers and processors: A large number of wineries and vineyards are found almost all regions (Aragatsotn, Ararat, Kotayk, Vayots Dzor, etc.) in Armenia, some of them owns their vineyards, others purchase the grapes directly from the farmers. Short information on the relatively large wine making companies are presented below:

- Voskevaz Winery, opened in 1932 in Voskevaz community, Aragatsotn region. The winery produces a variety of wine, mainly under the brands Vanakan, Voskevaz, Urzana, Voskehat, Voskevaz Areni Noir, and Chateau Voskevaz.
- ArmAs Winery, opened in 2007 in Nor Yedesia, Aragatsotn region. The winery produces a variety of Areni wine under the brand ArmAs. The company established its own vineyards.
- Armenia Wine Winery, opened in 2008 in Sasunik, Aragatsotn region. The factory produces wine under the brands Tariri, Takar and Armenia. It also produces the Armenia Champagne.
- Van Ardi Winery, opened in 2013 in Sasunik, Aragatsotn region. The winery produces a variety of wine under the brand Van Ardi.
- Vedi Alco Winery, opened in 1956 in Ginevet, Ararat region. The winery produces a variety of wine derived from the grapes of Areni, Kagor, Muscat and Saperavi, with the most notable brands being Yerevantsi, Getap Vernashen, Hayq, Khoran and Vivat Armenia. Vodka brands of Vedi include Afisha, Senator, and Leader. Cognac brands of Vedi include Duduk and Araks. The winery also produces fruit brandy, fruit vodka and fruit wine.
- Avshar Wine Factory, opened in 1968 in Avshar, Ararat region. The factory has a variety of Armenian cognac brands, including Avshar, Erivan, Gladzor, Ardvin, Marmara, Tigris, etc.
- Alluria Wines, opened in 2016 in Vagharshapat, Armavir region. The winery produces red and white wine labeled as Alluria.

- Hin Areni Vineyards, opened in 2007 in Areni, Vayots Dzor. The winery produces a variety of red Areni and white Voskehat wine under the brand Hin Areni.
- Trinity Canyon Vineyards, opened in 2009 in Aghavnadzor, Vayots Dzor. The winery was the first to produce award-winning certified organic wines in Armenia. Their brands are 'Trinity Eh, 6100, Ancestors' and Crossroads. The Trinity Ancestors is a natural red and amber wine.
- Areni Wine Winery, opened in 2003 in Areni, Vayots Dzor region. The winery produces red Areni under the brands Areni Wine and Areni Country, as well as white Areni under the brand Sun Areni.
- Yerevan Brandy Company, opened in 1887 in Yerevan. The company produces a series of Armenian cognac known as ArArAt, including Erebuni, Nairi, Tonakan, Vaspurakan, etc.

Government. The cluster is regulated by the Ministry of Agriculture, which is responsible for the state policy and programs implemented in plant growing and agro-processing, and by the Ministry of Economy, which is responsible for the Industrial Policy. The Government established a separate body responsible for the development of viticulture and winemaking in Armenia – the Vine and Wine Foundation of Armenia (VWFA).

The Vine and Wine Foundation (VWFA) of Armenia was established in 2016 for the efficient and coordinated development of the sector, as well as for the introduction of the new strategies of state policies and developmental

programs. As Armenia is experiencing its wine making renaissance, the VWFA developed a strategy aimed at the creation of all the preconditions necessary for the provision of high-quality raw materials for wine production focusing on:

- The enhancement of the competitiveness of Armenian wines in the international market,
- The enhancement of legislative framework and quality control mechanism,
- Targeting the development of professional capacities,
- Improving the business environment and increasing the export volumes.

Education. The Armenian National Agricultural University provides a degree in Fermentation Technology and Winemaking, while EVN Wine Academy (owns by ICARE foundation) offers a professional 18-month certificate program in Enology and Wine Business. Nonetheless, lack of skilled workforce is one of the major problems of the cluster.

Institutions for collaboration. Several institutions for collaboration exist in Armenia, such as the Union of Young Winemakers, Armenian Association of Winemakers, and Vineyards of Armenia, however, none of them represents the whole cluster and has enough power to affect and shape it. Union of wine makers was founded in 2012 and currently has 30 young members. The goal of the association is to boost wine industry development in Armenia and support young winemakers to get training

courses and build their career paths in the field. Currently, the association is going to implement some projects related to tourism development in the region, support local small winemakers to produce better quality wines and sell in better conditions. They organize Armenian wine promotion events to raise the awareness among consumers and also do yearly research around Armenia to find out which age segment prefer which type of wine of what producers' products and in which price range and to understand Armenian market demand. The latest research showed that preferences among consumers are changing in favor of Armenian wines. The association cooperates with VWFA, Areni Wine festival and Semina Consulting.

Nurseries. Nurseries are needed for growing grape vines until they are mature enough to be planted in grape yards. In Armenia, Semina Consulting has established 2 vine nurseries: Astghadzor Nursery in Vayots Dzor Region of Armenia (the grape varieties include: Kakhet, Voskehat, Tchilar, Nazeli, Khatun Kharji, Mormor, Movuz, Jrali Kara, Vardaguyn Yerevani, Tigrani) and Khramort Nursery in Artsakh (the grape varieties include: Khndoghni, Kangun (Armenian Complex Hybrid), Rkatsiteli (Georgian)) (Semina Consulting)

Supporting organizations: There are lots of supporting organizations, among which CARD foundation can be classified as a leader in the market. Central for Agribusiness and Rural Development Foundation (CARD) is a full successor of United States Department of Agriculture's Marketing Assistance Project (USDA-MAP), developed in 2005. CARD particularly

works on developing and improving the Armenian wine industry, focusing on vines, winemaking, and irrigation and harvest techniques. It helps farmers increase yield and improve the quality of Armenia's wines. It provides marketing, bottling and labeling assistance. CARD sponsored model wineries in Vayots Dzor initiating new boutique wineries development.

The role of private companies in Tomato Industry

Armenia's "tomato heritage" started in 1944, when plant breeder Anahit Ananyan cultivated the first Armenian tomato variety, which was named "Anahit 20" in her honor. Currently, the sector is saturated with different varieties of tomato, which are produced both for local consumption/processing and export. As mentioned earlier, the tomato grows in open field mainly small producers producing mainly for final consumption and processing, and in greenhouses (small and large producers) producing tomato mainly for export and local consumption in out of the season. The greenhouse industry has been an important contributor to the agriculture sector in Armenia and currently it is one of the most dynamically developing industries. And the increased demand for the country's greenhouse products, mainly vegetables, offer promising export opportunities for farmers.

Promotion of greenhouse crop production and export is important in the agenda of the Government of Armenia, as reflected in a number of its strategic documents and programs aimed at sustainable development and enhancing international competitiveness of the sector (see "Government Programs and Policy" section). To promote investments, the government

exempted from VAT the import of greenhouse complexes and of a number of resources used in greenhouse crop production (IFC, 2016). In addition, the greenhouse production is exempted from profit tax.

Most of the large greenhouses are located in Armavir, Ararat, and Kotayk regions. Investments in modern greenhouses are well anticipated in Armenia. In 2019, the Armenian Government approved the program of state support for the establishment of small and medium-sized greenhouses, thus prioritizing the sector's development.

The main players in Armenia in greenhouse industry are “Spayka”, “Amyanski Urojay (RoseArt)”, “Eco Land”, “Green Farmer”, “GreenFood”, others. Some available information on each greenhouse complex is introduced below:

“Spayka” LLC: “Spayka” LLC is the leading agricultural holding in the region. It is engaged in producing various types of agricultural products. Spayka LLC has invested more than 300 million in Armenian agriculture. Nowadays, the Greenhouse Complex of “Spayka” reach to 105 hectares, that produce 50 000 tons of Dutch sort tomatoes and pickled cucumber. The Greenhouse Complex with over 55 hectares is located at the foot of Saint Mount Ararat and 50 hectares not far from Yerevan. More than 1800 workers are engaged in the greenhouse operating.

The main crops produced here are mainly cucumber, tomato, pepper, radish. “Spayka”'s Greenhouses are built of French innovative technologies. Biological pest control is used for having ecological production.

The Greenhouse Complex of “Spayka” is certificated with Global Gap, ISO 22 000 and ISO 9001 management systems. The greenhouse is equipped with advanced system of ultra-climate, which ensures high

productivity. Besides C.I.S. and Russia, the products are also delivered to Gulf and European countries.

Green Farmer LLC: With 5 ha total area Green Farmer's greenhouse, located in Kotayk marz mainly produces tomato and lettuce. The greenhouse complex works with hydroponic system.

Eco Land: The total area of Eco Land greenhouse complex is almost 1 ha settled in Kotayk marz. They are producing tomato, cucumber, berries.

The tomato produced in greenhouses is mainly exported. In the summer season, when open field production takes place and the prices are lower, the processing companies buy the tomato from the farmers and produce different types of canned products. According to the Ministry of the Economy, there are more than 50 vegetables (including tomato) processing companies, out of which 8 processing companies are comparatively large ones (Artashat Cannery, Ararat canning factory, MAP CJSC, etc). Artashat Cannery OJSC is one of the leading and largest companies in food industry in Armenia. It is a continually growing and expanding company with a capacity to produce up to 40 million canned goods annually and continues to increase the production volumes. The mission which "Artashat Cannery" OJSC set to itself from the very first days of the company was to provide only high-quality food products which would improve one's quality of life. The company presents Artfood, Janarat and Like a Chef brands in the assortment of vegetables, marinades, jams, compotes, canned food and sauces, as well as Amare, Natura and Vitamix brands with various fruit juices.

3

Policies and Experience of Korea

3.1. Agricultural Products Quality Management System in Korea

3.1.1. Rating Standards and Pricing System for Raw Milk

Development of the Dairy Industry in Korea

From the 1960s to 1980s

After dairy cattle were first introduced to Korea through the Korean American Foundation in 1961, the import of dairy cattle from the United States, New Zealand, Australia, and Canada was facilitated. The dairy policy began to be widely implemented as it was included in the first Five-Year Economic Development Plan in 1962-1966. The policy was basically intended to form grasslands, introduce dairy cattle, and support dairy farms and milk processing businesses, thereby laying the groundwork

for the self-sufficiency of milk and dairy products and boosting the dairy industry. Back then, there were only three milk processing facilities newly constructed across the country, which was not sufficient to afford a growing volume of raw milk.

Under this dairy policy, the milk processing industry rapidly expanded, starting from the construction of a sweetened condensed milk processing plant by Seoul Milk in 1963, which was followed by the production of condensed milk by Vilac in 1965, the construction of a powdered baby formula plant by Seoul Milk in 1965, and the production of powdered baby formula and unsweetened condensed milk by Namyang Dairy Products Co., Ltd. respectively in 1966 and 1967.

Meanwhile, from the policy perspective, the Processing of Livestock Products Act was enacted and promulgated in 1961 to provide a legal basis for the treatment and processing of milk, while the Dairy Promotion Act was enacted in 1967 to provide a legal basis for the development of dairy farms, the designation of land for dairy farming, the dispute mediation between milk producers and processors, and the proper price setting for raw milk.

Many new milk processing plants were constructed in the 1970s. In 1971, the government entered into a 76 million-dollar-loan agreement for the dairy industry with the International Bank for Reconstruction and Development (IBRD) to initiate various projects, including the import of dairy cattle, the formation of grasslands, the support of equipment for dairy farms, and the construction of milk processing plants. Refrigerated transportation of milk was challenging back in those times, so most milk processing plants needed to be located near consuming regions. From the

mid-1970s, the shortage of raw milk due to the construction of many new milk processing plants and the increase in the demand for milk and dairy products led to the fierce competition between processing plants for raw milk. The then Ministry of Agriculture and Fisheries tried to resolve this situation with the support for the prepayment of dairy cattle and subsidies for dairy farming, but this also caused the frequent change of raw milk suppliers, intensifying the confusion in the milk collection market, stirring up the competition between businesses, and indirectly triggering the increase in the price of raw milk. In the 1980s, the volume of raw milk increased by only 10% to 412,000 tons due to social unrest and an economic slump, but the declining consumption of milk and the subsequent accumulation of stockpiles of milk led to the deferred payment for raw milk and the depression across the dairy industry. The Ministry implemented various measures to accelerate the consumption of milk, while continuously increasing the price of raw milk to protect dairy farms.

In the late 1980s, the Ministry handled livestock hygiene affairs with the following specific purposes: i) to modernize slaughterhouses, ii) to promote the early settlement of clean chicken production practices, expand the target consuming regions, and ensure the packaged and refrigerated distribution of chicken products, and iii) to tighten hygienic practices in dairy farms for the clean production and supply of raw milk, examine collected milk to reduce bacteria in raw milk, improve milk parlors, provide the refrigerated raw milk storage guidelines for hygienic raw milk collection, promote the collection of raw milk using cold storage vehicles, and institutionalize the milk fat percentage testing, which was causing issues often between dairy farms and milk processors.

From the 1990s

Until the 1980s, it was challenging to fundamentally foster the domestic dairy industry only by forming grasslands and importing dairy cattle. It required the distribution of dairy farming techniques as well as the infrastructure for processing and distribution of milk. The country also lacked experts who would train dairy farmers on livestock farming techniques, places for training, and fund to support the milk processing industry. In particular, few enterprises could start the milk processing business because it requires large-scale facilities and both raw milk and processed milk products get spoiled quickly.

To overcome such challenges, the government had to establish a legal basis to support the dairy and milk processing industries. The Dairy Promotion Act enacted in 1967 served as a legal basis in supporting the dairy industry and helping the industry to quickly grow. And dairy farms were built in cooperation with Germany and New Zealand, which was an opportunity to learn dairy farming techniques from advanced countries.

For example, a dairy farm was jointly constructed by Korea and Germany in Anseong, Gyeonggi-do. The Korean government first selected several candidate locations, and then the West German government supported the fund and equipment for the construction of grasslands and dispatched experts in grassland formation and dairy farming. The National Agricultural Cooperative Federation (NongHyup) supervised this project. Anseong Farmland, currently located in Anseong, originated from this Korea-Germany pilot dairy farm.

The Korea-Germany pilot dairy farm and the Korea-New-Zealand pilot dairy farm took the initiative in importing dairy cattle from foreign

countries and supplying them to Korean dairy farms, while serving as pilot farms to demonstrate and distribute dairy farming techniques. Various programs were also conducted, including the one through which Korean trainees were sent to dairy farms in New Zealand for training. The Korean government also signed loan agreements with Canada and the IBRD. The loan from the IBRD was used for a comprehensive project for the dairy industry to import dairy cattle, form grasslands, support dairy farming equipment, and construct milk processing plants.

With the launch of the World Trade Organization (WTO) system in the 1990s, the Korean government also opened the dairy market to foreign corporations as it did with the markets of other agricultural products. The subsequent tariffication and tariff reduction led to the increase in the imports of dairy products. As quality dairy products were increasingly imported from foreign countries, the quality improvement of domestic milk and dairy products came up as a significant issue.

3.1.2. Raw Milk Testing System in Korea

Overall Condition

The raw milk testing result is one of the most important aspects across the entire milk production process since it is a criterion in the quality evaluation of raw milk and dairy farms are paid based on it, which is directly related to their income. The raw milk testing criteria are decided based on the regular quality level of raw milk and the consumption trend of dairy products in each country, the conditions of feed production and

livestock farming management, and the level of raw milk testing technologies. The quality of milk is evaluated as high when it contains many nutrients, such as fat, protein, carbohydrate, vitamins, and inorganic substances.

Each country and region has different systems for the raw milk testing and payment, but most farms are paid generally based on the contents of butterfat and proteinoid and the numbers of bacteria and somatic cells. For instance, Japan uses fat-free dry matters rather than proteinoid, while the United States uses butterfat, proteinoid, and fat-free dry matters in testing the quality of raw milk. The threshold contents of butterfat and proteinoid are 3.5-3.6% and 3.2-3.4%, respectively. Governments tend to impose a penalty on dairy farmers for low-quality raw milk, while granting premiums for high-quality raw milk.

The quality testing is conducted on a weekly, biweekly, or monthly basis in each country. Dairy farms are paid for raw milk once or twice a month. The raw milk price may change each season in some countries. Raw milk containing many nutrients is usually evaluated as good, but the quality gap between dairy farms is not really big. So the number of bacteria and somatic cells and the contents of bacteriostatic substances usually decide the quality of end products, and hygiene is now a more important aspect than nutrients. Since the quality improvement of raw milk starts from the hygiene of dairy farms, advanced milk producing countries have long been implementing the quality-based differential payment system to promote the clean treatment of raw milk in dairy farms.

Raw Milk Testing Procedures

a. Collection method

Raw milk is collected from dairy farms using vehicles equipped with cold storage tanks. The vehicles must be inspected in accordance with the relevant regulations before the collection process. If there is any aspect that cannot be examined onsite, samples must be collected and tested at labs. Collected raw milk is swiftly transported to a collection center or a milk processing plant to be properly treated through the filtering, cooling or storage process.

b. Sample collection

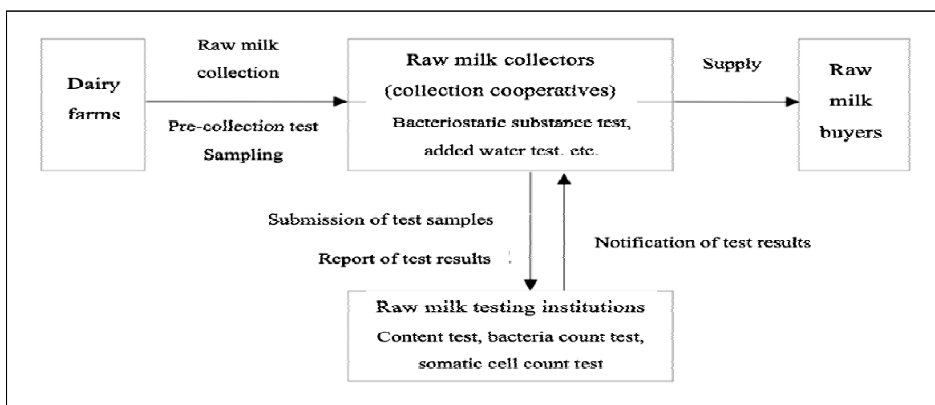
Samples to be tested at labs for any aspect that cannot be tested on site (the contents of milk, the number of bacteria and somatic cells, added water, bacteriostatic substances, etc.) should represent the raw milk subject to the test. Samples must be collected on a daily basis regardless of whether the test is conducted on that day. Raw milk should be stirred well before the sampling process. Bottles of samples must be marked in some way or another to distinguish suppliers.

c. Testing

The hygiene test of raw milk can be divided into the pre-collection test and the laboratory test. The former can be classified into the sensory test (a product test based on five human senses), the specific gravity test, the alcohol test (or a pH test), and the sediment test (measurement of dust and other foreign substances, which can be conducted only when necessary). The latter can be classified into the titratable acidity test, the bacterial count test, the somatic cell count test, the bacteriostatic substance test, and the content test. The bacterial count test and the somatic cell count

test are performed in each farm at least once every 15 days. Any new raw milk suppliers or those who fail in the milking cow inspection or any other laboratory tests may undergo frequent tests when necessary. The cooling temperature for the collection of raw milk at farms must be 5 degrees Celsius or under. The test criteria standards of livestock products as specified in the Livestock Products Sanitary Control Act.

〈Figure 27〉 Diagram of the Raw Milk Testing System



Raw milk collectors (collection cooperatives) conduct the bacteriostatic substance test and the added water test and submit the test result to raw milk testing institutions (animal hygiene and sanitation test centers in each city and province). Then these institutions perform the test of contents of milk and the measurement of the number of bacteria and somatic cells using the standardized test equipment and notify the test result.

Current State of Raw Milk Collection and Testing

The table below shows the changes in the volume of collected raw milk, including goat milk, for the past five years from 2015 across the country.

The sales of milk has been on the decline due to several reasons, including the decreasing birth rate, leading to the steady drop in the milk production by dairy farms. The volume of collected raw milk in 2020 is about 2,103,000 tons, a decrease by 49,000 tons from 2,152,000 tons in 2015. The failure rate of collected raw milk is 0.03-0.07%, meaning as low as 1,000 tons or less.

〈Table 5〉 The Result of Collection and Testing of Raw Milk

(Unit: 1,000tons(%))

Year	Tested	Passed	Failed
2015	2,152.1	2,151.4	0.7 (0.03)
2016	2,107.5	2,106.1	1.4 (0.07)
2017	2,076.6	2,075.7	0.9 (0.04)
2018	2,060.5	2,059.7	0.8 (0.04)
2019	2,062.4	2,061.7	0.7 (0.04)
2020	2,103.2	2,102.5	0.7 (0.03)

Source: Animal and Plant Quaratome Agency

According to the test result of rejected raw milk for the last three years, the highest failure rate was recorded in the residue test, followed by the alcohol test, the specific gravity test, and the sediment test. The failure rate of the residue test dropped from 52.8% in 2019 to 45.4% in 2020. Detected residues are presumed to be attributed to animal medicines added to feed or injected directly to cattle to treat mammitis and the consumption by cattle of feed polluted by fungal toxins such as aflatoxin.

〈Table 6〉 The Failure Rate by Raw Milk Test Type

(Unit: %)

Year	Sensory	Specific gravity	Alcohol(pH)	Sediment	Residue	Others	Total
2018	5.1	9.8	17.1	-	47.8	20.2	100.0
2019	5.6	10.4	16.3	-	52.8	14.9	100.0
2020	6.8	12.2	24.8	-	45.4	10.8	100.0

Source: Animal and Plant Quaratome Agency

Tasks of the Administrative Department for Raw Milk Testing (Animal and Plant Quarantine Agency)

The raw milk testing is performed in accordance with the Livestock Products Sanitary Control Act and the Enforcement Rule of the Raw Milk Testing Collectivization (announced by the Ministry of Agriculture, Food and Rural Affairs). The content tests regarding the number of bacteria and somatic cells, butterfat, and proteinoid, which are directly associated with the payment for raw milk, are performed by 13 municipal animal hygiene and sanitation test centers, while on-site tests (such as the sensory test) and laboratory tests (such as the residual test) are conducted by raw milk collectors and milk/dairy companies.

The Animal and Plant Quarantine Agency (APQA) is in charge of the standardization of raw milk testing, including the production and supply of the standard solution for testing the milk contents (fat, protein, lactose) and the number of bacteria and somatic cells, which are required to collectivize the raw milk tests, as well as the support of relevant technologies. The Agency also identifies and reports the trend of the raw milk collection and testing in each city and province on a semiannually basis.

Production and Supply of the Standard Solution for Raw Milk Testing

The APQA supplies the standard solution required to standardize the raw milk test equipment to 13 raw milk testing agencies across the country. Each month, the APQA provides six sets of the three standard solutions (low, medium, high) for testing the milk contents and somatic and bacterial counts. The APQA used to provide four sets of the standard solutions for the bacterial count test, but it increased the number of sets from 2011 to reflect the feedback from testing agencies based on the on-site inspection result regarding the lack of the standard solutions.

Test and Inspection by Raw Milk Testing Agencies

The APQA evaluates the level of the standardization of test equipment and testing skills of raw milk testing agencies to ensure the objectivity and fairness of the test result. The bacterial counts (low, medium, high), somatic cell counts (low, medium, high), and the contents of butterfat, proteinoid, and lactose (low, medium, high), are evaluated in the inspection. Thirteen raw milk testing agencies across the country are subject to this inspection. During the inspection, test samples of each concentration level (two sets per item) are measured for three consecutive times using each agency's equipment, and the measured values and average values are evaluated. If the measured values exceed the allowable error range in two or more out of three concentration levels per item (low, medium, high), this test item is considered inadequate.

The test equipment and skills of raw milk testing agencies are standardized to ensure the objectivity and fairness of the test results and minimize complaints by conducting training and evaluation regarding the

compliance of the work procedures. The APQA identifies the status of such agencies each year and examines the overall requirements that may impact the test results.

Training of Raw Milk Testers and Report of Test Outcome

The APQA conducts the annual training program for testers and assistants of raw milk testing agencies regarding the test equipment standardization guidelines for the collectivization of raw milk testing, the introduction to the basic principles of test equipment, and the comparison of test results between agencies.

The APQA also reports the outcome of raw milk hygiene tests across the country to the Ministry of Agriculture, Food and Rural Affairs (MAFRA) on a semiannual basis. The report contains the total volume of tested raw milk, the volume of raw milk that passed or failed the test, the details of rejected raw milk (the result of the sensory, specific gravity, alcohol, sediment, and residual tests), and the hygiene level test result (bacterial count, somatic cell count).

3.1.3. Price Setting Criteria of Raw Milk

From 1962 to 1972, a uniform price per kilogram was set for raw milk. As it turned out in the 1970s that some dairy farms mixed raw milk with water, the government introduced the butterfat-based differential pricing system for raw milk to prevent such misconduct. This system was first introduced as a trial in 1973 and implemented across the country later in 1977.

The MAFRA introduced this differential pricing system to improve the quality of milk and protect dairy farms. The Dairy Commission decided to set a different price for raw milk every 0.1% increase or decrease in the content of butterfat from the baseline at 3.4%. This system helped prevent the addition of water in raw milk and raise the awareness of butterfat as dairy farms can be paid under the differential pricing system based on the content of butterfat. It served as an opportunity to increase the volume of raw milk and butterfat from the perspective of cattle improvement.

〈Table 7〉 Implementation of the Different Pricing System for Raw Milk

Year	Period	Raw milk price (KRW/kg)	Differential price based on butterfat
1977	Jan to Dec 1977	150	Increase/decrease KRW 3 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)
1978	Jan to Dec 1978	167	Increase/decrease KRW 5 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)
1979	Feb to Dec 10, 1979	209	Increase/decrease KRW 6 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)
1979	Dec 10, 1979 to Feb 1980	249	Increase/decrease KRW 7.3 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)
1980	Feb 1980 to May 1981	266	Increase/decrease KRW 7.8 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)
1981	Jun 1981 to Mar 1982	307	Increase/decrease KRW 7.8 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)
1982	Apr 1982 to Apr 1985	313	Increase/decrease KRW 7.8 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)
1985	May 1985 to Jun 1993	322	Increase/decrease KRW 7.8 per a 0.1% increase/decrease from the baseline of butterfat content (3.4%)

Now the differential pricing system applies also based on the content of proteinoid. The baseline of butterfat is 3.5%, and that of proteinoid is 3.0%.

〈Table 8〉 Content-Based Raw Milk Price

Butterfat	Content (%)	3.0 or less	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1 or over
	Price (KRW/L)	-103	-41.2	-30.9	-20.6	-10.3	0	10.3	20.6	30.9	41.2	51.2	56.65
Milk protein	Content (%)	Below 3.0	3.0	3.1	3.2 or over								
	Price (KRW/L)	0	4.0	11.65	19.41								

From the hygienic perspective, the quality of raw milk can be improved starting from the management of dairy farms. With that in mind, advanced milk producing countries have long been implementing the differential pricing system to promote the hygienic treatment of raw milk in dairy farms. In 1990, the awareness of the quality of milk among consumers significantly increased due to the issues related to the increased number of somatic cells attributed to mammitis and the detection of residual antibiotic substances.

From June 1, 1993, the Korean government joined the global trend of introducing the hygiene-based pricing system of raw milk (based on the bacterial and somatic cell counts), which classifies the number of bacteria into five levels and that of somatic cells into four levels. In other words, the quality of raw milk is divided into five levels based on the number of somatic cells and four levels (1A, 1B, 2, 3, 4) based on the number of bacteria.

〈Table 9〉 Criteria of the Hygiene Level Rating and Differential Pricing System for Domestic Raw Milk

Bacteria			Somatic cells			Note
Level	Number of bacteria/ml	Price(KRW)	Level	Number of somatic cells/ml	Price(KRW)	
1A	Below 30,000	+52.53	1	Below 200,000	+52.69	Paid KRW 100 per liter for Level 4 in the bacteria rating and Level 4/5 in the somatic cell rating
1B	30,000–100,000	+36.05	2	200,000–350,000	+39.25	
2	100,000–250,000	+3.09	3	350,000–500,000	-	
3	250,000–500,000	-15.45	4	500,000–750,000	To be specified	
4	Over 500,000	To be specified	5	Over 750,000	To be specified	

According to the hygiene rating result of raw milk collected in 2020, 99.5% was rated Level 1 based on the bacterial count and only 0.09% was rated Level 3 or under. Based on the somatic cell count, 95.2% was rated Level 1 or 2, while 4.8% was rated Level 3 or under. Considering the strict hygiene rating criteria in Korea, the quality of domestic raw milk appears to be very high.

〈Table 10〉 Distribution Chart of the Hygiene Level of Domestic Raw Milk

Category		Hygiene level based on the bacterial count					Hygiene level based on the somatic cell count				
		1A	1B	2	3	4	1	2	3	4	5
Raw milk	Ton	2,010,964	124,251	9,031	1,469	440	1,356,961	686,600	97,330	5,111	153
	%	93.7	5.79	0.42	0.07	0.02	63.23	31.99	4.54	0.24	0.01

As shown above, the price of raw milk is decided by considering the basic price of raw milk as well as the contents of milk and the hygienic level. Price of raw milk paid to dairy farms = Basic price of raw milk + Price set

based on the milk content + Price set based on hygiene level. The basic price of raw milk went up from KRW 383/liter in 1991 to KRW 940/liter in 2013. The basic price was KRW 926 as of August 1, 2018.

3.1.4. Quality Rating and Price Setting of Grapes and Tomatoes as Ingredients for Processing

The data of supply and demand of grapes and tomatoes were summarized using the agricultural forecast data in 2021 released by KREI.

Grape

The area of grape cultivation has gradually reduced since 2010 due to the aging population in rural areas and the subsequent closure of farming businesses and the change of crops due to the increase in the imported grapes. Particularly in 2017, the grape cultivation area decreased by 13% from the previous year due to the support project for business closedown affected by the FTA. In 2020, however, with the growing number of a new crop planted, which is shine muscat, the grape cultivation area increased again to 13,183 ha, a 4% increase from the previous year. The grape production has been on the steady decline from 476,000 tons in 2000 to 166,000 tons. The production unit of grape used to be maintained at 14-15 tons per hectare after 2010, but it also decreased to 12.6 tons per hectare in 2020 due to the increase in the area of young trees.

〈Table 11〉 Changes in the Production of Grapes in Korea

Year	Cultivation area (ha)	Yield (ton)	Unit (ton/ha)
2010	17,600	257,000	14.6
2015	15,397	223,695	14.5
2016	14,946	229,284	15.3
2017	13,107	190,265	14.5
2018	12,795	175,399	13.7
2019	12,676	166,159	13.1
2020	13,183	165,906	12.6

The per capita consumption of grape (including imported grapes) was about 4 kg in 2010, but dropped to 3.7 kg in 2020. This change is assumed to be attributed to the growing volume of imported fruit including tropical fruit. As more various fresh fruits have been imported from various countries with the enforcement of the FTAs, the import of fresh fruit has been increasing by about 5% since 2000.

The export of fresh grape is on the increase each year. As of 2020, the volume was 1,972 tons, a 6% up from the previous year. Korea used to export the commodity mainly to the United States and Hong Kong in the 2000s, but with the growing export of shine muscat, the import to Southeast Asian countries such as Vietnam began to rise from 2018. The commodity was also exported to China from 2015. The export of grape is now increasing each year.

The import of grape started to be on the rise from 2004 when the Korea-Chile FTA came into effect. As of 2020, the import of grape decreased to 57,000 tons, a 18% drop from the previous year, due to the poor harvest in Chile, a major partner country for the import of the commodity.

As the seasonal tariff applies to fresh grape, the grapes imported from

Chile and Peru have been exempt from tariffs during the period when domestic grapes are not harvested since 2016. The tariff on the grapes imported from the United States (from May 1 to Oct 15), which has been reduced by a consistent rate, was 21.2% as of 2020.

〈Table 12〉 Tariff Rate of Fress Grape by Producing Country

Producing country	Current tariff rate	Tariff rate under the FTA					
		Importing period	2020	2021	2022	2023	2024
Chile	45	May to Oct	45	45	45	45	45
		Nov to Apr	0	0	0	0	0
USA	45	May to Oct 15	21.2	18.5	15.8	13.2	10.5
		Jan to Apr / Oct 16 to Dec	0	0	0	0	0
Peru	45	May to Oct	45	45	45	45	45
		Jan to Apr / Nov to Dec	0	0	0	0	0
Australia	45	May to Nov	45	45	45	45	45
		Jan to Apr / Dec	0	0	0	0	0

Tomato

The area of tomato cultivation has dramatically increased to 7,353 ha until 2007 with the growing interest of consumers in healthy food. It decreased to 5,270 ha in 2010 and then increased again to 7,070 ha in 2014, and has been on the steady decline since then. In 2020, the cultivation area dropped to 5,521 ha, a 3% decrease from the previous year, which was attributed to the lack of workforce due to the COVID-19 pandemic and the change of crops.

The production of tomato decreased from 500,000 tons in 2014 to an average of 367,000 tons between 2017 and 2019 due to the reduced cultivation area. In 2020, the tomato production declined to 344,000 tons,

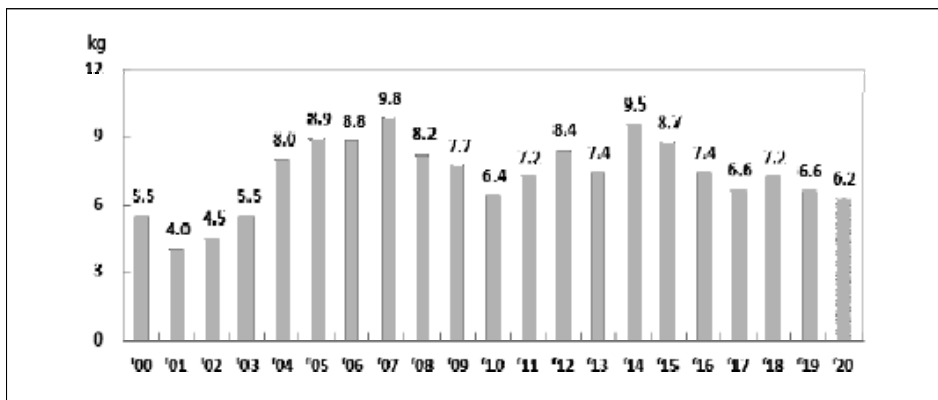
a 4% drop from the previous year, due to the decreased cultivation area as well as the reduced unit caused by the long rainy summer season and heavy rain.

The production unit of tomato per hectare increased from 56.3 tons in 2000 to 65.5 tons in 2015 thanks to the expansion of protected cultivation practices, including water culture and glass greenhouse, and the advancement of technologies. As farms have recently changed the crop type from ordinary tomato to jujube-shaped cherry tomato, the yield per unit area has been on the relative decline.

〈Table 13〉 Tomato Production Trend in Korea

Year	Cultivation area(ha)	Yield(ton)	Unit(ton/ha)
2010	5,270	324,806	61.6
2015	6,976	456,982	65.5
2016	6,391	390,303	61.1
2017	5,782	355,107	61.4
2018	6,058	388,657	64.2
2019	5,706	358,580	62.8
2020	5,521	344,048	62.3

〈Figure 28〉 Changes in the Per Capita Consumption of Tomato



The per capita consumption of tomato was 9.5 kg in 2014, a similar level to 9.8 kg in 2007, but reduced again to 6 kg in 2020.

Among the exported tomatoes, 64% is fresh and refrigerated tomato, and 35% is ketchup, a processed product. Imported paste (concentrated sauce) is reprocessed to be exported as a finished product. The volume of exported fresh and refrigerated tomato takes up only 1% in the domestic yield, but the commodity is still imported constantly. 97% of them is exported to Japan. In 2020, the export volume of tomato decreased to 4,315 tons, a 18% decline from the previous year (5,249 tons), due to the declined demand from Japan affected by the COVID-19 pandemic and the increased price of domestic products due to the poor harvest. The export volume of ketchup in the same year was 2,317 tons, and most of the exports were targeted at Russia (50%) and China (37%). The export to Vietnam has recently been on the rise.

The imports of tomato consist mainly of processed products such as paste, manufactured/preserved products, ketchup, and sauce. With the recent change in the food and dietary culture, the demand for tomato for cooking is growing, while the commodity is also used for food processing, boosting the import volume of tomato with the average annual increase rate of 2% between 2010 and 2020. In 2020, the import of paste, the type of tomato product with the largest import volume, was 24,818 tons, mainly imported from China (56%), the United States (27%), and Chile (9%). The import of manufactured/preserved tomato products increased from 2010 with the average annual increase rate of 7%, reaching 17,000 tons in 2020. Most of them are imported from Italy (58%) and the United States (39%).

Processed Grape and Tomato Market in Korea

Overall Condition

Grape is consumed in Korea mainly in the form of fresh products, while only a few percentages of it is processed and sold as beverage, alcoholic beverage, and jam products. In terms of tomato, fresh tomato takes up 99% of the consumption, while the rest is consumed as fresh juice or any similar products. Since domestic tomatoes as raw ingredients are more expensive than imported ones, most products such as tomato paste, manufactured/preserved tomato, ketchup, and tomato sauce are imported as finished products. Due to the absence of the data of processed domestic tomato products, this report only summarizes the data of processed products using domestic grapes.

Processed Grape Market

The number of fruit processing companies in Korea decreased from 752 in 2014 to 859 in 2019, with the total number of employees recorded to be 5,999. The volume of processed grape products was 178,000 tons as of 2019.

〈Table 14〉 Korean Fruit Processing Companies

Category	2015	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of Processors	272	572	584	594	701	752	716	530	5397	664	859
Number of employees	8,496	5,388	5,553	5,543	6,350	6,438	5,086	4,196	4,831	5,682	5,999
Volume of processed products (ton)	205	184	204	190	181	256	207	232	184	175	178

In terms of the percentage of fruit for processing in the total volume of each commodity, the percentage was highest in mandarin orange (12.2%), followed by apple (9.7%), grape (3.2%), pear (2.7%), and peach (0.8%). The average percentage is 8.1%, which is much lower compared to that of processed fruit in advanced countries. That is because Korean consumers tend to prefer fresh fruit to processed ones. The percentage of processed fruit products was 8.2% in 2010, similar to 8.1% in 2019. The percentage of processed grape products was about 3% during the same period, showing a similar trend.

〈Table 15〉 Percentage of Processed Products by Fruit Type

(Unit: 1,000 tons)

Category	2010			2019			Increase/ decrease (F-C, %p)
	Yield(A)	Processed (B)	% of processed products (B/A=C, %)	Yield (D)	Processed (E)	% of processed products (E/D=F, %)	
Apple	460	28.0	6.1	535	52.1	9.7	3.6
Pear	308	8.0	2.6	201	5.5	2.7	0.1
Grape	257	8.8	3.4	166	5.3	3.2	-0.2
Mandarine	615	91.1	14.8	630	77.1	12.2	-2.6
Peach	135	3.4	2.5	210	1.6	0.8	-1.7
Others	441	43.5	9.9	464	36.2	7.8	-2.1
Total	2,216	182.8	8.2	2,206	177.8	8.1	-0.1

In terms of the percentage of each usage in the total processed grape products, juice accounts for the largest share of 50.9%, followed by beverages (18.7%), jam (14.2%), and alcoholic beverages (9.8%). Alcoholic beverages are manufactured and processed mostly as grape wine.

〈Table 16〉 Type of Processed Grape Products

Category	Juice	Beverage	Jam	Alcoholic beverage	Others	Total
Volume of processed products (ton)	2,682	986	748	517	336	5,269
Percentage (%)	50.9	18.7	14.2	9.8	6.4	100.0

3.1.5. Standard Rating of Grape and Tomato in Korea

Standards for Grapes

Korea has the quality standards only for fresh grape, not for processed ones. The National Agricultural Products Quality Management Service classifies the quality level of fresh grape into three levels (excellent, good, moderate) based on the consistency in the size, color and gloss (color ratio), the shape of each grape, and the defective level (major, minor).

〈Table 17〉 Quality Standards for Grapes

Category	Excellent	Good	Moderate
Consistency in size	10% or less is different in weight compared to the size classification table	30% or less is different in weight compared to the size classification table	Insufficient to be excellent
Color and gloss (color ratio)	A product has the unique level of color and gloss of the variety with nicely attached powder on the surface	A product has the unique level of color and gloss of the variety with nicely attached powder on the surface	Insufficient to be excellent
Shape of each grape	The degree of maturity and size are very consistent among grapes	The degree of maturity and size are mostly consistent among grapes	Insufficient to be excellent
Major defect1)	No defect	No defect	5% or less
Minor defect2)	No defect	5% or less	5-20%

〈Table 18〉 Size Classification based on Bunch Weight by Variety

Variety	Unit	2L	1L	M
Shine Muscat	Bunch	650g or over	Less than 500-650g	Less than 350-500g
Kyoho	Bunch	500g or over	Less than 400-500g	Less than 300-400g
Campbell Early	Bunch	450g or over	Less than 350-450g	Less than 300-350g

Standards for Tomatoes

Like grape, Korea has the quality standards only for fresh tomato, not for processed ones. The National Agricultural Products Quality Management Service classifies the quality level of fresh tomato into three levels (excellent, good, moderate) based on the consistency in the size, color and gloss (color ratio), the freshness, and the defective level (major, minor).

〈Table 19〉 Quality Standards for Tomatoes

Category	Excellent	Good	Moderate
Consistency in size	5% or less is different in weight compared to the size classification table	10% or less is different in weight compared to the size classification table	Insufficient to be excellent
Color and gloss (color ratio)	A product meets the color ratio criteria and is consistent in the colored level	A product meets the color ratio criteria and is consistent in the colored level	Insufficient to be excellent
Freshness	The stalk is not withered, and the skin is very elastic	The stalk is not withered, and the skin is quite elastic	Insufficient to be excellent
Trace of flower	Almost invisible	Not striking	Insufficient to be excellent
Major defect1)	No defect	No defect	5% or less
Minor defect2)	No defect	5% or less	5-20%

〈Table 20〉 Tomato Size Classification based on Weight

Category	3L	2L	1L
Weight per tomato (not fully ripe)	300g or over	250g or over	210g or over

The type of processed tomato products in the market ranges from canned food, juice, soup, sauce, paste, ketchup, pulp, and purée. The color is an important factor in processed tomato products, along with the consistent colored level, vibrant red color, and the state free of defects such as crack and scratch, implying similar quality rating standards to those for fresh tomatoes.

The quality rating standards for tomatoes for processed food vary between countries. In Spain, the adequate weight of a tomato for juice is 60-100g, and the weight of a whole tomato for canned food ranges from 30g to 60g. Tomatoes for canned food must have a thick and firm skin to keep its original shape for cooking, and their stalks must be easily removed.

The criteria of the sugar content of tomatoes for processed food also vary depending on the usage. In general, the sugar content of tomatoes for processed food needs to be at least 4.5 °Bx (sugar content unit), which is different from 3.5-5.5 °Bx for fresh tomatoes.

3.1.6. Price Setting for Grapes and Tomatoes for Processed Food in Korea

As analyzed above, the percentage of grapes and tomatoes for processed food in the entire yield of each commodity is about a meager 3% and even

less than 1%, respectively, in Korea. So the country does not have any relevant laws or regulations for the rating system regarding the purchase price setting for grapes for wine and tomatoes for juice.

According to the study of winemakers using domestic grapes in Korea, Campbell Early is widely used for wine production with the purchase price around KRW 1,500 per kilogram. Considering that the purchase price of fresh grapes of the excellent/good level is KRW 2,500-3,000 per kilogram, those for wine production are of the lower level of size or color/gloss compared to fresh products. The most important factor in choosing grapes for wine is the sugar content. The average sugar content of fresh grapes is 14-16 °Bx, whereas that for grapes for wine production is 15-17 °Bx.

3.2. Lessons from Korea's Policies for the Quality Rating Standards of Agricultural Products for ODA Projects

3.2.1. Implementation of Relevant Policies in Korea

Dairy (Milk) Sector

Unified Raw Milk Collection System

With the commitment to the UR agreement (1994), the Korean government amended the Dairy Promotion Act in 1997 and organized the Dairy Promotion Association in January 1999 to strengthen the competitiveness of domestic processed dairy products against imported

ones, unify the raw milk collection system, control the supply and demand across the country, adjust the price of raw milk, and address various issues including the lack of trust between dairy farms and milk manufacturers over the raw milk testing process. The Association was founded mainly to unify the raw milk collection system and manage the supply and demand of raw milk in a systematic way. The following tasks were required to unify the raw milk collection system: i) to organize the complex and overlapping collection channels of raw milk and build a low-priced, highly-efficient collection system, ii) to increase the price competitiveness of domestic products by reducing other social costs such as the distribution cost, iii) to stabilize the supply and demand of raw milk and establish an integrated management system as a countermeasure against the opening of the dairy market, and iv) to run a system to improve training and productivity in the dairy industry.

The Dairy Promotion Association divided the country into nine regions and designated 15 raw milk collection cooperatives to conduct a project for the unified raw milk collection system. Local cooperatives and milk processors were unwilling to participate in the project in the early stage, so the project was first implemented in a pilot format around the regions with a low demand for milk processing companies and then expanded gradually across the country.

Collectivization of Raw Milk Testing

The collectivization of raw milk testing is intended to let designated raw milk testing agencies in each city and province (animal hygiene and sanitation test centers) conduct the raw milk tests under the supervision of the Minister of the relevant department, the Special Metropolitan City

Mayor, or a Do (province) Governor from 1999 (Dairy Promotion Act, Article 14), unlike the past where such tests used to be performed by each milk manufacturer individually. The project was initiated to standardize the raw milk collection procedures, equipment and technologies to ensure the objectivity and fairness of test results and build trust in dairy farms and raw milk buyers (processors), thereby accelerating the development of the dairy industry.

Quality Improvement with the Hygiene Rating System

As analyzed above, the demand for clean raw milk significantly grew among consumers in Korea like other advanced countries. The government amended the Livestock Products Sanitary Control Act and introduced the hygiene rating system on June 1, 1993, under which the quality level of raw milk is classified into five categories based on the bacterial count and four categories based on the somatic cell count, and the differential price setting applies to each level of raw milk based on the hygiene rating (based on the bacterial and somatic cell counts).

〈Table 21〉 Raw Milk Hygiene Rating Standards in Korea

Category	Hygiene rating	Criteria
Bacterial count	Level 1A	Less than 30,000/ml
	Level 1B	30,000 to below 100,000
	Level 2	100,000 to below 250,000
	Level 3	250,000 to 500,000
	Level 4	Over 500,000
Somatic cell count	Level 1	Less than 200,000/ml
	Level 2	200,000 to below 350,000
	Level 3	350,000 to below 500,000
	Level 4	500,000 to 750,000
	Level 5	Over 750,000

Support for Domestic Raw Milk Processing Business

The Korean government implemented the processed milk support project from 2011 to 2019 to increase the competitiveness of the domestic dairy industry and milk processing industry, which might be affected by the enforcement of the Korea-EU FTA. The government allocated KRW 10 billion of budget in 2011 and KRW 17 billion every year between 2016 and 2019 for this project, in which the government purchases domestic raw milk at a normal price and pays the difference between the milk production cost and the global nonfat dry milk price when milk processors make dairy products. The project supports any milk processing companies who manufacture processed milk, such as powdered milk and cheese, using domestic raw milk and participate in the national raw milk supply/demand control system.

This method can be employed by considering the conditions in the country as the government can encourage domestic milk processors to use domestic raw milk when the domestic raw milk price is higher than the global price.

〈Table 22〉 Governmental Support for Processed Milk Business

(Unit KRW 100 million)

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019
Government budget	100	72	100	121	140	170	170	170	170

Establishment of the Administrative System of Domestic Raw Milk Testing

The Korean government established the administrative system for raw milk testing to unify the raw milk collection system for the smooth control of supply and demand, improve the distribution of raw milk through the

collectivization of the test system, and run the pricing system by an objective method. To support the collectivization of the test system, the raw milk tests are conducted by animal hygiene and sanitation test centers in each city and province, while the APQA takes charge of technical support, including training for test equipment and preparation of test manuals. This helps the government control the hygiene and quality of products following the global market trend and also set the price of raw milk in a transparent way.

Fruit (Grape) and Vegetable (Tomato) Sector

The Korean government has no specific project to directly support fruits and vegetables farming for processed food, but it does implement a wide range of policies for the production, distribution and processing of high-quality fruits and vegetables as follows.

Quality Improvement of Ingredients for Processed Food with Support for Production and Distribution

1) Support project for cold storage/distribution facilities

This project is intended to maintain the marketability, functionality, and efficacy of agricultural products across the distribution process through the precooling and cold storage process, increase the income of farms by extending the expiration date and improving the delivery control and profitability, and building trust with consumers. The project supports the construction and repair of precooling facilities, cold storages, and sorting centers for cold treatment of horticultural and agricultural products as well as the purchase of cold storage vehicles that can keep the freshness of such commodities in the distribution process.

The project supports any farming associations, farming corporations, and cooperatives handling horticultural products worth over KRW 500 million annually through the contract cultivation, purchase, consignment, and export in cooperation with farms.

The project expenses are funded by the central government subsidies (30%), local government subsidies (30%), and self-funding by each corporation or cooperative (40%). In 2020, the project budget was estimated to be KRW 11 billion in total, consisting of KRW 3.3 billion of the central government subsidies, the same amount of the local government subsidies, and KRW 4.4 billion of self-funding.

2) Comprehensive fund support project for distribution in producing regions

This project is intended to provide farming groups in producing areas with the loan support for securing raw materials and help them expand the marketing channels for agricultural products and systematize, expand the scale of, and specialize producer groups, thereby upgrading their negotiating skills and stabilizing the operation of farm businesses. It supports cooperatives with the loan for procurement of fruits and vegetables (contract deposit, intermediate payment, prepayment, balance settlement). The supported loan in 2020 amounted to KRW 300 billion. The beneficiaries of this project include agricultural corporations, cooperatives, and farmers' organizations.

3) Support project for the modernization of quality fruit production facilities

This project is intended to help fruit farming businesses to produce

high-quality commodities through the modernization of facilities and increase the competitiveness of the fruit industry by preventing diseases. The project supports the facilities for producing quality fruit, including irrigation facilities and improvement of superior varieties. The production cost consists of subsidies (50%), loan (30%), and self-funding (20%). The interest rate of loan is fixed at 2% over three years of the deferment period and seven years of the repayment term. The project budget in 2020 amounted to KRW 132.2 billion (including the self-funding amount).

4) GAP-related support project

The Korean government also provides the support projects for the stability analysis and the management of hygienic facilities with respect to the Good Agricultural Practices (GAP). The stability analysis assistance project supports the fund for the analysis of soil and farming water resources to increase new GAP-certified farms and ensure the safety of certified agricultural products, as well as the safety test cost for newly-certified farms or those who already obtained the certification. The analysis cost is provided based on the actual expense, and the test cost is fully covered. The supported fund amounted to KRW 7.79 billion in 2020.

The support project for GAP-certified hygienic facilities is intended to help any agricultural production and distribution facilities that are designated as the GAP-managed facilities when those facilities need the additional construction or repair of facilities. The project expenses are funded by the central and local government subsidies (50%) and self-funding of producers' organizations (50%). The project budget amounted to KRW 7 billion in 2020.

Support System for Fruit and Vegetable Processors

Support project for the procurement of raw materials and the modernization of processing facilities

The Korean government provides the loan support for the procurement of raw materials for processing to increase the competitiveness of food manufacturers and encourage the use of domestic materials and for the repair of manufacturing facilities to ensure the food safety regarding the HACCP and GMP systems. The project is targeted at food companies and cooperatives who would like to receive the fund support for facility management and business operation.

The project supports the loan for 80% of the expenses, up to KRW 5 billion per company. The repayment term is 10 years for facility management and 1 year for business operation. The interest rate is 1.5-2.0% for agricultural corporations and 2.0-3.0% for general companies. The project budget amounted to KRW 221.25 billion in 2010 including the self-funding amount.

Support project for tourist-friendly distilleries

This project provides the consulting service linked with the rural tourism programs at distilleries and the environmental improvement programs by finding exemplary domestic distilleries and utilizing rural tourism resources in the neighborhood to turn those distilleries into activity locations for tourists, thereby helping them grow into local agricultural resources through convergence and integration. The project is targeted at distilleries who make traditional alcoholic beverages in Korea, and its expenses are funded by the central and local subsidies (40% from each) and self-funding (20%). The supported fund is utilized to improve the

environment of distilleries, create promotional contents, and provide consulting services for business operation. The amount of the central government subsidies is limited to KRW 24 million per company, and four companies are selected each year.

3.3. Relevant ODA Projects Conducted by Korea

Dairy (Milk) Sector

There have been almost no Korean ODA projects specifically for the development of the dairy industry in developing countries so far. With the recent growth in the demand for milk and dairy products around the world, the demand for ODA projects for the dairy industry is also on the rise in some countries including Philippines, Ethiopia, and Uganda. This report examines some projects related to the dairy industry, which are expected to be conducted in 2023.

Capacity Building Project for the Dairy Farming Value Chain in the Philippines (KOICA-HKNU Volunteer Project)

This volunteer project led by the Korea International Cooperation Agency (KOICA) was conducted over 18 months from December 2019. It was mainly intended to increase the milk productivity at Carabao growing farms, improve the quality of processed milk products and the level of hygiene and safety, and boost the consumption of dairy products by developing new ones. For this project, 14 volunteers including college and graduate students and graduates of Hankyong National University (HKNU),

who studied food biotechnology and animal life and environmental science and have knowledge of the production of milk, development of dairy products, and quality, hygiene and safety of milk, were dispatched to the target country.

The volunteer project group consisted of four teams for farms, milk processing, hygiene and safety, and IT and promotion. The partner institution in the Philippines was the Philippine Carabao Center (PCC), a Carabao research center under the country's Department of Agriculture. The PCC did have a research facility, a dairy farm, a milk processing plant, and a dairy product market, but it was going through various challenges in increasing the milk productivity and securing dairy product processing technologies due to the lack of research budget, facilities, technical capacity, and human resources. This project helped the center to improve the dairy farming value chain and increase the income of dairy farms.

Project for Development of the Dairy and Livestock Industry and Corporations in the Philippines (a planned project for 2023)

This project is a follow-up program after the aforementioned Capacity Building Project for the Dairy Farming Value Chain in the Philippines, which was conducted by KOICA and HKNU from 2019 to 2021. This new project was designed to boost the dairy industry in the country by improving productivity and profitability, increase the income of small dairy farms and small- and medium-sized relevant companies, and enhance the quality of condensed milk. The project is expected to perform the following specific programs. First, the project will install the necessary equipment and facilities, improve laboratories, and supply new equipment and materials for milk labs, data centers, and training schools for farmers.

The target locations include a PCC in Luzon (the milk lab and data center) and milk test centers in Visayas and Mindanao. Second, it will build the systems for the collection, processing and analysis of raw milk production data and those for the registration of livestock grown by participating farms and feedback sharing. Third, it will increase the technical capacity and human resources for research at milk test centers, data processing centers, and livestock registration centers and strengthen the capacity of participating farms and producers (cooperatives). The direct beneficiaries of the project are the PCC and the National Dairy Authority, and the indirect beneficiaries include 1.8 billion Carabao-growing farms, 31,994 dairy-cattle-growing farms, and small dairy businesses.

Quality Improvement Project for Dairy Products through the Enhancement of the Dairy Farming Value Chain and Capacity Building of Stakeholders in Ethiopia (a planned project for 2023)

This pilot project was designed to strengthen the dairy farming value chain, increase the milk yield, and provide farms and milk processors with technical training for dairy product development and quality control, thereby increasing the potential of the target country for the investment and development of the dairy industry. It is intended eventually to increase the income of dairy farms and boost the local economy by supporting potential milksheds in each village.

The project is comprised of several specific programs: i) support of livestock techniques, medicines and equipment (USD 1.5 million), ii) improvement of capacity for collecting and processing raw milk (USD 2.75 million), iii) close linkage between raw milk collectors and markets (USD 2.5 million), and iv) establishment of a digital platform for the dairy industry (USD 2 million).

Fruit and Vegetable Sector

No ODA projects that have been led by KOICA since 2010 are related to the quality ranking system for fruits and vegetables for processed food. Most projects related to horticultural products were performed with a focus on production and distribution facilities in producing regions, while only a few projects supported processing facilities. This section looks into several cases related to fruit processing businesses, which is relevant to the theme of this study. Several projects were conducted for the construction of fruit processing plants and capacity building of the relevant industry in Uganda, Nigeria, and Tanzania, and a project for the construction of a cooking oil collection plant was carried out in Ethiopia.

〈Table 23〉 Agricultural Product Processing Projects in Cooperation with KOICA

Category	Period	Expense	Programs	Note
Uganda	2011–2019	USD 8 million	Construction of a fruit processing plant Capacity building for cultivation and processing	Orange
Tanzania	2008–2009	USD 2.3 million	Construction of a food processing training center – Establishment of processing facilities Support of processing techniques and capacity building	Tropical fruit including mango
Nigeria	2008–2010	USD 1.8 million	Construction of an agricultural product processing and vocational training center • Vocational training for processing	Tropical fruit
Ethiopia	2014–2017	USD 5 million	Construction of a cooking oil refinery Dispatch of experts and invitational training programs	Refining of linseed oil and canola oil

3.4. Lessons from Korea's ODA Projects

As analyzed above, Korea's previous ODA projects were not focused on the quality rating system for agricultural and livestock products for processed food and the related price setting system. but some projects dealt with the improvement of the quality and hygiene of raw milk, that of the quality of fruits and vegetables, and capacity building for processing.

For the quality control of raw milk and the related price setting system, there must be relevant laws and regulations, while the production and collection infrastructure, including collection facilities, should be modernized to produce high quality raw milk under the sound governance for the collection and testing of raw milk. To this end, the relevant government departments and dairy associations must evolve in a systematic way and the cooperative system between the public and private sectors should be well operated.

In Korea, the dairy industry has been growing since the 1970s with the changes in the price of raw milk (payment for farms) and price setting standards. When working on the raw milk rating system and price setting system in Armenia in the future, the infrastructure construction and capacity building projects must be conducted first, and based on that, the rating standards should be established based on the quality and hygiene levels, which will be followed by the differential pricing system based on the rating result.

There have been no Korean ODA projects focusing on the quality standards and rating systems for grapes and tomatoes for processed food. But some of the previous projects did support the establishment of the

production basis and distribution facilities to improve the quality and price competitiveness of fruits and vegetables. The quality of ingredients for processed food such as grapes and tomatoes must be controlled strictly because those commodities should be produced and supplied based on the demand of processors.

For horticultural products including grapes and tomatoes, cooperatives must be systematically organized focusing on farms, while cultivation under contract is promoted to maintain a stable supply system with processors. The sugar content is one of the most important factors in the quality rating standards for grapes and tomatoes for processed food, so a capacity building project supporting cultivation techniques can be considered an ODA project.

To sum up, Korea has no specific experience in ODA projects closely relevant to the theme of this study, but it has potential to significantly contribute to increasing the income of farms in Armenia through the construction of infrastructure and the support for capacity building to improve the quality of raw milk, grapes and tomatoes for processed food. Such an ODA project can be accompanied by other programs for a policy basis, including laws and regulations, to implement the quality rating systems for agricultural products as ingredients for processed food.

3.5. Proposal for an ODA Projects in Armenia (Plan)

We would like to present three ODA projects that Korea can carry out by utilizing its experience based on the suggestions by the Armenian government.

Support for the Infrastructure and Capacity Building for Raw Milk Testing

Armenia needs to set the quality and hygiene rating standards for raw milk and increase the number of labs (research centers) and human resources capable of conducting quality and hygiene tests on raw milk to set the purchase price. This ODA project can be designed to define the quality and hygiene rating standards for raw milk, construct laboratories (research centers), support necessary equipment and materials, and strengthen the capacity of human resources for testing and research.

Pilot Project for the Modernization of the Dairy Industry

Dairy farming in Armenia is mainly performed by small cattle growing farms with poor farming facilities at a long distance from collecting facilities and with the inadequate cold storage equipment for transportation of raw milk. Their capacity to produce and supply high-quality raw milk treated in a hygienic way to milk processors is limited.

This ODA project for dairy farming in Armenia can be designed to increase the income of dairy farms, improve the quality of dairy products by helping producers provide quality raw milk to processors, and ensure safety, thereby contributing to the advancement of the dairy industry in the country.

The components of this ODA project may include the establishment of the foundation for dairy cattle farming, the construction of collecting centers, the support of necessary equipment and materials, the foundation of associations for raw milk collection, and the capacity building for improving the quality of raw milk.

Support for Strengthening the Fruit (Vegetable) Farming Value Chain

This ODA project is intended to set the purchase price setting system for grapes and tomatoes for processed food in Armenia, establish the basis for production of quality ingredients for processed food, construct distribution facilities, and strengthen the capacity of the industry. Fruits and vegetables are mostly cultivated by small farms in this country, so it is also necessary to consider fostering local farming cooperatives.

The table below summarizes the proposal for three ODA projects in Armenia.

〈Table 24〉 Overview of ODA Projects for Agriculture in Armenia (Proposal)

Project	Purpose	Components
Support for the Infrastructure and Capacity Building for Raw Milk Testing	Ensure transparency of the price setting system for raw milk Strengthen the capacity of the central and local governments for raw milk testing	Set the quality and hygiene rating standards for raw milk Construct raw milk test centers and support equipment and materials Strengthen the capacity of human resources for testing and research
Pilot Project for the Modernization of the Dairy Industry	Improve the productivity and quality of raw milk Enhance the distribution system of raw milk	Lay the groundwork for dairy cattle farming Construct collection facilities and necessary equipment Organize raw milk collection cooperatives and improve their capacity

Project	Purpose	Components
Support for Strengthening the Fruit (Vegetable) Farming Value Chain	<p>Ensure transparency of the price setting system for grapes (tomatoes) for processed food</p> <p>Improve the productivity and quality of grapes (tomatoes)</p> <p>Promote the foundation of farming cooperatives to improve the access to markets and the distribution system</p>	<p>Set the quality rating standards for grapes (tomatoes) for processed food</p> <p>Establish the foundation for producing quality grapes (tomatoes)</p> <p>Construct distribution facilities (storage, sorting)</p> <ul style="list-style-type: none"> • Promote the foundation of farming cooperatives and support capacity building

4

Project Plan

GRAPE

The given project plan involves the description and objective of creating social entrepreneurship model in wine industry in the Republic of Armenia, the project implementation structure, map of the project site, project design matrix, cost estimation and time schedule of the proposed project, risk management and project quality control plan.

The objective of the project is to unite under a single umbrella a number of grape growers and wine producers from the Aghavnadzor community, Vayots Dzor province, RA. This model will contribute to the improvement of the value chain of wine production by directly involving grape growers, creating preconditions for the quality of products, promoting the diversity of wine types specific to the region, providing sustainable and developing sources serving the financial interests of cooperative members. The above

mentioned will create a strong base for regulating pricing issues in value chain and establishing acting pricing mechanisms.

4.1. Project Scope and Description

The business idea of this initiative revolves around the model of social entrepreneurship in the wine industry. The cooperative will unite under a single umbrella a number of grape growers and wine producers from the Aghavnadzor community, Vayots Dzor province, RA. It will provide various services, professional guidance to its members. The project implementation team will act as a key member of the cooperative in the fields of knowledge, technology dissemination, and legal-organizational issues, not just ensuring the management of production activation but also facilitating the commercialization of newly created wine names under the auspices of the cooperative. It will provide consultation on the pricing of emerging names, thus ensuring their competitiveness in the market on the one hand and avoiding horizontal competition among network members on the other.

The cooperative will provide members with various services based on their actual needs. The three main principles of cooperation the services will stand on are as follows.

Cooperation Scheme 1. Targeted professional assistance in winemaking via on-site production control and consulting offered by independent winemakers (local farmers) with their orchards at each stage of the

production process. The wine will be made in small household productions, under the direction of the cooperative, which will provide ongoing professional consulting assistance, including that in the field of access to equipment for wine production (grape selection, processing, threshing, squeezing, refining, bottling, storage, transportation).

The products will be sold via cooperative.

Cooperation Scheme 2. Winemakers with their vineyards and other stakeholders are offered comprehensive management of the wine production process in the cooperative winery. The wine is produced in the winery of the cooperative under the full professional supervision of the winemakers' team.

Cooperation Scheme 3. The members of the cooperative, who have their vineyards but are not directly involved in viticulture chain, are offered to manage the whole chain of vineyards and wine production process ("from farm to plate"). The company will manage the vineyards, at the same time carrying out the wine production process in the cooperative winery.

They can sell their product with their own name, in the meantime stipulating on the label their membership to the Cooperative group.

Two major services will be implemented in the cooperative winery. The primary product of the business is a local wine, made from autochthonous grapes that meet the requirements of winemaking. The production is available in both local and foreign markets. The secondary service is wine tourism with elements of agro-tourism. The latter is based on targeted visits to the winery and vineyards. Various touristic and professional tasting packages will be offered throughout the season, i.e. from April to November.

The cooperative's products will be targeted at wine consumers (in Armenia and abroad), interested in discovering new exclusive wines with different flavors made of endemic grapes, which differ from the products of world-famous winemakers. This is a niche of a specific but large and fast-growing market, mostly noticeable in the hotel-restaurant-cafe segment (HoReCa). This new trend in wine consumption has spread among young people aged 25-35. The given segment is specifically interested in wines with a long history, those having a guaranteed quality, at the same carrying the legends associated with the cradle of winemaking, derived from millennial grape varieties.

The project consists of three main components:

1. Improvement of dairy production in the region through cooperatives model
2. Governance capacity building and strengthening
3. Access to new markets, finance and knowledge

Market and Competitors Analysis

The implementation team shall pursue two target market elements, namely:

1. New export markets with similar consumer preferences in countries and
2. Specialized markets for products in existing, prospective export target countries.

At present, there are about 50 registered wine companies in five wine regions of Armenia, including about 35 with commercial production. There are about 17,000 hectares of vineyards in Armenia, of which only 1,200 hectares are in Vayots Dzor, where the program in question will be implemented.

Vayots Dzor region is one of the most important wine-growing regions of the country of limited production capacities and a specific high-quality terrain of vineyards. 10 wine companies are registered here, offering various products. They work with local grape varieties, mainly Areni Black and Voskehat. About 70% of the wines produced in the region are red, 30% are white, of different degrees of sweetness (dry, semi-dry, semi-sweet, etc.). The price of one bottle of this product ranges from 2000 to 50,000 AMD (\approx 4-100 USD). In addition, large quantities of local grapes are bought by wineries operating in other parts of the country.

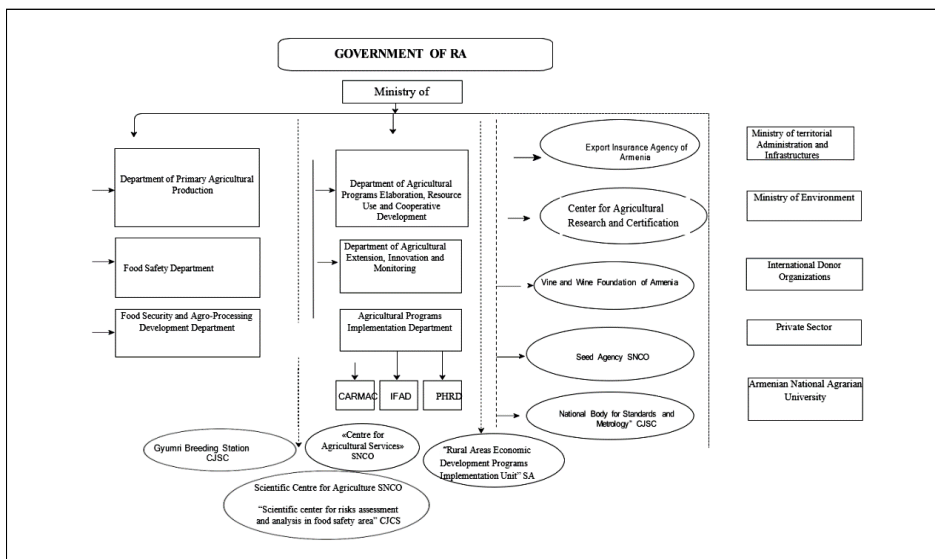
Given the high demand for quality wines in Armenia and abroad, as well as the currently limited productivity of the country's most powerful wine region, it is crucial to identify the specific market demand, which will ensure the competitiveness of the cooperative's products.

Both the cooperative's orchards and wine productions will be located in Aghavnadzor community of the province. Today, well-known wine-producing countries, such as France and Italy, apply the system of clear geographical indications (GI) that predetermines the quality of the wine. The key idea of the GI is the production of wine in the geographical location where the grapes originate from, as such a product is recognized as a higher class than the ones produced from unknown origin grapes, having nothing in common with the given locality. This system has a

history of a century, and winemakers are guided mostly by this quality indicator. Armenia is still taking the first steps towards joining this internationally accepted quality classification system. A number of macro-micro names have already been identified in the main wine regions of the country, and legislation regulating quality diversification is being developed. However, it is still a common practice among winemakers to procure grapes from other regions. In these conditions, the strategy of the cooperative winery, producing wine exclusively from grapes grown in Aghavnadzor, has a distinct sales advantage, offering consumers attractive quality wines closely related to the geographically known area.

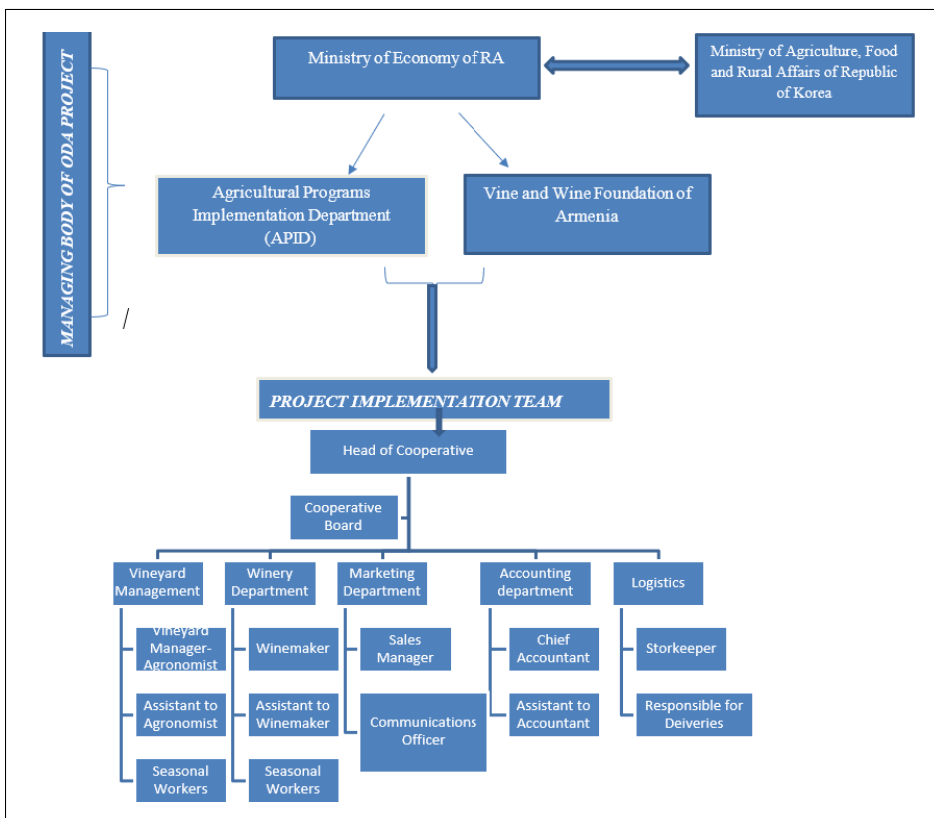
4.2. (Partner Country's) ODA Governance Structure

⟨Figure 29⟩ Governance Structure for Implementing an ODA Project in Diagrams



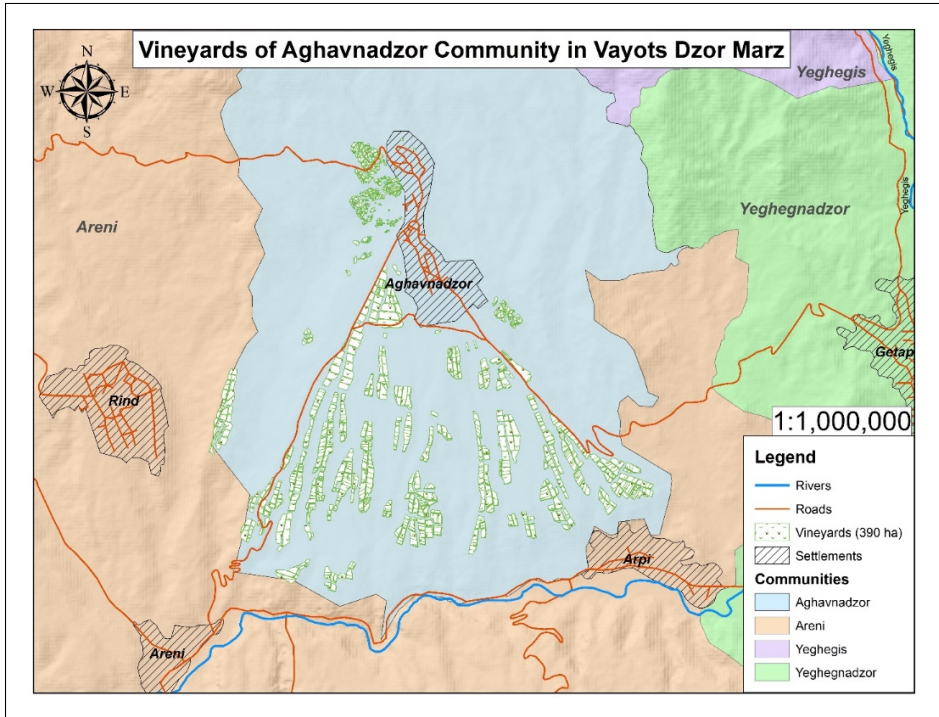
4.3. Project Implementation Structure

〈Figure 30〉 Project Implementation Structure



4.4. Project Site

〈Figure 31〉 Project Site



4.5. Project Design Matrix (PDM) and Project Outcomes

〈Table 25〉 Project Design Matrix for Grape Value Chain

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>Goal The objective of the project is to unite under a single umbrella a number of grape growers and wine producers from the Aghavnadzor community, Vayots Dzor province, RA. This model will contribute to the improvement of the value chain of wine production by directly involving grape growers, creating preconditions for the quality of products, promoting the diversity of wine types specific to the region, providing sustainable and developing sources serving the financial interests of cooperative member</p>	<p>Component 1</p> <ul style="list-style-type: none"> • 500 small-scale households directly or indirectly benefit from the project • Income increase by 10% • Improvement of wine product quality • New brands are developed • The quality corresponds to internationally acceptable level <p>Component 2</p> <ul style="list-style-type: none"> • At least 2 similar project are implemented in Armenia • Cooperative model accepted by the local government after study tours • New Pricing policy is accepted after capacity building training • The project acts in line with agricultural and rural development sustainable poverty reduction programs <p>Component 3</p> <ul style="list-style-type: none"> • At least 50 staff trained on market economy combined with rural development • At least 85 % staff understand and applied project-provided knowledge, capacities into their routine professional tasks 	<p>Monitoring Reports Surveys Interviews with Target groups</p>	<ul style="list-style-type: none"> • Sufficient funding • Political and economic stability • Stakeholders are motivated and fully comprehend the initiative purpose • Government support • International Organizations cooperate • Banks are willing to cooperate

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>Outputs</p> <ul style="list-style-type: none"> • Functioning cooperative • Getting viability of primary cooperatives by consolidation • Effective leadership and guidance of local community authorities and governmental bodies • Government support is available • Successful capital accumulation through steady growth • Replication of results through Armenia 	<p>Cooperative has a fixed structure and registration</p> <p>Agreements on funding are available</p> <p>The products by the cooperative are available on the market</p>	<p>Monitoring Reports</p> <p>Surveys</p> <p>Interviews with Target groups</p>	<p>The leadership is efficient</p> <p>Political and Economic stability</p>
<p>Activities</p> <ul style="list-style-type: none"> • Attracting the attention of the relevant institutions and creating a sound political background for the development of the sector via introduction of new pricing policy system • Identification source of funding • Meetings with processors and farmers • Identification of site and mode of cooperation • Acquisition of necessary inputs/technologies for the project • Launch of new Pricing policy based on grape quality standards and other new parameters of grape quality • Implementation of Marketing campaigns, dairy production trading 	<p>Inputs</p> <ul style="list-style-type: none"> • Funds • International expertise • Local expertise • Training materials • Project implementation site • New links and network connection with financial institutions 		<p>Government, Financial institutions/ donors/ stakeholders are willing to contribute</p> <p>Stakeholders are fully in line with initiative</p> <p>Economic/political stability</p> <p>Pertinent expertise and leadership is available</p>
	<p>Concerned Country Side</p>	<p>Korean Side</p>	

4.6. Cost Estimation and Time Schedule

The dominant revenue model of this business is anchored in the production package, that is, the creation of a special product, wine (under this program), which is produced under different names using different cooperative wine production methods. Given such a “limited orientation” of the product, wine tourism is becoming a more valuable secondary source of income in the current business model, as a type of additional activity that expands due to the profit-generating potential of the business.

It includes a wide selection specific to tourism, including wine tastings, wine purchases in vineyards, wineries, wine tours accompanied by guides, wine festivals, or other special, targeted events tailored to the needs of the company.

Taking into account the economic assessments and the analysis of the activities of the previous years, we have thoroughly analyzed and calculated the volume of investment and current expenses, which are necessary at the stage of the project implementation. The volume of sales growth is based on the following two factors:

1. Gradual increase of production volumes over the next five years, which is conditioned by the growth of the production of new members of the cooperative;
2. The consistent growth of the price range, which is based on the proper promotion of the produced wines in the market and increase of the recognizability level.

According to business expenditure forecasts, the overall dynamics of expenditures is related to two factors, in particular:

1. Production volumes
2. Increased costs associated with entering new markets.

The chart below shows the cost-benefit analysis of the project over the next five years of business development.

〈Table 26〉 Cost-Benefit Analysis of Grape Project

Expenses AMD	Year 1 45.000 bottles	Year 2 100.000 bottles	Year 3 150.000 bottles	Year 4 180.000 bottles	Year 5 200.000 bottles
Sale of goods and services	117,298,368	260,663,040	390,994,560	469,193,472	521,326,080
Costs of goods and services	43,124,400	91,040,400	129,373,200	146,622,960	156,206,160
Gross income	74,173,968	169,622,640	261,621,360	322,570,512	365,119,920
Operational costs					
Salary	18,926,820	32,175,594	35,393,153	42,471,784	46,718,962
Accounting / Legal Advice Services Fees	4,791,600	4,791,600	4,791,600	4,791,600	4,791,600
Depreciation costs	5,510,340	17,249,760	15,333,120	15,333,120	15,333,120
Bank loan interest	6,348,870	10,781,100	8,624,880	6,899,904	5,519,923
Profit tax	4,353,169	7,400,387	8,140,425	9,768,510	10,745,361
Other expenses	4,791,600	5,749,920	6,324,912	6,957,403	7,653,144
Marketing/promotion/sale/distribution	3,518,951	10,426,522	19,549,728	28,151,608	36,492,826
Transportation expenses and per diem	6,229,080	8,720,712	9,592,783	10,552,062	11,607,268
Operational costs	19,703,538	72,327,046	153,870,758	197,644,521	226,257,716
Profit tax	3,940,708	14,465,409	30,774,152	39,528,904	45,251,543
Net income	15,762,831	57,861,637	123,096,606	158,115,616	181,006,173
Profit margin	13%	22%	31%	34%	35%

<Table 27> Projected Cash Flow

(in AMD)

Cash flow statement	Project Implementation Year 1	Year 2	Year 3	Year 4	Year 5
Cash receipts					
Cash balance at the beginning of each year	0	41,026,158	104,692,080	232,506,037	381,278,393
Total sales	117,298,368	260,663,040	390,994,560	469,193,472	521,326,080
Investments	172,497,600	7,187,400	7,187,400	7,187,400	7,187,400
Other cash flow sources					
Cash inflows, total for one year	289,795,968	267,850,440	398,181,960	476,380,872	528,513,480
Cash outflows					
Supplies purchase	143,748,000	4,791,600	4,791,600	4,791,600	24,916,320
Commodity costs	43,124,400	91,040,400	129,373,200	146,622,960	156,206,160
Bank interest payments	6,348,870	10,781,100	8,624,880	6,899,904	5,519,923
Principal amount repayment	12,937,320	22,520,520	19,166,400	19,166,400	38,332,800
Accounting/Legal Advice Services Fees	4,791,600	4,791,600	4,791,600	4,791,600	4,791,600
Salary	18,926,820	32,175,594	35,393,153	42,471,784	46,718,962
Profit tax	4,353,169	7,400,387	8,140,425	9,768,510	10,745,361
Other expenses	4,791,600	5,749,920	6,324,912	6,957,403	7,653,144
Marketing/promotion/sale/distribution	3,518,951	10,426,522	19,549,728	28,151,608	36,492,826
Transportation expenses and per diem	6,229,080	8,720,712	9,592,783	10,552,062	11,607,268
Dividends:	0	5,786,164	24,619,321	47,434,685	63,352,161
Cash outflow, total for one year	248,769,810	204,184,518	270,368,003	327,608,516	406,336,524
Net difference *	41,026,158	63,665,922	127,813,957	148,772,356	122,176,956
Cash balance at the end of each year **	41,026,158	104,692,080	232,506,037	381,278,393	503,455,349

* The net difference shows whether the cash inflows exceed the outflows or vice versa, and to what extent.

** To get the cash balance, add or subtract the net difference from the cash balance at the beginning of the year. The value obtained indicates the new cash balance for the following month.

<Table 28> Implementation Plan

Activity	Timeframe (2022–2023)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
First cycle, collaborations												
Contract signing between the members of the cooperative												
Monitoring of farmers' small production												
Definition of cooperation schemes and development strategies												
Second cycle, equipment, and production												
Development of the final appearance of the cooperative winery												
Purchase of equipment for orchards, factories, and logistics												
Equipment installation and production organization												
Start of harvest and production												
Formation of a cooperative logistics bundle												
Third cycle: commercialization												
Definition of created names												
Sorting and new product naming												
Final processing and bottling												
Introducing new names to local and foreign customers												
Communication and awareness-raising campaigns, development and implementation												
Participation in wine festivals												

The given program is originally based on the idea of creating a cooperative network of grape growers and farmers seeking to expand their businesses and profitability by being directly involved in the wine industry. Therefore, the number of direct beneficiaries will be equal to the number of the cooperative members, which will increase steadily during the project period, especially at the expense of the villagers who intend to produce their wine in their households under the direction of cooperative winemakers who have no direct connection with the production capacity of the cooperative winery. Consequently, the actual number of these beneficiaries may continue to grow as demand for their products increases (see Cooperation Scheme 1).

In the first year of the project implementation (grant implementation period) it is planned to include at least seven households and individual grape growers in different cooperation schemes (as mentioned, preliminary agreements are already in place). Over the next three years, the cooperative plans to involve at least 10 local farmers / or individual orchard owners (cooperation schemes 2 and 3).

It should be noted that the provision of competitive consulting services by the cooperative team will expand the geography of the impact of the initiative to neighboring communities in Vayots Dzor province under the idea of promoting new cooperatives in other sub-regions and communities.

All the project beneficiaries will represent the Aghavnadzor community of the Vayots Dzor province of Armenia. This arrangement facilitates the communication, implementation of joint activities, and smooth cooperation among the beneficiaries.

According to the strategy of involving grape growers in the activities of

the cooperative, which will result in the establishment of large networks of interconnected wineries, awareness-raising and information campaigns on cooperation technologies and their benefits are launched among neighboring farms. In addition to the practical benefits of this initiative, demonstrating its financial viability is crucial, thereby promoting the actual involvement of cooperative members/beneficiaries in wine production cycles and increasing the likelihood of attracting new beneficiaries.

It is clear that the production targeted at the quality prioritization and the successful commercialization of wine production is a precondition for significantly greater financial benefits than growing grapes and selling them as raw materials.

At the moment, the purchase price of Vayots Dzor grapes fluctuates between 150 to 350 drams per kg (about 35-75 US cents). Unfortunately, even this amount is variable, and prices can fluctuate significantly across years, thus inducing financial instability among local farmers. Given the winemaking conversion ratio (1 bottle of wine = 1.2 kg of grapes), the wine-producing farmer can triple his average net income compared to the income from selling the grapes he has grown to other winemakers. One of the most significant benefits of working with a wine cooperative is that the cooperative will support its members in all chains of the production cycle, including logistics and product marketing.

Among the preconditions for the successful implementation of the project are the two key elements of cooperative activities. First of all, the cooperative requires a closed production facility, managed by a team of

skilled winemakers and equipped with grape processing and fermentation equipment, to provide the necessary services to all the cooperative members.

Secondly, the logistics and distribution center is an essential element of the project, which is not just a warehouse but also a component of the marketing policy of the new assortment, produced by the cooperative members.

The implementation of this program will serve as a powerful incentive for the establishment of a cooperative network of winemakers by consolidating and developing the existing value chain of wine production in Aghavnadzor. Moreover, one of the key aspects of the project is the strengthening of the main functioning winery by purchasing new equipment and increasing production capacity.

Marketing Strategy (planning to attract buyers, wholesalers, and traders if needed). The cooperative to be formed during the implementation of this program, with its products including new types of wine, is favorable for predicting a separate targeting of existing and future markets. The flexibility of the prices of these types will enable grouping the products according to the price classes, adapting them to the realities of different markets and consumers. As already mentioned, large buyers in Armenian and overseas markets form three main segments, dictating their targeting in terms of product percentage. The restaurant-hotel-cafe sector is targeted at about 30% of the products. At the same time, being the most significant in terms of profitability, this sector will get down the most expensive wines, which ensure a high-profit margin.

Specialized wine store chains are the second largest market for customers, accounting for about 30% of products. The profitability here is almost the same as in the previous segment. In the case of supermarket chains, the targeting of product volumes by customers is of higher importance, especially in the case of newer types of wine, being equal to 40%, which, however, includes wines of the lower price segment.

The overall marketing strategy of the cooperative envisages the development of the first two most profitable segments through the implementation of product quality on the one hand and the implementation of effective advertising and promotion strategies on the other hand.

The strategic marketing planning of the implementation team has two main directions, which predetermine the ways of the company's commercial activity development:

- 1) Expansion and strengthening of existing markets
- 2) Discovering new opportunities to increase revenue by gaining a position in new markets or the existing ones.

The primary precondition for ensuring stable and dynamic cooperation with existing importers, which leads to an increase in demand for products in this market, is the gradual increase in sales in existing distribution networks. A number of tools are applied in this direction, including promotional campaigns with distributors, participation in exhibitions, wine tasting events, targeting potential new importer customers, direct bilateral business cooperation with resellers in the respective countries,

such as restaurants, pubs, and specialized shops. In addition, the company's products are marketed owing to tourists visiting the wine tasting hall, with accurate communication being developed on the contacts of the distributors and the assortment of wines available in the target exporting countries.

The strategy of ensuring access to new markets is rooted in two main directions, namely: 1) promotion of wines in new countries; 2) awareness of specialized distributors of wine in new and existing markets. These two approaches are implemented through a number of promotion-awareness campaigns, notably participation in wine competitions, awareness-raising in countries targeted through social media, participation in specialized tastings and wine competition events, with the specific aim of raising product and brand awareness.

A quality warehouse is required to provide the necessary logistical support and quality distribution services for all wines produced in the cooperative. An appropriate warehouse will also be needed to serve as a base for the cooperative after repairs and equipment installation.

The implementation of this initiative will facilitate market development in a number of directions. First of all, the creation of many new wine names under the auspices of the cooperative will substantiate the expansion of the assortment of wines offered to existing, functioning, and future distributors in the market. Under the flexible pricing policy with a wide range of product prices, such diversity will enable the gaining of new market shares and new customers that could not have existed without the results of this initiative.

Moreover, there is a steady growth in demand for the company's products in both domestic and foreign markets. Therefore, the success of the project, which will increase the production capacity of the main component of the cooperative, will have a direct impact on the market expansion.

4.7. Risk Management

Like any agricultural sector, winemaking and its market are subject to various risks, which emerge from several factors. The following risks were identified during the company's operation:

1. Human behavioral factor

This risk is related to changes in consumer behavior, as well as developments in market preferences. Today, the general trends in the wine market are beneficial for the whole range of the company's products, based on high-quality wines made from local grapes, which are attractive for foreign markets, therefore, the possible impact of this risk is estimated as low.

2. Climatic conditions

Grapes are sensitive to geographical conditions. They are grown all over the world in specific climatic conditions, which ensure the cultivation of high-quality grapes. But at the same time, this close dependence on the climate makes the plant extremely sensitive to weather fluctuations. The

climate of Vayots Dzor is characterized as high continental, where mid-season, and mainly day and night fluctuations in temperature pose risks to the quality and quantity of grapes grown in individual years, which the company has faced in previous years. However, global warming has reduced the climate change risk, as the overall temperature is higher during the growing season, reducing the likelihood of spring frosts. Therefore, this risk is classified in the lower-medium range.

3. Production processes

The human factor plays an essential role in winemaking, mostly conditioned by the qualitative characteristics and skills of the working team and the orchard staff. Lack of proper attention, care, along with the lack of a system to control and analyze the specific risks of the technological scheme of production, can lead to a reduction in product volumes, at the same time accounting for the quality of the final product.

4. Price fluctuations

Wine production is one of the most dynamically growing sectors in the food industry. Every year, various new winemaking programs are developed and implemented in different parts of the world, increasing the competition level between types of wine. Moreover, the Armenian wine sector is developing dynamically, which is reflected in the doubling of production in the last 4-5 years solely. This fact, together with the general economic situation, can inevitably lead to price fluctuations and affect business profitability. The probability of this risk is estimated as medium.

5. Economic and financial risks

The economic situation of the country and the level of inflation can be a challenge for the profitability of the company and the annual sales volumes. However, the current economic orientation of the government, as well as the state policy that has made the wine sector a priority for the Armenian economy, are greatly beneficial for this sector. These risks range from low to medium.

This program addresses the identified risks by first creating a new model of cooperation between the wine value chain participants, thus creating effective incentives to develop new wine names and varieties, diversifying the market, thus increasing the competitiveness of production in local and international markets. This project promotes job creation by enabling villagers to engage in highly profitable manufacturing processes.

However, it is important to realize that higher production volumes mean, among other things, higher risks associated with consistent product quality assurance. Thus, it is essential to have a quality enlargement strategy in place to ensure that the identified risks are properly addressed.

The following measures are suggested to counteract the identified risks:

1. Addressing risks associated with consumer preferences

The key idea of the wine cooperative is to create a diverse production system, the implementation of which will bring to market products with different technological characteristics, presented in different price segments, which will meet the changing needs of consumers, as well as be

resilient to changes in market trends. Therefore, the most important way to counteract is to follow market developments closely, adapting production strategies to the challenges posed by the consumer needs analysis.

2. Addressing the risks of climatic conditions

The risks in this area are addressed based on two principles. First of all, the cultivation of crops, which are the least sensitive to harsh climatic conditions, diseases, and other natural conditions.

The second way to resist is to ensure the diversity of the grape varieties being cultivated, taking into account the resistance characteristics of each of them. In this case, the management of the vineyards is endowed with a high degree of flexibility to climatic conditions, as different species or varieties have different adaptations to climatic conditions, always ensuring the expected harvest volume for wine production.

3. Addressing the risks associated with production processes

It is essential to ensure the professional development of local employees directly involved in the wine production process, targeting all elements of this business, from orchard management to the commercialization of the products. Capacity building and development of skills are consistently carried out for both seasonal and full-time employees of the company. The organization actively cooperates with Vayots Dzor Regional State College, introducing a two-dimensional education system in the latter's curriculum, under which the trainees of this institution and interns are involved in production processes, ensuring the transfer of necessary practical knowledge and dynamic staff education. In addition, close cooperation

with international consultants in the field of orchard management and winemaking is an integral part of training and education, especially in the areas of organic agriculture and the food industry.

4. Addressing the risks of price fluctuations

To withstand the price fluctuation risks, it is proposed to the cooperative facility to offer different products in different price segments. The wines produced will be designed to have their unique market section, thus ensuring the integrity of market demand, adequate flexibility of production, responding to the specific price arbitrariness of the world wine market. The company's marketing team will conduct ongoing and consistent market research and monitoring, as well as develop an effective strategy to direct the pricing process and ensure product commercialization.

5. Coping with economic and financial risks

The main way to deal with these risks is through active and effective cooperation with other winemakers and the Vine and Wine Foundation of Armenia, through lobbying, tax policy development and promotion, and awareness-raising activities in the wine industry, attracting the attention of the relevant institutions and creating a sound political background for the development of the sector, which at the same time will reduce the sector-specific financial risks.

4.8. Seeking Opportunities for Linkage and Convergence with Joint Research-Related Projects

Our study aimed to reveal the gaps for effective pricing mechanism acting in the country as well as to provide concept paper for implementing a pilot project to ensure a fair and mutually profitable pricing for both farmers and producers. The study attested that one of the main challenges is the lack of linkages between the main stakeholders in this process due to which many challenges arise including the pricing.

Due to our proposed project we will be able to integrate the main stakeholders of the value chain under one roof as well being coordinate by the Ministry's relevant unit they will also have state's support. In addition, enlarging the volumes of the production they will have a positive impact on stabilizing the price.

4.9. Project Quality Control Plan

⟨Table 29⟩ Project Quality Control Plan

KPI	Evaluation Dates
Number of contracts concluded and executed with the members of the cooperative	Half a year following the launch of the project
The volume of wine produced	Annually
Increase in the number of international partners	Semi-annually (export windows)

KPI	Evaluation Dates
Increase in the number of local partners	Semi-annually (based on the report of the local distributors)
The volume of the new wines produced	Annually (following the end of the first year)
Export volumes	Annually

The implementation of this program leads to the development of a completely new model of cooperation between viticulturists and winemakers. Undertaking the role of the cooperative, the key player in a wine production value chain, and other winery programs manager the organization will undoubtedly form a new evolutionary path to its business approaches.

Finally, such a shift also requires strategic changes in the organizational structure of the company, which will define the operational procedures, the system of management instructions, meeting the special needs of its members-partners. Therefore, the company has planned a new management unit in its structure, which will work closely with both grape growers and winemakers, carrying out the functions of coordinating the cooperative's winemaking programs and implementing product commercialization strategies for each of them.

Tomato

The given project plan involves the description and objective of creating social entrepreneurship model in tomato value chain in the Republic of Armenia, the project implementation structure, map of the project site, project design matrix, cost estimation and time schedule of the proposed project, risk management and project quality control plan.

The objective of the project is to unite under a single umbrella a number of tomato growers and producers from the Vosketap community, Ararat Marz, RA. This model will contribute to the improvement of the value chain of tomato production by directly involving tomato growers, creating preconditions for the quality of products, promoting the diversity of tomato indigenous types, providing sustainable and developing sources serving the financial interests of cooperative members. The above mentioned will create a strong base for regulating pricing issues in value chain and establishing acting pricing mechanisms.

4.1. Project Scope and Description

Please write project scope and justification. You are required to designate and explain project site in the level of District in detail.

The business idea of this initiative revolves around the model of social entrepreneurship in the tomato value chain industry. The cooperative will unite under a single umbrella a number of tomato growers and producers

from Vosketap community, Ararat Marz, RA. It will provide various services, professional guidance to its members. The project implementation team will act as a key member of the cooperative in the fields of knowledge, technology dissemination, and legal-organizational issues, not just ensuring the management of production activation but also facilitating the commercialization of tomato products under the auspices of the cooperative. It will provide consultation on the pricing, thus ensuring their competitiveness in the market on the one hand and avoiding horizontal competition among network members on the other.

The cooperative will provide members with various services based on their actual needs. The three main principles of cooperation the services will stand on are as follows.

Cooperation Scheme 1. Targeted professional assistance in growing tomato plants via on-site production control and consulting offered by independent local farmers with their orchards at each stage of the production process. The tomato will be grown in small household productions, under the direction of the cooperative, which will provide ongoing professional consulting assistance, including that in the field of access to equipment for tomato planting (selection of proper type, selection of inputs, irrigation technologies).

Cooperation Scheme 2. Tomato growers with their plantations and other stakeholders are offered comprehensive management of the tomato production process in the cooperative factory. The tomato is produced in the factory of the cooperative under the full professional supervision of the tomato processors' team.

Cooperation Scheme 3. The members of the cooperative, which have

their plantations but are not directly involved in processing activities, are offered to manage the whole chain of tomato growing and production processes (“from farm to plate”). The company will manage the plantations, at the same time carrying out the tomato production process in the cooperative factory.

The major service will be implemented in the cooperative factory. The primary product of the business is a local tomato paste, tomato marinade made from raw material that meet the requirements of tomato processing. The production is available in both local and foreign markets.

The cooperative's products will be targeted at tomato paste and marinade consumers (in Armenia and abroad).

Market and Competitors Analysis

The implementation team shall pursue two target market elements, namely:

1. New export markets with similar consumer preferences in countries and
2. Specialized markets for products in existing, prospective export target countries.

At present, based on the geography of tomato production, most of the processing factories are located near the sources of raw material – Ararat and Armavir marzes. Around 6 of the factories are located in Yerevan, 4 of them are in Kotayk marz and 1 in Ashtarak (Aragatsotn marz), which are also relatively close to Ararat valley. Thus, most of around 25 vegetable canneries are located 60km away from Yerevan (or in Ararat valley or very

close to it). The geographic location of the factory plays an important role in its efficient operation and the closer the factory is to the source of the raw material the more competitive advantage it has.

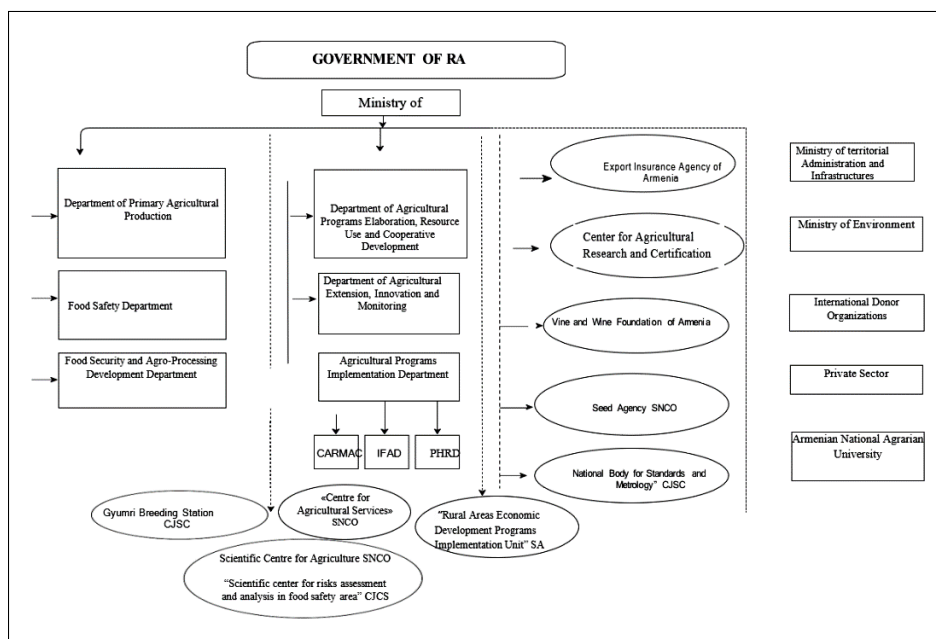
Ararat marz is one of the most important tomato-growing regions of the country as the number of sunny days is quite many during the year and the average temperature is rather high for large-scale tomato production (often two sowing areas per year). Around 25 vegetable canneries are located in Ararat valley or very close to it. The price of one kg of canned tomato paste average price ranges from 1000 to 1200 AMD (\approx 2-2.5 USD).

Given the high demand for quality products in Armenia and abroad, as well as the currently limited productivity of tomato in the country, it is crucial to identify the specific market demand, which will ensure the competitiveness of the cooperative's products.

Both the cooperative's orchards and factory will be located in Vosketap community of the Marz.Armenia is still taking the first steps towards joining internationally accepted quality classification system.

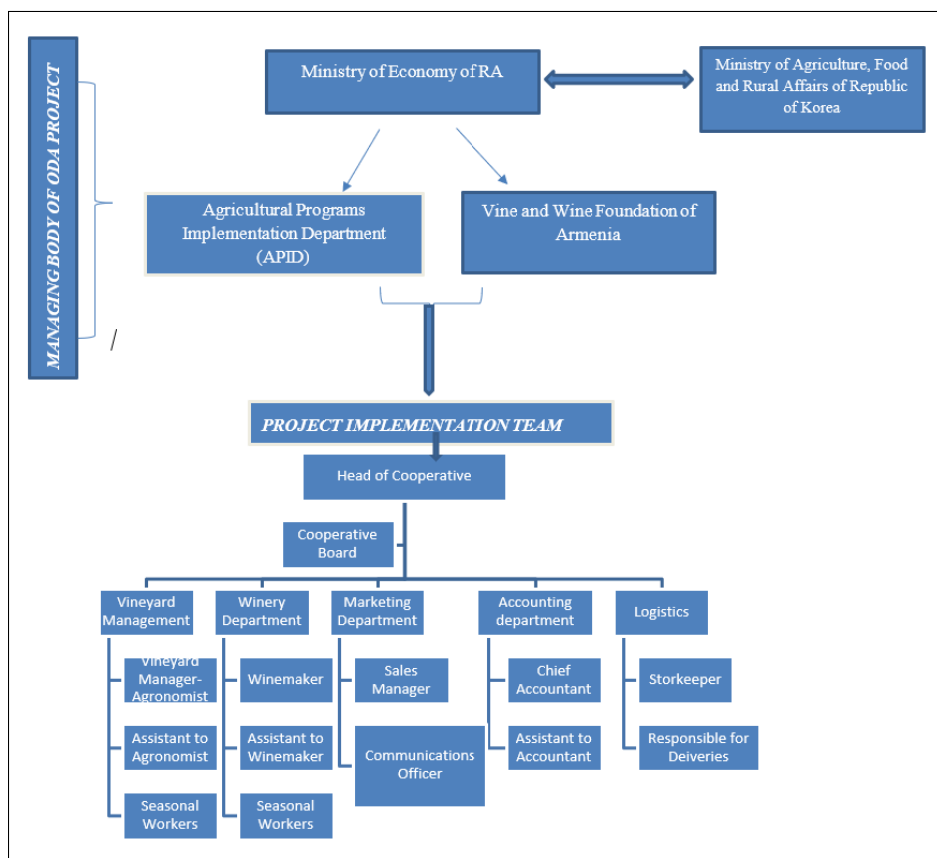
4.2. (Partner Country's) ODA Governance Structure

〈Figure 32〉 Governance Structure for Implementing an ODA Project in Diagrams



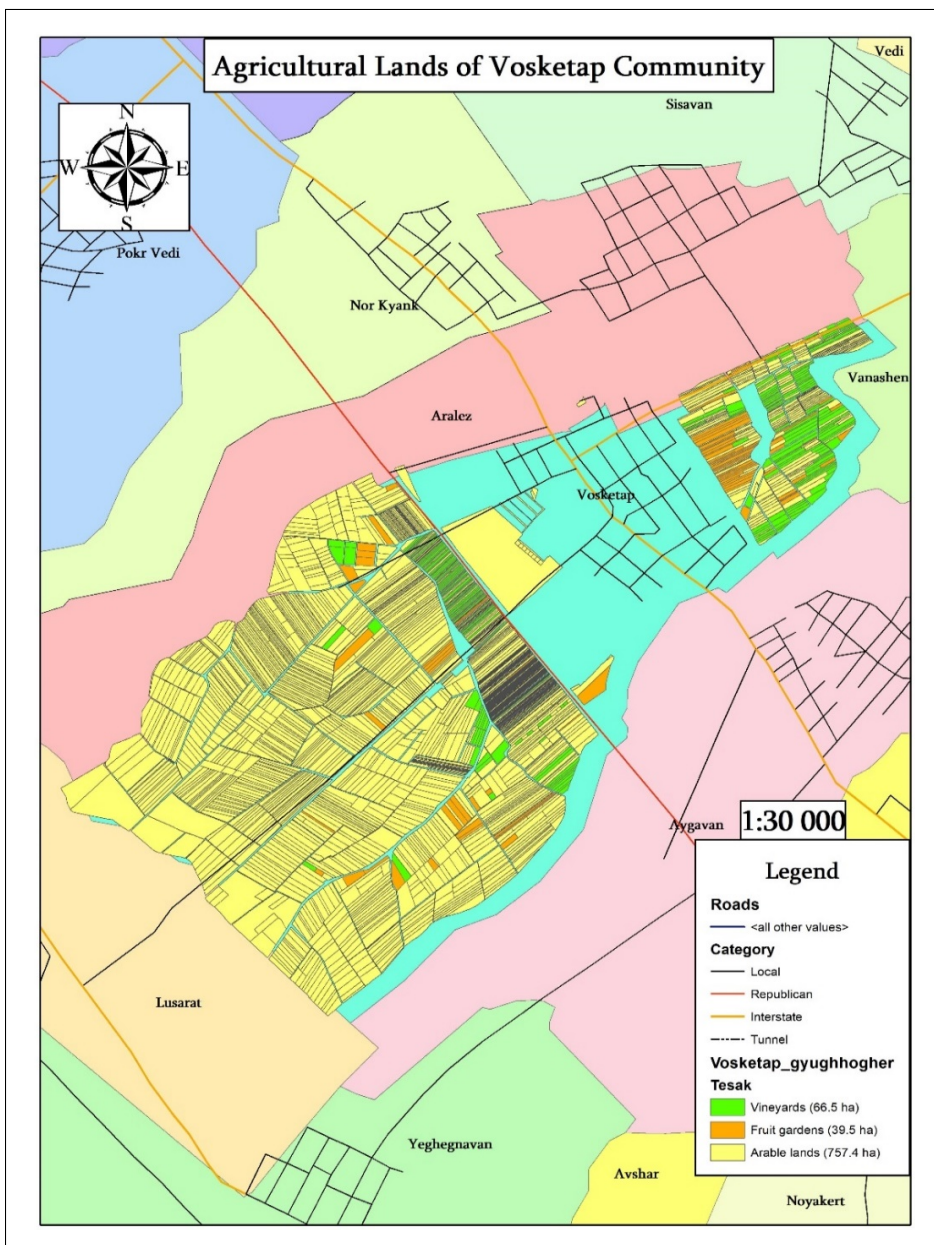
4.3. Project Implementation Structure

〈Figure 33〉 Project Implementation Structure



4.4. Project Site

〈Figure 34〉 Project Site



4.5. Project Design Matrix (PDM) and Project Outcomes

〈Table 30〉 Project Design Matrix for Tomato Value Chain

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>Goal The objective of the project is to unite under a single umbrella a number of tomato growers and producers from the Vosketap community, Ararat Marz, RA. This model will contribute to the improvement of the value chain of tomato production by directly involving tomato growers, creating preconditions for the quality of products, promoting the diversity of tomato indigenous types, providing sustainable and developing sources serving the financial interests of cooperative members.</p>	<p>Component 1</p> <ul style="list-style-type: none"> • 500 small-scale households directly or indirectly benefits from the project • Income increase by 10% • Improvement of tomato product quality • New brands are developed • The quality corresponds to internationally acceptable level <p>Component 2</p> <ul style="list-style-type: none"> • At least 2 similar project are implemented in Armenia • Cooperative model accepted by the local government after study tours <p>Component 3</p> <ul style="list-style-type: none"> • New Pricing policy is accepted after capacity building training • The project acts in line with agricultural and rural development sustainable poverty reduction programs • At least 50 staff trained on market economy combined with rural development • At least 85 % staff understand and applied project-provided knowledge, capacities into their routine professional tasks 	<p>Monitoring Reports Surveys Interviews with Target groups</p>	<ul style="list-style-type: none"> • Sufficient funding • Political and economic stability • Stakeholders are motivated and fully comprehend the initiative purpose • Government support • International Organizations cooperate • Banks are willing to cooperate

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>Outputs</p> <ul style="list-style-type: none"> • Functioning cooperative • Getting viability of primary cooperatives by consolidation • Effective leadership and guidance of local community authorities and governmental bodies • Government support is available • Successful capital accumulation through steady growth • Replication of results through Armenia 	<p>Cooperative has a fixed structure and registration</p> <p>Agreements on funding are available</p> <p>The products by the cooperative are available on the market</p>	<p>Monitoring Reports</p> <p>Surveys</p> <p>Interviews with Target groups</p>	<p>The leadership is efficient</p> <p>Political and Economic stability</p>
<p>Activities</p> <ul style="list-style-type: none"> • Attracting the attention of the relevant institutions and creating a sound political background for the development of the sector via introduction of new pricing policy system • Identification source of funding • Meetings with processors and farmers • Identification of site and mode of cooperation • Acquisition of necessary inputs/technologies for the project • Launch of new Pricing policy based on quality standards • Implementation of Marketing campaigns, tomato production trading • Implementation of Marketing campaigns, dairy production trading 	<p>Inputs</p> <ul style="list-style-type: none"> • Funds • International expertise • Local expertise • Training materials • Project implementation site <p>Concerned Country Side</p>	<p>Korean Side</p>	<p>Government, Financial institutions/ donors/ stakeholders are willing to contribute</p> <p>Stakeholders are fully in line with initiative</p> <p>Economic/political stability</p> <p>Pertinent expertise and leadership is available</p>

4.6. Cost Estimation and Time Schedule

The dominant revenue model of this business is anchored in the production package, that is, the creation of a product, canned tomato (under this program), which is produced under different names using different cooperative tomato production methods.

Taking into account the economic assessments and the analysis of the activities of the previous years, we have thoroughly analyzed and calculated the volume of investment and current expenditures, which are necessary at the stage of the project implementation. The volume of sales growth is based on the following two factors:

1. Gradual increase of production volumes over the next five years, which is conditioned by the growth of the production of new members of the cooperative;
2. The consistent growth of the price range, which is based on the proper promotion of the produced tomato in the market and increase of the recognizability level.

According to business expenditure forecasts, the overall dynamics of expenditures is related to two factors, in particular:

1. Production volumes
2. Increased costs associated with entering new markets.

The chart below shows the cost-benefit analysis of the project over the next five years of business development.

〈Table 31〉 Cost–Benefit Analysis for Tomato Project

(in AMD)

Expenditures	Year 1 14000 canned tomato	Year 2 17000 canned tomato	Year 3 18000 canned tomato	Year 4 19000 bottles	Year 5 20000 bottles
Sale of goods and services	11,900,000	14,450,000	15,300,000	16,150,000	17,000,000
Costs of goods and services	5,670,000	6,885,000	7,290,000	7,695,000	8,100,000
Gross income	6,230,000	7,565,000	8,010,000	8,455,000	8,900,000
Operational costs					
Salary	3,000,000	3,750,000	4,500,000	5,000,000	5,500,000
Depreciation costs	20000	18000	18000	18000	18000
Profit tax	1,246,000	1,513,000	1,602,000	1,691,000	1,780,000
Other expenses	50000	50000	50000	50000	50000
Operational costs	4,316,000	5,331,000	6,170,000	6,759,000	7,348,000

〈Table 32〉 Implementation Plan

Activity	Timeframe (2022–2023)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
First cycle, collaborations												
Contract signing between the members of the cooperative												
Monitoring of farmers' small production												
Definition of cooperation schemes and development strategies												
Second cycle, equipment, and production												
Development of the final appearance of the cooperative factory												
Purchase of equipment for orchards, factory, and logistics												
Equipment installation and production organization												
Start of harvest and production												

Activity	Timeframe (2022–2023)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Formation of a cooperative logistics bundle												
Third cycle: commercialization												
Definition of created names												
Sorting and new product naming												
Final processing and canning												
Introducing new names to local and foreign customers												
Communication and awareness-raising campaigns, development and implementation												

The given program is originally based on the idea of creating a cooperative network of tomato growers and farmers seeking to expand their businesses and profitability by being directly involved in the value chain. Therefore, the number of direct beneficiaries will be equal to the number of the cooperative members, which will increase steadily during the project period, especially at the expense of the villagers. Consequently, the actual number of these beneficiaries may continue to grow as demand for their products increases (see Cooperation Scheme 1).

In the first year of the project implementation (grant implementation period) it is planned to include at least seven households and individual tomato growers in different cooperation schemes (as mentioned, preliminary agreements are already in place). Over the next three years, the cooperative plans to involve at least 10 local farmers / or individual orchard owners (cooperation schemes 2 and 3).

It should be noted that the provision of competitive consulting services by the cooperative team will expand the geography of the impact of the

initiative to neighboring communities in Ararat Marz under the idea of promoting new cooperatives in other sub-regions and communities.

All the project beneficiaries will represent the Vosketap community of the Ararat Marz of Armenia. This arrangement facilitates the communication, implementation of joint activities, and smooth cooperation among the beneficiaries.

According to the strategy of involving tomato growers in the activities of the cooperative, which will result in the establishment of large networks of interconnected farmers, awareness-raising and information campaigns on cooperation technologies and their benefits are launched among neighboring farms. In addition to the practical benefits of this initiative, demonstrating its financial viability is crucial, thereby promoting the actual involvement of cooperative members/beneficiaries in tomato production cycles and increasing the likelihood of attracting new beneficiaries.

It is clear that the production targeted at the quality prioritization and the successful commercialization of tomato production is a precondition for significantly greater financial benefits than growing tomato and selling them as raw materials.

Among the preconditions for the successful implementation of the project are the two key elements of cooperative activities. First of all, the cooperative requires a closed production facility, managed by a team of skilled tomato producers and equipped with tomato processing equipment, to provide the necessary services to all the cooperative members.

Secondly, the logistics and distribution center is an essential element of

the project, which is not just a warehouse but also a component of the marketing policy of the new assortment, produced by the cooperative members.

The implementation of this program will serve as a powerful incentive for the establishment of a cooperative network of farmer and producers by consolidating and developing the existing value chain of tomato production in Vosketap community. Moreover, one of the key aspects of the project is the strengthening of the main functioning factory by purchasing new equipment and increasing production capacity.

4.7. Risk Management

Like any agricultural sector, winemaking and its market are subject to various risks, which emerge from several factors. The following risks were identified during the company's operation:

1. Human behavioral factor

This risk is related to changes in consumer behavior, as well as developments in market preferences.

2. Climatic conditions

Tomato is sensitive to geographical conditions. They are grown all over the world in specific climatic conditions, which ensure the cultivation of high-quality tomatoes. But at the same time, this close dependence on the climate makes the plant extremely sensitive to weather fluctuations.

3. Production processes

The human factor plays an essential role in tomato processing, mostly conditioned by the qualitative characteristics and skills of the working team and the orchard staff. Lack of proper attention, care, along with the lack of a system to control and analyze the specific risks of the technological scheme of production, can lead to a reduction in product volumes, at the same time accounting for the quality of the final product.

4. Price fluctuations

Tomato production is one of the most dynamically growing sectors in the food industry. Armenian tomato sector is developing dynamically, which is reflected in the increasing of production volumes in the last 4-5 years solely. This fact, together with the general economic situation, can inevitably lead to price fluctuations and affect business profitability. The probability of this risk is estimated as medium.

5. Economic and financial risks

The economic situation of the country and the level of inflation can be a challenge for the profitability of the company and the annual sales volumes.

This program addresses the identified risks by first creating a new model of cooperation between the tomato value chain participants, increasing existing volumes of production, diversifying the market, thus increasing the competitiveness of production in local and international markets. This project promotes job creation by enabling villagers to engage in highly profitable manufacturing processes.

However, it is important to realize that higher production volumes mean, among other things, higher risks associated with consistent product quality assurance. Thus, it is essential to have a quality enlargement strategy in place to ensure that the identified risks are properly addressed.

The following measures are suggested to counteract the identified risks:

1. Addressing risks associated with consumer preferences

The key idea of the tomato cooperative is to create a diverse production system, the implementation of which will bring to market products with different technological characteristics, presented in different price segments, which will meet the changing needs of consumers, as well as be resilient to changes in market trends. Therefore, the most important way to counteract is to follow market developments closely, adapting production strategies to the challenges posed by the consumer needs analysis.

2. Addressing the risks of climatic conditions

The risks in this area are addressed based on two principles. First of all, the cultivation of tomato varieties, which are the least sensitive to harsh climatic conditions, diseases, and other natural conditions.

The second way to resist is to ensure the diversity of the tomato varieties being cultivated, taking into account the resistance characteristics of each of them. In this case, the management of the orchards is endowed with a high degree of flexibility to climatic conditions, as different species or varieties have different adaptations to climatic conditions, always ensuring the expected harvest volume for tomato production processes.

3. Addressing the risks associated with production processes

It is essential to ensure the professional development of local employees directly involved in the tomato production process, targeting all elements of this business, from orchard management to the commercialization of the products. Capacity building and development of skills are consistently carried out for both seasonal and full-time employees of the company.

4. Addressing the risks of price fluctuations

To withstand the price fluctuation risks, it is proposed to the cooperative facility to offer different products in different price segments. The tomatoes produced will be designed to have their unique market section, thus ensuring the integrity of market demand, adequate flexibility of production, responding to the specific price arbitrariness of the world wine market. The company's marketing team will conduct ongoing and consistent market research and monitoring, as well as develop an effective strategy to direct the pricing process and ensure product commercialization.

5. Coping with economic and financial risks

The main way to deal with these risks is through active and effective cooperation with other producers and the Ministry of Economy, through lobbying, tax policy development and promotion, and awareness-raising activities in the tomato industry, attracting the attention of the relevant institutions and creating a sound political background for the development of the sector, which at the same time will reduce the sector-specific financial risks.

4.8. Seeking Opportunities for Linkage and Convergence with Joint Research-Related Projects

Our study aimed to reveal the gaps for effective pricing mechanism acting in the country as well as to provide concept paper for implementing a pilot project to ensure a fair and mutually profitable pricing for both farmers and producers. The study attested that one of the main challenges is the lack of linkages between the main stakeholders in this process due to which many problems arise including the pricing.

Due to our proposed project we will be able to integrate the main stakeholders of the tomato value chain under one roof as well being coordinated by the Ministry's relevant unit they will also have state's support. In addition, enlarging the volumes of the production they will have a positive impact on stabilizing the price.

4.9. Project Quality Control Plan

⟨Table 33⟩ Tomato Project Quality Control Plan

KPI	Evaluation Dates
Number of contracts concluded and executed with the members of the cooperative	Half a year following the launch of the project
The volume of canned tomato produced	Annually
Increase in the number of international partners	Semi-annually (export windows)

KPI	Evaluation Dates
Increase in the number of local partners	Semi-annually (based on the report of the local distributors)
The volume of the new types of products	Annually (following the end of the first year)
Export volumes	Annually

The implementation of this program leads to the development of a completely new model of cooperation between farmers and producers. Undertaking the role of the cooperative, the key player in tomato production value chain, and other tomato value chain related programs manager the organization will undoubtedly form a new evolutionary path to its business approaches.

Finally, such a shift also requires strategic changes in the organizational structure of the company, which will define the operational procedures, the system of management instructions, meeting the special needs of its members-partners. Therefore, the company has planned a new management unit in its structure, which will work closely with both tomato growers and producers, carrying out the functions of coordinating the cooperative's programs and implementing product commercialization strategies for each of them.

DAIRY

The objective of the project is to establish milk collection center in Sisian, Syunik Province, RA in order assure continuous quality and quantity of milk for dairy production. For that purpose, it is important to unite farmers of the region under a single structure as cooperatives. This model will contribute to the improvement of the value chain of milk production by directly involving all players (stockholders, processors, producers) in the community. Moreover, the establishment of cooperative model will ensure effective quality-price relationship in the milk market. It is also important to promote quality standards for milk production (based not only on fat control but also on somatic bacteriological and antibiotic content of milk). If high-quality milk is priced more, then farmers will be interested in producing better quality milk. The cooperative will take responsibility for the whole milk production value chain (quality of breed animals, semen, fodder, etc.) which will encourage competitive import and local production and sale of high quality dairy products.

Farmers creating preconditions for the quality of dairy products, promoting the diversity which is significant for the region, providing sustainable and developing sources serving the financial interests of cooperative members. The above mentioned will create a strong base for regulating pricing issues in value chain and establishing acting pricing mechanisms. Moreover, created effective environment will give smallholder milk farms a prevailige. By creating a cooperative model, a supply of locally produced milk of high quality can be secured for large dairy processors, and at the same time will create possibilities for smallholder farmers to develop sustainable milk production.

The project consists of three main components:

1. Improvement of dairy production in the region through cooperatives model
2. Governance capacity building and strengthening
3. Access to new markets, finance and knowledge

4.1. Project Scope and Description

In the absence of cooperatives or similar organizations, regulations, and policies, the gradual integration of food markets makes it difficult for average producer of raw milk to enter goods and input markets. So, small dairy farms and producers of fluid milk have the difficulty to reach to the big processors and are forced to work with intermediate buyers and they face with the risk of low marketing price and longer payment periods. Finally, it is not wrong to state that the capital requirements of building a dairy farm with optimal capacity are hard to reach for small farmers unless a system of marketing and production agricultural cooperatives and/or institutions are organized. However, the cooperative itself cannot operate independently without the government support either, as it needs to have a continues capital. Therefore, the business idea of this initiative is to establish a cooperative which with the support of government and other institutions (local and international) will on a village level modernize the set-up of the dairy production. The thorough modernization of milk production and processing technologies will enable producers to achieve a

considerable improvement of the quality of dairy products, which alongside the cost and price advantage will make dairy production of the region more competitive. Besides, as mentioned above, the cooperative will start its operation on a village level and as a successful case will be duplicated to other regions of RA. Also, it will provide various services, professional guidance to its members, trainings and other relevant information based on actual needs. The project implementation team will act as a key member of the cooperative in the fields of knowledge, technology dissemination, and legal-organizational issues, not just ensure the management of production activation but also facilitate the commercialization of high-quality dairy products under the auspices of the cooperative. It will provide consultation on the pricing of emerging names, thus ensuring their competitiveness in the market on the one hand and avoiding horizontal competition among network members on the other.

There are various study cases related to cooperative models worldwide. For example, in Turkey there is a huge number of dairy farms and the majority of them have less than 10 cows. Many of Turkey's dairy herds are small-family owned but again the number of larger farms has been increasing. Contrary to the upward trend in milk production, the number of dairy farms is declining. There has been a shift in the number of dairy farms from small-scaled farms to larger and more efficient farms for the past decade. This was the result of cooperation between farms and by that mean growing milk yield per cow. However, the government and other interested parties in the dairy production field played a crucial role for that

development. Now, Turkey is a large milk producer, with production of 22.9 billion liters in 2019. Due to its high level of production and government policies, the amount of milk production in Turkey ranked 3rd in the EU and 8th in the world. This increase in volumes were shown for the last decade. There were many new measures applied for livestock breeding, such as cattle fattening and milking cows were included in the scope of agricultural insurance scheme which was adopted in 2011. It plays huge role in high quality milk production. Moreover, other laws were adopted since in 2011.

Since 2011, 15 basic laws leading up Structural Change and Transformation period in agriculture have been adopted.

- Law on Agriculture,
- Law on Organic Farming,
- Law on Agricultural Producer Unions,
- Law on Protection of Plant Breeder's Rights for New Plant Varieties,
- Law on Agricultural Insurances,
- Law on Soil Protection and Land Use,
- Law on Establishment of Agriculture and Rural Development Support Institution,
- Law on Ending Guaranty arisen from Collective Village Loan/Group Loans supplied by Ziraat Bank and Agricultural Credit Cooperatives,
- Law on Approval of FAO Central Asia Sub-region Office Agreement between United Nations (UN) Food and Agriculture Organization (FAO) and Republic of Turkey,
- Law on Veterinary Services, Plant Health, Food and Feed,

- Law on Restructuring of Agricultural Credits with problems and supplied by Ziraat Bank and Agricultural Credit Cooperatives

The agricultural credit interest rates which were 59% in 2002 became interest free for irrigation and livestock activities and decreased to 7,5% in other agricultural activities. With the decrease in interest rates, the use of agricultural credits has substantially increased. Agricultural credit periods were extended from 18 months to 24 months for operating credits and from 5 years to 7 years for investment credits. Credit rate of return has risen to 98%.

Government of Turkey puts effort to tackle its agricultural sector problems by structural changes and transformations, consequently making agribusinesses work not only for local market but also in international market (price-quality balance monitoring). Therefore, more investment opportunities also are available in the region, for example within the scope of Turkey-EU Financial Cooperation; 22 projects with 147 Million Euro budget have been completed and 8 projects with 134 million Euro are still proceeding. These numbers talk about sustainability in the sector.

This research shows that the development of the sector is strongly depends on government support and through the policy road map it is possible to record a successful result.

Change of rural development policy through Community Development Program started in 1960s in Korea is another case study. The cooperatives model they follow nowadays took more than 40 years to be almost perfect for replication in developing countries. With the contribution of leaders and program strategic development model already in 1970s allow to

increase of agricultural productivity, support price policy and narrow down rural-urban development gap in the country. The project not only had an impact on above mentioned areas but also stimulated the overall development of the region (village access roads reconstruction, access to knowledge, finance and so on). Main factors of success were the central and local government intervention during the program implementation, through frequent meeting with local farmers, other community members, monitoring visits and record keeping. This activation brought an activation among the farmers and villagers overall. Homogeneous socio-economic status of farmers was important factor for closer cooperation. In 1980s, Policy experiment of Integrated Rural Area Comprehensive Development (IRACD) applied the efficiency-oriented Top-Down approach in 12 pilot villages and after short period of time the number of villages increased to 261. The goal was to improve the sanitary conditions and physical living environment of the villages. The essence of the cooperatives was determined based on the production cost solely on the cost without any mind for profit. Besides cooperative board they had a National Federation (NF) as an organization which was in the agricultural cooperatives structure. NF was responsible for Education (awareness rising, trainings, professional consultancy etc.) and link to the Central Bank; conducting mutual financing within the primary cooperatives and subsidies support for different value change stages. In 1960s 2 more institutions were established to create synergy. That was Agricultural Bank (AB) and National Agricultural Cooperatives Federation (NACF). Government decided to merge those to organizations to avoid caused issues regarding finance and cooperatives capital. So, as a result Multipurpose Cooperative was created

as a model which operates until now. For the Government the goal was to establish and implement a perfect mechanism to reach Food Self-sufficiency by increasing production. Therefore, Agricultural Cooperatives were given a “task” to do an effective distribution of agro supplies under the government active support to accomplish it. Also, exclusive rights/privileges were given to agribusinesses. They were granted by necessary agro supplies. In addition, there was a TAX cut also and in parallel NACF started to act as an executor of government. Because of small scale of farms multipurpose cooperative members started to merge unions per county.

To summarize, the success factors of the cooperative mechanism in Korea are:

1. Adopting a multipurpose cooperative
2. Getting viability of primary cooperatives by consolidation
3. Effective leadership and guidance of national federation, NACF
4. Government supports
5. Successful capital accumulation through steady growth

It is essential for each country to find a proper size of its primary cooperatives.

In Armenia, there are available resources to start the implementation of such mechanisms on government level, as well as on international level in order to attract more organization to invest in the agricultural development.

The cooperative formation in Armenia will follow and make use both above mentioned paths by Turkey and South Korea.

The cooperative will provide members with various services based on their actual needs. Cooperative members will access to professional consulting assistance, equipment, agro-supplies, laboratory, knowledge, finance and markets. However, cooperative members should take responsibility for milk quality and further improvement of workshop. The cooperative's products will be targeted at high value dairy production consumers (in Armenia and abroad).

It is important to identify the distribution of milk fat, protein, number of bacterial, and number of somatic cell to choose the standard, and we think the effects after the introduction of the system will be predictable. Especially in Armenia, cheese and curd production and exports are important, so it is necessary to raise the weight value of milk protein to the European level. In addition, in the case of sanitary quality of raw milk, if it is difficult to introduce bacterial and somatic cells at once, it would be better to first introduce the number bacteria and then consider introducing somatic cells later. In fact, it would be good to analyze the cases of companies that are calculating oil prices by including these ingredients and sanitary levels in their pricing.

It would be desirable to organize a dairy cooperative and foster it as a company that encompasses the entire process from milking, processing, and selling milk. In addition, technical and financial support is also needed to enable the establishment of a cold chain system from the pre-collecting milk.

It is important to promote a pilot project through the formation of a cooperative organization.

Market and Competitors Analysis

This program addresses the identified risks by first creating a new model of cooperation between the dairy production value chain participants, thus creating effective incentives to develop new dairy product names and varieties, diversifying the market, thus increasing the competitiveness of production in local and international markets. This project promotes job creation by enabling villagers to engage in highly profitable manufacturing processes.

However, it is important to realize that higher production volumes mean, among other things, higher risks associated with consistent product quality assurance. Thus, it is essential to have a quality enlargement strategy in place to ensure that the identified risks are properly addressed.

The implementation team shall pursue two target market elements, namely:

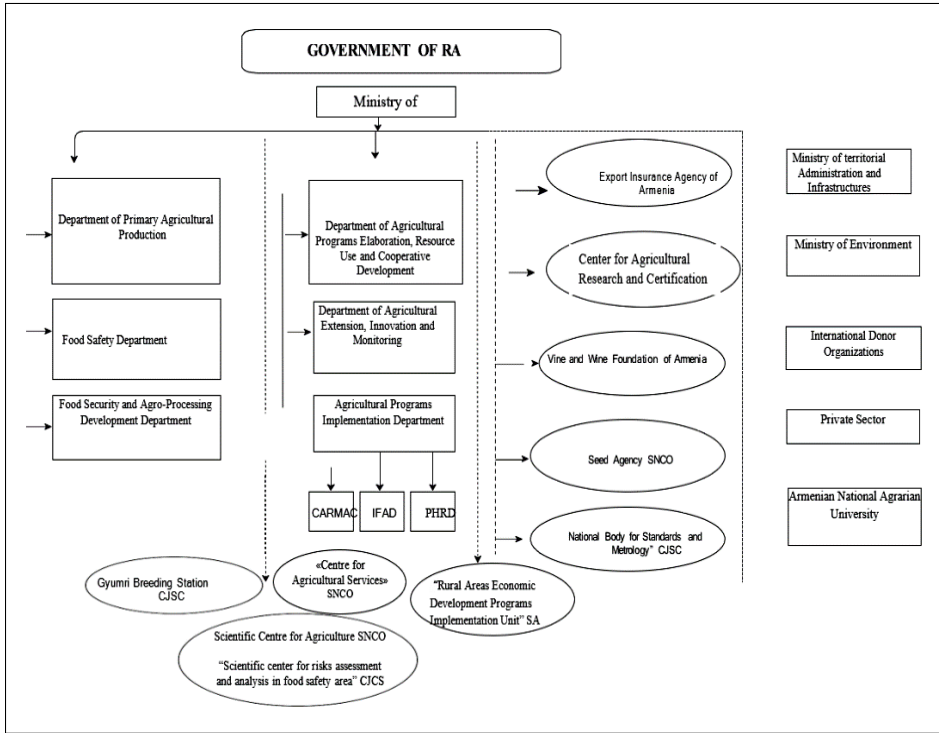
1. New export markets with similar consumer preferences in countries and
2. Specialized markets for products in existing, prospective export target countries.

At present, there are more than 70 milk processing and dairy companies in Armenia, the largest of which are “Dustr Marianna” LLC, “Chanakh” LLC, “Ashtarak-Kat” CJSC, “Biokat” LLC, “Igit” “Dairy Factory LLC”, “Arzni Kat” dairy production enterprise, “Tamara” LLC, “Marila” LLC a and “Bandivan Kat” LLC. In 2016, 43,140 tons of dairy products were produced in Armenia, of which 51.73% was used for cheese production. The main

countries importing dairy products in 2016 were Ukraine (36%), New Zealand (26%), Russia (23%), Belarus (5%), Finland (4%) and Germany (2%). In same year, 98.64% of dairy was exported to Russia. Very little amount was exported to Georgia, the United States and Kazakhstan. The dominant of exported dairy products were cheese and cottage cheese - 5,498 tons, or 99.7%. For international market Armenian cheese (Chanakh, Lori, etc.) is not in high demand, therefore dairy producers also produce high value cheese (gouda, feta, blue cheese, etc), however expensive equipment and knowledge of technology should be applied for high value cheese production, which requires big investments. In addition, good technology and modern equipment are not enough to reach the expected quality, as the main indicator for good quality cheese production is high quality milk and its consistency. On one hand, for improving the quality of milk farmers should shift to better breeds through artificial insemination or import of cows (Shwits, Heifer), improve fodder quality and ratio and improve the stable sanitary conditions, and on the other hand the government and other supporting organizations should assist to create necessary conditions and monitor the process in the framework of this project. Thus, the role of the cooperative and milk collection center with the support and monitoring of government will also be guaranteeing high quality milk production.

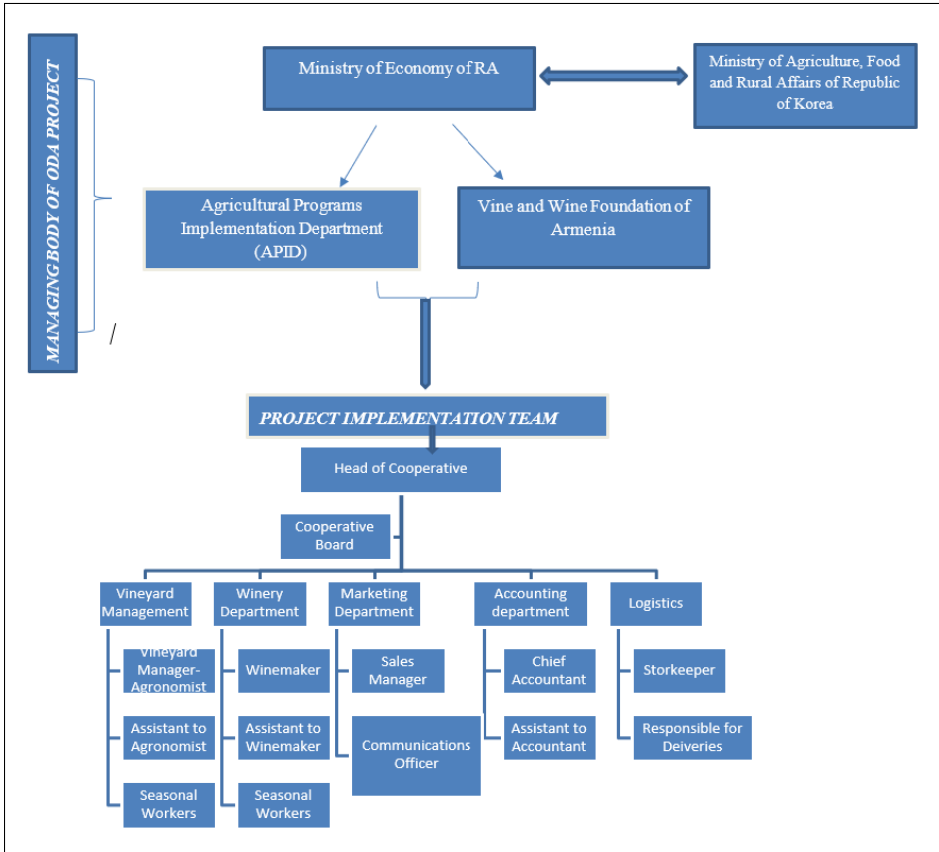
4.2. (Partner Country's) ODA Governance Structure

〈Figure 35〉 Governance Structure for Implementing an ODA Project in Diagrams



4.3. Project Implementation Structure

〈Figure 36〉 Project Implementation Structure



4.4. Project Site

〈Figure 37〉 Project site



4.5. Project Design Matrix (PDM) and Project Outcomes

〈Table 34〉 Project Design Matrix for Dairy Value Chain

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>Goal To establish milk collection center in Sisian, Syunik Province, RA to assure continuous quality and quantity of milk for dairy production and unite farmers of the region under a single structure as cooperatives to build up</p>	<p>Component 1</p> <ul style="list-style-type: none"> • 500 small-scale households directly or indirectly benefits from the project • Income increase by 10% • Improvement of dairy product quantities • 2-4 new types of products 	<p>Monitoring Reports Surveys Interviews with Target groups</p>	<ul style="list-style-type: none"> • Sufficient funding • Political and economic stability • Stakeholders are motivated and fully comprehend the

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>quality-price relationship in the milk market. The center will serve as model for replication The Components: 1. Improvement of dairy production in the region through cooperative model 2. Governance capacity building and strengthening 3. Access to new markets, finance and knowledge</p>	<p>and adaptation of new cheese making/dairy processing g technologies</p> <ul style="list-style-type: none"> • Somatic, fat and antibiotics indicators in milk corresponds to internationally acceptable level • At least 2 processors applied same policy model in other regions <p>Component 2</p> <ul style="list-style-type: none"> • 500 small-scale households directly or indirectly benefits from the project • Income increase by 10% • Improvement of dairy product quantities • 2-4 new types of products and adaptation of new cheese making/dairy processing g technologies • Somatic, fat and antibiotics indicators in milk corresponds to internationally acceptable level • At least 2 processors applied same policy model in other regions <p>Component 3</p> <ul style="list-style-type: none"> • 500 small-scale households directly or indirectly benefits from the project • Income increase by 10% • Improvement of dairy product quantities • 2-4 new types of products and adaptation of new cheese making/dairy processing g technologies • Somatic, fat and antibiotics indicators in milk 		<p>initiative purpose</p> <ul style="list-style-type: none"> • Government support • International Organizations cooperate • Banks are willing to cooperate

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
	corresponds to internationally acceptable level • At least 2 processors applied same policy model in other regions		
Outputs <ul style="list-style-type: none"> • Functioning cooperative • Getting viability of primary cooperatives by consolidation • Effective leadership and guidance of local community authorities and governmental bodies • Government support is available • Successful capital accumulation through steady growth • Replication of results through Armenia 	Cooperative has a fixed structure and registration Agreements on funding are available The products by the cooperative are available on the market	Monitoring Reports Surveys Interviews with Target groups	The leadership is efficient Political and Economic stability
Activities <ul style="list-style-type: none"> • Attracting the attention of the relevant institutions and creating a sound political background for the development of the sector via introduction of new pricing policy system • Identification source of funding • Meetings with processors and farmers • Identification of site and mode of cooperation • Acquisition of necessary inputs/technologies for the project • Launch of new Pricing policy based on somatic cell count and other new parameters of the milk quality • Implementation of Marketing campaigns, dairy production trading 	Inputs <ul style="list-style-type: none"> • Functioning cooperative • Getting viability of primary cooperatives by consolidation • Effective leadership and guidance of local community 		Government, Financial institutions/ donors/ stakeholders are willing to contribute Stakeholders are fully in line with initiative Economic/political stability Pertinent expertise and leadership is available
	Concerned Country Side	Korean Side	

4.6. Cost Estimation and Time Schedule

The dominant production will be cheese and it will be produced both for local and international consumer. Therefore, new equipment and technologies will be required for high value cheese production. In recent research the approximate equipment prices were calculated. Equipment needed for the production of gouda, masdam, feta, Roquefort cheeses are molds, racks, presses, and needle-punching machines. According to the calculations, the cost of purchasing this equipment for production with a capacity of 500 kg will be 14,093 and 13,255 thousand AMD, and for Roquefort - 4,640 thousand AMD, no additional equipment is required for feta production. Depending on the production side which will be chosen in the first stage of the project implementation, it will be clear if additional construction is needed or renovation of the existing milk collection will be enough for the pilot. Operational costs, such as marketing and branding will also be included in the budget based on size of the production.

The volume of sales growth is based on the following two factors:

1. Gradual increase of production volumes over the next five years, which is conditioned by the growth of the production of new members of the cooperative;
2. The consistent growth of the price range, which is based on the proper promotion of the produced dairy products in the market and increase of the recognizable level.

According to business expenditure forecasts, the overall dynamics of expenditures is related to two factors, in particular:

1. Production volumes
2. Increased costs associated with entering new markets.

The chart below shows the cost-benefit analysis of the project over the next five years of business development.

<Table 35> Cost-Benefit Analysis for Dairy Value Chain

(in AMD)

Expenses	Year 1 45.000 bottles	Year 2 100.000 bottles	Year 3 150.000 bottles	Year 4 180.000 bottles	Year 5 200.000 bottles
Sale of goods and services	117,298,368	260,663,040	390,994,560	469,193,472	521,326,080
Costs of goods and services	43,124,400	91,040,400	129,373,200	146,622,960	156,206,160
Gross income	74,173,968	169,622,640	261,621,360	322,570,512	365,119,920
Operational costs					
Salary	18,926,820	32,175,594	35,393,153	42,471,784	46,718,962
Accounting / Legal Advice Services Fees	4,791,600	4,791,600	4,791,600	4,791,600	4,791,600
Depreciation costs	5,510,340	17,249,760	15,333,120	15,333,120	15,333,120
Bank loan interest	6,348,870	10,781,100	8,624,880	6,899,904	5,519,923
Profit tax	4,353,169	7,400,387	8,140,425	9,768,510	10,745,361
Other expenses	4,791,600	5,749,920	6,324,912	6,957,403	7,653,144
Marketing/ promotion/sale/ distribution	3,518,951	10,426,522	19,549,728	28,151,608	36,492,826
Transportation expenses and per diem	6,229,080	8,720,712	9,592,783	10,552,062	11,607,268
Operational costs	19,703,538	72,327,046	153,870,758	197,644,521	226,257,716
Profit tax	3,940,708	14,465,409	30,774,152	39,528,904	45,251,543
Net income	15,762,831	57,861,637	123,096,606	158,115,616	181,006,173
Profit margin	13%	22%	31%	34%	35%

<Table 36> Projected Cash Flow

(in AMD)

Cash flow statement	Project Implementation Year 1	Year 2	Year 3	Year 4	Year 5
Cash receipts					
Cash balance at the beginning of each year	0	41,026,158	104,692,080	232,506,037	381,278,393
Total sales	117,298,368	260,663,040	390,994,560	469,193,472	521,326,080
Investments	172,497,600	7,187,400	7,187,400	7,187,400	7,187,400
Other cash flow sources					
Cash inflows, total for one year	289,795,968	267,850,440	398,181,960	476,380,872	528,513,480
Cash outflows					
Supplies purchase	143,748,000	4,791,600	4,791,600	4,791,600	24,916,320
Commodity costs	43,124,400	91,040,400	129,373,200	146,622,960	156,206,160
Bank interest payments	6,348,870	10,781,100	8,624,880	6,899,904	5,519,923
Principal amount repayment	12,937,320	22,520,520	19,166,400	19,166,400	38,332,800
Accounting/Legal Advice Services Fees	4,791,600	4,791,600	4,791,600	4,791,600	4,791,600
Salary	18,926,820	32,175,594	35,393,153	42,471,784	46,718,962
Profit tax	4,353,169	7,400,387	8,140,425	9,768,510	10,745,361
Other expenses	4,791,600	5,749,920	6,324,912	6,957,403	7,653,144
Marketing/promotion/sale/distribution	3,518,951	10,426,522	19,549,728	28,151,608	36,492,826
Transportation expenses and per diem	6,229,080	8,720,712	9,592,783	10,552,062	11,607,268
Dividends:	0	5,786,164	24,619,321	47,434,685	63,352,161
Cash outflow, total for one year	248,769,810	204,184,518	270,368,003	327,608,516	406,336,524
Net difference *	41,026,158	63,665,922	127,813,957	148,772,356	122,176,956
Cash balance at the end of each year **	41,026,158	104,692,080	232,506,037	381,278,393	503,455,349

* The net difference shows whether the cash inflows exceed the outflows or vice versa, and to what extent.

** To get the cash balance, add or subtract the net difference from the cash balance at the beginning of the year. The value obtained indicates the new cash balance for the following month

<Table 37> Implementation Plan

Activity	Timeframe (2022–2023)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
First cycle, collaborations												
Contract signing between the members of the cooperative												
Monitoring of farmers' small production												
Definition of cooperation mechanism and development strategies												
Second cycle, equipment, and production												
Development of the final appearance of the cooperative milk collection center												
Purchase of equipment for high value chees production												
Equipment installation and production organization												
Start of milk collection												
Formation of a cooperative logistics bundle												
Third cycle: commercialization												
Definition of created names												
Sorting and new product naming												
Final processing and packaging												
Introducing new names to local and foreign customers												
Communication and awareness-raising campaigns, development and implementation												
Participation in expos, social media activities, etc.												

Marketing Strategy (planning to attract buyers, wholesalers, and traders if needed). The cooperative to be formed during the implementation of this program, with its products including local cheeses such as Chanakh, Lori, etc. and high value chesses such as gouda, feta, blue cheese etc., is favorable for predicting a separate targeting of existing and future markets. The flexibility of the prices of these types will enable grouping the products according to the price classes, adapting them to the realities of different markets and consumers.

The overall marketing strategy of the cooperative envisages the development of the first two most profitable segments through the implementation of product quality on the one hand and the implementation of effective advertising and promotion strategies on the other hand.

The strategic marketing planning of the implementation team has two main directions, which predetermine the ways of the company's commercial activity development:

1. Expansion and strengthening of existing markets
2. Discovering new opportunities to increase revenue by gaining a position in new markets or the existing ones.

The primary precondition for ensuring stable and dynamic cooperation with existing importers, which leads to an increase in demand for products in this market, is the gradual increase in sales in existing distribution networks. A number of tools are applied in this direction, including promotional campaigns with distributors, participation in exhibitions, expos, targeting potential new importer customers.

The strategy of ensuring access to new markets is rooted in two main directions, namely: 1) promotion of high quality cheese in local and international markets; 2) awareness of specialized distributors existing markets.

For high value cheese production, the cooperative should pay attention on various factors to be penetrate to a right niche in the market and keep the competition. All below mentioned key factors for market penetration must be implemented in parallel with government and other institutions, to create best model, which can be in near future replicated.

1. Improve equipment and technologies for diversification of dairy products
2. Improve quality of fodder. To ensure high quality milk production hydroponic should be established for the cooperative member's use.
3. Improve livestock breeds through artificial insemination or with the support of government import new breeds (Haifer, Shwits).
4. Application of food safety standards (HACCP)
5. Develop export strategy and export promotion
6. Improve export logistics
7. Use new tools for investment programs
8. Introduce new pricing system on government level
9. Promote the creation and development of agricultural wholesale and retail markets
10. Conduct research on the ability to create modern wholesale markets

These are the essence of the dairy production cooperative value chain which cannot be reached by its on. The government involvement and the

support of other organizations, jointly with this project should establish a cooperative model which can be replicated in other regions of Armenia as well.

4.7. Risk Management

Like any agricultural sector, milk production value chain and its market are subject to various risks, which emerge from several factors. The following risks should be considered and recommendation to mitigate.

The primary producers of milk (i.e. animal husbandry farms) face the following major risks:

- Climatic risks - forage and feeding for the animals may be insufficient due to natural cataclisms;
- Animal diseases - animal health management practices are far from being effective and efficient;
- Drop-down of milk prices in the market;
- Non-purposeful use of loans.

Risks of primary milk producers may be mitigated by the following measures:

- Establishment of diversified self-operated forage production basis, replication of existing practices;
- Establishment of private farm and veterinary service centers; enhancement the capacities of existing structures via trainings;

- Development of the State milk strategy controlling the milk balance and State interventions.

Milk processing enterprises face the following main risks:

- Drastic growth of the main input's (i.e. raw milk) price;
- Inability of procuring milk due to insufficient quantity in raw milk market;
- Old and obsolete facilities, equipment, and technologies creating also food safety risks;
- Cease of end-products market;
- Lack of funds for meeting the regulatory requirements in food safety issues.

Risks of milk processors may be mitigated by the following measures:

- Intensification of primary milk production;
- Subsidies to enhancement of processing enterprises through respective financial services;
- Subsidies for sharing costs of mandatory installation of food safety standards.

In addition, there are more risks which can occur during the project such as: human capital - lack of professional working the field both within the project and cooperatives, also economic and financial situation in local and international markets. The economic situation of the country and the level of inflation can be a challenge for the profitability of the company and the annual sales volumes.

The main way to deal with these risks is through active and effective cooperation with other producers and sector organizations/unions, through lobbying, tax policy development and promotion, and awareness-raising activities in dairy production, attracting the attention of the relevant institutions and creating a sound political background for the development of the sector, which at the same time will reduce the sector-specific financial risks.

4.8. Seeking Opportunities for Linkage and Convergence with Joint Research-Related Projects

Our study aimed to reveal the gaps for effective pricing mechanism acting in the country as well as to provide concept paper for implementing a pilot project to ensure a fair and mutually profitable pricing for both farmers and producers. The study attested that one of the main challenges is the lack of linkages between the main stakeholders in this process due to which many challenges arise including the pricing.

Due to our proposed project we will be able to integrate the main stakeholders of the value chain under one roof as well being coordinate by the Ministry's relevant unit they will also have state's support. In addition, enlarging the volumes of the production and monitoring the quality of it they will have a positive impact on stabilizing the price.

4.9. Project Quality Control Plan

〈Table 38〉 Milk Project Quality Control Plan

KPI	Evaluation Dates
Number of contracts concluded and executed with the members of the cooperative	Half a year following the launch of the project
The volume of milk produced/processed	Annually
Increase in the number of international partners	Semi-annually (export windows)
Increase in the number of local partners	Semi-annually (based on the report of the local distributors)
The volume of the new dairy produced	Annually (following the end of the first year)
Export volumes	Annually

The implementation of this program leads to the development of a completely new model of cooperation between milk producers and processors. Undertaking the role of the cooperative, the key player in a dairy production value chain, and other dairy production programs manager the organization will undoubtedly form a new evolutionary path to its business approaches.

Finally, such a shift also requires strategic changes in the organizational structure of the company, which will define the operational procedures, the system of management instructions, meeting the special needs of its members-partners. Therefore, the company has planned a new management unit in its structure, which will work closely with both farmers and processors, carrying out the functions of coordination among those key players.

Annex 1. Information on Standards

Information on Standards

Information on Standard of Raw Cow Milk

Terms and Definitions

This standard applies the following terms with the appropriate definition:
milk: normal physiological secretion of the mammary glands of a cow, obtained from one or more animals during lactation from one or more milking, without any addition or extraction of any substances from it.

Raw milk: Milk that has not been heat treated at temperatures exceeding 40 °C or has not been processed to alter its constituent parts.

Technical Specifications

Milk must be obtained from healthy farm animals in an area free from infectious and other diseases common to humans and animals.

In terms of organoleptic characteristics, milk must meet the requirements of below.

Indicator name	Specification
Consistency	Homogeneous liquid without sediment and flakes
Taste and smell	Clean, free of foreign odours and tastes that are not typical of fresh milk A mild fodder taste and smell is allowed
Colour	White to light cream

In terms of physicochemical and microbiological indicators milk must comply with the standards specified with below

Indicator Name	Indicator Value
Mass rate of fat, %, not less than	2,8
Mass rate of protein, %, not less than	2,8
Acidity, ° T	From 16,0 to 21,0 including
Mass rate dry skim milk solids (SNF), %, not less than	8,2
Group of purity, not less	II
Density kg/mnot less than	1027,0
Freezing temperature, ° C, not higher than minus	0,520
Content of somatic cells in 1 cm, not more than	4,0·10
QMAFAnM, *, CFU**/cm, not more than	1,0·10

* The quantity of mesophilic aerobic and facultative anaerobic microorganisms.

**Colony-forming units

Milk intended for the production of baby food, diet food, sterilized, condensed food, cheese must comply with the requirements established by regulatory legal acts in force on the territory of the states that have adopted the standard.

No residues of inhibiting substances are allowed in milk, including detergents, disinfectants and neutralizing agents.

Permissible content of potentially hazardous substances (toxic elements, mycotoxins, antibiotics, pesticides, radionuclides), pathogenic microorganisms, including salmonella in milk must comply with the requirements established by regulatory legal acts in force on the territory of the states that have adopted the standard.

After milking the milk must be filtered (purified). Milk is cooled in farms no later than 2 hours after milking to a temperature of $(4 \pm 2) ^\circ\text{C}$.

The transport marking of products from the supplier (natural or legal entity) must comply with the requirements established by regulatory legal acts in force on the territory of the states that have adopted the standard.

Acceptance Rules

Milk received from cows in the first seven days after calving and in the last five days before drying-off, and/or received from sick animals and those in quarantine, is not subject to acceptance for food purposes.

The rules for acceptance and filling out the accompanying documentation are in accordance with the requirements of regulatory legal acts in force on the territory of the states that have adopted the standard, and in accordance with GOST 139280.

The frequency of monitoring the quality and safety indicators of milk during acceptance is established in accordance with below.

Controlled indicator	Control frequency	Testing methods during double control	
		at the request of the supplier	in case of dispute
Organoleptic indicators	Daily in every batch	In accordance with GOST 28283	In accordance with GOST 28283
Temperature, °C	Daily in every batch	In accordance with GOST 26754	In accordance with GOST 26754
Titrate acidity, °T	Daily in every batch	In accordance with GOST 3624	In accordance with GOST 3624, Point 2.2
Mass rate of fat, %	Daily in every batch	In accordance with GOST 5867	In accordance with GOST 22760
Mass rate of protein, %	Daily in every batch	In accordance with GOST 25179	In accordance with GOST 23327
Mass rate of C O M O, %	Daily in every batch	In accordance with GOST 3626, Point 2.4.3	In accordance with GOST 3626, Point 2.4.3
Density, kg/m	Daily in every batch	In accordance with GOST 3625	In accordance with GOST 3625, Part 3
Group of purity	Daily in every batch	In accordance with GOST 8218	In accordance with GOST 8218
Freezing temperature, °C	In accordance with PCP*	In accordance with GOST 25101	In accordance with GOST 30562
The presence of phosphatase or peroxidase	If heat treatment is suspected	In accordance with GOST 3623	In accordance with GOST 3623

Controlled indicator	Control frequency	Testing methods during double control	
		at the request of the supplier	in case of dispute
Heat resistance group	For products with high processing temperatures according to the PCP	In accordance with GOST 25228	In accordance with GOST 25228
The content of somatic cells, thousand/cm	Daily in every batch	According to GOST 23453	According to GOST 23453, Part 3
Presence of inhibiting substances	Daily in each batch for baby food and dietary food and in accordance with PCP *	In accordance with GOST 23454	In accordance with GOST 23454
Antibiotics, mg/kg	Not less than once every 10 days	In accordance with the methods provided by the regulatory documents in force on the territory of the states that have adopted the standard	
Bacterization, CFU/g	Not less than once every 10 days	In accordance with GOST 32901	In accordance with GOST 32901

* PCP - Production control program.

Control of the content of pesticides, toxic elements, neutralizing and preserving substances, radionuclides, aflatoxin M and microbiological indicators is carried out in accordance with the procedure established by regulatory legal acts in force on the territory of the states that have adopted the standard.

The frequency of control of the content of microbiological and chemical pollutants in milk is established in the production control program developed in accordance with the regulatory legal acts in force on the territory of the states that have adopted the standard.

Upon receipt of unsatisfactory test results for at least one of the indicators, a repeated analysis of a double volume of a sample taken from the same batch of milk is carried out. The results of the repeated analysis are final and apply to the entire batch of product.

Control Methods

Selection and preparation of samples for analysis – in accordance with GOST 13928, GOST 26809.1, GOST 32901, GOST 26929.

Determination of appearance, colour, consistency is carried out visually and characterized in accordance with the requirements of this standard.

Determination of smell and taste – according to GOST 28283. Taste assessment is carried out selectively after boiling the sample.

To assess the smell, 10-20 cm of milk is heated for 35° C.

Temperature determination – in accordance with GOST 26754.

Determination of acidity – in accordance with GOST 3624.

Determination of density – in accordance with GOST 3625.

Determination of the mass rate of fat – in accordance with GOST 5867 or GOST 22760.

Determination of the mass rate of protein – in accordance with GOST 25179 or GOST 23327.

Determination of mass rate of non-fat milk solids – calculation method in accordance with GOST 3626 (Point 2.4.3).

Determination of the effectiveness of heat treatment (presence of phosphatase or peroxidase) – in accordance with GOST 3623.

Purity determination – in accordance with GOST 8218.

Freezing temperature determination – in accordance with GOST 25101, GOST 30562.

Determination of heat resistance – in accordance with GOST 25228.

Determination of microbiological indicators:

- bacterization, the number of mesophilic aerobic and facultative anaerobic microorganisms - in accordance with GOST 32901;
- pathogenic microorganisms, including salmonella - in accordance with GOST 31659.

Determination of the content of somatic cells - in accordance with GOST 23453.

Determination of the content of toxic elements:

- lead- in accordance with GOST 26932, GOST 30178, GOST 30538;
- arsenic - in accordance with GOST 26930, GOST 30538;
- cadmium - in accordance with GOST 26933, GOST 30178, GOST 30538;
- mercury - in accordance with GOST 26927.

Determination of aflatoxin M - in accordance with GOST 30711.

Determination of the content of antibiotics - in accordance with the methods provided by the regulatory documents in force on the territory of the states that have adopted the standard.

Determination of inhibiting substances - in accordance with GOST 23454.

Determination of pesticides - in accordance with GOST 23452.

Determination of radionuclides (cesium-137; strontium-90) - in accordance with the methods provided by the regulatory documents in force on the territory of the states that have adopted the standard.

Control of milk for compliance with the requirements specified in Section 4 may also be carried out according to other regulatory documents in force on the territory of the states that have adopted the standard.

Shipping and Storage

Milk is transported in specialized vehicles in accordance with the rules for the carriage of short-life products valid for this type of transport. Freezing milk is not allowed.

Transportation of milk is carried out in sealed containers with tight-fitting lids, made of materials permitted in the prescribed manner for contact with milk. Vehicles must be capable of maintaining the temperature specified in this standard.

Milk is transported in sealed tanks for food liquids In accordance with GOST 9218, metal flasks in accordance with GOST 5037 and other types of containers with tight-fitting lids.

Storage and transportation of milk intended for the production of baby food is carried out in separate containers in compliance with the requirements of regulatory legal acts in force on the territory of the states that have adopted the standard.

Storage of milk before processing is carried out at $(4 \pm 2) ^\circ\text{C}$ for no more than 36 hours, considering the transportation time.

Storage of milk intended for baby food - at $(4 \pm 2) ^\circ\text{C}$ for no more than 24 hours, considering the transportation time.

During the transportation of milk to the processing site, the temperature should not exceed $10 ^\circ\text{C}$. Milk that does not meet the established requirements for its temperature must be processed immediately.

Storage and transportation of milk is accompanied by documents confirming its safety and information provided for by regulatory legal acts in force on the territory of the states that have adopted the standard.

INFORMATION ON STANDARD OF FRESH GRAPE

Classification

Depending on the purpose (use) and the method of harvesting, fresh grapes are subdivided into:

- manually harvested grapes for juice production
- manually harvested grapes for canned production
- manually harvested grapes for dried grapes production
- manually harvested grapes for wine production
- mechanically harvested grapes for wine production.

Technical Specifications

Fresh grapes for industrial processing must meet the requirements of this standard and be collected according to the technological instructions in compliance with sanitary norms and rules approved in the prescribed manner for the member states of the Customs Union. Based on the organoleptic and physicochemical indicators, fresh grapes should meet the requirements.

In terms of microbiological indicators, the content of toxic elements, nitrates, pesticides, radionuclides, fresh grapes must comply with the norms established by sanitary rules, norms and hygienic standards or technical regulations in force on the territory of the state that adopted the standard.

Package

The grapes for industrial processing are packed in wooden boxes in accordance with GOST 10131, GOST 11354, GOST 17812 or other types of

containers from other materials, the use of which in contact with the product of this type ensures its quality and safety²).

The container, used for packing grapes, must be clean, dry, not contaminated with agricultural pests and must not have any foreign odour.

Marking

Marking is applied with a waterproof, odourless, non-toxic paint on the front side of the container.

Non-toxic paper and glue are used for the manufacturing and application of labels.

Marking of the products must state the following:

- product name
- ampelographic variety
- manufacturer's trademark (if any)
- harvesting method
- date and time of harvesting
- storage conditions
- designation of this standard
- information on compliance conformity.

Marking of the shipping container in accordance with GOST 14192.

Acceptance Rules

Acceptance of fresh grapes is carried out by the processing organization in the presence of an authorized representative of the supplier in accordance with the regulatory documents in force in the state that adopted the standard. Fresh grapes for industrial processing are accepted in batches. Batches are any quantity of grapes of one ampelographic

variety packed in a container of one type from one shipping container, registered in one document.

The accompanying document indicates:

- name of the product
- name of the ampelographic variety
- name and location of the manufacturer
- manufacturer's trademark (if any)
- harvesting method
- date and time of harvesting
- designation of this standard
- information on compliance conformity.

Procedure and frequency of control

For each batch of grapes control of organoleptic and physicochemical parameters, net weight, quality of packaging and labeling is carried out. The procedure and frequency of control of the content of toxic elements, pesticides, radionuclides and the content of eggs of helminths and intestinal pathogenic protozoa form cysts are established by the manufacturer in the production control program in accordance with the regulatory legal acts of the state that adopted the standard.

In order to determine the quality of the fresh grapes of a batch, samples are taken from different places:

- from the grapes packed in a container
 - one packing unit from up to 30 packing units
 - one packing unit per each 30 packing units from up to 90 packing units
 - an additional packing unit from a packing unit of more than 90

- from the grapes not packed in a container - a combined sample weighing not less than 6 kg and not more than 12 kg.

Control methods

The quality of a package and the marking of the packing units are checked visually. One packing unit is randomly chosen from selected 6.4.3 packing units in order to determine the content of fallen berries.

Appearance, smell and taste are determined organoleptically. Determination of the admixture content of grapes of other ampelographic varieties, mashed, withered berries, damaged by pests and diseases.

The combined sample according to 6.4.3 is weighed, examined, the clusters of other ampelographic varieties are separated from the main grape variety, removing the mashed and withered berries with stalk damaged by pests and diseases.

The selected admixture of other ampelographic grape varieties are weighed, its content is determined as a percentage of the mass of grapes of the combined sample. Berries mashed, withered and damaged by pests and diseases are defined by removing them with the stalk from the cluster of the combined sample of grapes, weighing, determining their content as a percentage of the mass of the combined sample.

Determination of the mass concentration of sugars - according to GOST 27198 and according to regulatory documents in force on the territory of the state that adopted the standard. Determination of the mass concentration of titratable acids - according to GOST 25555.0 and according to regulatory documents in force on the territory of the state that adopted the standard.

Preparation and mineralization of samples to determine the content of toxic elements - in accordance with GOST 26929 and with the regulations in force on the territory of the state that adopted the standard.

Determination of mercury - in accordance with GOST 26927, GOST 30178, GOST 30538 and with the regulations in force on the territory of the state that adopted the standard.

Determination of arsenic - in accordance with GOST 26930, GOST 30178, GOST 30538 and with the regulations in force on the territory of the state that adopted the standard.

Determination of lead - in accordance with GOST 26932, GOST 30178, GOST 30538 and with regulatory documents in force on the territory of the state that adopted the standard.

Determination of cadmium - in accordance with GOST 26933, GOST 30178, GOST 30538 and with the normative documents in force on the territory of the state that adopted the standard.

Determination of pesticides - in accordance with GOST 30349, GOST 30710 and with methods approved by regulatory legal acts in force in the territory of the state that adopted the standard.

Determination of radionuclides, helminth eggs and intestinal pathogenic protozoa cysts - according to the methods approved by the regulatory legal acts in force on the territory of the state that adopted the standard.

Shipping and Storage

Fresh grapes for industrial processing are transported in clean, dry, foreign odourless vehicles in accordance with the rules for the carriage of short-life products in force for specific types of transport.

Fresh grapes for industrial processing are stored in clean, dry, foreign odourless premises in accordance with the established rules and under conditions that ensure their safety.

The storage period and conditions are established by the manufacturer.

Information on Standard of Fresh Tomatoes

Terms and definitions

This standard applies the terms of GOST 27519, as well as the following terms with the appropriate definition:

excessive external moisture: Moisture on tomatoes from rain, dew or watering.

Notification: Condensation on the tomatoes delivered from refrigerators or refrigerated vehicles caused by temperature differences are not considered excessive external moisture.

tomatoes of green ripeness: Fruit, fully formed, green in color, with firm flesh and no signs of mucus.

tomatoes at breakers stage: Fruits with a light green color with a whitish shade on the surface, light green flesh with mucousness around the seeds, with a hard skin.

tomatoes at turning stage: Fruits are solid, with a glossy sheen, with partial or half brown spills on the surface of the fruit with signs of pink color at its top

tomatoes at pink stage: Fruits are solid, with light pink or bright orange colouration

tomatoes at red stage: solid fruits at full biological maturity

overripe tomatoes: Fruits are soft with a whole skin, with freely moving pulp under the skin.

Technical Specifications

Tomatoes should meet the requirements of this standard and/or normative legal acts of the state that adopted this standard.

For whole-fruit canning, tomatoes of small-fruited varieties and varieties of elongated shape, botanical varieties and hybrids are used; for pickling tomatoes grown in the open field are used.

In terms of organoleptic and physicochemical indicators, tomatoes for whole-fruit canning and pickling must correspond to the characteristics and values of indicators.

Specifications of Fresh Tomatoes for Industrial Processing

Packing

Tomato packaging - according to (2) and / or regulatory legal acts of the state that adopted this standard.

Tomatoes are packed directly into boxes in accordance with GOST 9142, GOST 10131, GOST 17812.

GOST 20463, box pallets in accordance with GOST 21133 or in other transport packaging providing the quality and safety of the product during transportation and storage in accordance with the requirements, established by this standard. [1] and / or regulatory legal acts of the state, of this standard.

The materials used for packaging, as well as ink, paint, glue, paper,

suitable for printing or marking, should ensure maintaining their quality and safety while in contact with the fruit.

The contents of each package must be homogeneous and must contain tomatoes of the same origin and botanical variety.

The visible part of the contents of a packaging unit must correspond to the contents of the entire packing unit.

Marking

Marking of a packaging unit of tomatoes - according to [3] and / or regulatory legal acts of the State that has adopted this standard.

Product information is applied in the language of the supplying country and the language of the consumer country on the transport packaging, on labels and inserts, not washable, not sticky, odorless, non-toxic paint, ink.

The information applied to the packaging unit of tomatoes must contain:
name of the product (“Tomatoes for industrial processing”, indicating the color “red”, “pink”, “yellow” and their purpose)

name and location of the manufacturer and / or shipper

country of origin

botanical variety

collection date, packing date and shipment date

shelf life and storage conditions

information on the use of genetically modified organisms: if the product contains more than 0.9% genetically modified organisms, the marking contains information about their presence (for example, “genetically modified product”)

gross and net weight

designation of this standard
information on confirmation of conformity
manufacturer's trademark (if any).

Transport packaging marking - in accordance with GOST 14192 with application of manipulation signs: "Short-life cargo" and "Temperature limitation."

Acceptance Rules

Tomatoes are accepted in batches. A batch is any number of fresh tomatoes of one botanical variety, in a package of the same type and standard size, received in one transport means and accompanied by shipping documentation that ensures product traceability.

The accompanying document must contain the following information:

document number and date of issue
name and address of the sender
name and address of the recipient
name of the product
botanical variety
number of packaging units
net weight of the product in a packaging unit
collection date, packing date and shipment date
shelf life and storage conditions
number and type of vehicle
designation of this standard
information on confirmation of correspondence.

To determine the quality of tomatoes, the correct packaging and marking, as well as mass of the product in a packaging unit for compliance with the requirements of this standard, select a sample from a batch of tomatoes from different places, the volume of which is indicated below.

Lot size, number of packaging units	Number of selected packaging units
Up to 100 including	3
From 100 up to 500 including	15
from 500 up to 1000 including	20
From 1000 up to 5000 including	25
From 5000 up to 10000 including	30
from 10000	30 and additionally for every 500 complete and incomplete packing units one packing unit

From each selected packaging unit from different locations, samples weighing at least 10% of tomato fruits are selected. From samples a combined sample weighing not more than 10 kg is made up, which is being analyzed. The test results are valid for the entire batch. After checking, the selected packaging units are combined with the batch of fresh tomatoes.

The quality of tomatoes in damaged packaging units is checked separately and the results apply only to tomatoes in these packaging units. The procedure and frequency of monitoring the content of toxic elements, radionuclides, pesticides, nitrates, helminth eggs and cysts of intestinal pathogenic protozoa, microbiological safety indicators (pathogenic) are established by the manufacturer of products in the program of production control.

Upon receipt of unsatisfactory results of determination for at least one of the indicators, a repeated determination of the doubled sample size taken from the same batch is carried out. Double testing results are final and valid for the entire batch.

Control methods

The following measuring instruments, equipment and materials are used:

- scales for static weighing in accordance with GOST 29329 average accuracy class with the highest weighing limit 25 kg.
- vernier scale in accordance with GOST 166 of the first class of accuracy with a measurement error of 0.05 mm or second class of accuracy with a measurement error of 0.1 mm
- metal ruler in accordance with GOST 427, 300 mm long
- laboratory pressing machine
- juicer
- refractometer:
- household cotton gauze in accordance with GOST 11109.

It is allowed to use other measuring instruments with metrological characteristics not below the mentioned ones.

The quality of packaging and marking of packaging units selected according to 6.2. are assessed for compliance with the requirements of this standard visually.

All tomato fruits selected according to 6.3 are subject to quality control.

Shipping and Storage

Transportation and storage of tomatoes – according to [1] and / or regulatory legal acts of the state adopting this standard.

Tomatoes are transported in clean, dry, odorless vehicles not infected with agricultural pests, in accordance with the rules for the carriage of goods valid for specific types of transport, subject to the requirements for transport conditions.

Transportation of fresh tomatoes is allowed in transport packages in accordance with GOST 24597 and GOST 26663.

Tomatoes are stored in clean, dry, free from pests, well ventilated refrigerated rooms, free of foreign smell, in accordance with regulatory documents valid in the territory of the state that adopted this standard.

The shelf life and storage conditions of fresh tomatoes are established by the manufacturer in accordance with the regulatory documents valid in the territory of the state that has adopted this standard.

Approximate shelf life of tomatoes at a relative humidity of 85% - 90%:

At breaker stage of maturity at an air temperature of 11 ° C to 13 ° C - not more than three to four weeks;

brown and pink stage of maturity - at an air temperature from 1 ° C to 2 ° C - not more than one month;

red stage of maturity at an air temperature of 0.5 ° C to 1 ° C - not more than two to four weeks, from 10 ° C to 18 ° C - five to eight days.

Annex 2. Survey Tools for Qualitative Interview

Questionnaire for Dairy Value Chain

1. What indicators are taken into consideration for determining the price while purchasing the raw material?
2. Who are your main consumers (local market, processors, cooperatives/ organizations, wholesale market, foreign market)?
3. What problems are there in purchasing raw material?
4. The average consumer milk price last month?
5. The amount paid by the main producer for milk during last summer season?
6. The amount paid by the main producer for milk during last winter season?
7. How much (in %) has the average consumer has changed as compared with the previous year?
8. To what extent is the price suggested to you by the processing company is acceptable for you?
9. Is the price mentioned in the raw material procurement contract subject to change during the contract period or not?
10. What factors can impact on price increase?
11. What factors can reduce the price?
12. Does the main consumer carry out the following testing procedures while purchasing the milk?
 - a) fat measurement
 - b) calculation of somatic cells

- c) calculation of bacteria
 - d) milk consistency
 - e) dry matter residue
13. What special approaches does the producer use in pricing mechanism, so that you are interested in producing quality product?
 14. What suggestions do you have in applying mutually acceptable efficient criteria for raw material purchase price?

Questionnaire for Tomato Value Chain

1. What criteria are considered while determining the purchase price of the raw material (variety, size, quantity of dry matter, degree of maturity)?
2. Are there any standards for the tomatoes to be purchased, by which you are guided?
3. Who are your main consumers (local market, processors, cooperatives/ organizations, wholesale market, foreign market)?
4. What problems are there in purchasing raw materials?
5. The average milk price paid by the main producer?
6. The amount paid for tomato by the main producer during the previous and current seasons.
7. How much (in %, AMD) has the average consumer price changed as compared with the previous year?
8. To what extent is the purchase price suggested by the processing company for the raw material acceptable for you?
9. Is the tomato price specified in the purchase contract subject to change or not?

10. What factors can impact on price increase?
11. What factors can reduce the price?
12. Does the main producer check the dry matter content and other quality indicators while purchasing the tomato?
13. What special approaches does the producer use in pricing mechanism, so that you are interested in producing quality product?
14. What suggestions do you have in applying mutually acceptable efficient criteria for raw material purchase pricing?

Questionnaire of the Interview with the Head of Moe Food Security and Agro-Processing Development Department

1. Have there been any studies related to price formation in the tomato value chain?
2. Is there any developed policy for possible price regulation in the tomato value chain? If yes, then to what extent is it applied?
3. Does the Government, acting through the Ministry of Economy, carry out regulatory functions in price formation?
4. During the recent years, according to your proven experience, how has the tomato sales and purchase price been formed?
5. Which are the factors, that can contribute in applying mutually acceptable efficient criteria of price formation?
6. What can be the role of the Government in this?
7. Is there any policy aimed at reducing the tomato cost price (easing the tax burden, subsidy or export privileges)?

Questionnaire of the Interview with Card Milk Processing Projects Director

1. What can You tell about the milk produced in Armenia?
2. What problems can be identified in the field?
3. Why is milk pricing lacking?
4. Are there any companies applying the pricing mechanism?
5. What attempts have been made in the past to introduce milk pricing?
6. How To Introduce Milk Pricing?

Questionnaire of the Interview with Executive Director of Vine and Wine Foundation of Armenia

1. What can you tell about the grape produced in Armenia?
2. What problems can be identified in the field?
3. Are there any companies applying the pricing mechanism?
4. What attempts have been made in the past to introduce grape pricing?
5. What criteria are considered while determining the purchase price of the raw material?

In general sugar content and healthy grapes. It can vary from the winemaking companies' requirements.
6. Are there any standards for the grapes to be purchased, by which you are guided?
7. What problems are there in purchasing raw materials?
8. Is the grape price specified in the purchase contract subject to change or not?

9. What factors can impact on price increase?
10. What factors can reduce the price?
11. Does the main producer check the dry matter content and other quality indicators while purchasing the grape?
12. What special approaches does the producer use in pricing mechanism, so that you are interested in producing quality product?
13. What suggestions do you have in applying mutually acceptable efficient criteria for raw material purchase pricing?

Annex 3. Inforcement Rule of the Raw Milk Testing Collectivization (Amended in November 2019)

Article 1 (Purpose) This enforcement rule is designed to specify the details of the tests conducted by designated raw milk testing agencies pursuant to Article 14 of the Dairy Promotion Act, for the purpose of increasing the fairness of the raw milk test procedures.

Article 2 (Designation of a raw milk testing agency) ① The Special Metropolitan City Mayor, a Metropolitan City Mayor, a Metropolitan Autonomous City Mayor, a Do Governor or Special Self-Governing Province Governor (hereinafter referred to as “Mayor/Do Governor”) shall designate a raw milk testing agency to conduct raw milk tests pursuant to Article 14 of the Dairy Promotion Act. However, the Special Metropolitan City Mayor or a Metropolitan City Mayor of areas with a small number of dairy farms that collect raw milk may not designate such an agency and ask any raw milk testing agency in nearby regions to conduct the tests.

② Any raw milk testing agency designated under Paragraph 1 above shall be a livestock testing and evaluation agency that complies with Article 6 of the Act on Testing and Inspection in the Food And Drug Industry.

Article 3 (Entrustment of a raw milk test) ① To conduct a raw milk test pursuant to Article 12 of the Livestock Products Sanitary Control Act, a

Mayor/Do Governor shall require a raw milk collection business operator to conduct a test on the collected raw milk through any designated raw milk testing agency pursuant to Article 2 of this rule.

② Any raw milk collection business operator who must entrust a raw milk test pursuant to Paragraph 1 above shall submit test samples for the laboratory tests, including the bacterial count test, somatic cell count test, and the content test (butterfat, proteinoid), and fill out the test entrustment form pursuant to Article 15 of the Enforcement Rules of the Livestock Products Sanitary Control Act with the details of test items and submit the form to the head of the raw milk testing agency.

③ The head of any raw milk testing agency with any entrusted test pursuant to Paragraph 1 above may require the business operator that has collected the subject raw milk to conduct laboratory tests using its own testers, excluding the tests to be performed pursuant to the Livestock Product Test Standard 1 (Pre-collection Test during the Raw Milk Test Procedures) under Article 12 of the Enforcement Rules of the Livestock Products Sanitary Control Act and those to be conducted by a designated raw milk testing agency pursuant to Paragraph 2 above.

④ The test samples to be prepared pursuant to Paragraph 2 above must be collected by complying with the standardization rules defined by the Minister of the Agriculture, Food and Rural Affairs.

Article 4 (Test cycle) The cycle of tests to be performed pursuant to the rules under Paragraph 2 of Article 3 above shall be determined pursuant to the rules under Article 12 of the Enforcement Rules of the Livestock Products Sanitary Control Act.

Article 5 (Notice of the test result) ① The head of the raw milk testing agency in charge of the entrusted test shall conduct the test pursuant to the rules under Paragraph 2 of Article 3 above and inform the business operator that has collected the subject raw milk of the test result.

② If the business operator that has collected the subject raw milk under Paragraph 1 above is a raw milk collection cooperative (hereinafter “a raw milk collection cooperative”) organized pursuant to Subparagraph 5 of Article 2 of the Dairy Promotion Act, the head of the raw milk testing agency shall also inform raw milk buyers of the test result. If inevitable, the agency may inform raw milk buyers of the test result through the raw milk collection cooperative.

③ Any raw milk collection cooperative informed of the test result pursuant to Paragraph 1 above shall notify the dairy farms under contract of the test result individually.

Article 6 (Fairness of a test for a raw milk collection business operator not complying with the aforementioned rules) ① A Mayor/Do Governor shall establish and implement a measure to ensure the fairness of the tests on the collected raw milk for any business operators that do not submit the test samples and request form required pursuant to Paragraph 2 of Article 3 above.

② Any measure for ensuring the fairness of the tests pursuant to Paragraph 1 above shall include the actions in each of the following subparagraphs.

1. Standardized inspection of the test equipment
2. Tests with the presence of tester(s)
3. Collection test

Article 7 (Storage of the test result) ① Pursuant to Paragraph 4 of Article 15 and Article 17 of the Enforcement Rules of the Livestock Products Sanitary Control Act, any raw milk testing agency and any raw milk collection business operator shall keep the result of tests performed pursuant to Paragraph 3 of Article 3 and Paragraph 1 of Article 5.

② The test result stored pursuant to Paragraph 1 above shall include the original copy printed from the test equipment.

Article 8 (Report of the test result) ① Any raw milk collection business operator shall report the result of test performed pursuant to Paragraph 3 of Article 3 to a Mayor/Do Governor and the head of a designated raw milk testing agency on a monthly basis pursuant to Article 19 of the Livestock Products Sanitary Control Act and Subparagraph 2 of Paragraph 1 of Article 54 of the Enforcement Rules of the Livestock Products Sanitary Control Act.

② The head of a designated raw milk testing agency shall report the result of tests performed pursuant to Paragraph 1 of Article 5 to a Mayor/Do Governor and the head of the Animal and Plant Quarantine Agency.

③ If the raw milk test result is collected and notified through the data network, the report required under Article 5, Article 7 and Article 8 above may be replaced by the report through the data network.

Article 9 (Cooperation, etc.) ① The Minister of the Agriculture, Food and Rural Affairs, a Mayor/Do Governor, the head of the Dairy Promotion Association, and the head of a raw milk collection cooperative shall

provide as much cooperation as possible including the modification of the budget plan at the request of the head of a designated raw milk testing agency for necessary equipment and so on.

② If any test equipment is broken, a raw milk testing agency may conduct a raw milk test pursuant to Paragraph 1 of Article 5 at other institutions or workshops equipped with the necessary test equipment.

Article 10 (Review period) As of January 1st, 2020, the Minister of the Agriculture, Food and Rural Affairs shall examine the validity of raw milk tests and take proper actions including improvement every three years (until December 31st of the every third year).

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