Japan International Cooperation Agency (JICA)

Data Collection Survey on Agriculture Sector in Moldova

Final Report

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Abbreviations and Acronyms

ACED	Agricultural Competitiveness and Enterprise Development
ACSA	National Agency for Rural Development
ADA	Austrian Development Agency
ADB	Asian Development Bank
AIC	Agriculture Information Center
AIPA	Agency for Intervention and Payments in Agriculture
BEM	Banca de Economii Moldova
BI	Business Incubator
BIP	Boarder Inspection Point
BRC	British Retail Consortium
CBI	Center for the Promotion of Imports from developing countries
CEN	Comité Européen de Normalisation
CIS	Commonwealth of Independent States
CMR	Condition of Convention on the Contact for International Carriage of goods by Road
CRARA	Republican Center for Amelioration and Animal Reproduction
CRPE	Romanian Center for European Policies
DANIDA	Danish International Development Agency
DCFTA	Deep and Comprehensive Free Trade Area
DP	Development Partner
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
ELISA	Enzyme-Linked Immunosorbent Assay
ENPARD	European Neighborhood Program for Agriculture and Rural Development
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIATT	Fund for Innovation in Agriculture and Technology Transfer
FVO	EU Food and Veterinary Office
F&V	Fruits and Vegetables
GAC	General Agricultural Census
G.A.P.	Good Agricultural Practice
GEF	Global Environment Fund
G-FEZ	Giurgiulesti Free Economic Zone
GoM	Government of Moldova
ha	Hectare
hp	Horse Power
HACCP	Hazard Analysis and Critical Control Point
HVAA	High Value Agriculture Activity
HVC	High Value Crop
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management Programme
IRU	International Road Union
ISO	International Organization for Standardization
JNPGA	Japanese Non-Project Grant Aid
MAC-P	Moldova Agriculture Competitiveness Project
MBIN	Moldova Business Incubators Network
MCC	Millennium Challenge Corporation
MDL	Moldova Leu

MIEPO	Moldovan Investment and Export Promotion Organization
MoAFI	Ministry of Agriculture and Food Industry
MoEI	Ministry of Economy and Infrastructure
MoH	Ministry of Health
MOLDAC	National Center of Accreditation of the Republic of Moldova
NBS	National Bureau of Statistics
NFFM	National Farmers Federation of Moldova
NFSA	National Food Safety Agency
NIF	Neighbourhood Investment Facility
OD	Optical Density
ODIMM	Organization for developing small and medium enterprises
OVOP	One Village One Product
PCA	Partnership and Cooperation Agreement
PGRFA	Plant Genetic Resource for Food and Agriculture
PHC	Public Health Center
PIU	Project Implementation Unit
RASFF	Rapid Alert System for Food and Feed
RCVD	Republican Center of Veterinary Diagnosis
RENAR	Romanian Accreditation Association
SDAM	Sustainable Development Account Moldova
SEA	Strategic Environmental Assessment
SPS	Sanitary and Phytosanitary
SSF	Single Support Framework
TIR	Transportation International Routier
UAA	Utilized Agricultural Area
UASM	State Agrarian University of Moldova
USAID	United States Agency for International Development
USD	United States Dollar
VAT	Value Added Tax
WB	World Bank
WUA	Water Users Association

1. Outline of Study

1.1 Study Background and Objective

1.1.1 Background

The Republic of Moldova has prioritized plans and policies aimed at improving the competitiveness of the country's agriculture sector as part of the National Strategy on Agriculture and Rural Development for the period 2014 - 2020.

The return to competitiveness in the agricultural sector is essential for Moldova, not only because it directly improves farmers' disparately low income, but also because it is expected to act as a counter measure to the curtail the outflow of young people from rural areas; an approach regarded as the key factor to sustainable growth of the country.

Although the Moldovan Government is drawing action plans based on the National Strategy to achieve this goal, there are various constraints such as budgetary limitations. It is necessary for decision makers in Moldova to identify the key issues among broad themes within the sector and to implement an effective solution in an efficient manner, utilizing assistance from development partners.

1.1.2 Objective

Based on Moldova's current ambitions, JICA is considering providing assistance regarding Moldova's agricultural development policy in the context of industrial promotion, which executes one of the two major Japanese Governmental assistance policies in respect to Moldova.
In order to achieve this task, JICA appointed a JICA Survey Team to collect basic information about the agricultural sector in Moldova and to analyze the dataset using a cooperation scenario deemed appropriate by JICA.

1.1.3 Target Areas and Estimated CP Agencies

The target area is the entire country of Moldova excluding territory within Transnistria.

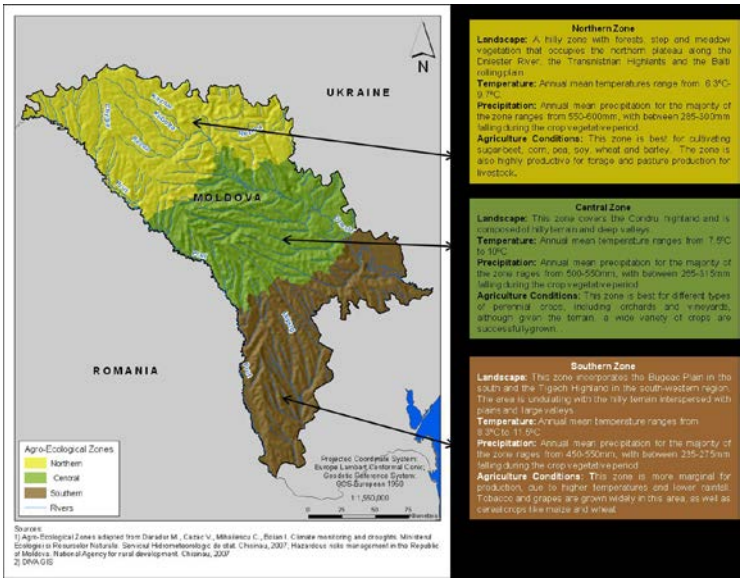


Figure 1-1: Agro-eco Zone of Moldova

Major counterpart agencies are as follows:

- Government Agencies: Ministry of Agriculture and Food Industry (MoAFI), National Food Safety Agency (NFSA)
- Relevant Agencies: Agency for Intervention and Payments in Agriculture (AIPA), 2KR Project Implementation Unit (2KR PIU), National Farmers Federation of Moldova (NFFM), AGROinform.

1.1.4 Survey Contents

The study was designed to undertake data collection, and analysis, through the process of a literature review, questionnaires, conversational interviews, and field visits. Home assignments in November and December of 2016, and January 2017, alongside the first field assignment in December 2016 were conducted. The second field assignment was also carried out from March to April in 2017. The work schedule and survey items are shown in the table 1-1. Based on feedback provided by stakeholders, the survey team has compiled an Interim Report.

Table 1-1: Work Schedule

Work Schedule

Survey Items \ Date	Year 2016				Year 2017															
	November		December		January		February		March		April		May		June		July		August	
Survey Content (1): Preparation of Inception Report																				
Task 1: Collection and analysis of available data / information and addressing expected issues																				
Task 2: Preparation of questionnaires and presentation materials																				
Survey Content (2): Analysis of the current state of the agricultural sector																				
Task 3: Sector trends																				
Task 4: Agricultural policy																				
Task 5: Current status of and issues facing small-scale farmers (Farm village survey)																				
Task 6: Actor Analysis																				
Task 7: Analysis of assistance trends of international donors																				
Survey Content (3): Interim Report																				
Task 8: Preparation of Interim Report																				
Survey Content (4): JICA's assistance scenario																				
Task 9: Preparation of JICA's assistance scenario																				
Survey Content (5): Draft Final Report																				
Task 10: Preparation of Draft Final Report																				
Task 11: Preparation of presentation materials on JICA's assistance scenarios and policies																				
Survey Content (6): Discussion with stakeholders about JICA's assistance scenarios and policies																				
Task 12: Discussions during the on-site workshop																				
Survey Content (7): Final Report																				
Task 13: Finalization of the report in reflection of JICA's feedback on DF/R																				
On-site Workshop															▲					
Report Submission	△ IC/R			△ IT/R									△ DF/R			△ F/R				

<Legend> IC/R:Inception Report, IT/R:Interim Report DF/R:Draft Final Report, F/R: Final Report

Home assignment　Field study

1.2 Report Structure

Chapter 1 of this report briefly outlines the contents of the study. Chapter 2 provides an overview of the trends in the agricultural sector which delineates the need for transition from low value crop such as cereals and industrial crops to high value crop (HVC) production; with the provision that food security is safeguarded by sound cereal crop production. Chapter 3 reviews agricultural policy in Moldova and its implementation. Chapter 4 provides an analysis of the current status and issues faced by small-scale farmers and discusses agricultural actor analysis. Chapter 5 identifies assistance trends of international development partners. After the second field assignment, Chapter 6 provides a summary of current challenges, and draws links to possible JICA assistance approaches. It further proposes an assistance scenario through which JICA may assist in the development of agriculture sector in Moldova.

2. Agricultural Sector Trend

2.1 The Current Status and Transition of Agricultural Sector

2.1.1 The Position of Agriculture among Industries

The agricultural sector in Moldova, despite some decline in recent years, is still considered to a great extent, to comprise the backbone of the economy. This is also true with regard to its GDP contribution and effect on the employment rate. The agricultural sector employs a great deal of people, especially when subsistence agriculture is taken into account. Although Moldovan agriculture with special emphasis on the agri-food industry is of critical importance to the economy, its performance has been uneven as growth has been slow and highly variable.[1]

The Moldovan trade balance features an overall surplus stemming from production of agri-food products, from which around USD 328 million was generated in 2015; in total, agri-food products generating a value of USD 914,489,000 have been exported while products valued at USD 586,576,000 were imported.

Moldova has a total population of 3.555 million people, with 1.266 million who are considered economically active. Of these workers, 822,000 are employed in the non-agricultural sector; i.e. 444,000 are employed in agriculture; however, according to anecdotal evidence, up to 1 million people are living and working abroad – in the EU as well as in Russia.

The total Gross Added Value is comprised accordingly: agriculture, forestry and fishing contribute 11.7%,[2] mining and quarrying, manufacturing industry, production and distribution of electricity and heat, gas, hot water and conditioning air 15.2%, construction 3.6%, wholesale and retail trade, maintenance and repair of motor vehicles and motorcycles 13.6% and transport and storage 5%. Agriculture's overall contribution to GDP is low relative to the number of people employed by the sector.

At the moment, the Moldovan economy is still undergoing significant structural changes. The service sector is currently the largest contributor to economic growth, along with tradable sectors. Conversely, agriculture and manufacturing have stagnated. The main drivers of growth have been and remain to be, retail and wholesale trade along with other services, which includes the financial sector. The transport and communication sectors are also strong performers. Industry, which includes the manufacturing, mining and quarrying industry, along with agriculture (when measured as a share of GDP) has been in steady decline, falling from 56% in 1995 to a mere 26% in 2013.[3]

The agri-food industry is the most important sector within the Moldovan processing industry, as it accounts for 43% of the industry, although it has decreased markedly from 52% in 2004[4]. Two-thirds of all exports originate from the agri-food sector.[5]

[1] The World Bank (WB)- Moldova Trade Study Note 3, Competitiveness in Moldova's Agricultural Sector; 2016
[2] National Statistical Office of the Republic of Moldova: Moldova in Figures. Statistical pocket-book; 2016
[3] National Institute for Economic Research / AGRICISTRADE: Country Report -Republic of Moldova; March 2015
[4] The number 43% was published in National Institute for Economic Research / AGRICISTRADE: Country Report - Republic of Moldova; March 2015
[5] East Invest: Moldova Agribusiness Sector outlook; www.eat-invest.eu

Table 2-1: GDP in Agriculture and Industry[6]

Unit: MDL (thousands)

	1995	2000	2005	2012	2013	2014
Agriculture, hunting and forestry	3,084,906	6,623,905	11,794,382	17,644,954	28,034,799	26,335,610
Manufacturing industry	4,408,975	7,682,060	21,116,557	38,707,081	43,487,632	49,720,593

Source: National Bureau of Statistics (NBS)

2.2 Agricultural Production and Market Trend

2.2.1 Outline of Primary Products

(1) General Background and Land Use

The agricultural sector is still struggling, having left behind a centrally planned economy with kolkhozes (collectively managed) and sovkhoz (state managed) state farms. Despite these reforms, the level of farming has not yet arrived at western standards. This has partially been caused by the redistribution of former state farm lands to people living in the villages which have in turn created scores of new smallholders with limited agricultural working experience. Indeed, the former workers on state farms used to perform highly specialized functions, in charge of feeding animals or driving tractors, but possessing no holistic understanding of farm management. Compared to farmers in Western Europe, who have been involved in farm management for many generations, former members of state farms (with the exception of former farm managers) in Commonwealth of Independent States (CIS) have little to no understanding of agricultural systems. This problem is further compounded by the fact that agriculture is the sole source of income for most farmers with the possible exception of remittances.

Similar to most agricultural sectors worldwide, farmers are attempting to grow their operations through activities such as renting and buying agricultural land, enlarging their farms, and intensifying their agricultural activities. The last option involves moving toward more labor-intensive crops with higher returns; e.g. vegetables, technical and table grapes, apples and other orchards. Animal husbandry (mainly of ruminants) is by many farmers not considered economically viable because of limited grazing areas for ruminants in Moldova. The situation is better for pig farms due to the availability of cereals and other suitable crops.

In 2014, the gross value of agricultural production was MDL 27,254 million, with plant production contributing MDL 17,341 million, and animal production constituting MDL 9,417 million. The remaining MDL 496 million were generated by "services", which, in this context, refer to services provided for agricultural enterprises, such as agrochemical services rendered to agricultural enterprises or the repair and maintenance of agricultural machinery and cars.[7](See Table 2-2.)

Between 2012 and 2014, plant production constituted 60-65% of gross agricultural production, whereas animal production contributed 33-38% while the rest came from services. Therefore, it is reasonable to conclude that plant production remains the dominant sector in Moldova's agricultural sector.

[6]http://statbank.statistica.md/pxweb/pxweb/en/40%20Statistica%20economica/40%20Statistica%20economica__13%20CNT__CNT010/CNT010100.px/table/tableViewLayout1/?rxid=5360837a-13b5-4912-a2e0-12892e96d2ab

[7] National Institute for Economic Research / AGRICISTRADE: Country Report - Republic of Moldova; March 2015

Table 2-2: Transition of Agricultural Production (2012-2014)

Contribution of different sub-sectors to Gross Agricultural Production in Percentage of Value

	2012	2013	2014
Plant Production	60.07	65.00	63.63
Animal Production	37.79	33.30	34.55
Services	2.13	1.70	1.82

Source: NBS

Moldova is a small country with a total area of 33,846 km², yet almost 74% of its land area is used for agriculture.[8] A detailed breakdown is as follows:

Table 2-3: Land Use in Moldova

	ha (thousands)		%	
	2015	2016	2015	2016
Lands - total	**3384.6**	**3384.6**	**100.0**	**100.0**
Agricultural land	2499.7	2499.6	73.8	73.9
Arable land	1817.4	1822.9	53.7	53.9
Perennial plantations	291.7	288.9	8.6	8.5
Orchards	134.5	132.5	4.0	3.9
Vineyards	137.5	136.2	4.1	4.0
Pastures	346.4	345.0	10.2	10.2
Hayfields	2.2	2.1	0.1	0.1
Fallow lands	42.0	40.6	1.2	1.2
Forests and lands covered with forestry vegetation	464.5	465.2	13.7	13.7
Rivers, lakes, reservoirs and bogs	96.8	96.7	2.9	2.9
Other lands	323.6	323.1	9.6	9.5
Lands provided with Irrigation facilities	228.3	228.3	6.7	6.7
Arable land	213.3	213.3	6.3	6.3
Perennial plantations	13.3	13.3	0.4	0.4

Source: NBS

As shown above, from the 3,384,600 hectares (ha) that constitute the entire surface area of Moldova, 73.9% (2,499,600 ha) is classified as agricultural land. The 53.9% of agricultural land (1,822,900 ha) is arable land primarily used for the production of cereals, sunflowers and vegetables. In 2015, there were only 27,600 ha of field vegetables; i.e. 1.5% of arable land.[9] The area for fruits (perennials plantation) are 8.5% (288,900 ha) of all lands, where the total size of vineyards (technical and table grapes) and other orchards are almost equal.

Making the above data comparable, one could say that vegetables are grown on 0.81% of the total land and fruits on 8.5%; in total HVCs[10] cover less than 9.5% of all land in Moldova.

Moldova's agricultural sector is characterized by a large degree of heterogeneity; there are about 900,000 farms[11] in Moldova, with an average size of around 2.5 ha; however, this figure is

[8] http://statbank.statistica.md/pxweb/pxweb/en/10%20Mediul%20inconjurator/10%20Mediul%20inconjurator__MED050/MED050100.px/table/tableViewLayout1/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774

[9] Table 2-3: Sown Areas of main Crops

[10] HVCs are F&V with the exception of potatoes

[11] The WB - Moldova Trade Study Note 3, Competitiveness in Moldova's Agricultural Sector; 2016

potentially misleading as not all 900.000 land owners are actively engaging in farming activities and large areas of agricultural land are rented out to bigger operating farms with more than 50 ha.

(2) Plant Production

Within the last 10 years there has been a clear shift away from potatoes, vegetables (field vegetables) and maize as a fodder crop. With the exception of sugar beets and tobacco, farmers have increasingly turned to cereals and industrial crops. Thus, the overall crop rotation suffers from the resultant reduction in the production of leguminous crops and feed crops.

Table 2-4: Sown Areas of Main Crops

	ha (thousands)			Growth rate (2006 – 2015) in %
	2006	2014	2015	
Sown areas – total	1483.4	1502.8	1502.6	101
Cereals and leguminous crops	917.6	940.4	949.6	103
Wheat (winter and spring)	298.1	348.6	345.5	116
Barley (winter and spring)	108.8	96.8	84.5	78
Grain maize	459.3	467.8	492.8	107
Leguminous crops	41.5	21.9	23.7	57
Industrial crops	400.7	437.7	434.9	109
Sugar beet (industrial)	42.4	28.1	21.9	52
Sunflower	287.4	319.7	330.3	115
Soy	55.7	54.9	67.8	122
Rapeseed (winter and spring)	6.7	29.5	8.7	130
Tobacco	3.5	0.9	0.8	23
Potatoes, vegetables and melons and gourds	87.6	63.1	57.3	65
Potatoes	34.4	22.8	22.1	64
Field vegetables	42.4	31.9	27.6	65
Cabbage (different)	3.9	2.0	1.6	41
Cucumber	3.6	2.5	2.2	61
Tomato	8.0	5.4	4.7	58
Dry onion	6.0	5.7	5.1	85
Green peas	2.8	2.4	1.2	42
Pumpkins	3.1	3.0	3.2	103
Melons crop supply	8.8	7.1	6.4	72
Forage crops	77.5	61.6	60.8	78
Maize for silage and green fodder	12.5	6.3	7.4	59

Source: NBS

Plant production is the primary generator of revenue in agriculture; constituting two-thirds of total agricultural production value. According to the National Institute for Economic Research, the share belonging to animal production began to decline during the 1990s.

Cursory analysis of the yields per ha has confirmed that at least within the agricultural enterprises cohort, yield has been increasing across all crop types. The circumstances at household level show partially significant lower yields. To highlight this trend and to make it possible to reference seasonal weather variations, the average yields for 2014 and 2015 have been evaluated against data from 2006.

Table 2-5: Average Yield per ha of Agricultural Crops

	2006	2014	2015	2015 yield of 2006 yield in %
	kg/ha	kg/ha	kg/ha	
Cereals and leguminous crops – total	2,500	3,100	2,300	92
Wheat (winter and spring)	2,300	3,200	2,700	117
Barley (winter and spring)	1,800	2,300	2,100	117
Oats	1,400	1,600	1,000	71
Buckwheat	100	1,700	300	300
Leguminous crops	1,600	1,400	1,000	63
Grain maize	2,900	3,400	2,200	76
Other cereals	1,300	3,000	2,500	192
Industrial crops				
Sugar beet (industrial)	27,800	49,900	25,300	91
Sunflower	1,300	1,800	1,500	115
Soy	1,400	2,100	700	50
Tobacco	1,400	1,600	1,600	114
Rape	1,000	2,300	1,900	190
Potatoes, vegetables and melons and gourds				
Potatoes	11,000	11,800	7,200	65
Vegetables				
Field vegetables	11,100	9,800	8,500	77
Different cabbage	16,500	14,800	11,000	67
Cucumbers	10,600	10,200	7,900	75
Tomatoes	12,900	10,700	11,400	88
Onion	9,100	10,000	7,500	82
Other vegetables	11,900	8,800	9,000	76
Pumpkin	14,600	13,800	10,100	69
Paprika	12,700	7,500	7,100	56
Melons and gourds	11,700	6,700	8,600	74
Forage crops				
Forage roots	11,200	20,600	11,800	105
Maize for silage and green fodder	9,100	16,600	8,400	92

Source: NBS

Cereals

Whereas in 2014, the general yield of wheat in Moldova was 3,370 kg/ha, that figure was notably higher in Romania (3,598), Hungary (4,729) and Austria (5,922 kg/ha)[12]over the course of the same year. There is untapped potential to increase yields per ha in crop production in Moldova. The production of wheat, barley, and maize is able to satisfy the local demand and thus enables large export volumes.

The low yield for cereals might also be attributable to a tendency to pursue low-input farming. Mindful of the high risk of drought, farmers apply minimal fertilizers and agro-chemicals; which reduces their losses in bad years, and conversely lowers their yields if weather conditions are fine.

[12] http://www.fao.org/faostat/en/#data/QC

In 2015, around 493,000 ha of farmlands were sown with grain maize, 346,000 ha with wheat (winter and spring) and approximately 85,000 ha with barley (winter and spring).Over the years, farming areas under wheat and maize have been expanding whereas those areas being cultivated with barley have shrunk, also because wheat and maize are frequently used for fodder.

Annual precipitation ranges from 500-550 mm in the North, to 450 mm in the center and 350 mm in the South[13]. Due to low rainfall, the farmers with bigger areas under cereal production are switching to low or no-tillage cultivation which saves costs and reduces evaporation. These efforts are being supported by International Fund for Agricultural Development (IFAD) among others.

Durum wheat production is an essential input for the bakery industry but still requires being imported; it is apparent that a quality payment scheme does not exist, else it cannot incentivize potential producers.

Farmers have reported[14] that profit per ha is around EUR 50, equivalent to around EUR 15 per ton which is therefore very low. As a consequence, growing cereals is only profitable for very big farms.

Moldova is a net exporter of cereals. In 2015, Moldova exported USD 113,860 worth of cereals while only importing USD 14,048 worth of cereals. It is worth noting that in 2014, exports were also significantly higher than in 2015.

As wheat represents basic cereal necessary for the production of flour and bakery products, it has a share of about 30-35% in the composition of cereal crop production in the country. Maize represents the most prevalent spring crop for the Republic of Moldova comprising about 35-40% of cereal production.

Fruits & Vegetables (F&V)

Fruit-growing represents one of the main strategic branches of the national economy, as it accounts for around 40% of the agricultural production value. Moldova is a net exporter of fruits. The market structure for fruits in Moldova involves the following distribution channels: approximately one hundred open air markets, four wholesale markets, one hundred supermarkets, and a myriad of small kiosks. In addition, there is HoReCa (hotels, restaurants, cafes, the foodservice sector) that buy directly from open air and wholesale markets, as well as from growers and retailers. Besides these commercial channels, a large portion of rural households consume and preserve their production for their own consumption or informal exchange with their neighbors. It paints picture of a relatively stable consumption pattern with some small variations from year to year.[15]

Historically, fruit production varies from approximately 200,000 tons to 400,000 tons on an annual basis, but according to private sources (fruit traders, exporters), Moldovan production of fruit has increased to approximately 1 million tons per year, resulting from new technology, farm management, and irrigation schemes. Fruit production concentrates on: apples, plums, sweet and sour cherries, pears, peaches & nectarines, quinces, apricots, soft fruit, walnuts, table and technical grapes.

Apples are the largest fruit crop in Moldova; 60% of fruit production and more than 300,000 tons. Around 80% of apples are sold as fresh product while the surplus apples and apples of poor qualities are used by the processing industry, mainly to produce apple juice concentrate.

[13] FAO (Food and Agriculture Organization of the United Nations), 2001
[14] Meeting with farmers in Cahul area on 28 March 2017
[15] MIEPO: Agriculture and Food Processing; Republic of Moldova; Edition 2016/2017

On one hand, there are many apple orchards with old trees and outdated varieties; on the other, growing numbers of investors are putting money into modern apples (and other fruit) plantations. The establishment of a traditional orchard costs EUR 2,000/ha while a super-intensive orchard costs EUR 35,000/ha.

Apples play a predominant role in production, storage, and sales as apple producers and traders have and use the bulk of post-harvest infrastructure. Nevertheless, sorting and packing lines as well as packaging materials are often missing, which leads to low quality exports.

Grown mostly in the central and northern regions of the country, Moldovan apples have long been a staple in Eastern markets. While consumers have enjoyed these apples for decades during the Soviet era, Moldovan producers are now looking for new markets as the Russian markets are almost closed due to the embargo.

Mainly open field vegetables consist of dry onions, tomatoes, different kinds of cabbage, pumpkins, cucumbers and green peas. In Moldova, fewer and fewer field vegetables are being grown; the total area for which was 42,400 ha in 2006 shrank to only 27,600 ha in 2015.

A few years ago, the protected areas (greenhouses) for growing vegetables covered a total surface area of 550 ha. In greenhouses, total production is approximately 54,000 tons of vegetables with tomatoes accounting for 77%, cucumbers 9%, sweet peppers 3% and 11% provided by other crops like cabbage and radishes[16]. Since a few years ago greenhouses have become more widespread.

Altogether the production techniques currently used on vegetables in Moldova result in low quality, low yield per ha, and (apart from tomatoes) country wise limited volumes, open-field production (and only very limited use of plastic tunnels or greenhouses) of vegetables yields produce that is often unsuitable for sale to supermarkets. This is because supermarkets desire produce of uniform appearance and size. For this reason, most of these vegetables are sold at open-air markets and to the processing industry. The bulk of tomatoes, the principal vegetable crop, are processed but yields are relatively low here as well, almost no vegetables are exported. Traders have little export experience in these commodities. Cold storage and proper handling is limited and packaging is obsolete.[17]

[16] USAID: End Market Study for fresh F&V in Moldova; ACED; 2011
[17] Moldova Millennium Challenge Corporation (MCC) - Value Chain Analysis and Market Study in the F&V Sector; Final Report: Analysis of HVA Constraints, Opportunities and Requirements; 2009

Table 2-6: Plantations and Orchards

hectares (thousands)

	2008	2013	2014	2015
Fruit and berry plantations - total	**114.1**	**122.1**	**122.3**	**135.6**
of which, fructiferous	99.1	89.9	91.8	110.4
Orchards - total:	**113.2**	**121.3**	**119.6**	**132.6**
of which, fructiferous	98.3	89.3	89.4	107.7
seed orchards (apple, pear, quince and others)	68.0	66.3	59.2	65.3
of which, fructiferous	62.7	55.5	47.0	57.4
orchards stone fruit (plum, cherry, cherry, apricot, etc.)	38.6	41.1	36.2	42.0
of which, fructiferous	32.0	27.6	28.2	35.3
walnut (walnuts, almonds, etc.)	6.7	14.0	24.2	25.2
of which, fructiferous	3.6	6.1	14.3	15.0
Berry plantations (strawberries, raspberries, currants, gooseberries, etc.)	**0.8**	**0.8**	**2.7**	**3.0**
of which, fructiferous	0.8	0.7	2.4	2.7
Vineyards	**149.8**	**136.7**	**140.4**	**135.4**
of which, fructiferous	136.7	127.7	133.7	128.8
Vineyards of table grapes	**19.1**	**19.2**	**20.5**	**19.9**
of which, fructiferous	17.4	16.5	17.6	17.4

Source: NBS[18]

Fresh fruits are grown at a considerable scale relative to the available land area in Moldova. The most important products in terms of export volumes and values are apples, table grapes, cherries, plums, and walnuts.

Technical and Table Grapes

As shown in the tables above and below, the total area cultivated by grapes has slowly been declining as well as the total harvested volumes. In reality, grapes are grown on over 155,000 ha in Moldova annually. When differentiating between technical and table grapes, one could see that the allotted area for table grapes has remained stable (19,900 ha in 2015).

The same has to be said when it comes to table grapes. If there are 17,400 ha designated for table grapes in Moldova and if we assume a yield of 15,000 kg per ha, then we would arrive at 261,000 tons. The data provided by the NBS shows that 84,700 tons of grapes were harvested from 17,400 ha; i.e. 4.87 tons / ha in average – one third of the expected result.

During field visits, farmers informed the JICA Study Team that irrigated vineyards can produce up to 25 tons of table grapes/ha and that those without irrigation would yield just 50% of that.

96.5% of Moldova's vineyards are privately owned. Small farmers produce mainly table grapes as their revenues are much higher than those of technical grapes; table grapes also show higher yields per ha and higher prices per kilogram.

[18] The above data have to be seen critical as it makes sense if the harvested volume varies from year to year but not the number of ha in thousands; 2013 – 136.7, 2014 – 140.4 and 2015 – 135.4.

Moldova cultivates a lot of different table grape varieties such as Codreanca, Cardinal, Apiren pink, Apiren Black Grozeshti, Muscat of Hamburg (or Black Muscat), Muscat Bugeac, Tudor, Moldova, Moldovan Kishmish and also several varieties of foreign origin like Prima (France), Kubani (Russia), Danuv (Bulgaria) and others.

Larger table grape growers cultivate many different crops including fruits and field crops. Smaller growers also have several crops but focus on a small number of fruits and table grapes. In general, table grape production is concentrated among small farmers in Moldova.

Small farmers in particular need more extension services. Currently, the National Agency for Rural Development (ACSA)[19] provides extension services to farmers but it would need more detailed technical advice, e.g. which varieties to grow concerning climate and markets. Moreover, the marketing of table grapes within the country has been poor; there are a growing number of grading and packaging activities and many cold storage facilities (often without cooling chamber) have been built, but in terms of sales, the owners of cold storage facilities simply wait for foreign trucks to come and purchase the available grapes. Table grape growers cannot identify the buyers and therefore cannot initiate useful marketing activities. Marketing should be executed with the purpose to produce a "branded product" and a movement away from being considered a commodity, as suppliers of commodities can be quickly replaced by supermarkets and other large buyers. ,

Sugar Beets

Sugar beets are of strategic importance to the national economy in Moldova. Moldovan sugar beets are grown almost exclusively in the northern part of the country; however, the total area under sugar beet cultivation has declined sharply from approximately 42,000 ha in 2006 to approximately 22,000 ha in 2015. The average yield per ha lies between 25 tons and 50 tons which is dependent mainly on weather conditions, though one farmer was recently able to produce 90 tons per ha. Sugar content is between 16-19%, which also depends on the weather. Farmers generally are not able to gain any profit when harvesting only 25 tons / ha.

Yield is highly dependent on weather conditions because irrigation is not yet widespread. From 22,000 ha under sugar beets, around 3,000 ha could technically be irrigated but owing to lack of water, only 1,000 ha are actually irrigated.[20] Ground water would be available but cannot be used as it is controlled by the Ministry of Environment (and not by MoAFI). Only 12% of water volume is pumped today relative to Soviet times.

Farmers cultivate lands ranging from 2-3 ha up to 1,600 ha. To overcome financial problems, the industry pays 40% in advance, which enables farmers to purchase seeds and perform the soil preparation and planting. Average costs are estimated to be EUR 1,300-1,500/ha. Harvesting is performed by machinery services owned by the sugar industry, though this service division will most likely be privatized. Big farmers have their own machines. The industry also provides extension services.

The final sugar price for farmers depends on the overall harvest; the better the harvest, the lower the price and vice versa.

[19] ACSA is the largest non-governmental, non-profit and non-political organization, which has 32 regional centers and a network of 430 consultants (national, regional and local). Providing advisory services for farmers and promotes policies and minimum MoAFI small farmer advisory activities.

[20] Under Soviet times there have been 250,000 ha agricultural land irrigated; USAID rebuilt 12,000 ha but out these only 700 ha are today in use because often the irrigation costs (i.e. energy) are too high.

Farmers have access to cheaper credit from the MoAFI when investing in irrigation and from the sugar industry when investing in farm techniques. Furthermore, farmers seem not to face procurement problems with seeds (e.g. Stubbe) and agro-chemicals (e.g. Bayer, BASF) as these products can be imported without long testing phases; owing to the good relations between the local authorities and the sugar industry.

Oilseeds (sunflower, soy and rape)

The sown area of sunflower has been growing continuously, from 287,000 ha in 2006, up to 330,000 ha in 2015. Moldova has an average annual harvest of 560,000 tons of sunflower seeds. Also, soy beans have shown an upward trend from 56,000 ha in 2006 to around 68,000 ha in 2015. On a lower level but with more severe variability, rapeseed was grown in 2006 on less than 7,000 ha, had almost 30,000 in 2014, and then on around 9,000 in 2015.

It is worthwhile to mention that the high output volatility in Moldova is most pronounced for rain-fed crops, such as wheat, maize, sunflower seed, sugar beet and others. Whereas the yield for sugar beet was twice as much in 2014 than in 2015, the yield for soy was three times higher in 2014 than 2015.According to official statistics, the average yield per ha is at 1.8 tons (2014), though capable farmers can reach 2.3 tons. The Floarea Soarelui SA operates a 40,000 ha farm where around 8,000 ha are annually sown with sunflowers, resulting in approximately 18,000 tons of sunflower seeds; i.e.2.25 tons/ha.

In addition to unpredictable weather conditions which can be buffered for if there are irrigation schemes available, farmers sometimes also face difficulties with the quality of the offered seeds as especially the germination percentage appears to be often too low. All three crops (Sunflower, soy, rape) might grow in hectarage as they are easy to cultivate, harvest, and have low-tillage requirements; i.e. one year deep plowing and 3 years no-tillage direct seeding. Sunflowers, the biggest crop in this group, currently offer farmers two marketing opportunities; sale to the local crushing plant in Balti or exportation via traders and intermediaries to neighboring countries, especially Ukraine.

Niche Product: Walnuts

Moldovan nut production is expanding and has utilized more than 25,000 ha in 2015; see the table below. According to the Nuts Association, there are 15,000 ha of walnut orchards with an additional 5,000 ha of walnuts being grown in backyard gardens and roadside trees. The remaining nuts are comprised of almonds and hazelnuts.

The yield is difficult to determine as extensive and young orchards can reach up to 1 ton/ha , non-irrigated walnut orchards can produce a yield of 2.5 tons/ha and irrigated orchards 3.5–4.0 tons(Irrigated nuts generate greater yields).

Average productivity varies from 2 to 2.5 tons per ha, depending on the variety and climatic conditions. If considering only the 15,000 fruit-bearing orchards then the annual harvest must be in the range of 30,000 - 37,500 tons.

Table 2-7: Table Walnut Production in Moldova 2008 - 2015

ha (thousands)

year	2008	2009	2010	2011	2012	2013	2014	2015
walnuts incl. almonds, hazelnuts, etc.	6.7	8.0	9.4	11.3	12.3	14.0	24.2	25.2
of which, fructiferous	3.6	3.9	4.1	4.6	5.0	6.1	14.3	15.0

Source: NBS

70% of walnuts are grown on private plots and 30% in industrial orchards. Walnut exports grew from USD 39 million in 2007 to more than USD 100 million in 2014. The total export volume of walnuts in 2016 was 32,000 tons/year and has reached an export value similar to that of wine.

One of the challenging aspects of walnut production is that it takes 5-10 years until full harvest can be achieved; i.e. it requires long-term pre-financing while farmers interested in walnut orchards must have another source of income until walnuts are capable of bearing sufficient yield. Sometimes the shelling of nuts is done by hand on the farm which can substantially increase profits.

Apart from new plantations, there are thousands of kilometers of alleys with walnut trees along the main roads; unfortunately, new roads are no longer being planted with walnut trees.

When investing in walnuts, one should calculate the following costs:

- Purchase of agricultural land: USD 2,000/ha
- Planting 100 trees per ha, 1,000 trees in total – around 10% male for pollination and rest female: USD 5,000/ha
- Drip irrigation: USD 1,000–2,600/ha (Ukrainian or Israeli model); additionally, a reservoir, filter and a well have to be financed.
- Irrigated nuts generate greater yields.
- Annual costs for spraying: USD 500/ha
- Furthermore, an investment into a storage facility e.g. with 400 m² (to be used by other products) would cost around USD 50,000.
- Depending on the size of one's family, seasonal workers could be employed for at least USD 10/day

Governmental subsidies currently cover the cost of 30% of the trees plus a one-time-payment of MDL 200,000 (= USD 10,000). Other sources say that all orchards are subsidized with EUR 700 per ha from the government and this subsidy is limited up to 25 ha[21].

If assuming a yield of walnuts of 2-4 tons per ha and a farm-gate price of USD 3 per kilogram (in shell), then the revenues per ha would be between USD 6,000 - 12,000.

Niche Product: Dried Fruits

In Moldova, despite the fact that a large volume of fruits are grown, very few are marketed as dried fruits; which primarily includes prunes, cherries, apples, pears and apricots. Moldova produces around 4,000 tons[22] of dried fruit per year, depending on the growing conditions for the raw material. Export levels are usually about 70% of production and exceed the volume of imports

[21] Meeting with President Mr. Oleg Tarsana and Deputy President Mr. Constantin Gujim from the Nut Association on 29th March 2017

[22] MIEPO: Agriculture and Food Processing; Republic of Moldova; Edition 2016/2017

of dried fruit, primarily dried versions of the crops that are not domestically grown i.e. Moldova is a net exporter of dried fruits despite the sector operating under capacity.[23]

The major constraint to further expansion of the fruit drying sector is the poor raw material production base. Aging orchards with declining yields, lack of varieties suitable for drying, high costs of growing technologies, lack of irrigation, poor harvesting and post harvesting handling techniques as well as labor shortages constitute the major issues for growers and processors.

The sector is characterized by a few large and medium sized companies and a larger number of smaller companies, all competing with each other. The EU-27 absorbs about 80% of the sector's exports while CIS countries, primarily Russia, Belarus and Ukraine, purchase the rest. Because of a relatively small presence in the EU markets, Moldova has the potential to substantially increase its export volumes.

(3) Animal Production

Meat Production / Livestock

The livestock sector did not successfully manage the transition from the centrally planned to the free market economy. During the Soviet era, animal production was concentrated in large farms which have since been privatized. After the animals were distributed to the local population, many were slaughtered by rural households as sufficient fodder and stables were not available. This has been the case especially regarding the transfer of cows to private households, where it can be difficult to raise 1 – 2 cows in a backyard.

Today, animal production counts substantially (with the exception of poultry) fewer heads than it did in Soviet times. Cattle counted 1,112,000 heads in 1989 which dropped to 186,000 heads in 2016. Swine fell from 2,045,000 to 453,000 heads; while sheep and goats from 1,344,000 to 869,000 over that same period. Only the headcount of poultry increased from 25.5 million in 1989 to 45 million in 2016.

[23] USAID: Moldova's Dried Fruit Sector Assessment; 2008 (also for following paragraphs)

Table 2-8: Number of Animals per Category of Producers[24]

	2009	2014	2015	2016	% distribution among producers*	% Ø 2015/16 versus 2009
All categories of producers	heads (thousands)					
Bovine / Cattle	218	189	191	186	100	87
Cows	160	131	130	128	100	81
Pigs	284	420	473	453	100	163
Sheep and goats	866	849	875	869	100	101
Horses	56	45	43	39	100	74
Agricultural enterprises						
Bovine / Cattle	13	11	12	13	7	97
Cows	5	5	5	5	4	102
Pigs	65	158	196	185	41	293
Sheep and goats	25	17	22	25	3	93
Horses	2	1	1	0,0	0	13
Poultry	3,115	3,377	3,511	3,972		120
Households						
Bovine / Cattle	205	176	178	171	92	85
Cows	155	125	125	122	95	80
Pigs	218	261	276	267	59	125
Sheep and goats	840	829	851	841	97	101
Horses	54	44	42	39	99	75

*It shows the ratio of number of animals in each category against total in 2016
Source: NBS

The privatization process (1996 - 1999) resulted in the slaughter of many animals with just a few that were successfully transferred onto private farms or at least survived there. Commercial animal husbandry was eventually given up. The production on the agricultural land was quickly shifted to cash crops – mainly to cereals. The reasons for this have been that cereals require relatively small investments in farm machinery, have short production cycles, and finally reorient cropping patterns. Fodder production –as well as vegetable growing - was reduced as no one had sufficient capital to pre-finance meat production.

Until now, financing costs are still too expensive to make long-term farm investments, the situation has not been able to recover and it is questionable whether the headcount under Soviet times will ever be reached again.

Poultry farming on the other hand, offers fast returns on investment. Whereas beef production takes 1-2 years, broiler chickens are slaughtered when they weigh approximately 2 kg, usually between seven and nine weeks of age. Like in many other countries, investments into poultry are done by investors from outside the agricultural sector or by fodder mills.

Table 2-9: Meat Production by all Categories on thousand tons

Year	2008	2013	2014	2015
Meat (in slaughter weight)	**78.3**	**115.1**	**122.2**	**130.6**
of which:				
beef and veal	10.6	8.3	8.2	8.4
pork	35.1	61.1	64.6	71.9
mutton	2.2	2.0	1.9	1.9
poultry	29.6	42.9	46.7	44.1

Source: National Statistics 16.3.7

[24] Producers can be divided into agricultural enterprises and individual farms

Cattle

In 1990, Moldova had 1,112,000 heads of cattle, out of which 402,000 were cows; in 2000, the number of cattle fell to 423,000, out of which 275,000 were cows. Today there are 186,000 heads, of which around 128,000 are cows. These alarming figures show that the number of milking cows have come down to less than 1/3 of the 1990 status while bulls (including calves) feel from 700,000 to 60,000.[25]

Today only 15,100 heads – out of which are 6,000 dairy cows - are kept under farm conditions; all other cattle are kept by smallholders in their backyards; usually a household farm has 1-2 cows because in most cases the size of the premises do not allow for the keeping of more animals.

During Soviet times, the dominant breeds were Red Steppe and Simmental; to increase their milk potential, these animals have been cross–bred with the black and white Holstein which has resulted in the Moldovan type of black-motley cattle[26]. Besides this still wide-spread breed on small farms, there are more and more pure Holsteins being imported especially by newly established commercial livestock farms with 200 heads and more.

The knowledge base of nutrition issues is poorly developed among smallholders, which may be the reason for the low rearing quote (71%). The commercial farms are also performing better due to better skilled farmers. For example, on bigger farms, weekly feeding ratios are often elaborated by hand; i.e. not based on simple software programs.

Artificial insemination for cattle is mandatory by law and is therefore wide-spread; around 90,000 cows are artificially inseminated annually; however, on community pastures there is not much regulation to deter natural methods of reproduction using bulls. More than 700 technicians work in this sector on a self-employed basis; the current fee for AI per cow is MDL 200 (around € 10). Semen is available from international companies and the governmental Scientific and Practical Institute by Biotechnologies in Animal Husbandry and Veterinary Medicine in Maximovca. The semen is subsidized to give technicians better access to smallholders for monitoring purposes; however, it remains unclear what kind of monitoring is actually being performed; anecdotal evidence suggests that the semen is quite old as the institute does not have sufficient funds to purchase high-quality breeding bulls.

Marketing takes place in a traditional way. Smallholders are backyard producers and they rely on agents or traders who typically work directly but sometimes indirectly for processors. These agents buy up animals individually, and prices are negotiated on the spot, which is dependent on the agent's assessment of the animal's quality. There appears to be no price-finding mechanism, such as livestock auctions and no price-information system in place either. The market for meat is non-transparent, beyond any word-of-mouth communications among neighbors, but since quality does vary, even information on purchase prices in the same or neighboring villages provides little guidance to livestock farmers. Especially attributable to better logistics and reliable quality, the processing companies generally prefer imported meat[27].

[25] http://statbank.statistica.md/pxweb/pxweb/en/40%20Statistica%20economica/40%20Statistica%20economica__16%20AGR__AGR030/AGR030100.px/table/tableViewLayout1/?rxid=5360837a-13b5-4912-a2e0-12892e96d2ab

[26] KONSTANDOGLO, A. et al. - Moldovan type of black-motley cattle; Scientific and Practical Institute by Biotechnologies in Animal Husbandry and Veterinary Medicine, MD 6525, v. Maximovca, AneniNoi, Moldova, aconstandoglo@yahoo.com; 2014

[27] ERNST, U.F.W. et NEEL, S.: Business environment impacts on competitiveness: Moldova's meat value network; July 2009

Summary

The majority of smallholders do not possess much knowledge about raising cattle, regardless of whether it is for milk or meat production. ACSA as the responsible extension service provider is not very active on cattle farms and skills in animal husbandry, fodder production, nutrition, farm management and cost-counting are not well developed.

Furthermore, access to finance is limited, especially due to lack of collateral for most actors. In cases where they have sufficient collateral, interest rates are usually too high and the grace period often too short.

Regarding the market outlook, local and international demand for milk and meat will continue to increase due to increasing world population and the fact that wealthier countries consume more milk and meat products than poorer ones.

The current self-sufficiency rates for these basic daily food products do not meet the demand; local operations constitute only 30-32% of the meat demand (beef) and 65% of the milk demand; i.e. 2/3 of meat and 1/3 of locally consumed milk is imported.[28]

Small Ruminants

Numbers of sheep and goats have dropped from 1,344,000 heads in 1989 to around 900,000 heads in 2016; for small ruminants, the worst time with the lowest headcount seems to be over. Nowadays the sheep and goats together account for almost 869,000 heads in Moldova and over the last 8 years that number has remained constant. Of these small ruminants, around 15% are goats and the remaining 85% are sheep. The majority of all small ruminants have seasonal lambing behavior; only recently, farmers have begun trying to steer the delivery period in the year.

There are 8 Tsigai sheep breeding farms with 3,858 breeding animals and 6 Karakul breeding farms with 1,875 breeding animals. The Tsigai sheep are kept for milk and wool production, whereas the Karakul sheep is a multi-purpose sheep are kept for milk, meat (fat-tailed breed) and wool.

Breeding farms are controlled for pure breeding activities and breeders can ask higher prices for their animals as the buyers do get a subsidy if they purchase certified pure-bred animals; e.g. a pure-breed milking goat can cost up to USD 300 per head in the market; that corresponds roughly to twice the "meat" price.

The majority of all sheep are produced for meat purposes and just a small number are milked; in the case of goats, it is the other way around.

Goats are kept mainly for milk; the vast majority is a local breed that gives 200 – 500 liters of milk per 310 days; furthermore, there are around 320 animals from the Sannen race with a milk production of 500-700 liters in 270 days and the 154 animals of the Alpine race producing 600 liters of milk in 270 days. Fresh goat milk costs MDL 40 per liter[29] (equal to USD 2.1) as the product faces heavy demand; for comparison, that is 4-5 times the price of cow milk.

Sheep graze on public pastures and they do not consume any grain or other fodder. Fencing of pastures is not known and shepherds are hired to watch the folks. Usually sheep are grazed separately from goats or cows.

[28] See also: The WB - Moldova Trade Study Note 3, Competitiveness in Moldova's Agricultural Sector; 2016
[29] Interview with Mr.Ivan BACIN, goat farmer from Comrat on 04 April 2017

To avoid overgrazing there is a law that regulates a specific time period for when the public pastures in the communities might be used for grazing animals; officially, the grazing period starts in May but even at the beginning of April, the JICA survey team could already see many animals on the pastures.

All animals are brought home at night for supplemental feeding and partially for milking; goat milk is consumed as milk and cheese whereas almost all sheep milk is processed into cheese – usually at farm level. As forests and trees have been cleared over the decades to generate more arable land, many areas now used as pastures are facing problems related to overgrazing and erosion as a consequence. Besides on-farm consumption, the animals are marketed similarly to cattle. Butcher shops are noticeable from the road as usually a number of small ruminants are flocked there, ready for slaughter when the customer shows up.

Pork

In 1990, the number of pigs totaled 2,045,000; 1,718,000 came from agricultural enterprises and 328,000 from households. In 2000, the total number of pigs was only 683,000 and at that time, most were kept on household farms. Total figures reached 377,000 animals in 2010, with less than 100,000 coming from agricultural enterprises. Since then the commercial farms have been growing rapidly and in 2016, from a total of 453,000 animals, 185,700 came from agricultural enterprises.

Households with backyard production get their piglets from commercial farms; sometimes these piglets are imported (from Germany at 12 kg and sold shortly later at 18 kg to backyard producers) and often from local markets. According to anecdotal evidence, unfortunately some farmers import piglets in car trunks from Ukraine (as cereals and energy are cheaper there). Most commercial farms have a closed cycle for reproduction of breeding animals and their offspring are used for on-farm fattening.

At the moment, self-sufficiency in pork meat is not guaranteed as only 68%[30] of pork meat is produced locally. Currently the larger portion of pig production is coming from private households, but large farms are catching up and will eventually overtake households. This is mainly due to large scale investments being made; there are around 15 big pig farms in Moldova with 1,000 sows on average. A well-known example is the farm owned by Regional Meat; the Danish company entered the Moldovan market in 2014 by renting a pig farm to test the business climate and the market. After one year, the company decided to invest in the livestock sector and purchased an existing pig farm, with a production surface of 54,000 m² located in Rezina district in the North. The farm currently has 40 employees, has 2,200 sows (mainly of Danish and Dutch genetics) and a total production capacity of 45,000 pigs which are sold locally.[31] The next investment phase will see a duplication of the produced pigs soon.[32]Financing of pig farms is possible at interest rate of 11% in the local currency, if collaterals can be provided.

The aforementioned 15 farms are the exception in Moldova as 267,000 animals are still reared on household farms. Usually, 2-3 piglets are purchased in spring and slaughtered when the weather turns colder as farmers do not want to keep the stables warm. In most cases, stables are built in the backyard of the houses and offer poor hygienic conditions. The nutrition of these animals is also poor; the main reason for this being a lack of knowledge among farmers.

Despite existing regulations, pigs kept in backyards are usually not controlled by veterinarians,

[30] Interview with Finn Mikkelsen, Regional Meat at MoAFI on 10 March 2017
[31] MIEPO: Agriculture and Food Processing; Republic of Moldova; Edition 2016/2017; 2016 and Meeting with the Pig Farmer Association on 10 April 2017
[32] Interview with Finn Mikkelsen, Regional Meat at MoAFI on 10 March 2017

[33]are consequently not registered and have therefore are not fitted with ear tacks. The situation is getting worse as these pigs are slaughtered in the backyard despite the fact that this practice is forbidden by law. The law enforcement is not being executed properly. Recently, this resulted in a case of swine fever as contaminated meat was imported from Ukraine and due to poor hygiene and handling, came into contact with backyard pigs.

While households keeping pigs avoid using slaughterhouses, they are essential to the operations of commercial farms, and despite their large number (over 100 in Moldova); the level of quality and food safety seems to be very low. Investments for upgrading these slaughterhouses have not been made, and in time they will be out of business. The previously mentioned Danish farm cooperates with several slaughterhouses in parallel as their individual slaughtering capacities are not sufficient.

There are two methods of operation for slaughterhouses: either they purchase the animals by live weight and expect a carcass to yield 72-74% or they provide slaughtering services. In the case that just the slaughtering services are required, the slaughterhouses charge MDL 1 per kg live weight. Surprisingly, no classification schemes exist, not even on paper; as prices are fixed every Friday for the upcoming week. In general for smallholders, slaughterhouses are regarded to be too expensive and are therefore bypassed.

In regard to governmental subsidies, pig farmers do not receive the same support as cattle farmers, while cattle farmers get 50% of construction and animal costs reimbursed, pig farmers only get 30% and face also a lower ceiling. Forthcoming support for better genetics – purchase of pure bred animals - with EUR 500,000 is also too low.

Environmental issues are relevant when it comes to manure management. Currently most farmers – also large cereal farmers – do not value the amount of NPK fertilizer held by the manure, due to gaps in knowledge. There are almost no liquid manure spreaders in the country and often the manure in pig farms is separated so that the liquid part goes into lakes or rivers whereas the concrete manure is stored on the farm for 1-2 years before it is brought to the fields. Due to limited understanding, the corresponding equipment like (liquid) manure spreaders is not widely utilized.

The commercial farms import very often most premixes as they do not trust the domestic premixes. Internationally accredited laboratories for feed analysis could therefore improve the situation here.

Summary

The management of pig farms is poor in all respects: fodder production, nutrition, hygiene, genetics and more.[34] This deficit is partially caused by the agricultural colleges that do not provide specific education and practical training.

Another environmental and food safety problem is the lack of rendering plants in Moldova;[35] it is unknown what happens to slaughterhouses' disposals. Also, dead animals on farms and especially in households are not properly disposed of. The investment costs for a rendering plant would be around USD 15 million (according to NFSA) without the bacteriological and serological laboratory that would be needed in the same structure as the dead animals have to be analyzed as well.

[33] This caused recently a case of swine fever as contaminated meat from Ukraine was imported and due to poor hygiene handling it came in contact with the backyard pigs. The required bacteriological and serological analyses could not be done in Moldova due to missing laboratory with this specific experience; finally the sample was analysed in Spain.
[34] Interview with Finn Mikkelsen, Regional Meat at MoAFI on 10 March 2017
[35] Meeting with Mr. Ion TOMA, Vice General Director of NFSA on 6th December 2016 but also highlighted in another meeting with Mr. Iurie USURELU, Deputy Minister at MoAFI in December 2016

As fodder is mainly purchased from neighbors at very competitive prices, the lack of silos constitutes an obstacle as not all the grains can be purchased immediately after harvest when prices are low. Usually, only Russian type silos are available, resulting in higher manipulation costs; not many metal silos are in place due to higher investment costs.

Public extension service is not available and 6-7 bigger farms have established a Pig Producer and Processor Association; every third month they hire a Danish veterinarian who acts as advisor as well; however, to increase the production of pork meat, public advisory services are necessary for the professional as well as semi-subsistence farmers.[36]

Poultry

Poultry records for Moldova are incomplete as poultry was not counted at the household level under the former system, a condition that has persisted until today. Therefore, only data from farms (i.e. agricultural enterprises) are available. In 1990, the total number of poultry almost reached 14 million, while 10 years later in 2000, only 1,233,000 were left. Since that time, the sector has recovered and by 2010 there were already 3,355,000 animals. In 2016, there were an estimated 4,036,300 animals.[37]

The booming poultry sector is most likely driven by financially-sound agricultural enterprises; the high capital intensity moves the poultry production towards investors that often show linkages to the feed industry.

The newcomers to the sector are focusing mainly on broiler chicken production which generates an estimated 47,000 tons of poultry meat annually.[38]Additionally, some 173,500,000 eggs[39] are produced annually in Moldova.

Fish

Fish farming is doing well; annual production reached officially 10,100 tons (2011).[40]According to Mr. Iurie Uşurelu, an acting Minister, fish production has actually reached 12,000 tons.[41]The increase in production is based partially on the exploitation of waters which were not intended for the use of fish culture; e.g. the JICA Study Team observed many areas of abandoned former orchards for which the irrigation of these orchards, simple lakes were built, often just by making a small dam to avoid run-off of water. These lakes can be rented and are usually used for fishing; from a legal standpoint, they can hardly be used for irrigation purposes.

Furthermore, production is becoming more professional through creation and use of the gene pool of highly productive breeds and lines – mainly carps. Specialized fish-breeding enterprises such as Aquaculture Moldova provide little fish for all categories of ponds.

Small-size fish farms produce around 20% of the total fish.

Milk

Milk production in Moldova is derived mainly from small farms and households. Milk

[36] Interview with Finn Mikkelsen, Regional Meat at MoAFI on 10 March 2017
[37] http://statbank.statistica.md
[38] MIEPO: Agriculture and Food Processing; Republic of Moldova; Edition 2016/2017
[39] NBS; http://www.statistica.md/pageview.php?l=en&idc=315&id=2281
[40] MoAFI et MIEPO: Agriculture and Agri-Food Industry of the Republic of Moldova; 2013
[41] Workshop at the Scientific and Practical Institute by Biotechnologies in Animal Husbandry and Veterinary Medicine, MD 6525, v. Maximovca on 07 April 2017

productivity varies by region but ranges between 1,260-4,252 liters per cow. According to statistics, the average in 2015 was 3,468 liters per cow,[42] but this estimate maybe too high. Bigger milk farms with 200 milk cows and over can reach 8,000-9,000 liters per cow/year.

The overall milk production at household level is declining; in 2011, the produced volume was 545 million tons; in 2012, 509 million tons; in 2013, 511 million tons; in 2014, 503; and finally, in 2015, 497 million tons. At the level of agricultural enterprise, production has been growing since a few years ago. In 2013, milk production reached 14.9 million tons; in 2014, 18.7 million tons; and in 2015, 21.7 million tons.[43] However, the overall reduction in milk production from 2014 to 2015 could not yet be fully compensated for by agricultural enterprises.

The milk from villages with household farms of 1-2 animals is collected by the processing enterprises through the milk-collection points, which count for about 611 points at the present moment. The bigger collection points are equipped with cooling tanks and the milk is basically checked for acidity and fat content; farmers are well educated and milk is not often rejected. The milk truck stops once a day to accept the milk brought from different farmers in small quantities. JLC, as the biggest dairy processor in Moldova runs 70 milk collection points to where the unpasteurized milk is delivered by villagers in plastic containers.[44]

On the other hand, it should be mentioned that the refrigeration of milk from the cow to the consumer needs to be greatly improved. All village collection points need to be provided with refrigeration capabilities, like those that currently exist at the larger centers. Also, the milk transports sector needs a major overhaul, highlighting the dire need for refrigerated milk trucks.[45]

Bigger farms with a few thousand liters per day are selling through contractual agreements to the bigger dairy plants that usually send a truck directly to the farm to collect the milk.

Milk from small ruminants

This milk is usually processed on farms. Sheep milk is used to make different types of cheese whereas goat milk is usually processed into fresh milk; due to the lack of processing plants, these milk processing activities are also farm-based.

Overall problems of the livestock sector

The dominance of backyard livestock operations is inadequate to meet total demand. In fact, domestic meat production has been even less responsive to demand than to the weather, a factor that determines the availability and price of animal feed. It is a widespread condition in former Soviet countries that many smallholders are largely dependent on purchased feed as their farms are too small or are not able to produce fodder.

Furthermore, entrepreneurial farmers are often confined by limited financial funds; therefore, they often have to look for agricultural activities that generate quicker returns on investments such as livestock production – which requires longer production cycles than cereals. Moldova lacks pastures to keep ruminants grazing in an extensive way and the remaining arable land is more profitably used for growing crops rather than fodder plants. The missing fodder crops again have a negative influence on crop rotations and further reduce the potential for animal husbandry – this is also an issue which has been identified in the National Strategy.

[42] http://www.statistica.md
[43] http://statbank.statistica.md/pxweb/pxweb/en/40%20Statistica%20economica/40%20Statistica%20economica__16%20AGR__AGR030/AGR030200.px/table/tableViewLayout1/?rxid=5360837a-13b5-4912-a2e0-12892e96d2ab
[44] http://www.jlc-group.com/en/view_post.php?id=1588
[45] MoAFI: Strategic priorities for the activities of the MoAFI of the Republic of Moldova in the years 2011 - 2015

Due to limited access to finance and an absence of substantial governmental support towards animal husbandry, crop production has ended up dominating the sector. In recent years, a propensity toward a poorly diversified structure of sown areas has emerged, whereby cereals and industrial crops now occupy more than 90% of the arable land area. The dominance of maize and sunflower in the structure of sown areas is mostly consistent across the country.

(4) Balance in Production and Consumption

For a better understanding of local consumption patterns, the table below was prepared comparing the volumes of local Production, Import, Usage, Export and others to achieve an overview of the Personal consumption per capita, kg per year[46].

The table below shows that the consumption per Moldovan head is covered in 2015 for leguminous crops, sunflowers, fruits (including berries and nuts), grapes, and eggs but not for vegetables and melons, milk (including butter) and meat (including by-products).

[46] It should be mentioned here again that the data are calculated on the basis of the official population which might be 1 million less in reality due to people working abroad or even persons already emigrated.

Table 2-10: Data Showing the Moldovan Export Potential 2013 - 2015

	Leguminous crops			*Sunflower*			*Potatoes*			*Vegetables and melons*			*Fruit (including berries and nuts)*			*Grapes*			*Milk (including butter)*			*Meat - total (including by-products)*			*Eggs - total, million*		
	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
Resources																											
Production	23.10	31.32	23.10	504.50	547.50	484.80	239.50	268.02	158.20	346.50	374.15	300.40	419.00	497.29	469.80	612.70	593.88	598.70	526.90	524.71	519.70	115.10	122.21	130.60	623.70	645.05	628.80
Import	0.30	0.58	0.80	0.30	2.80	4.30	33.40	37.00	44.80	47.20	60.34	60.70	61.40	60.99	54.20	17.30	15.20	13.10	96.30	86.45	79.30	50.60	40.00	25.30	13.60	11.42	21.30
Stock change	-4.70	-0.85	0.30	-75.10	-72.14	99.20	-5.30	-17.73	71.30	-11.20	-17.30	21.70	48.50	-20.30	3.80	-1.00	1.08	0.20	0.80	-9.20	8.50	0.60	0.38	-0.50	4.00	0.17	-0.20
Total resources	**18.70**	**31.05**	**24.20**	**429.70**	**478.15**	**588.20**	**267.60**	**287.30**	**274.30**	**382.50**	**417.19**	**382.40**	**528.90**	**537.98**	**527.80**	**629.00**	**610.17**	**611.90**	**624.00**	**601.96**	**607.60**	**166.30**	**162.00**	**155.30**	**641.30**	**656.64**	**649.90**
Applications																											
Export	0.00	0.02	3.30	275.10	247.50	365.70	0.90	7.51	8.00	44.00	22.26	29.00	376.00	295.45	288.30	38.30	52.16	45.90	16.70	20.83	27.30	1.40	7.15	3.60	5.10	3.93	38.60
Seeds	3.30	3.03	4.80	2.20	2.95	1.70	57.00	56.42	58.50	5.50	5.04	4.60	-	-	-	_	_	_	_	_	_				29.00	29.26	28.80
Feed	5.20	4.29	3.30	4.30	2.13	1.70	4.20	4.18	5.40	16.50	15.68	11.40	0.70	0.60	1.20	_	_	_	16.50	17.77	14.70	0.00	0.00	0.00	19.10	19.93	15.00
Processing for non-food purposes	0.00	0.00	0.00	139.20	213.42	210.40	0.00	0.00	0.00	0.00	0.00	0.00	28.70	34.40	32.10	561.90	529.40	539.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Losses	1.00	0.77	1.10	3.60	6.81	3.40	18.10	11.27	12.30	10.70	11.95	9.20	4.40	5.81	5.20	6.00	5.81	6.00	0.00	0.06	0.00	0.60	0.65	0.70	1.00	1.62	0.60
Personal consumption of the population	9.20	22.94	11.80	5.30	5.33	5.30	187.40	207.92	190.10	305.80	362.27	328.40	124.80	201.72	201.00	22.80	22.80	20.50	590.80	563.30	565.60	164.30	154.00	151.00	587.10	601.90	566.90
Total uses	**18.70**	**31.05**	**24.20**	**429.70**	**478.15**	**588.20**	**267.60**	**287.30**	**274.30**	**382.50**	**417.19**	**382.40**	**528.90**	**537.98**	**527.80**	**629.00**	**610.17**	**611.90**	**624.00**	**601.96**	**607.60**	**166.30**	**162.00**	**155.30**	**641.30**	**656.64**	**649.90**
Self-supplying level,%	123.53	100.95	110.40	326.33	237.37	217.89	89.80	95.79	59.41	102.36	94.74	84.90	264.19	205.04	196.16	103.72	106.43	105.78	86.76	90.29	89.56	69.80	79.02	86.09	98.04	98.83	102.86
Exportpotential = EP	**EP**	**EP**	**EP**	**EP**	**EP**	**EP**				**EP**			**EP**	**EP**	**EP**	**EP**	**EP**	**EP**									**EP**

All prducts in thousands of tons, except eggs which are counted in millions.

(5) Trade Balance of Primary Products

For a better understanding of local consumption patterns, the table below was prepared comparing the value of the agri-food exports with their corresponding import values. In respect to live animals and animal products, the number of imports is much higher than that of exports because Moldova has substantial deficits in livestock farming. This is due to a shortfall in capital to invest in longer cattle-livestock production cycles. Fast moving products like chicken and pigs reveal a different picture. The sub-category, "vegetable products – including edible fruits and nuts" shows that exports in this field exceed imports. Also, the next sub-category, animal or vegetable fats and oils reveal greater production rates than consumption and therefore a positive export balance. Finally, prepared foodstuffs are exported at a greater rate than imports by a narrow margin.

It should be noted that Moldova is not currently entitled to export products of animal origin to the EU due to not-fulfilling the food safety standards with the two exceptions of honey and Moldovan caviar[47].

[47] Factsheet on EU-Moldova DCFTA benefits in 2015 - Trade Websites; http://trade.ec.europa.eu/

Table 2-11: Comparison of Export- and Import Data for Agri-Food Sector

	Export in USD (thousands)			% Ø 2014/15 increase versus 2006	Import in USD (thousands)			% Ø 2014/15 increase versus 2006	% Ø 2014/15 import versus export
	2006	2014	2015		2006	2014	2015		
I. Live animals; animal products	16,227	59,733	37,511	300	51,931	158,760	99,938	249	266
01. Live animals	3,869	6,416	10,131	214	1,359	17,174	8,207	934	153
02.Meat and edible meat offal	1,833	35,297	8,885	1,205	19,314	54,250	26,146	208	182
03.Fish and crustaceans, mollusks and other aquatic invertebrates	134	8	94	38	15,373	41,223	29,252	229	68,622
04.Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	10,375	17,893	18,107	173	15,146	41,828	32,470	245	206
05.Products of animal origin, not elsewhere specified or included	15	118	293	1,334	739	4,285	3,863	551	1,983
II. Vegetable products	136,465	549,667	501,701	385	72,757	195,402	194,167	268	37
06.Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	677	1,170	1,684	211	6,469	11,733	12,372	186	844
07.Edible vegetables and certain roots and tubers	5,695	15,047	9,183	213	10,468	30,021	25,528	265	229
08.Edible fruit and nuts; peel of citrus fruit or melons	64,581	194,013	194,659	301	20,482	65,537	74,602	342	36
09.Coffee, tea, mate and spices	549	511	1,506	184	5,012	12,615	12,504	251	1,245
10.Cereals	42,012	181,243	113,860	351	4,001	15,632	14,048	371	10
11.Products of the milling industry; malt; starches; inulin; wheat gluten	259	2,562	1,677	820	14,645	30,263	23,360	183	1,265
12.Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	22,645	154,210	178,182	734	9,233	27,719	30,625	316	18
13.Lac; gums, resins and vegetable saps and extracts	2	2	74	2,021	2,371	1,865	1,107	63	3,869

	Export in USD (thousands)			% Ø 2014/15 increase versus 2006	Import in USD (thousands)			% Ø 2014/15 increase versus 2006	% Ø 2014/15 import versus export
	2006	2014	2015		2006	2014	2015		
14.Vegetable plaiting materials; vegetable products not elsewhere specified or included	45	908	876	1,965	75	17	21	25	2
III. Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	34,857	77,523	72,012	214	11,131	25,579	20,289	206	31
15.Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	34,857	77,523	72,012	214	11,131	25,579	20,289	206	31
IV. Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	275,743	378,429	303,265	124	179,794	339,585	272,182	170	90
16.Preparations of meat, of fish or of crustaceans, mollusks or other aquatic invertebrates	1,591	288	12	9	11,845	13,067	10,697	100	7916
17.Sugars and sugar confectionery	19,112	55,770	38,521	247	4,687	17,500	13,063	326	32
18.Cocoa and cocoa preparations	1,623	6,188	5,488	360	13,430	23,333	19,769	160	369
19.Preparations of cereals, flour, starch or milk; pastrycooks' products	3,101	17,207	13,395	493	14,704	44,802	33,121	265	255
20.Preparations of vegetables, fruit, nuts or other parts of plants	42,321	59,665	49,883	129	14,473	21,793	16,823	133	35
21.Miscellaneous edible preparations	2,573	7,766	7,501	297	23,531	71,541	53,359	265	818
22.Beverages, spirits and vinegar	186,612	193,736	160,017	95	42,388	57,799	40,012	115	28
23.Residues and waste from the food industry; prepared animal fodder	8,642	21,111	15,771	213	6,930	29,539	25,673	398	150
24.Tobacco and manufactured tobacco substitutes	10,170	16,697	12,677	144	47,806	60,211	59,666	125	408
Total	463,293	1,065,351	914,489		315,612	719,326	586,576		

Source: NBS

Looking at the trade balance table above, one can see a surplus concerning the agri-food products of around USD 328 million in 2015.

In general, the EU – the Association Agreement with the EU was signed by Moldova in June 2014 - is Moldova's most important trade partner.[48]Around 62% of the country's exports are sent to the EU, followed by Russia (12%) and Belarus (6.7%). The total trade volume with the EU is negative; in 2015, exports from Moldova to the EU reached EUR 1,223 million and imports EUR 2,087 million - resulting in an overall trade deficit of EUR 864 million. This figure may seem deceptively high but compared to previous years where trade deficit reached a maximum of 1,317 million (2013) the situation looked likely to improve. Most likely the reduced imports are linked to the financial crisis around the Banca de Economii Moldova (BEM) which became public in late 2014.

In addition, by virtue of EU's trade preferences (Deep and Comprehensive Free Trade Area, DCFTA); there has been an increase in mutual trade between the EU countries and the Republic of Moldova[49]. Although the trade data show more advantages for EU exports to Moldova than the other way around.

Key EU exports include: machinery and appliances, mineral products, transport equipment and chemical products. Whereas key EU imports from Moldova are focused primarily on agricultural products and beverages, textiles and textile articles, machinery and appliances.

In 2015, Moldova's total worldwide trade balance was negative as imports reached EUR 4,513 million. In the same period, exports amounted only to EUR 1,897 million - the result was an overall trade deficit of EUR 2,616. The annual trade deficit grew steadily over the last decade with very few exceptions and is cause for serious concern.

Table 2-12: Top EU Agri-Food Imports from Moldova in 2016

Product	**EUR million**	**%**
Oilseeds, others than soybean (i.e. sunflowers)	95	19
Wheat	76	15
Tropical fruits, fresh and dried, nuts, spices	62	12
Cereals, others than wheat and rice	44	9
Vegetable oils, others than palm and olive oils	37	7
Beet and cane sugar	36	7
Remaining agri-food products	148	30
Total	*498*	*100*

Source: European Commission, Directorate-General for Agriculture and Rural Development: AGRI-FOOD TRADE STATISTICAL FACTSHEET; EU – Moldova, February 2017

Constraints on agri-food trade keep tensions high with regards to Ukraine, numerous Russian trade restrictions, the missing access for products of animal origin to the EU and especially the limited value adding processes in Moldova which could achieve higher export values.

The top 5 export products from Moldova are fruits and vegetables (F&V) with 12.8% of the overall exported goods, followed by machinery and electrical equipment with 11.9%, textiles with 11.2%, oilseeds with 10.9% and cereals with 7.4%[50].

[48] European Commission: EU, Trade in goods with Moldova; 2016. See also http://ec.europa.eu/trade/policy/countries-and-regions/countries/moldova/

[49] FAO: Agricultural trade policies in the post-Soviet countries 2014/15. A summary. 2016

[50] http://wko.at/statistik/laenderprofile/lp-moldawien.pdf (2017 update)

When looking at famous wine from Moldova, the EU imported in 2014 wine for only EUR 23.1 million and in 2015 for EUR 28.1 million;[51] both figures are quite modest.

With respect to the above-mentioned table, the following product groups would fit well for increased efforts to reduce the trade deficit:

- 03.Fish and crustaceans, mollusks and other aquatic invertebrates
- 11.Products of the milling industry; malt; starches; inulin; wheat gluten

The product group below shows very competitive products as for these, the trade balance is positive:

- II. Vegetable products
- III. Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes

Table 2-13: Exports of Animal and Vegetable Products from Moldova

Exports of Animal Products in 2015	
	USD (thousands)
Russian Federation	5.795
Syria	5.607
Iraq	5.282
Kazakhstan	4.655
Egypt	2.539
Italy	2.127
Germany	1.723
France	1.402
Slovakia	1.361
Belarus	1.047
Exports of Vegetable Products in 2015	
	USD (thousands)
Romania	95.175
United Kingdom	81.928
Belarus	70.652
Italy	56.417
France	35.797
Turkey	28.120
Switzerland	19.125
Russian Federation	18.855
Greece	18.433

Source: http://wits.worldbank.org/CountryProfile/en/Country/MDA/Year/2015/TradeFlow/

Trade policy is often unpredictable, especially when dealing with Russia. As a consequence of the Russian bans on imports of agricultural goods from Moldova in 2014 and 2015, direct compensatory payments were disbursed by the government to Moldovan farmers, which, due to a limited state budget, were partially paid through September 2015. Although Moldovan farmers suffered from the loss of access to the Russian market, the Russian ban on Moldova's pork imports affected consumers in Moldova as it resulted in decreased domestic pork prices, which resulted in a reduction in supply of more expensive pork from Brazil.

[51] https://ec.europa.eu/agriculture/sites/agriculture/files/wine/statistics/extra-eu-trade_fr.pdf

Summary

Moldova is making use of its agricultural export potential, especially when it comes to cereals, sunflowers, fruits, vegetables and sugar. Due to poorly developed food safety institutions, an export of products of animal origin to the EU Member States is not yet feasible. The limited options for meat exports have caused sellers to set their sight on Russia and other CIS countries; living animals from Moldova are exported to Africa too.

The gap between local milk and meat production is large and production cannot match demand; within agricultural crops like cereals, sunflowers, F&V and others, the production is higher than demand and as such they are exported, often to the EU.

2.2.2 Outline of Agri-food Processing Industry

In 2011, there were 1,342 enterprises in the agri-food sector which employed 26,700 persons. The number of enterprises since decreased to 1,259 in 2013 and no data regarding employment have been published since. Assuming a linear decrease in employment, then there should have been 25,180 persons employed in 2013; however these data are weak as usually only 5% of employees in agri-food are permanent employees, an overwhelming majority is temporary or seasonal workers, employed primarily during harvest season.

The large-scale food processing industry which originated from the centrally planned state economy is characterized by underutilization of its capacities and insufficient investment. High levels of moral and physical depreciation of the industrial capacities and infrastructure is typical for local food processing companies. In general, processing equipment and technologies are not energy efficient [52] and do not meet modern standards. [53] Many enterprises lack modern management practices and the necessary investments and working capital.

The lack of financial resources has led to inadequate compensation and has further contributed to the outward flow of skilled labor. Also missing is working capital which constitutes a major threat as agricultural raw materials must be purchased on a cash-against-goods basis which renders processors unable to procure all the necessary raw materials due to financial limitations. It seems to be much easier to obtain credit for investments into machines and buildings than for working capital; i.e. to procure raw materials.

The lack of horizontal and vertical coordination of supply chains has placed constraints on the growth of the agri-food industry. This has resulted in low levels of international competitiveness for the agri-food sector overall.

There are additional depressing factors which are driving down prices of agricultural products. These include: poor development of wholesale markets, low bargaining power, inconsistent product quality, insufficient distribution channels, poor infrastructure and limited access to foreign markets. Value chain deficiencies lead to large discrepancies between the farm gate price and the consumer price, which in turn results in low-income, low investment and persistently low-quality products at the farm level.

Having illustrated the current state of the business conditions endured by farmers and producers, this chapter endeavors to describe the corresponding agribusiness industry sub-sectors.

Milling Industry

There were 241 mills and 278 bakeries operating in Moldova in 2013. Producers concentrated

[52] Positive exceptions are e.g. T.B.Fruits and Floarea Soarelui SA
[53] National Institute for Economic Research / AGRICISTRADE: Country Report -Republic of Moldova; March 2015

around the large bread-baking plants that have a market share of about 65%. the group consisting of small and medium scale bakeries has a market share of about 35%. As main leaders in this sector can be mentioned "Franzeluta" SA located in the capital city, the bread baking factory from Balti in the North region and the bread baking factory "Cahul Pan" SA in the South[54].

Despite a substantial surplus in cereals, not all types of cereals are grown; e.g. the durum wheat which is required by the bakery industry (also for biscuits) has to be imported due to insufficient supply; obviously a quality payment scheme does not exist for it as it has not incentivized potential producers.

Interestingly, and also typical to the entire food processing sector is that the biggest bakery Franzeluta which is purchasing its flour from different mills in Moldova is now planning a EUR 4 million investment in its own milling capacities – to reduce dependency and increase its margin, as the bakery business is characterized by severe competition.

Like slaughterhouses, mills are either purchasing cereals, which they mill themselves and subsequently sell the flour or are offering milling services for an average of MDL 600 per ton.

Exports of flour are not the norm but exist in a limited range towards Romania and Cyprus.

Processing Industry of F&V

According to Moldovan Investment and Export Promotion Organization (MIEPO), the agricultural sector contributed around 12% to Moldova's Gross Domestic Product[55]with the agri-food industry contributing another 4%.

During the Soviet era, the fruit and vegetable processing industry–including dried fruits and herbs but excluding wineries - was of great importance and was comprised of around 30 large companies. Of these 30 companies, only 6 of them have survived but they are currently running below their installed capacity. Moldova faces similar issues to those of many comparable, former communist regime countries; the transformation to the market economy in agriculture was characterized by a lack of trust in the absence of the formerly established systems. Each seller of agricultural produce began demanding cash payments, i.e. payment against delivery. In the past, a state farm often was forced to wait six months to receive payment from the food industry which was considered standard practice by the former government. The free market economy introduced broad, sweeping changes and consequently F&V for the processing industry as well as sugar beets production suffered harsh cut-downs in cultivated areas.

Most F&V canning companies did not have sufficient funding to guarantee payments to farmers, which caused them to move away from growing F&V for the processing industry. This move played a large role in reducing the 30 big processing companies to the few remaining in operation.

The declining livestock sector reduced the production of fodder plants and also diminished the crop rotation patterns. Subsequently the F&V production was also negatively affected which caused supply issues for the F&V canning industry in sourcing raw materials.

Anecdotal evidence suggests that 20% of the installed capacities within the F&V processing industry are being utilized effectively. Most of the larger processing companies are equipped with modern equipment imported from the EU.

[54] National Institute for Economic Research / AGRICISTRADE: Country Report -Republic of Moldova; March 2015
[55] MIEPO: Agriculture and Food Processing; Republic of Moldova; Edition 2016/2017

The agro-food industry in Moldova is export-oriented and is composed of the following sub-sectors:

Canning Industry

This industry produces a wide range of products such as fruit juices, canned vegetables, jams, baby food and other preserves as well as a number of B2B products such as apple juice concentrate, fruit purees, and plum and tomato paste. The figures in the table above illustrate the fast decline of the canning industry.

Table 2-14: Canned Vegetables and Fruits

Unit: tons

Year	2010	2011	2012	2013	2014	2015
Canned vegetables and fruits, tons	1,500	1,300	1,500	900	700	500

Source: NBS

The bigger processors include: Orhei-Vit, Alfa-Nistru, Natur-Vit, Natur Bravo (with a factory in Edinet), Rozmiar, Cosnita, and Floresti who account for the bulk of apple juice, preserved cucumber, canned peas, juice and whole tomato exports. Their product ranges are diverse: natural juices (clarified and with pulp), nectars and fruit. More than 90% of production is destined for export.

For farmers, this kind of industry is not attractive as T.B.Fruit does not offer good prices unlike the fresh market; therefore, only the fruit of poor quality and surpluses are sold to the processors. On the other hand, it comprises an additional market outlet.

One of the reasons that the company produces in Moldova lies in the trade agreement with their preferred status, Moldova faces better export conditions than Ukraine where the production costs are cheaper; this is especially relevant for sugar and apple juice concentrates.

Table 2-15: Canned Vegetables and Fruits

Tons (thousands)

	2008	2009	2010	2011	2012	2013	2014	2015
Canned vegetables and fruits	41.9	26.5	29.9	26.3	24.3	25.1	30.4	15.7

Source: NBS; www.statistica.md/public/files/publicatii_electronice/Anuar_Statistic/2016/14_Industrie.pdf

Drying Industry

At present, this sector processes about 20,000-23,000 tons of fresh fruit such as plums, apples, sweet and sour cherries, apricots, pears and some vegetables. Most of the dried fruit exports are destined for the Western markets such as Germany, Poland, Slovakia, Lithuania, Latvia and the Czech Republic.

The drying of fresh fruits is usually done by small farmers on a cottage industry and not by large commercial companies.

Freezing Industry

There are several IQF freezing facilities – Ecoprod Rosmol, Alfa Nistru and Natur Bravo. The companies produce a wide range of frozen vegetables such as tomatoes, potatoes, sweet pepper, zucchini, eggplants, onion, carrot, broccoli, green peas, sweet corn, corn on the cob; a variety of

vegetable mixes for soups, salads and other dishes; as well as fruits – plums, cherries, strawberry, currants, melons, etc.

Vineries

Bearing in mind that Moldova has 128,800 ha of fruit bearing vineyards, not all the fruits grown there are used for commercial wine production. Around one-third or 40,000 ha are vineyards planted in villages around the homestead which are used to make home-made wine, or "vin de casa". This wine is only consumed in Moldova and most likely satisfies the entire domestic market. Of course, some Moldovan bottled wine is also sold locally, but not in large volumes. The remaining 88,000 ha are available for export.

MIEPO writes that the raw material increased to the level of 500,000 tons and approximately 250 million liters of wine. Most likely a large proportion of grapes goes into distilled alcohol and other spirits.

Travelling through the country, one can see many old and poorly-maintained vineyards situated next to large-scale brand-new plantations.

Currently there is a boom of boutique wineries that cultivate between 30 and 100 ha, while there are still many large-scale plantations with thousands of ha available. Whereas the boutique wineries like Purcari, Fautor, MiMi, Et Cetera, Gitana, Equinox and others try to produce quality wine in well-designed bottles, the big wineries still export substantial quantities in bulk for which the quality is rather low.
Moldova's wine production is focused on white wine with 70%. The cultivated varieties are with 70% mainly European varieties and the rest is equally of local and Caucasian origin.

The existing varieties are Cabernet Sauvignon, Pinot Noir, Merlot, Carmenere, Plavai, Galbena, Zghiharda, Batuta Neagra, Feteasca Alba, Feteasca Neagra, Tamaioasa, Cabasia, Rara Neagra, and many others.

As mentioned earlier, the produced wine in total has been decreasing by quantity but some quality-oriented winemakers are able to achieve higher prices for their boutique wines. Reasonable wine is available in shops in Chisinau starting from USD 6 per bottle and has a relatively good price-value. However Moldovan wines for USD 15 – 20 per bottle in European wine-shops face severe worldwide competition.

Table 2-16: Grapes Harvested

Tons (thousands)

	2008	2009	2010	2011	2012	2013	2014	2015
Grapes	635.5	685.1	481.6	594.8	505.9	612.7	593.9	598.7
of which, table grapes	65.6	74.2	45.5	86.2	70.2	87	94.4	84.7

Source: NBS

Moldova’s wine industry is important. 86% of all grapes are technical varieties for wine-making and the remaining 14% are marketed for consumption as table grapes. The processing from grapes to wine is done by around 100 bigger wineries. The most prominent wineries include Acorex, Chateau Vartely, Cricova Winery, 'DK-Inter trade', Dionysos-Mereni, Lion-Gri, Milestii Mici and others. Around one-quarter of all wine companies own their own plantations.

In addition, there were 18 factories producing, maturing and bottling distillates. The grapes which supply this industry are grown by about 70,000 individuals, mostly smallholder farmers.[56]

The existing wine production companies have a wine grape processing capacity of 1 million tons and storage of wines over 800 million liters. Over 80% of companies processing grapes are equipped with modern machinery and technology. Secondary wine units have been reassembled almost entirely with modern bottling lines. The volume of grape processing and wine production from raw materials increased to the level of 500,000 tons and approximately 250 million liters of wine. Progress on exports depends on the markets. Total exports in 2015 amounted to approximately USD 160 million, mainly because of lower exports to Russia. 60% of the total amount of exported wine went to CIS countries, accounting for a value of approximately USD 65 million.[57]

A positive outcome from the Russian trade restrictions is that wine makers are slowly re-orienting themselves towards improving quality, especially among newcomers; and also, (albeit involuntarily) moving towards the more competitive Western markets.

Sugar Industry

During the Soviet era there were up to 16 sugar plants operating in Moldova. Today that number has fallen to just two and both are western joint ventures: JSC Südzucker Moldova (70% market share) operates the sugar factories in Drochia and Falesti and has a packaging plant in Alexandreni, the second player is JV Magt Vest Ltd, a Polish joint venture with the former Marr Sugar Moldova LTD (30% market share) that owns the sugar factories in Cupcini and Glodeni. Despite closing several sugar plants and several reorganizations, the sugar industry is still struggling.
The sugar beets are grown almost exclusively in the northern part of the country which is mainly attributable to better water supply in that area. For that reason, the sugar mills have also been established there.

By area, JSC Südzucker Moldova manages 15,000 ha of sugar beets; out of which around 3,000 ha are cultivated by Südzucker itself to guarantee the raw material supply for the sugar plants that operate 100 days a year. JV Magt Vest Ltd. cultivates around 7,000 ha.

The sound financing of international companies like Südzucker could re-establish sugar beet production in Moldova; often farmers have limited working capital and cannot accept long term payment goals; however in case of Südzucker who offer up to 40% upfront payments to farmers for seeds and seeding activities, liquidity for farms seems to be solved and sugar beets could be grown more frequent – at least from financial point of views.

In summary, products that have a long production cycle or need a lot of upfront investments are handicapped even if they would be profitable.

Moldova has an annual EU sugar quota of 35,000 tons that achieves better prices in the EU market; total annual production is around 100,000 tons and local consumption requires around 70,000 tons. If there is a production shortage, Moldova imports sugar from Russia in order to fulfill its quota. No other export activities are planned.

A multi-national company like Südzucker may give Moldova some special attention as the country (which is not a member of the EU) is not affected by certain political restrictions such as the trade embargo to Russia.

[56] MIEPO: Agriculture and Food Processing; Republic of Moldova; 2015
[57] MIEPO: Agriculture and Food Processing; Republic of Moldova; Edition 2016/2017

The necessary seeds are supplied by KWS, Syngenta, Vanderhaven, Stubbe, and others. The original testing procedure could be reduced from 3 to 1 year when the product comes from an EU Member State. This reduced testing period is not applicable for other seeds besides sugar beets.

Oilseeds (sun-flower, soy and rape) industry

Floarea Soarelui SA (part of the Trans Oil Group) is the only producer and exporter of soft oils and meal in Moldova. The group runs two crushing plants with a total throughput of 1,500 metric tons of oil seeds per day, one in Balti and a smaller one in the South Eastern area of Ceadir-Lunga. Floarea Soarelui SA has the annual capacity to process 220,000 tons of sunflower seeds. Last year 150,000 tons of sunflower oil were produced, and this year (Sept 2016 – August 2017) 120,000 tons are expected. The harvesting season is from August until November.

85% of the produced oils are exported to over 25 countries such as Iraq, China, Emirates, Bulgaria, Georgia and others; 15% are sold in Moldova. Export is mainly done in bulk, and only 30% are exported already in the final consumer packaging. Oil cake is a by-product of the production process and 10% of the produced oil cakes are marketed locally for fodder purposes while the rest goes to Turkey, Italy, Spain, and Egypt among others.

70% raw material procurement comes farmers, 20% from traders and around 10% from own farming activities.[58]

Trade margins for exporters are reported to be around USD 5 per ton without much risk; a typical trader makes around USD 150,000 (equivalent to 30,000 tons exported sunflower seeds). Ukraine is looking for more raw materials as Ukrainian exporters are getting special support.

Processing of Walnuts

According to the International Trade Center in Geneva, Moldova is one of the largest exporters of walnuts to Europe, after the USA, Mexico, and China. Walnuts are grown on 25,000 ha in Moldova. According to the Director of the Union of Nuts Producers Associations of Moldova, Constantine Gazhima, walnut production can become a major sector of agriculture in Moldova.[59]

The process is rather simple; after receiving and pre-cleaning, the real processing starts with drying, shelling, electronic/hand sorting and finally packaging. When breaking the shells, some chemicals are released which cause lung damage after one hour of exposure; for this reason, machine processing is more appropriate.

Around 30,000 – 37,500 tons are harvested from around 20,000 ha of walnut orchards and alleys. The entire nuts production is exported to 40 countries. Furthermore, Moldova is also processing foreign walnuts, imported from France, for example.

To enter the export business, Moldova requires some licenses and therein the problems seem to begin. According to anecdotal evidence, three main exporters dominate the market while recently, smaller exporters have been sent back by Moldovan border inspection due to missing documents.

One of the required quality certificates is issued by NFSA; the costs are MDL 3,000 (USD 150) per certificate which takes two weeks to obtain.

Niche product dried fruits

The Moldovan dried fruit sector consists of a few large and medium companies and many small

[58] Meeting with Mrs. Stella OSTROVETSKI, General Manager of Floarea Soarelui SA on 23rd March 2017
[59] https://madein.md/en/news/economy/walnuts-production-can-become-a-major-sector-of-agriculture-in-moldova

enterprises. Over the past few years, Moldova produced 2,000-3,500 tons of dried fruit per year. These yields were dependent upon growing conditions for the raw material. Export levels usually represent about 70% of production, with the EU absorbing about 80% of exports. CIS countries, primarily Russia, Belarus and Ukraine account for the remaining 20%.

Important processors and exporters in dried fruits are: Monicol, a processor and exporter of dried fruit and walnut kernels, and VM Plumcom, another processor and exporter of dried fruits.

Milk / Dairy Industry

As the 128,000 milking cows in Moldova are spread over more than 50,000 households, the logistics are challenging the dairy industry. The leading milk companies in Moldova have established milk-collection points all over the country; currently there are 611 collection points equipped with cooling tanks. Milk is collected on a daily basis and transported to the processing companies, often located 160 km and more away. Some of the milk producers have formed milk collection cooperatives to maintain economic viability. One of the biggest cooperatives is located in the Rezina region and involves 410 members.

The current milk price at farm gate is about MDL 6/kg (3.2% protein &3.5% fat content). Despite large efforts to collect the milk and process it at dairy companies, only 25% of Moldova's milk is processed; [60]the rest is used on farms and sold in grey market channels, bypassing all veterinary and food safety control mechanisms. The reason is not the lack of legislation but its inability to be enforced. According to a recent working paper prepared by UNIDO and MoAFI, Moldovan farmers produce 520,000 tons per year, equivalent to 1,425 tons per day. With 128,000 milking cows, the daily production would amount to 11.1 liter/cow/day.

According to MIEPO, as quoted above, only 25% of this amount reaches the registered dairy plants amounting to 356,000 liters per day for all the dairy plants. In case one were to be established, considering modern Western processing plants have a daily capacity of 200,000 liters, two plants would be sufficient for Moldova.

Under the Soviet system around 30 years ago, the country had 3 times as many milking cows as it does today which largely explains the surplus in processing capacities. The milk processing is undertaken in Moldova by 12 companies, out of whom, four dairy companies control around 80% of the market. These companies are: JLC, Lactalis (Lactalis Group and Lactalis North), Incomplac and LapMol.[61]

In 2015, the Moldovan dairy companies produced about 111,000 tons of dairy products, 40,000 of them being milk and sour cream, 32,000 tons milk products, 4,000 tons butter, 16,000 tons ice cream, 11,000 tons cheese (but only three manufacture higher value products like hard-cheese) and 17,000 tons of other dairy products.[62]

Due to shortages in milk supply, the larger dairy processing companies are using just 50% of their capacity. The local milk supply does not satisfy the market demand and processed products are still being imported. According to the WB, 1/3 of locally consumed milk has to be imported.[63]On

[60] MIEPO: Agriculture and Food Processing; Republic of Moldova; Edition 2016/2017

[61] http://www.east-invest.eu/en/investment-promotion/Moldova-2/MD-Agribusiness; Lactalis (France), the largest dairy enterprise in the world, has two dairy plants in Moldova where it produces under the President and Alba brands. It invested EUR 17 million in 2010 to expand its activities and develop its cheese and feta cheese exports.

[62] http://en.publika.md/moldova-to-supply-milk-and-dairy-products-on-eu-markets-in-2018_2631274.html; this is especially valid for modern large scale milk farms

[63] See also: The WB - Moldova Trade Study Note 3, Competitiveness in Moldova's Agricultural Sector; 2016

top of official imports, anecdotal evidence says that substantial volumes of milk are smuggled into Moldova via Transnistria and Ukraine.

Dairy manufacturers in Moldova are facing severe competition from cheap imports, primarily from the Ukraine. Ukrainian dairy farms have cheaper raw materials available and the production costs for milk with a fat content of 3.5% are only EUR 0.19 per liter with a tendency to decrease, while in Moldova it stands at EUR 0.29, according to Lapte's Executive Director, Carolina Lint.[64]The Ukraine produced substantially more milk than necessary for local consumption and in the past, the main purchaser of Ukrainian dairy products used to be Russia. Due to the ban since July 2014, Ukrainian producers are searching for alternative markets such as Moldova. On top of the severe competition faced by the Moldovan dairy industry, there are a number of permanent problems, including expensive loans and the lack of comprehensive programs for industry development. The dairy product industry accounts for 5% of the entire food processing industry and 12% of the food product and beverage industry.

Summary

There are several serious reasons to encourage milk production in Moldova such as providing support to smaller farmers (starting with 60 cows), food security, diversification of agricultural production (crop rotation) and job creation, but also educational reasons, as veterinary students from university and agricultural student from colleges do not have practical experience due to the lack of training facilities and the same could be said about the extension service providers.

The challenges to improve the performance of the milk farms are how to attract investors and to replicate successful milk farm models all over Moldova. The currently missing fodder and soil testing laboratories would support involved farmers substantially.

Meat processing industry including slaughterhouses

Between 1995 and 2010, cattle livestock decreased by 56%, pig production by 45%, and sheep and goats by 35%. The fall in livestock numbers was the consequence of inefficient restructuring of large animal and bird farms and also the consequence of a lack of investment funds. During the last few years, this trend has slowed down and even partly reversed. Livestock production in Moldova is very sensitive to climate changes, mainly caused by a lack or shortage of fodder brought on by droughts.

Table 2-17: Meat Production by All Categories; thousand Tons

	2008	2009	2010	2011	2012	2013	2014	2015
Meat (in slaughter weight)	**78.3**	**90.8**	**110.9**	**117.9**	**115.7**	**115.1**	**122.2**	**130.6**
of which:								
beef and veal	10.6	11.1	10.2	9.7	9.5	8.3	8.2	8.4
pork	35.1	42.2	56.9	63.9	64.5	61.1	64.6	71.9
mutton	2.2	2.2	2.1	2.1	2.1	2.0	1.9	1.9
poultry	29.6	34.5	40.9	41.4	38.8	42.9	46.7	44.1

Source: NBS 16.3.7.

The table above shows that in 2015, the average annual meat consumption per capita was 52 kg, assuming that 2.5 million people lived in Moldova. Furthermore, the table demonstrates that beef and sheep are not well represented in the daily diet. The WB stated that local operations can satisfy only 30-32% of the demand for beef, indicating that two thirds of the locally consumed meat has to be imported[65]. Other sources show better figures saying that in 2014, Moldova produced around

[64] http://www.dairyglobal.net/Articles/General/2016/1/Moldova-Dairy-farmers-are-losing-the-battle-2734928W/
[65] See also: The WB - Moldova Trade Study Note 3, Competitiveness in Moldova's Agricultural Sector; 2016

200,000 tons of meat out of which 65,000 tons were poultry[66].

The MoAFI concept paper about the revitalization of the cattle, sheep, and goats sector for meat and milk provides data about de facto meat production, providing data on animals' live weight. Taking this as a baseline, applying international carcass yield percentages and assuming that an average cow has a live weight of 500 kg and an average sheep a weight of 50 kg, the following results of slaughtered animals have been calculated:

Table 2-18: Overall Meat Production

	Percentage carcass yield	Tons live weight	Tons meat	Number of animals
Beef	53	21,500	11,395	43,000
Sheep	45	6,100	2,745	122,000

Source: JICA Survey Team's own calculation based on data provided by MoAFI

The conclusion from the table above would be that the local beef consumption – based on local beef – is less than 5 kg per capita. Moldova lacks sufficient animals for meat production but has around 160 slaughterhouses; the vast majority is dedicated to pigs and ruminants with around 30 for poultry. Most of them are outdated as these slaughter facilities are large industrial complexes constructed during the Soviet regime. The heaviest concentration of facilities is located in the central part of the country, near the Chisinau district.[67] These slaughterhouses are usually equipped with outdated technology and not be able to qualify for EU standards without substantial investments. By being limited to the local market they will eventually be closed. Just a few of them, for example, a recently established new chicken/poultry slaughterhouse will be able to fulfill EU requirements.

Moldova imports approximately 60%of its consumption of beef products as only 40% are coming from domestic production. Pork is the most important type of meat produced in Moldova and the country is more or less self-sufficient in that regard; the demand for pork meat is high as it is much more affordable than beef. The poultry industry is also considered to be self-sufficient.

As to different sources, Moldova does not produce sufficient quantities of meat for local consumption, it has to import meat and meat products to fill the gaps in supply. It is also likely that in the meat sector, the business environment is not well developed as there seems to be an exclusive import licensing scheme in place; therefore Moldovan households consume less meat than would be expected for the country's level of income, but pay at least 35% more for meat than consumers in neighboring countries.[68] The legal base for this rather monopolistic import structure stems from the application of a 2006 Government Decision (No. 1363) that in effect assigns considerable market power to selected importers and has led to higher prices.[69]

For the agricultural sector, this should not cause any disadvantages as local meat production is not sufficient and due to higher prices for imported meat, the farming sector can – at least in theory - benefit from higher local prices. The imported meat comes mainly from Brazil, Argentina, Netherlands, Germany and Ukraine. Ukrainian pork imports were halted in 2016 due to an outbreak of swine flu.

[66] http://www.globalmeatnews.com/Industry-Markets/Moldova-increases-meat-production
[67] ERNST, U.F.W. et NEEL, S.: Business environment impacts on competitiveness: Moldova's meat value network; July 2009
[68] ERNST, U.F.W. et NEEL, S.: Business environment impacts on competitiveness: Moldova's meat value network; July 2009
[69] ERNST, U.F.W. et NEEL, S.: Business environment impacts on competitiveness: Moldova's meat value network; July 2009

Moldova has around 70 meat processing companies; the top companies are the following, given their estimated market share as percentage of the total market:

- Rogop 17%
- Pegas Ltd 12% (plus two own pig farms)
- SA Basarabia Nord, 10-11%
- FARM MEAT PROCESSING S.R.L. 9%
- SRL Nivalli5-7%
- Aviselect SRL 5-7%

In the past, Moldova exported beef, pork and sheep and goats. Since a few years ago and as a result of armed conflicts in the Middle East, lamb exports from Moldova to Syria, Libya, Iraq and Yemen have dried up. During field visits, few farms have been found that are buying semi-finished bulls for final fattening in a kind of feedlot. Exports of bulls are taking place but only unlimited numbers; destinations are Arab countries like Egypt and Sudan.[70]

Whereas exports are not important, imports of meat – often in deep frozen form – are very relevant also because the meat processing companies require uniform pieces of meat which local farmers cannot deliver.

Summary

The meat sector in Moldova is non-transparent also due to the lack of a market information system that communicates prices. Currently, prices are largely set through bilateral negotiations between buyers as well as suppliers with market power.[71]

Slaughterhouses in Moldova are in urgent need of modernization. As soon as NFSA begins to oversee the veterinary issues in production and processing, stricter enforcement of existing laws is expected, such as farmers will having to bring all their animals to slaughterhouses which will drive an urgent need for modern slaughterhouses. Therefore, this might be an opportune time to provide financing for slaughterhouses that are compliant with EU standards and to start with law enforcement.

Furthermore, from the farmers' point of view, it is important to have a good meat processing industry in the country so that farmers can have reliable buyers of their products. A strong performing meat processing industry based on imported raw materials is not helping farmers. For this reason, closer linkages between farmers and agri-food processors (slaughterhouses) might improve the situation. Additionally, it should be avoided (from the farmers' point of view) for meat processors and slaughterhouses to start setting up livestock farms to produce their own raw materials as this approach would again prevent farmers from selling their products.

Market Trends

The transition from a Soviet-type, centrally planned agricultural system towards a modern, value-adding agri-food sector will require a better raw material supply chain. This may be achieved through improved backward integration – linking farmers to processors. It would require gathering farmers as raw material suppliers (into contractual arrangements) and investment in more sophisticated (and possibly expensive) marketing.

[70] Interview with Mrs. Carolina Linte from Milk Farmer Association at the 05 April 2017
[71] ERNST, U.F.W. et NEEL, S.: Business environment impacts on competitiveness: Moldova's meat value network; July 2009

- Meat

Meat consumption is growing as it is closely linked to increasing GDP. Even countries with populations that have typically not consumed as much meat due to cultural or religious reasons (e.g. Hindus in India) are starting to consume more meat in their daily diet. In Moldova, as in many other rather poor countries, this trend is directed toward chicken and pork.

Globally, the meat industry is still confronted with Russian sanctions on Europe, US, Canada, Australia and Norway and these sanctions are still hitting the meat business more than any other single trade-related issue. Further points of concern:

- Majority of meat processors want to improve their export activities
- Environmental management – especially waste management – is high on the agenda
- Animal welfare and animal diseases such as Porcine Epidemic Diarrhea Virus (PEDV), African swine fever and avian influenza pose great threats to the livestock sector.
- Investments in new product development and in the meat sector are taking place as competition is getting more intense.[72]

Dairy Products

The annual dairy product per capita consumption (kg) in the EU-27 is 65 liters on average but this number varies greatly between countries; Estonia consumes almost 127 liters per capita whereas Romania and Bulgaria are at around 10 liters.[73]Bearing in mind that Moldovan consumption is closer to Romanian levels, there is a strong market development ahead to keep up with the EU 28.

Consumer preferences will shift from cheap, soft-fresh cheese towards hard cheese, and from plain yoghurts to fruit yoghurts.

F&V

The increased popularity of healthy natural products, organically produced products and convenience food is the driver of fresh fruit and vegetables. The total European trade of fresh fruit and vegetables is increasing gradually year by year. Local fruit and vegetables have recently enjoyed stronger promotion. Seasonal fresh products that are locally produced have been well received by European consumers. This trend is reinforced by the limited access of EU products to the Russian market.

A significant group of European consumers are increasingly seeking pure and natural products. This is a principal reason for them to buy organically produced fruit and vegetables. The organic market in Europe grew 7.4% in 2014; in terms of market size, the total retail sales of organic products are highest in Germany (2016: EUR 9.5 billion[74]) and France, with increases of 10-11% in 2015.

Also, convenient foods are increasing. Especially in North-Western Europe, retailers are responding to this trend with freshly cut fruit, snack vegetables, seedless fruit, easy peelers, prolonged shelf life, individually sized products (for example, mini-papayas and mini-watermelons[75]), ready-to-eat products and e-commerce. Although demand for convenience products in other parts of Europe is still low, it is on the rise.

[72] William Reed: State of the Global Meat Industry: Key Findings; 2016
[73] http://www.animaweb.org/sites/default/files/document_etude_debouches_lactimed_en_web_final.pdf; 2010 data
[74] http://www.fibl.org/en/themes/organic-farming-statistics.html
[75] http://www.freshplaza.com/article/160225/People-love-the-new-packaging-of-mini-watermelons

Finally, tracking and tracing is becoming more important, as well as certification schemes such as GLOBAL Good Agricultural Practice (G.A.P) and British Retail Consortium (BRC) global standards. GLOBAL G.A.P. has become a minimum standard for most European supermarkets. Growers and exporters are advised to pay specific attention to cleaning and decontaminating equipment, containers and transport vehicles. Strict compliance with food safety regulations is a challenge for every producer and exporter. At the same time, if applied well, it can improve one's competitive position.[76]

Outlook

Currently, meat exports towards EU Member States are not possible due to the lack of food safety standards and that are not expected to change quickly in the next few years. Moldova will have to satisfy local market demand before entering export markets. Similar things could be said about the market for dairy products. F&V might have better market opportunities if marketing were conducted in a more professional way. In this context, it has to be said that many old orchards need to be replanted with modern varieties and these investments will often not be done by smallholders as they lack a long-term perspective (children have left the rural area and do not intend to come back) and the access to financing. Cereals as a product with a fast return on investment will remain important but value adding processes would be appreciated; even as a mid-term strategy, fattening pigs and poultry for export is an option, even if the EU market remains inaccessible.

Looking at the different geographical markets, the trend is moving towards the EU; this is strongly supported by the Russian embargo. North America is far away and causes higher transport costs. Gulf States present good opportunities especially for F&V and in the long run for live animals and meat products as well.

Moldova is facing a difficult situation as it has to increase the quality and appearance of its products and in doing so, will face competition from Western countries and Turkey (and eventually from Ukraine). It seems that its export potential cannot be tapped without making the necessary investments as selling apples of poor-quality to markets such as Bangladesh will not generate desirable revenues.

2.3 Management Trends and Workforce

2.3.1 Current Status of Management Style

(1) Legal Status of Holdings and Land Use

The possession of juridical status is one of the key determining factors when it comes to categorizing holdings in Moldova in the agricultural industry.

Definitions of Agricultural Holdings

a) Agricultural Holdings:
   - A technical economic unit (with or without juridical status) having a single management and carrying out agricultural activities by utilizing agricultural land and/or livestock breeding or activities related to maintenance of agricultural land in good agricultural and environmental conditions, whether as a principal activity or as a secondary activity.

b) Agricultural Holdings with Juridical Status:

[76] https://www.cbi.eu/market-information/fresh-fruit-vegetables/trends/

- Agricultural cooperatives, joint stock companies, limited liability companies, state enterprises and other types of holdings.

c) Agricultural Holdings without Juridical Status
- Registered peasant households (farmers) / entrepreneurs and other types of households.

Difference between Holdings with Juridical Status and Those without Juridical Status

a) Holdings without Juridical Status
- The members of the holdings have unlimited liability for the obligations with all their assets, except for goods which cannot be traced by law.

b) Holdings with Juridical Status
- The holdings are liable for the assets which belong to them. The founder and members are not liable for their obligations to the holdings, and the holdings are not liable for obligations to the founder and members, except for issues specified by law.

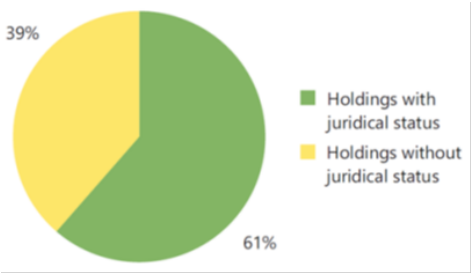
From the viewpoint of business development, one of the main differences between holdings with juridical status and ones without juridical status is the creditability of the former to potential business partners. As juridical status is regarded as an important indicator of creditability, companies tend to look for business partners among entities that possess juridical status. Furthermore, the creditability brought by juridical status also positively impacts fund raising ability. In short, banks provide better financial programs for holdings with juridical status, compared to those without juridical status.

In Moldova, a share of only 0.4% of agricultural holdings enjoy juridical status, while the remaining 99.6% of agricultural holdings do not hold juridical status. As shown in the Figure below, 0.4% of holdings and 99.6% of holdings correspond to 61% and 39% of the total utilized agricultural area (UAA), respectively. On the other hand, it is worth noting that the average land of agricultural holdings without juridical status is quite small (0.63 ha on average), compared to those of agricultural holdings with juridical status (345.62 ha on average). The size of UAA in each category is as follows:

Table 2-19: The Average Land Size of Agricultural Holdings, by Legal Status

Juridical Status of Holdings	Number of Holdings	Total UAA	Average Land Size
Holdings with Juridical Status	3,446	1,191,019.25 ha	345.62 ha
Holdings without Juridical Status	898,768	570,535.83 ha	0.63 ha

Source: 2011 General Agricultural Census (GAC) in the Republic of Moldova

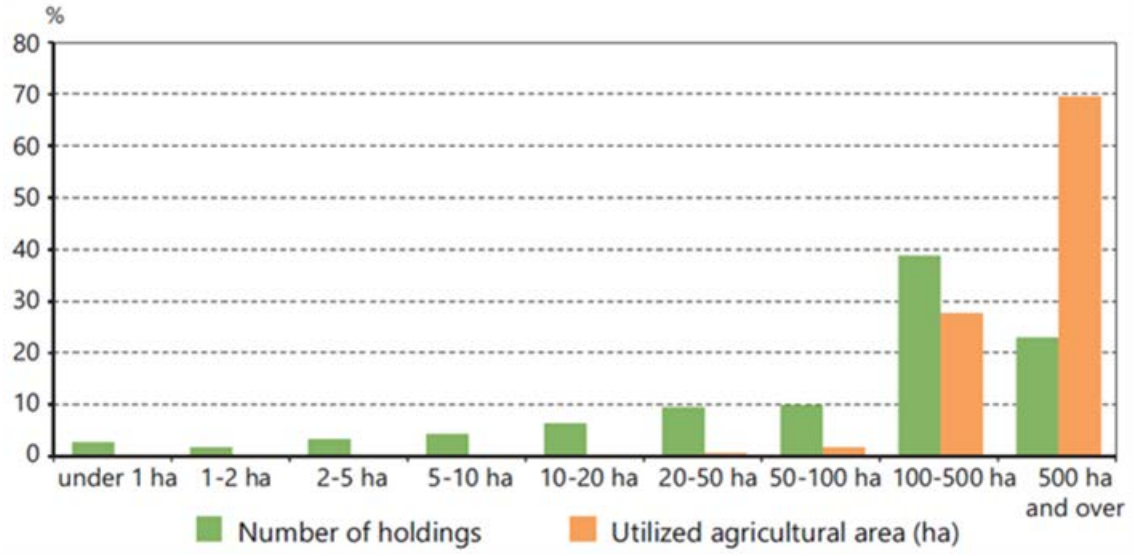


Source: 2011 GAC in the Republic of Moldova

Figure 2-1: Distribution of the UAA of the Agricultural Holdings, by Legal Status of the Holdings

As shown in the Figure below, almost 62% of total agricultural holdings with juridical status operate land area classifications “between 100-500 ha” (1,339 holdings) and “500 ha and over”

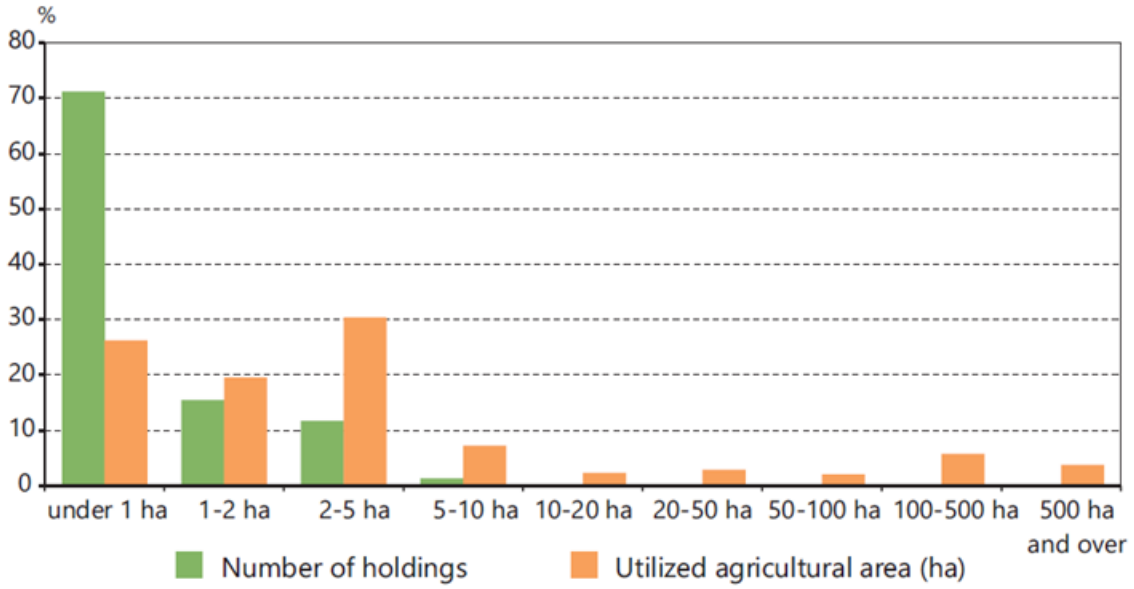
(792 holdings), which represent a total of 1,191,019.25 ha. The average size of land holdings with juridical status is 345.62 ha.



Source: 2011 GAC in the Republic of Moldova

Figure 2-2: Distribution of Agricultural Holdings with Juridical Status and UAA by Size Classes of Total Area, %

Over 98% of agricultural holdings without juridical status (884,326 holdings) are concentrated within the land size classification of "up to 5 ha" which comprises over 76% of the total agricultural area belonging to agricultural holdings without juridical status (570,535.83 ha). The average size of land holdings without juridical status is only 0.63 ha.



Source: 2011 GAC in the Republic of Moldova

Figure 2-3: Distribution of Agricultural Holdings without Juridical Status and UAA by Size Classes of Total Area, %

(2) Categories of Agricultural Holdings

In the agricultural sector, there are three major categories of holdings (entities or households) in terms of organizations, which are classified by the NBS, namely: (i) Agricultural enterprises, which are Enterprises that produce agricultural products; (ii) Unincorporated family farms[77], and; (iii) Households.

(i) Enterprises

Agricultural enterprises include all enterprises and organizations which carry the status of a legal person producing agricultural products, who owns or uses agricultural land and carries out agricultural activities, regardless of legal form or type of ownership. This category includes both companies that practice agriculture as their main activity and those that practice agriculture as a secondary activity (within their structural subdivisions), as well as institutions and organizations (monasteries, military units, etc.) that have agricultural land and/or farm animals. According to their legal form, agricultural enterprises include: agricultural production cooperatives (CAP), joint stock companies (SA), limited liability companies (SRL), state enterprises (IS) etc.

There are 3,446 agricultural enterprises, holdings with juridical status, and they can be categorized into 5 types: agricultural cooperatives, joint stock companies, limited liability companies, state enterprises and other types of holdings. Of these categories, limited liability companies constitute the largest number (1986) which makes up 58% of the total as well as the largest share of utilized arable land (55%). In addition to this, the average area of utilized arable land of agricultural holdings with juridical status is approximately 388.01 ha.

Table 2-20: The Number, Share and Average of Arable Land of Agricultural Holdings with Juridical Status, by Types

Types of agricultural holdings	Number & Share		Share of UAA	Average UAA
	Number	%		
Agricultural cooperatives (CAP)	204	5.9%	12%	712.80 ha
Joint Stock companies (SA)	158	4.6%	4%	455.38 ha
Limited liability companies (SRL)	1,986	57.6%	55%	388.01 ha
State enterprises (IS)	89	2.6%	1%	192.34 ha
Other type of holding	1,009	29.3%	28%	340.95 ha

Source: 2011 GAC in the Republic of Moldova

(ii) Unincorporated Family Farms

Unincorporated family farms refer to entities that carry out entrepreneurial activity based on

[77] Unincorporated family farm (gospodărie ţărănească/de fermier in Romanian), as defined in Articles 2 and 3 of the Moldovan Law No. 1353-XIV of 3 November 2000 "On Unincorporated Family Farms", is a farm based on private ownership of land and other assets and on labour of family members aiming at producing agricultural produce, its primary processing and sale. Such farm has the legal status of a physical person.

privately owned or used land/assets and produce, process and sell agricultural products. This category also includes persons who received plots as equivalent land shares[78], but have not duly registered their entities.

(iii) Households
Households are entities that produce agricultural products through their own labor, i.e. work done by individuals or their family members (especially on household plots) in order to meet their subsistence purposes and other needs.

(3) Size of Farmers and Definitions

In the Republic of Moldova, there is no clear criteria that determines the size of an unincorporated family farm, which can be used for the purposes of targeting and focusing of farm development policies. A classification system should be developed that could be implemented in agricultural policies aimed at the development of such holdings.

The NBS, however, has its own classifications, which are used to collect and analyze data from farmers. Such classifications are as follows: (i) *small farmers* – farmers with processed land areas up to 10 ha; (ii) *medium farmers* - farmers with processed land areas that range from 10 to 50 ha; (iii) *large farmers* - farmers with processed land areas greater than 50 ha.

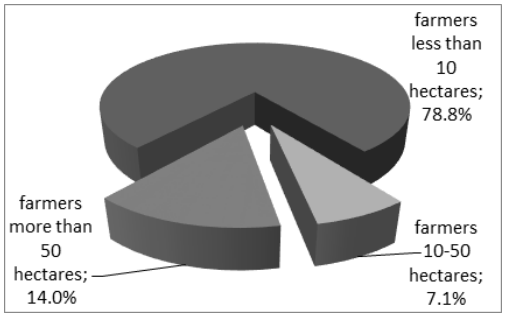


Figure 2-4: Structure by the Size of Land in Farms in Moldova, 2015

In the structure of land holdings, the largest share is made up of farmers who operate land areas smaller than 10 ha. They are the most representative, and most frequently, practice subsistence farming. Table 2-21 shows the number of holdings by operation scale and types of farmers; namely, small farmers, medium farmers and large farmers.

[78] Plots (shares) of land equivalent to people's prior labour contribution allocated during privatisation process.

Table 2-21: Number of Holdings and Area by Types of Farmer

Categories of Farmers by Land Holding Size	No. of Holdings		Area (ha)	
	No.	%	hectore	%
Total	**902,214**		**2,243,540**	
of which Small Farmer	**896,105**	**99.3%**	**826,340**	**36.8%**
less than 0.1	38,177		2,566	0.3%
0.1 – 0.2	109,182		15,130	1.8%
0.2 – 0.3	79,315		19,697	2.4%
0.3 – 0.5	233,235		84,895	10.3%
0.5 – 1	180,529		123,327	14.9%
1 – 2	139,162		199,602	24.2%
2 – 3	64,482		156,172	18.9%
3 – 4	28,581		98,153	11.9%
4 – 5	11,933		52,660	6.4%
5 – 10	11,509		74,138	9.0%
of which Medium Farmer	**3,080**	**0.3%**	**63,434**	**2.8%**
10 – 20	1,868		24,980	39.4%
20 – 30	574		13,886	21.9%
30 – 50	638		24,568	38.7%
of which Large Farmer	**3,029**	**0.3%**	**1,353,766**	**60.3%**
50 – 100	617		44,425	3.3%
100 – 200	621		89,860	6.6%
200 – 500	963		314,416	23.2%
500 – 1000	550		378,419	28.0%
1000 – 2500	229		338,693	25.0%
2500 and over	49		187,953	13.9%

Source: General Agriculture Census

The number of holdings is highest in small farmers with 99.3%, but coverage of total farming area is highest amongst large farmers at 60.3%. Though it is smaller than the total farming area of large farmers, the area of small and medium farmers account for about 40% of the total area. Apart from the above mentioned three categories, there are micro agricultural holdings also known as "*horticultural partnerships"* with plots for fruit and vegetable production. These are non-profit organizations created by citizens under voluntary conditions to solve social problems related to the cultivation of vegetables and fruits and other problems. The plots for horticultural partnerships were distributed to families in urban areas (as plots for summer cottages) with areas of 0.06 ha. Owners are not allowed to build residential buildings with an area greater than 50 square meters. Currently, such plot classifications are no longer being distributed. Such partnerships that are managed and worked constitute the smallest denominations of agricultural land.

The equivalent land share was divided into several plots, depending on the quality (results of value assessment) of soil, location, plantation type (vineyard, orchard), etc. In many places, and for various reasons, owners received their equivalent land share in the form of four or more plots. Between 1998 and 2000, projects were developed and approved to organize the territory of land under agricultural cultivation and outlines were developed for each plot of agricultural land distributed to citizens. Under these projects, each owner received title deeds in a new format, titles of authentication of the landowner, while provisional titles were revoked.
The agricultural land plots and the ownership rights over such land plots were recorded in the Real Estate (Cadastre) Registry. In instances where provisional land title owners had died prior to the release of the new format titles, and their heirs had submitted inheritance certificates to the Mayor's Office, as a rule, the beneficiary's own land and inherited land were amalgamated (merged) together.
The world average for the area of an agricultural holding is 2.2 ha; incorporated farms average an area of 247.9 ha, while unincorporated farms average only 0.8 ha.

According to the statistical data, the land area of Moldovan agricultural holdings is divided into 2,654.7 thousand plots, with each agricultural holding containing about 2.9 plots on average. The

average size of plots, nationally, is 0.8 ha; the average size for incorporated farms is 25.8 ha, while for unincorporated farms, it is 0.4 ha.

The process of awarding land plots (equivalent land shares) owned by citizens is currently being finalized. Art. II (3) of Law No. 173 of 22 October 1998 on amending and supplementing the Land Code stated that all claims of individuals with regards to the award of the equivalent land share were to be resolved prior to 1 January 1999 and claims lodged after such a period would no longer be considered. Accordingly, citizens who, for some reason or other, were not included in lists to obtain ownership of agricultural land (equivalent land share) can no longer stake such a claim.

(4) Current Status of Profitability of Agricultural Holdings

In this section, the current situation regarding the profitability of agricultural holdings and earnings of workers engaged in agricultural activities will be explained. As National Statistics of Moldova can only provide data for the period after 2014, the following tables and graphs have been created using the available data from 2014 and 2015; moreover, as the data of National Statistics of Moldova is arranged by category of enterprise, the definitions of each category are written as they appear below.

> According to National Statistics of Moldova, there were 2,920 enterprises in 2014. Among them, 1,693 enterprises (58.0%)were categorized as 'Micro', and 951 enterprises (32.6%) were rated as 'Small'. An important characteristic of these two categories is their low profitability. The average annual earnings before taxes of Micro enterprises is MDL 25,200 (Approx. USD 1,266) and Small enterprises average around MDL 385,000 (Approx. USD 19,342).
> (The exchange rate: USD 1 = MDL 19.9046 as of February 2017)

Therefore, it can be concluded that about 90% of agricultural enterprises in Moldova perpetually suffer from a severe shortage of cash.

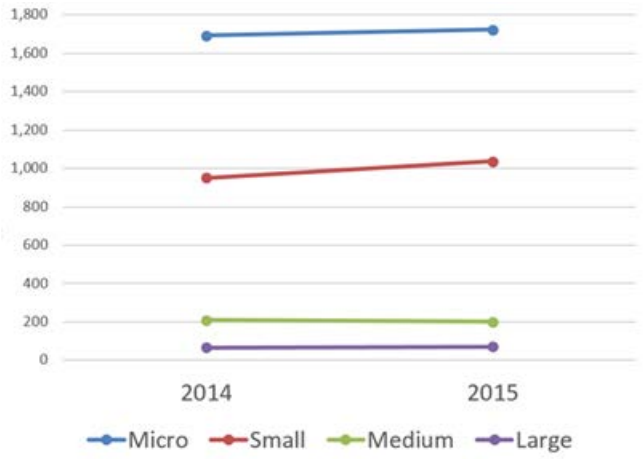
a) Definition of Each Category of Enterprises
   - The definition of each category of enterprise in Moldova are as follows:

Table 2-22: Definition of Each Category of Enterprises in Moldova

Category	Number of Employees	Annual Amount of Revenue from Sales	Annual Amount of Assets
Micro	1-10	< MDL 3 million	<MDL 3 million
Small	11-50	< MDL 25 million	<MDL 25 million
Medium	50-250	<MDL 50 million	<MDL 50 million
Large	≥250	≥ MDL 50 million	≥ MDL 50 million

Source: National Statistics of Moldova

b) Number of Enterprises
   - The figure below details the number of enterprises engaged in crop and animal production, hunting and related service activities, by category:



Source: National Statistics of Moldova

Figure 2-5: Changes of the Number of Enterprises by Size

c) Profitability of enterprises engaged in crop and animal production, hunting and related service activities, by category.

- In terms of investment towards further development (such as challenging high- value products, purchasing new machines and other facilities) the average profit: MDL 25,200 for Micro and MDL 385,000 for Small enterprises is not sufficient, especially considering their relative expenses.

Table 2-23: Average Profit before Tax per Enterprise Engaged in Crop and Animal Production, Hunting and Related Service Activities, by size

Unit: MDL (in thousands)

Size	Number in 2014
Micro	25.2
Small	385.0
Medium	1,308.1
Large	3,410.6

Source: National Statistics of Moldova

d) Current Status of Earnings

- The average earnings of workers engaged in agricultural activities are about 30% lower than those of workers engaged in other businesses. The average income of workers engaged in agricultural activities, belonging to social and economic units with four or more employees and all budgetary institutions is MDL 2,967.2 per month, while the workers engaged in other business are expected to earn MDL 4,184.6 per month.

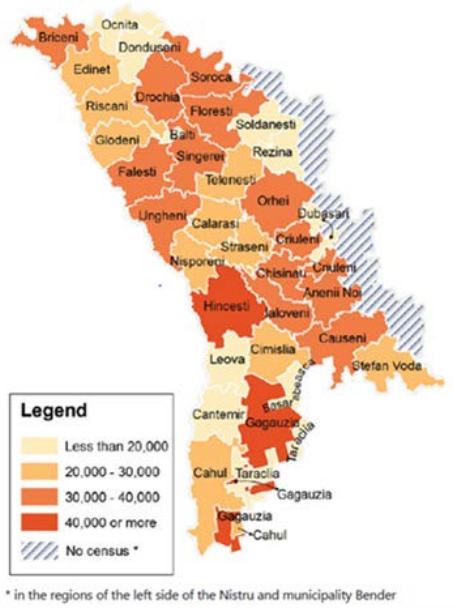
Table 2-24: Comparison of Average Earnings of Employees Engaged in Agricultural Activities and Others

	Earnings in 2015
Average Earnings of the Employees Engaged in Crop and Animal Production, Hunting and Related Service Activities	2,967.2
Average Earnings of all Economic Activities	4,184.6

Source: National Statistics of Moldova

(5) Distribution of the Agricultural Holdings

Agricultural holdings are represented across the entirety of Moldova. In most districts, there are over 20,000 agricultural holdings, while only 8 districts have a population over 100,000 (according to figures from 2014), these include Chisinau: 772,800, U.T.A. Gagauzia: 156,600 and Balti: 128,800).

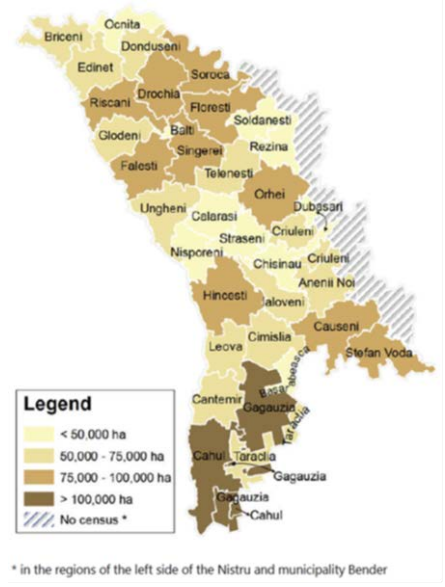


Source: 2011 GAC in the Republic of Moldova

Figure 2-6: Distribution of the Agricultural Holdings, by District

(6) Distribution of Total Land Area of the Agricultural Holdings, by County

Relatively large areas of utilized agricultural land appear in the northern and southern parts of Moldova in particular.



Source: 2011 GAC in the Republic of Moldova

Figure 2-7: Distribution of Total Land Area of the Agricultural Holdings, by District

(7) Cooperatives in Moldova

In most cases, cooperatives are key players in the development of the agricultural sector. In the case of Moldova, there were 2,058 cooperatives in 2015, which combined for 0.5% of registered agricultural holdings, and utilized 6.5% of the agricultural land of the total registered agricultural holdings. According to AGROinform, who cooperated with United States Agency for International Development (USAID) on projects such as "Agricultural Competitiveness and Enterprise Development (ACED) Project," the number of cooperatives that were financially supported by the project increased over the course of the project period. But after the financial support was completed, most of the cooperatives gradually stopped their activity. It can therefore be assumed that the cooperatives established by the donor fund could not sustain their activities because there were not enough opportunities to collect funds from commercial banks (non-donor support fund). In other words, there is no incentive to formulate or sustain cooperatives without access to finance with conditions better than those that presently exist.

The Moldovan government utilizes the CIS's definition of cooperatives as its own, as stated it in CIS legislature. As for the ownership of cooperatives in Moldova, property and non-property rights such as voting power are allocated to members based on their proportion of the share. The summaries of definitions are as follows:

Three Types of Cooperatives:

a) Agricultural Producer Coops
   - A legal entity, established by five or more physical persons for the purpose of practicing joint production and other business activities based for the most part on the personal work of its members and accumulation of contributions in the registered capital of the cooperative. A production cooperative is considered a private enterprise created to generate profits.[79]
     In 2015, there were 273 registered agricultural cooperatives, out of which 207 are in operation, employing over 5,000 personnel.

b) Entrepreneurial Cooperatives
   - A legal entity or physical persons performing business activities and owning simple shares or, in some circumstances, preferential shares.[80]
     In 2015, there were 98 registered entrepreneurial cooperatives, out of which 47 are still in operation, employing over 450 personnel.

c) Consumer Cooperatives
   - Autonomous and independent associations of physical persons, established on the basis of the principle of a voluntary agreement to unite its members' shares and to carry out business activities in order to satisfy their interests and their consumer's needs".[81]
     In 2015, there were 857 registered agricultural cooperatives, out of which 493 are currently operational, employing over 5,500 personnel.[82]

2.3.2 Current Status and Business Ownership of Workforce

In this section, the current status of the workforce engaged in agricultural activities has been summarized, focusing on gender balance and stability of the work place.

[79] Cooperative law: Production coop (Apr2002, updated. 2010)
[80] Cooperative law: Business (entrepreneurial) coops (Apr2001)
[81] Cooperative law: Consumer cooperation (Sep2000)
[82] JICA Study Team tried to obtain the information about the number of cooperatives, but neither MoAFI nor AIPA could deliver statistics. The 2015 data is extracted from a study made by Rural Economic Development Center PROMO-TERRA, an NGO that implemented a project on the establishment and promotion of groups of agricultural producers, which was funded by WB.

Through their analysis, the JICA survey team detected three key work issues as follows:

a) Unstable Employment
   - Only 5% of employees in agricultural businesses are permanent employees.

b) Disproportionate Employment between Men and Women.
   - Employed women constitute 20% of all employed persons, while men constitute an 80% share.

c) Aging Workers in Agricultural Business
   - 387,039employees fall within the age group of"45-54 years old", while only 99,921 employees fall within "25-34 years old" which is only 26% of the 45-54 year old cohort.

A detailed investigation of these issues has been described in the following sections:

(1) Structure of Persons Involved in Agricultural Activities

The JICA Study Team attempted to collect recent data on the number and categories of persons specifically participating in agricultural activities, but the most recent data that could be obtained was from the 2011 GAC. Compared to the present situation, the 2011 GAC data represents a population of 3.5 million. Since that time, the resident population has gradually decreased, but the data is still relevant and proves that Moldova is still an "agrarian country", as most of its economy and active population are focused on agricultural activities.

Table 2-25: The Number of Persons Involved in Agricultural Activities, by Gender

	Total	Men	Women
Persons Involved in Agricultural Activities	2,860,706	1,807,416	1,053,290
Rate by Gender	100%	63%	37%

Source: 2011 GAC in the Republic of Moldova

The structure of employed and unemployed persons involved in agricultural business is as follows:

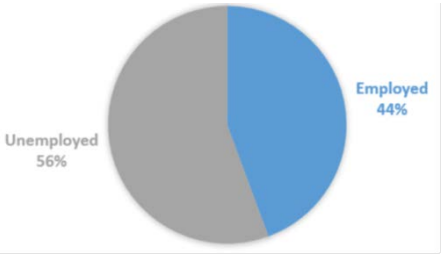
- 56% of people participating in agricultural business are not formally / legally employed.
- 80% of employees are men.

The majority of Moldovan entrepreneurs and businesses involved in agriculture industry suffers from a lack of financial resources. For business owners, it is cost effective to circumvent paying taxes for legally employed personal. This is compounded with the fact that agricultural work is often seasonal and that owners are not familiar with employment paperwork. Moreover, many small agricultural businesses are family businesses; from their perspective, not paying employment taxes can allow for higher profit, which is considered the best option.

There is a gender disparity in the agricultural industry, men constitute 80% while women make up only 20%. This disparity shows that labor in Moldovan agriculture is still largely physically-oriented, which is demonstrated by the preference of business owners to hire men. Also, as a matter of culture, women in rural areas take care of the children and the garden around the house, whereas men work the arable land, picking fruit or farming.

On the other hand, during field visits, it was observed that processing companies prefer to employ women, as they tend to cope better with stress and keep a preferable working environment. Moreover, as owners seem to assume a relatively aggressive stance in the employer-employee relationship, Moldovan women have the image of being much less confrontational than their male counterparts.

The majority of business activities in the agricultural sector in Moldova are limited to scenarios where farmers cultivate crops in their fields using agricultural machinery.



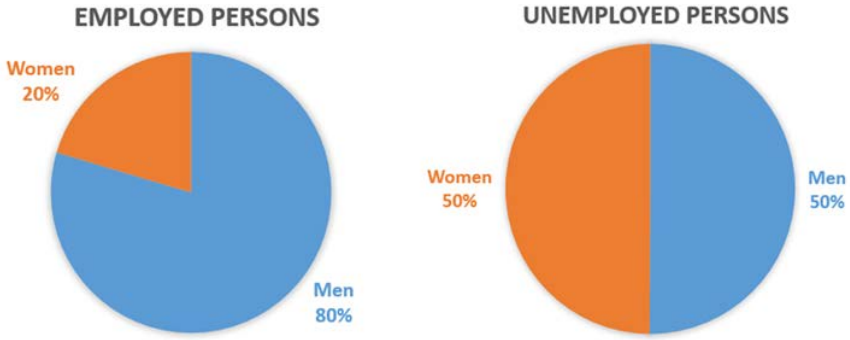
Source: 2011 GAC in the Republic of Moldova

Figure 2-8: The Structure of Employment of Persons Involved in Agricultural Activities

Table 2-26: The Number of Employed and Unemployed Persons Involved in Agricultural Activities, by Gender

Category	Total	Men	Women
Employed Persons	1,270,054	1,010,942	259,112
Unemployed Persons (with Holdings without Juridical Status)	1,590,652	796,474	794,178

Source: 2011 GAC in the Republic of Moldova



Source: 2011 GAC in the Republic of Moldova

Figure 2-9: The Structure of Employed and Unemployed Persons Involved in Agricultural Activities, by Gender

(2) The Status of Permanently Employed Persons, and Unemployed Persons

The present conditions regarding the terms of employment are as follows:

- 5% of employed persons are permanently employed.
- 70% of employed persons are "Others," who are employed without a specified contract period.

Business activities in agriculture are primarily the production of cereals, fruits and grapes (both table grapes and wine production).For these activities, the required work time for the personnel is seasonal; therefore, except for processing companies, meat, milk, poultry sectors and wine makers, the majority of business owners do not have any reason to hire permanent employees.

The WB's 2016 figures placed Moldova at a 6% unemployment rate, whereas the Moldovan NBS showed a 3.8% unemployment rate for the same year, but with an active population of

approximately 1.2 million people. Based on the data extracted from 2011 GAC in Moldova, there were approximately 1.26 million persons solely employed by agriculture.
Therefore, it was concluded that the actual number of employees working in agricultural business is much lower than the number stated in the 2011 GAC as Moldova's agricultural workforce has gradually been shrinking since 2011.

During visits to the processing companies, JICA Study Team received the feedback that "we cannot find skilled workers". Skilled workers will always opt for formal employment irrespective of whether it is permanent or temporarily, but on a utilitarian basis, considering that they desire a stable income, along with health, pension and social insurance coverage.

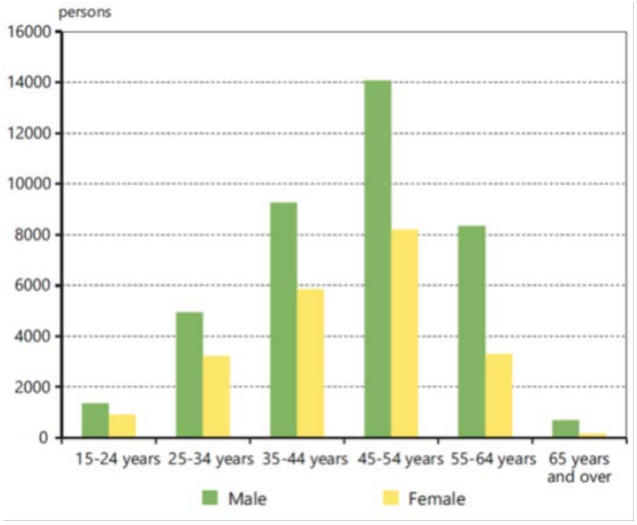
As Moldova is a relatively small country, skilled workers often opt to move abroad to neighboring countries where they speak a common language but can enjoy a much higher salary (at least double) such as the Russian Federation, CIS countries, and Romania. At present, more than 0.5 million Moldovan citizens also have Romanian citizenship which opens the possibility to work in the EU, along with the privileges that come with EU citizenship.

Table 2-27: The Number of Employed Persons by Employment Conditions and Gender

Category	Total	Men	Women
Permanently Employed Persons	60,386	38,693	21,693
Temporarily Employed Persons	314,984	188,685	126,299
Other Categories of Employed Persons	894,684	783,564	111,120

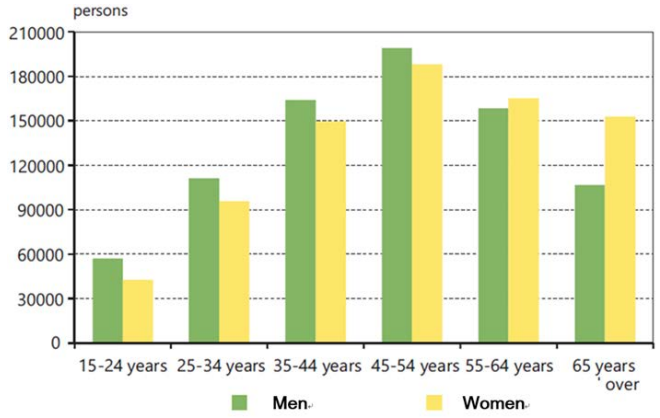
Source: 2011 GAC in the Republic of Moldova

Regarding the distribution of labor force by age group and gender, the majority of workers in agricultural activities are over 45 years old, with only a slight overall difference between men and women. As JICA Study Team observed during field visits, workers below 45 years old are very few in number. When compared to the figures of 2011 GAC, statistics have indicated that the present situation is worsening. Moldova is gradually losing its younger work force due to migration as agricultural businesses complain not only about the lack of skilled personnel, but even finding workers in general, irrespective of experience. If this situation continues, the Moldovan agricultural sector and its working force will face serious difficulties in a matter of years.



Source: 2011 GAC in the Republic of Moldova

Figure 2-10: Distribution of Employed Labor Force, by Age Group and Gender, for Total Agricultural Holdings



Source: 2011 GAC in the Republic of Moldova

Figure 2-11: Distribution of the Persons Involved in Farm Work, by Age Group and Gender, in Agricultural Holdings without Juridical Status

2.3.3 Issues of Management

(1) Issues Regarding Standardization

During field visits, JICA Study Team observed various types of businesses conducting agricultural activities, mostly with juridical status, but also some cases of individuals growing cereals and vegetables for self-consumption and for selling to obtain income. In the case of agricultural holdings without juridical status, the issue of standardization itself can neither be approached nor targeted, as the technical and financial resources are very limited. For the small registered producers and processers, conforming to the international standards of EU, Russian Federation or CIS countries, which are the main potential markets for Moldovan goods, incurs not only an enormous financial cost, but also requires technical knowledge for the implementation of standards. The consulting services for such assistance seem underdeveloped in Moldova; therefore, even if a small producer could consider contracting paid consultation, it would still be difficult to identify trustworthy experts. Furthermore, the majority of small producers lack key business skills, such as marketing, cash flow management, accounting, contracting loans from banks, etc. Another big issue faced by the small producers is the low level of awareness regarding the standardization of production. In most places that JICA Study Team visited, the prevailing mindset of the small producers was “how can we export, we are small company?” or “it is costly and I cannot take the risk, also considering competing with bigger companies”. The Government and international donors have provided numerous projects for the development of the agricultural sector, but it seems that these projects had significant impact mostly for big or medium sized companies, that already possessed some level of business acumen.
For the medium and big sized companies, the main issue is the costs. These 2 types of companies already have sufficient business knowledge with the decision to standardize already part of their business strategy for most of these companies.

(2) Issues Regarding Necessary Facilities and Inputs

When considering the necessary facilities, most producers are working a limited area (average size 1.44ha), using outdated agricultural machinery, and dealing with a lack of machinery for washing the goods. Also, they often lack access to modern technology for storing the merchandise, sorting and packaging lines, and means for transportation. As resources are very limited, most of the producers have little choice but to sell their products immediately and at a low value. For their products to obtain added value, it is crucial for them to have access to some of the missing components mentioned above. This does not necessitate owning the equipment, but at least

providing access through a rental system, cooperative system or other type of system put in place by the local authorities or government.
In the case of medium and big companies, the issues regarding facilities are mostly financial, as they have issues contracting loans from banks and dealing with disadvantageous interest rates.

With regards to agricultural inputs, Moldovan companies gain access to registered products made in the EU and Russian Federation, though acquisition prices can vary. For example, one of the biggest agricultural cooperatives in Moldova, known as Agrostoc, enables access to agricultural inputs to their members and partners at a discounted price, while charging a premium to regular customers.

Each year the Government of Moldova (GoM) implements a different scheme for agriculture subventions, which is used to cover all the agricultural sub-sectors. Consequently, businesses cannot rely on subventions purchasing agricultural inputs, as each year the situation changes, which also exerts an impact on the prices of agricultural inputs.

(3) Issues Regarding Permanent Shortage of Cash

a) Despite a limited sample size, it was assumed from site interview responses that small farmers suffer from a perpetual shortage of cash (this was also proved in Section 4.1). This in turn makes it difficult for them to take decisions which can lead them towards greater profit in the long run. With regards to income, small farmers generally prioritize immediacy. For example, the owner of a wholesale market in Chisinau illustrated this propensity with the following anecdote about small farmers:

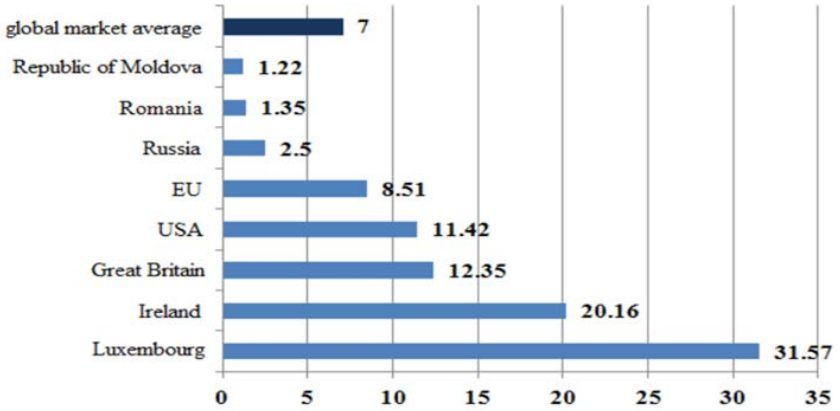
- The owner asked small farmers to change the type of apples they produce to a type of higher value. But most of these farmers were unable to survive the period of experimentation required to produce the new type of apple. Others struggled to purchase the necessary pesticides and fertilizers. In the end, their endeavors failed and these farmers continued to cultivate and sell the same product.
- The owner also elaborated on the financial situation of small farmers. When smallholder farmers want to sell their products, negotiation with buyers at the farm gate is very competitive. Part of the reason is that, after harvest, most smallholder farmers are short of cash and in some cases, indebted from their fertilizer and pesticide purchases. The desperation caused by these debts pressures farmers to sell products at the lowest price in order to secure some income.

b) In Moldova, there are several types of loans for agricultural activities, with the most common interest rate around 19%. This rate guarantees that the original loan amount will double after 4 years, conditions which place significant pressure on business costs. Furthermore, agricultural bodies generally find it difficult to come up with suitable collateral; often their land is disregarded as collateral by banks due to the low liquidity of the land market. Moreover, the required value of collateral is usually 130% of the loan amount.

Ex.) Loans for agricultural activities
Moldova Agroindobank
Target : Cooperative, commercial society
Duration : From 12 through 60 months
Rate : From 17.00 to 19.00 %
Amount : MDL 10,000 - 700,000
Condition : Collateral is required
Moldindconbank

Name of Credit	: Agro
Target	: Entity who engages in agricultural business
Duration	: Up to 15 months (with 6 months flexible reimbursement)
Rate	: 10.00 %
Amount	: Up to MDL 3,000,000
Condition	: To be decided based on the entity's profile.

c) According to interviews undertaken by the JICA survey team in Moldova, agricultural holdings generally hesitate to use agricultural insurance. Several farmers explained that among the reasons is that they do not trust insurance companies, as there have been cases where companies have refused to make a claim payout. In actuality, insurance services have low penetration across the market in Moldova, which according to a report written by Dr. Angela Timuș[83], was only 1.22% in 2011.



Source: "The insurance market of the Republic of Moldova in terms of investment potential"

Figure 2-12: Insurance Penetration Degree in terms of GDP

d) Skills such as financial management represent another key factor which leads to cash shortage issues. For instance, cash savings are the ultimate achievement for agricultural holdings which result from all business activities. To maintain sufficient amounts of cash, it is necessary for agricultural holdings to draw up concrete business plans, conduct practical actions and operate their businesses in an appropriate manner; however, Ms. Iulia IABANJI, the director of ODIMM (Organization for Developing Small and Medium Enterprises), explained to the JICA Survey team that there are several common managerial problems occurring among agricultural holdings which are as follows:

- Most workers who engage in agricultural holdings, especially in rural regions, do not have enough access to business education and knowledge. Therefore, one issue for people living in Moldova's local regions is that they do not have the opportunity to learn about business, especially compared to people living in the capital. As agricultural holdings are also SMEs, they should undergo certain business training and gain practical business knowledge to become skilled business owners. Without attaining this level of business knowledge, it cannot reasonably be expected for agricultural holdings to solve their problems on their own.

[83] Title of the report: "The insurance market of the republic of Moldova in terms of investment potential"
Dr. Angela Timus: PhD, Associate Professor, Scientific Secretary, National Economic Research Institute of the Academy of Sciences of Moldova

(4) Issues Regarding Knowledge on Exports

If individual households want to sell their products in external markets such as the EU market, at a minimum they require an understanding about basic market standards. They would also need to meet the required conditions in areas such as soil condition and hygiene; however, when the JICA survey team asked farmers about their awareness regarding EU (external) market standards, most of them did not. It seems that most households in Moldova do not possess knowledge about the fundamental requirements of external markets.

(5) Issues Regarding Marketing

When JICA survey team conducted interviews regarding knowledge of marketing concepts to small farmers and persons, who were engaged in agricultural business, two recurrent issues seemed to be particularly prevalent:

a) Branding
Among small farmers who were interviewed by the JICA survey team, only a few farmers had attempted to build a preferable brand image of their agricultural products. On the other hand, this appears to be quite uncommon in Moldova. In fact, the majority of small farmers have never attempted to build an original brand image.
b) Activities Towards Finding New Customers
JICA survey team findings also revealed that few farmers had conducted marketing activities in order to acquire new customers. The majority of farmers seem to focus predominately on production. Instead they rely on chance or coincidence, with many relying on buyers to visit their farm gates.

2.4 Status of Agricultural Technologies

2.4.1 Current Status of Development, Transfer and Dissemination of Technologies

(1) General Situation of Technology Transfer through Existing Extension Services

Moldova extension services have started to become more advanced since 2000 in the public sector with donor support and in the private sector as consulting services (offering a specialized and complex field of business).
Extension services being provided are as follows:

- Government finances the provision of the required minimum of extension services to unincorporated family farms through organizations that are selected and entrusted as consultancy providers through tenders and are assigned to provide extension services for a three-year period.
- Agencies (federations of agricultural producers and farmers, associations of producers for particular goods) and consulting companies provide expert advice to farmers under projects financed by foreign donors. In addition, such agencies and companies provide paid extension services, including individual consulting of a more specific and complex nature (feasibility studies, business plans, etc.)

Major organizations of rural extension services are as follows:

a) ACSA
It is the largest non-governmental, non-profit and non-political organization, which has 32

regional centers and a network of 430 consultants (national, regional and local). Providing advisory services for farmers and promotes policies and minimum MoAFI small farmer advisory activities.

b) National Federation of Agricultural Producers "AGROinform"
It has a network of 22 regional associations with a total of 6,000 members (agricultural enterprises, private households and household cooperatives). The most important continue to be lobbying, assistance in marketing and analytics, business development in agriculture and rural activities and social, e.g. mobilization of women in income generating activities, alternatives through study circles and so-called activities within winter schools. An internal credit system supports the development of such shares.

c) Union of Agricultural Producers of Moldova "UNIAGROPROTECT"
It is an umbrella organization for its members - associations of farmers, but also for other economic entities in the food industry. "UNIAGROPROTECT" has 15 regional associations, which provides consultants in the financial, accounting, administration sectors. The target groups of the services provided by this organization are all household types, but most (80%) is large households, with an area of 200-500 ha.

d) NFFM
It has a network of eight regional centers. Providing advisory services to farmers, training, and implementing projects aimed at facilitating the development of small farmers and farmer activities.

Agencies that are entrusted with extension services develop extension materials themselves, and disseminate knowledge and skills. Approaches of technology transfer are various. For example, ACSA and AGROinform develops texts for trainings, and conducts farmer training activities for their members. They also use their website to disseminate information and to publish newspapers every two weeks. NFNF produces a TV program (Agro TV channel) and disseminates new technologies through mass media. Because the materials for extension service such as manuals for application of new technologies or prevention of common challenges such as soil erosion have been developed through the assistance of donor agencies, the quality of such materials are good according to the observations of the Project Team. However, it can be said that there is a challenges in controlling quality of services by MoAFI since NGOs develops their extension materials and methodologies without harmonization between them. Another issue is a lack of outreach of extension services in those NGOs. According to the interviews to several small farmers taken by the Project Team, none of them have received extension service from such NGOs.

Other private participants in the consultation process play an important role in the dissemination of knowledge in seeds, farm equipment, fertilizers, chemicals for the prevention and treatment of diseases, pesticides, herbicides, etc. The beneficiaries are primarily rural residents.
Local farm shops, specialized suppliers of inputs and other operators market agricultural products and products related directly or indirectly to agriculture (seeds, farm equipment, fertilizers, products for the treatment and prevention of diseases, pesticides, herbicides, etc.) and also provide consultancy services with the aim of promoting its products.

(2) Use of Farm Machinery

Agricultural machinery is one of the essential inputs in Moldova where the farmers lack a sufficient work force. Cultivation of major staple crops such as wheat, corn and barley are fully mechanized. As mentioned in section 2.2, some processes of vegetable and perennial crop production such as pruning, planting and harvesting are not mechanized due to requirements of sophisticated, high tech machinery. Also, mechanized land preparation and plant protection works

are generally more cost-effective than manual operations. Even though the majority of farmers are small scale (operating with less than 1 ha), they are bound to operate many of their farms with machinery or commission machinery obtained from service providers.

Tractors and combine harvesters

Tractors are one of the most essential and commonly used pieces of farm machinery. According to the Agricultural Census in 2011, 708,431 holdings which represent 78.5% of total agricultural holdings utilized machinery in some capacity or another to engage in agricultural activities. Of the aforementioned holdings, 97% used tractors. The census differentiated between two definitions of tractors; namely "tractor of all type" and "mini-tractor". The first category literally includes medium to large scale tractors including wheel and crawler types; however, "mini-tractor" vehicles were isolated into a second category. While the term "mini-tractor" is commonly used in Moldova, there is no clear distinction or specification. According to statistics provided by 2KR PIU, which deals with agricultural machinery, a mini-tractor can be defined as a tractor with low capacity of horse power (hp) which ranges from 30 to 50hp. Based on this description, the most popular capacity (hp) tractor in Moldova should fall into the "tractor of all type" category, according to the sales statistics provided by 2KR Unit (Table 2-28), as they are typically greater than 80 hp.

Table 2-28: Trend of Sales of Tractors and Their HP

Tractors by HP	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	Ratio
<30									2	9	4		1				16	0.35%
30 < 50				4						1	1	3	5	20	3	9	46	1.01%
50 < 80										1	1			6		8	16	0.35%
80 < 100		151	310	405	283	393	317	492	183	332	361	252	123	212	35	112	3,961	86.88%
100 < 150	42	21		82	10	12	13	26	9	43	35	25	17	32	7	29	403	8.84%
150 < 250				1	1				1	4	11	5	5	13	4	15	60	1.32%
250 <							2		3	5	17	8	10	7	3	2	57	1.25%
Total	42	172	310	492	294	405	332	518	198	395	430	293	161	290	52	175	4,559	N/A
Grant in Total	42	21		82		100	51	89		73		58					516	11.32%

Source: 2KR PIU

Table 2-29 shows that the number of tractors of all types is 24,695, while the number of mini-tractors is only 1,090. In the year that the census was undertaken, 77.3% of existing tractors were over 10 years old. Extrapolating this information, it can be assumed that these machineries have exceeded their standard service life[84]. Despite this situation, 94.7% of tractors are still utilized on farms. Put another way, tractors are being used beyond their service life and should be replaced. Interviews with farmers also verified that the many of the respondent's tractors were more than 10-15 years old but could not be replaced due to financial difficulties[85].

The condition of combines and harvesters of all types were in a similar state to tractors. The number of combines and harvesters are 3,000, and 1,997 respectively, of which 66.6% are being used beyond their recommended service life.

[84] Legal service life in Japan is 7 years, while it is 15 years for tractors and 10-12 years for other machinery in America according to Iowa State University, Extension and Outreach, Ag Decision Maker which provides various data applied for calculating machinery cost (http://www.extension.iastate.edu/AGDM/crops/pdf/a3-29.pdf).

[85] According to the report for preparatory survey of 2KR (2012), it was also observed that many machines used in Moldova have already surpasses warranty and service life recommendations.

Table 2-29: Ratio of Machineries Aged more than 10 years and Operational Machineries

Agricultural machineries	Existing Number of Machinery			Number of operationable / utilized machineries	
	Total	of which: aged 10 years and over			
		Number	Rate in total	Number	Rate in total
Tractors of all type	24,695	19,092	77.3%	23,381	94.7%
Mini-tractor	1,090	449	41.2%	965	88.5%
Combines and harvesters of all type	3,000	1,997	66.6%	2,854	95.1%
Seeders and planters	8,431	5,436	64.5%	8,915	105.7%
Mechanical cultivators	12,045	8,198	68.1%	12,154	100.9%
Plows for tractors	13,782	9,736	70.6%	13,882	100.7%
Sprayer	2,627	1,374	52.3%	2,445	93.1%
Machinery and equiptment for irrigation	773	266	34.4%	712	92.1%

Source: 2011 General Agriculture Census in Republic of Moldova

Table 2-30 shows that the majority of machinery is owned by a small number of farmers. The ratio of farmers who utilize their own tractors is 3%. The ownership ratio for attachments, combines and harvesters is around 1%. In other words, most farmers rely on machinery services or lease them.

Table 2-30: Ownership of Machineries

Agricultural machineries	Holdings		Rate in total
	Utilized machineries	Utilized own machineries	
Tractors of all type	708,431	21,433	3.0%
Mini-tractor	6,379	923	14.5%
Combines and harvesters of all type	98,746	1,729	1.8%
Seeders and planters	581,455	5,966	1.0%
Mechanical cultivators	579,752	8,572	1.5%
Plows for tractors	673,266	10,627	1.6%
Sprayer	24,425	1,496	6.1%
Machinery and equipment for irrigation	3,388	444	13.1%

Source: 2011 General Agriculture Census in Republic of Moldova

Attachments for tractors

There are various implements attached to a tractor which are used for different purposes depending on the crop, physical and the environmental conditions at individual farms. The number of major implements is showed in Table 2-30. Plows and mechanical cultivators are used for land preparation for crop production; this explains why the number of these land preparation machines is higher than other implements. Plows are utilized to turn over or dig up soil. It was found that during field observations in Moldova that the bottom plow (one side or reversible) or chisel plow are the most common attachments for plowing. Mechanical cultivators are also used to pulverize and stir soils or to harrow the soil after plowing[86]. Different types of harrowing implements are utilized especially for cultivation of grains. Mechanical cultivators or other implements with similar functions such as 'disc type' or 'rotary type' harrows are also often observed in the field. These attachments are used not only for grains but also for vegetable or fruit cultivation to prepare soils for seeding. Therefore, the number of mechanical cultivators are almost equal with the number of plows. About 70% of the land preparation attachments are 10 years or older. Because the service life of these attachments is also around 10 years in duration, it is assumed that most existing land preparation implements are overdue for replacement.

[86] It is said that plowing cases soil erosion on farms. Thus, the government promotes no-till (plowing) method. However, according to the experts in Soil Institute of Moldova, tilling is necessary for soils to improve soil condition every 2 – 3 years depending on the soil conditions and environment, so farmers need to be advised where to apply for no-till and how often.

Seeders or planters are also common machines used in the agricultural sector. There are a variety of seeders and planters operated in Moldova, but the pneumatic seeders and planters which have functions for tilling (those which till soil simultaneously while seeding/planting) and seeding with 3 - 6m working width (operated in combination with a 80-120 hp tractor) are most common. It was also verified through interviews with agricultural machinery dealers that pneumatic planters or seeders are commonly used by the farmers in Moldova. Seeders and planters are also necessary implements for grains, but the number of these machines is much lower than the number of attachments for land preparation. This can be explained by the fact that their working efficiency is greater than that of plows due to the working width[87].

Spraying machines are mainly used for spraying chemicals such as pesticides, herbicides and fungicides as well as liquid fertilizers. Popular spraying machines in Moldova are traction types with two wheels mounted or pulled by a tractor. Manual or self-propelled varieties are less commonly used, though also available. For annual crops such as grains or other vegetable crops, a boom sprayer which has long arms equipped with spraying nozzles is used. Multi-direction sprayers, sometimes referred to as speed sprayers, are used for perennial crops such as fruits and nuts. According to sales figures for sprayers from machinery dealers, the latter type is more common than other types of sprayers.

(3) Use of Facilities and Equipment

Irrigation facilities for plant production

Irrigation schemes in Moldova have been operated by 12 state enterprises during the time of Soviet Union. In Moldova, irrigation systems are divided into three components; namely: i) pump stations, ii) distribution channels with small scale pumps to redirect water course and; iii) on-farm distribution equipment. There were 95 pump stations along the two major rivers, 160 pump stations to redirect course of water, and 575 irrigation facilities on farm (movable sprinkler irrigation systems). After Moldova gained its independence, the land reform and privatization had taken place. Due to inefficiencies in the distribution of water to subdivided small pieces of private lands, the state enterprises failed to maintain the irrigation schemes. There are no irrigation pumps that are still operational except for pump stations rehabilitated by the donor fund. Irrigation facilities on farms were also abandoned.

Large scale water pump stations with other two components have been rehabilitated through a project called the COMPACT program which is funded by USAID/MCC (see Section 5.2). Through the program, 10 irrigation systems were rehabilitated, and Water Users Associations (WUAs) were organized for each system[88]. Ownership of irrigation systems belongs to state enterprises, but are leased to WUAs for a duration of 30 years. Annual membership fee of WUA is USD 10-15 per ha. Water fee is 15 cents per 1 cubic meter for WUA members, and 45 cents for non-members. Farming scale of the members is around 1 to 15ha, and major crops are F&V. According to Sustainable Development Account Moldova (SDAM) which was originally established as a Millennium Challenge Account for USAID/MCC funded project management, one of the challenges for WUAs is that members do not always pay the membership fees because they do not use the irrigation facilities if rainfall is sufficient.

Apart from large scale irrigation schemes operated by WUAs in Moldova, there are enterprises and family level irrigation activities. Sources of irrigation water are ground water or surface water such as pond, lake and rivers. As surface water is not always available around the farms where

[87] Plowing may sometimes be required for 2 times depending on the soil and weather conditions, and it could be the reasons for less working efficiency than seeding and planting.
[88] 12 state enterprises are not involved in management of rehabilitated irrigation systems, but they manage water supply utility since 2000.

farmers want to water, ground water is more common for holding level irrigation; however, there are two conditions for using the ground water, namely: i) there is no access to river water and; ii) there is enough ground water according to the government assessment. These conditions could prevent farmers from using ground water. Moreover, according to Water Moldova which controls state owned irrigation and water supply, 90% of ground water in Moldova is not suitable for agriculture due to its high salinity.

In addition to such regulatory and environmental factors, dissemination of technologies at the holding level is also a limiting factor for use of irrigation water. According to the agriculture census, the number of irrigation machines or pieces of associated equipment is 773. Only 34.4% of this total is over 10 years old, suggesting that existing irrigation machines and equipment are comparatively new. There are different types of irrigation machinery and equipment but field observation and interviews revealed that drip irrigation systems, water trucks with hosepipes and engine-driven water pumps with hosepipes are widely used. With the exception of drip irrigation system, these technologies are simple, and farmers do not need a great deal of technical skill to operate them. Thus, it can be assumed that the factors preventing farmers from using water, except for regulatory and environmental factors, are financial.

As the irrigation facilities and equipment are relatively new and few in number, the coverage of irrigation is very limited. The combined irrigated area for grains and industrial crops is approximately 1%. Vegetables, potatoes, orchards and vineyards require a plentiful and consistent water supply; thus, the coverage of irrigation is much higher than that of grains and industrial crops, but still only about 15% that of vegetables and less than 10% of orchards and vineyards. The vegetables and fruit farmers whom the survey team interviewed had individual irrigation systems, but they emphasized that irrigation was the main obstacle to expanding their area of cultivation.

Table 2-31: Coverage of Irrigation

Categories of crops	Total Agricultural Holdings		Total cultivated area (ha)	
	No. of Holdings	Area (ha)	Area (ha)	Rate of irrigated area
Cereals for grains	168	2,048.2	804,108.1	0.25%
Sugar beet	6	104.6	23,301.7	0.45%
Sun flower	31	252.3	239,373.2	0.11%
Soya	19	804.8	61,049.6	1.32%
Tabaco	10	227.9	4,520.0	5.04%
Potatoes	510	2,621.6	25,081.1	10.45%
Vegetables	1177	5,701.5	36,493.2	15.62%
Orchards*	96	2,024.0	28,506.3	7.10%
Vineyards	41	1,064.2	26,276.3	4.05%

* It does not include the productive areas in plots around the house and gardens (scattered trees).
Source: 2011 GAC in the Republic of Moldova (2012)

Storage for crops

The table below shows the potential capacity of sheds, barns for grain, space for refrigeration, cold storage and other storage and the total production of relevant crops such as grains, vegetable and fruits[89]. The rate of capacity vs utilization is more than 100% across all storage facilities. In other words, farmers have insufficient space for storage. The lack of space for refrigeration and cold storage which is especially important for vegetables and fruits are being stretched to critical capacity. Freshness is the most important factor for the value of fruit and vegetables; therefore, this lack of refrigeration space and cold storage constitutes a significant obstacle to adding value

[89] Amount of productions is calculated from NBS data.

to crops. Needless to say, the lack of appropriate storing facilities may also harm the safety of the crops.

Table 2-32: Capacity of Storage for Crops

Facilities for crops storage	No. of holdings	Potential capacity (ton)	Total productions (ton)	Rate of capacity utilization
Sheds, barns for grain	195,180	1,888,070	2,206,000	116.8%
Spaces for refrigeration	6,330	321,907	889,500	276.3%
Cold storage		196,125	889,500	453.5%
Other storageof vegetable products	159,807	712,141	889,500	124.9%

Source: 2011 GAC in the Republic of Moldova (2012) and NBS (2015)

Livestock facilities

Interestingly, according to the statistics for livestock related facilities, the rates of capacity utilization are very low compared to crop related facilities. Stables for cattle and pigs are utilized to around 65% of capacity while that rate for horses is only 57.9%. The shelters for sheep and goats are better than others but they are not even using 80% of potential capacity. The lowest usage rate is for poultry shelters which operate at a paltry 45.4%.

There is no reliable data or information about the causes of underutilization for livestock facilities; however, it can be assumed that the livestock industry has been hampered by many incidents which occurred throughout the process of privatization after the collapse of Soviet Union and independence of Moldova. This might include issues such as: the in-flow of cheaper and higher quality products from other countries; the lack of competitiveness of animal products due to inefficient technologies, and under-investment among other causes.

Table 2-33: Status of Livestock Facilities

Facilities for livestock	No. of holdings	Potential capacity (head)	Total No. of animals (head)	Rate of capacity utilization
Stables for cattle	206,767	447,182	296,894	66.4%
Stables for horses	57,644	83,246	48,179	57.9%
Shelters for pigs	301,559	1,103,960	689,478	62.5%
Shelters for sheep and goats	135,401	1,445,102	1,137,529	78.7%
Shelters for poultry	55,142	27,508,605	12,502,379	45.4%

Source: 2011 GAC in the Republic of Moldova (2012) and NBS (2015)

(4) Use of Fertilizers and Chemicals

In Moldova, agricultural production is entirely dependent on the imports of plant protection products, fertilizers, seeds, and fuel, which has a negative impact on the competitiveness of Moldovan agricultural and food products. Since both fuel and plant protection products and fertilizers are imported, the agriculture of Moldova is dependent on the volatility of international prices.

The prices for agricultural products and raw materials have increased significantly over the last decade; however, trading conditions remain unfavorable for farmers of Moldova. World prices for agricultural products have increased by 70%, while agricultural prices for agricultural raw materials have increased by 58% over the same period. Since most of the traded agricultural inputs are imported, the farmers of the Republic of Moldova must pay global prices for them, but are unable to benefit from global prices for their products to the same extent.

The table below shows the analysis of the usage of fertilizers and pesticides in the cultivation of crops in the analyzed farmsteads.

Table 2-34: The Use of Fertilizers and Pesticides in the Cultivation of Crops per Unit of Area in the Interviewed Farms

Plot No.	Major Production	Agricultural Inputs									
		Fertilizer (kg/ha)						Chemical, l or kg / ha			
		NPK	Ammophos	NAG	URE	Manur	Others	Herbicide	Fungicide	Insecticide	Others
1	Winter wheat	27.13	11.82	58.51	24.97	147.02	0.40	0.35	1.02	0.05	0.01
2	Barley		21.64	37.91	5.45			0.21	0.43	0.15	
3	Corn	15.83	2.12	15.69	1.36	77.48	0.63	1.59	0.35	0.07	
4	Sunflower	36.54	12.34	1.90	1.69	10.32	0.35	0.78	1.09	0.11	
5	Soy beans	39.86			0.42			1.24			
6	Green house		176.47	133.53		13,890.20	9.80		10.21	1.85	
7	Vegetable	11.43	5.02	22.31		1,232.01		0.03	4.53	1.18	
8	Stone fruit	5.08	8.13	2.03		1,092.26	4.88	0.23	6.01	1.52	0.49
9	Seed fruit						0.49	0.87	1.66	3.71	0.45
10	Berry										
11	Nuts		19.66			5,678.62			0.15		
12	Fruit tree nursery	69.61	90.49	116.47				0.14	1.62	0.82	
13	Grapes	53.03						1.62	3.98	0.04	
14	Alfalfa – clover										

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Analyzing the data table, we can see that the intensity levels of cultivation are low because mineral fertilizers are introduced in small amounts, thus the protection of plants against pests and diseases are also at a minimum. Farmers have understood the benefits of using herbicides and use them on almost all field crops, but fungicides and insecticides are still only used in small amounts.

The quantities of fertilizers applied per ha are small (compared to the amounts of fertilizers recommended by agronomists), as they are presented in physical substance and are insufficient for obtaining high yields or to ensure the high intensity of applied technology. Inputs need to be imported into Moldova, because it is a limited market that lacks resources. The most important inputs in agriculture, which have a larger share in the unit cost, are mineral fertilizers, seeds and seedlings, pesticides and petroleum products.

The mineral pesticides are bought by the farmers from specialized brands, because there are recognizable brands (Fosagro, Evroghim, Rosoş, etc.) and they are marketed by a steady 10-20 companies that have advertising divisions and guarantee quality. The market for mineral fertilizers and other fertilizers faces tough competition, prices are optimal (including profit margins); however, the biggest problem is that soil fertilization normally requires large amounts of fertilizers, and fertilizers can be relatively expensive, which limits their optimal application by farmers.

Pesticides are marketed by several companies and this market is flooded with counterfeit products alongside original ones. There are famous brands (BASF, Bayer, Dupont, Syngenta) that sell original products, which are of high quality and are sold at the highest prices. There are also companies that sell generic pesticides which represents a medium segment with average prices (there are good products as well, but need to be tested). The lowest prices for pesticides are chemical products of Chinese origin, which are of dubious quality and efficacy. Suppliers of

pesticides and seeds add a substantial profit margin because the market is small and limited and seek higher returns. Suppliers typically add a profit margin of 20-25% of the import value to prices for pesticides and seeds upon advance payment for goods. If the farmer requests the purchase of pesticides through a technical credit, which is to pay the value of products in autumn (October), suppliers add 35-40% of the import value. Most suppliers are dealers of companies with which they cooperate, where the dealer gets a commercial discount at the end of the year if he/she makes all payments to the company in November - early December (this discount may amount to 10-18% of the transaction amount – depending on the sales volume, as there are caps for different sales volumes).

The market for petroleum products is monopolized as well, because, prior to customs clearance of such products, their import price is artificially inflated. Companies registered in offshore zones act as intermediaries between refineries (where oil is purchased) and the customs; they increase the value of products (making the goods more expensive) while profits are collected in tax havens. The National Agency for Energy Regulation of Moldova must monitor and control the prices, which are established based on the price calculation mechanism, but it does not fulfil its duties adequately, because it is politically-affiliated and is not independent (the director is a political appointee, as the competitive recruitment for the position is imitated).

The majority of the interviewed farmers mentioned the fact that the state must interfere in the market for pesticides to regulate the prices and to verify the quality of the pesticides, as there are many counterfeit products on the market sold at the price of the recognized brands and original products. As a consequence, farmers have incurred significant losses resulting from the state's inability to fulfill its obligations.

The regulation and monitoring of the market for pesticides, fertilizers and seeds (seedlings) falls under the responsibility of the following government institutions/agencies:

1. NFSA, a national authority in charge of implementing the state policy on regulation and control of food safety and veterinary safety, animal husbandry, plant protection and phytosanitary quarantine, seed control, quality of primary products, food and livestock fodder.
2. State Enterprise "State Centre for Certification and Approval of Phytosanitary Means and Fertilizers" under the MoAFI.
3. Cartel agreements must be investigated and penalized by the National Agency for Protection of Competition.

2.4.2 Cost Efficiency of Productions of Major Crops

(1) Cropping Calendar and Inputs

Cropping calendars provide appropriate timing of every form of farm work. Better outputs in agricultural activities can be attributed to timely inputs, especially in Moldova where rainfall is limited. Thus, it is important to know the cropping calendar when we estimate cost efficiency of agricultural activities. In this section, we demonstrate the cropping calendars of major crops, namely: Wheat (which represents grains), cucumbers, tomatoes, cabbage, apples, plums and table grapes. Since the sample base is limited, the estimate of working days and necessary laborers and machinery used have been assessed through a theoretical approach[90].

[90] For these cropping calendars, an estimation of inputs and cost-benefit analysis will be reviewed during the next visit in March.

Grains

As can be seen in the table below, the wheat production process is more mechanized compared to other crops. The availability of farm machinery and equipment for grains is better than machines for other crops because these are traditional crops in Moldova. The typical scale of grain production is large, thus mechanization is inevitable.

Table 2-35: Cropping Calendar of Wheat (100ha)

Activity	Inputs	Required time/days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Land preparation (plowing)	Tractor with plow, 1 operator	21 days								■	■	■		
Land preparation (harrowing)	Tractor with harrow, 1 operator	21 days									■	■	■	
Seeding	Tractor with seeder, seeds, 1 operator	14 days										■		
Fertilizer	Tractor with sprayer, labor	20 days			■	■	■	■	■	■				
Pest control	Tractor with sprayer, labor	20 days					■	■	■					
Harvesting	Combine harvester, 1 Labor	18 days							■	■	■			

Source: JICA Survey Team

Vegetables

Vegetable production is more labor intensive compared to grain production. Land preparation for vegetables is conducted by mini-tractor with a rotary tiller which stirs soil and makes ridges. Spraying is conducted by the mini-tractor and a sprayer. There are several ways to spray chemicals and liquid fertilizers, but for the purpose of these estimates the team assumed that farmers apply a small-sized boom sprayer. Laborers are generally sourced from within the village. Working hours do not always entail the full-day, especially during the summer season. Farmers work for half days during the morning or evening or both.

Table 2-36: Cropping Calendar of Cucumber Production

Activity	Inputs	Required time/days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Land preparation	Tractor with rotary tiller, 1 labor	2 days					■							
Seeding	Seeds, 1 labor	1 day						■						
Plant	10 Labor	0.5 day x 2 days							■					
Fertilizer	Fertilizer, labor	0.5 day x 12 times							■	■	■	■	■	
Pest control	Mini-tractor with sprayer, pesticide, 1 labor	1 day							■	■	■			
Pest control	Pesticide, 1 labor	2 hours x 12 times									■	■	■	
Harvesting	3 Labor	0.5 day x 40 days								■	■	■	■	

Source: JICA Survey Team

Table 2-37: Cropping Calendar of Cabbage Production

Activity	No. of labor	Required tiem/days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Land preparation	Tractor	0.5 day												
Fertilizer (manure)	4 labors	2 days												
Seeding	2 labors	2 days												
Fertilizer	1 labor	2 hours												
Transplant	5 labors	3 days												
Watering (1.5h/day)	drip irrigation													
Fertilizer	1 labor	2 hours x 2												
Pestisides	Tractor, sprayer	2 hour												
Harvesting	3 labors	10 - 14 days												

Source: JICA Survey Team

Table 2-38: Cropping Calendar of Tomato Production

Activity	Inputs	Days of Working	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Land preparation	Mini-tractor with tiller	2 days												
Seeding	3 labors	2 days												
Trasplant	3 labors	3 days												
Watering (irrigation)	water	everyday												
Fertilizer	1 labor	1 - 2 hours x 3												
Pesticides	1 labor	1 - 2 hours x5												
Harvesting	3x200 lei	0.5 days x 20												

Source: JICA Survey Team

Fruits

Fruit production in Moldova is highly labor intensive. The cropping pattern is similar to that of vegetables. Laborers are mobilized for plant management before the season starts to perform activities such as pruning and branch binding and for harvesting as well. Fruits also require a lot of spraying for plant protection depending on the condition of the plants.

Table 2-39: Cropping Calendar of Apple Production

Activity	No. of labor	Fee / day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pruning and pest contro (painting medicine on bottom of trees)	2 labors	40 days												
Spraying	Mini-tractor with sprayer, pesticides, operator	20 days												
Watering	drip irrigation													
Harvesting (early)	10 labors	3 days												
Harvesting (late)	10 labors	3 days												
Mowing (5 times)	1 operator	0.5 x 5 days												
Fertilizer (5 times)	1 operator	0.5 x 5 days												

Source: JICA Survey Team

Table 2-40: Cropping Calendar of Plum Production

Activity	Inputs	Days of Working	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pruning and pest contro (painting medicine on bottom of trees)	2 labors	14 days												
Mowing (disc harrow)	Tractor with mower, 1 operator	1 days												
Sprayer	Tractor with sprayer, 1 operator	0.5 day x 8 times (every 2-3 weeks)												
watering	1 tractor operator and 1 labor	2 days x 3 times												
Harvesting	5 labors	7 days												

Source: JICA Survey Team

Table 2-41: Cropping Calendar of Grape Production

Activity	No. of labor / machinery	fee / day (amount)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pruning and pest contro (painting medicine on bottom of trees)	3 labors	10 days												
Branch binding	3 labors	5 days												
Bud picking	3 labors	5 days												
Spraying	Mini-tractor with sprayer, 1 operator	2 hours x 12												
Watering	1 tractor operator, 1 labor	2 days x 3 times												
Harvesting	3 labors	10 days												

Source: JICA Survey Team

(2) Assumed machinery combination, field coverage and operation cost

Field coverage

Accurate estimation of the cost efficiency of mechanization can only be attributed to the accumulation of accurate data and processing it through long-term research and observation. Thus, in this section, the team estimates the cost efficiency of typical machinery based on the available data collected in Moldova in conjunction with other relevant data to increase the accuracy of its estimations.

To estimate the approximate cost for operating farm machinery, it is necessary to calculate the field coverage of available machinery that is typically used to service major crops such as grains, vegetables and perennial crops. In order to calculate the field coverage of machinery, the team used the field coverage of typically required implements for the above-mentioned crops operated by tractors as was mentioned in the table such as: (1) plow, (2) harrow, (3) seeder/planter, (4) sprayer with large tank (5) combine harvester, (6) sprayer (7) rotary tiller (8) speed sprayer and (9) mower. The attachments (1) to (5) are used for grains while (6) and (7) are required for vegetable cultivation. (8) and (9) are predominantly used with perennial crops such as fruits and nuts. The specifications for using attachments such as the hp of tractors, working width, and speed of operation can vary widely, in this case standard specifications have been used to make estimates. For instance, the most common tractors are 80-100 hp for grains and 30-50hp for vegetables and perennial crops in Moldova. Some data used for calculating field coverage were collected through the field survey; otherwise, existing data has been utilized where applicable[91].

[91] Specifications for machinery such as working width, operating speed and others are collected from the documents acquired from the machinery dealers in Moldova. Data was also collected through Internet sources that include the machinery dealers in Moldova. Because there is no standardized rate in Moldova for calculating field coverage, something that is usually formulated based on long-term data collection and processing in a certain region in countries where there is an institution specialized in agricultural mechanization, the team utilized the field efficiency rate and daily field operation rate of Hokkaido where the climate is similar to Moldova. Available daily working hours (hours of workable daytime), daily field operation hours and rates for available working days were also adapted from Hokkaido's figures.

The table below shows the universal method of field coverage calculations for farm machines. According to the table, the field coverage of plow and harrow which are used for land preparation and seeding is around 80 to 100 ha. Multiplying the field coverage of these attachments with the total number of the attachments in the 2011 GAC, produced an estimated total coverage for all machinery[92]. The total coverage of machinery for grains and industrial crops is lower than the total ha sown, about 2 million for grains and industrial crops and 1.5 million for grains only (2011 GAC). The capacity of machinery for grains and industrial crops is around 60% except for combine harvesters used for grains which is about 17%. Based on this calculation, the number of required machines can be also estimated. As has been demonstrated, the need for essential machinery is very high.
Boom sprayers with small tanks and rotary tillers operated by 30-50 hp tractors are used for vegetables. The field coverage of these attachments is71.3 ha and 37.2 ha respectively. Because the field coverage of a tractor is constrained by the minimum coverage of the attachment which in this case is the rotary tiller, the field coverage of one mini tractor for vegetable cultivation is assumed to be around 30 to 40ha. Similarly, the coverage rate for vegetable crops is estimated at only 66.5%. Additionally, it is worth mentioning that the sown areas of vegetables declined dramatically from 117,000ha in 2000 to 54,000ha in 2015. In other words, Moldovan farmers may require 2,179 more rotary tillers to cover the area sown in 2000.

Speed sprayers which are towed by a mini tractor can cover about 82 ha while the coverage of a mower is only 50 ha. Since reliable data for the number of mowers is not available, estimating the rate of field coverage for perennial crops has been based on the speed sprayer at 70%.

The number of machines applied to this estimation is based on data from 2011 (except in the case of speed sprayers), thus the potential exists that actual coverage could be higher than the estimates. Assuming that the sown areas are actually covered by the identified number of machines, farmers must be operating machinery for more than appropriate periods of time. In fact, this is a common practice in countries or areas where the number of agricultural machines is insufficient to meet demand. In order to cover the sown areas, farmers cannot avoid operating the machinery before or after the appropriate seasonal periods for farm work. This contributes to lower productions per ha and is particularly problematic for small or medium scale farmers. Depending on the lease arrangements or machinery services provided by others, farmers may have no other choice but to wait for machines to become available; subsequently, their yields are lower than those of machine owners.

[92] An estimate for the total coverage of sprayer for grains and mowers for orchards (perennial crops) has not calculated because it is difficult to extract the number of boom sprayers and speed sprayers from the total in the census. The number of sprayers for orchards is based on data provided by 2KR Unit which is a total of all sales from 2001 to 2016. There is no reliable data for the number of mowers.

Table 2-42: Field Coverage of Major Implements

Items	Symbol / Formula	1	2	3	4	5	6	7	8	9
		Plow	Harrow	Seeder / Planter	Boom Sprayer (large)	Combine harvester	Boom Sprayer (small)	Rotary Tiller	Speed Sprayer	Mower
Applicable Crops		Grains Industrial crops	Grains Industrial crops	Grains	Grains Industrial crops	Grains				
Required Horse Power	hp	100-120hp	100hp	100hp	100-120hp	150hp	30-50hp (vegetables)	30-50hp (vegetables)	30-50hp (orchrard)	30-50hp (orchard)
Width (m)	W	1.3	2.7	3	18	5	8	1.5	8	1.5
Operating speed (km/h)	V (km/h)	5	5	8	4	9	4	3	6	5
Theoretical field capacity	Ct(ha/h)= W*V/10	0.7	1.4	2.4	7.2	4.5	3.2	0.5	4.8	0.8
Field Efficiency (%)	Ef	75	75	55	60	70	60	75	55	75
Effective field capacity (ha/h)	C=Ct*Ef/100	0.5	1.0	1.3	4.3	3.2	1.9	0.3	2.6	0.6
Daily working hour	T	11	11	11	11	11	11	7	8	11
Daily field operation rate	J	75	75	55	75	70	75	75	75	70
Daily field operation hour	Te＝T*J/100	8.25	8.25	6.05	8.25	7.7	8.25	5.25	6	7.7
Daily field capacity (ha/day)	Ad(ha/Day)= C*Te	4.0	8.4	8.0	35.6	24.3	15.8	1.8	15.8	4.3
Total days in farming period	D	30	30	20	30	30	30	30	120	90
Rate of available working days	K	75	70	70	60	60	60	70	65	65
Effective working days (in farming period)	De=D*K/100	22.5	21	14	18	18	18	21	78	58.5
Times of field operation on a plot	N	1	2	1	4	5	4	1	15	5
Field coverage	A(ha)=Ad*De /N	90.5	87.7	111.8	160.4	87.3	71.3	37.2	82.4	50.7
Number of Machineries		13,882	12,154	8,915	N/A	3,000	N/A	965	702	N/A
Total coverage		1,256,213	1,066,001	996,733	N/A	261,954	N/A	35,907	57,822	N/A
Swon areas of major crops*		1,938,000	1,938,000	1,503,000	1,938,000	1,503,000	N/A	54,000	82,000	N/A
Rate of coverage		64.8%	55.0%	66.3%	N/A	17.4%	N/A	66.5%	70.5%	N/A
Required number to cover sawn areas		7,534	9,942	4,528	N/A	14,213	N/A	486	294	N/A

*The data for column 1- 5 are total sown areas of grains and industrial crops that may required the attachment in the columns (NBS, 2015). Column 6 and 7 are sown areas of vegetables and 8 and 9 are orchard (NBS, 2015 and 2011 GAC)

Source: JICA Survey Team

Fixed cost of tractors

The fixed cost of tractors is calculated by multiplying the initial cost with the fixed cost rate which consists of: depreciation cost, repair cost, the cost of a machinery shed and other incidental costs like interest on investment, tax and insurance. The repair costs could be higher than the applied rate as most machinery is being operated beyond the service life.
Variable costs of tractors are associated with the attached implements.

Table 2-43: Estimation of Fixed Cost

Unit: MDL

A)	Fixed Cost	Calculation/Unit	Tractor	Mini-tractor (50hp)	Mini-tractor (30hp)
1	Fixed Cost	Initial cost - salvage value / life of machine	250,320	204,627	90,303
2	Initial cost of machine		1,260,000	1,030,000	454,545
3	Fixed Cost Rate	total fixed cost / initial cost x 100	19.9%	19.9%	19.9%
4	Depreciation	(initial cost - salvage value) / life of machine	6.7%	6.7%	6.7%
5	Repar cost	{life repare cost + mainte cost)/life of machine}/initial cost	4.7%	4.7%	4.7%
6	Machinery shed	Cost of machinery shed / initial cost	1.5%	1.5%	1.5%
7	Other cost	(Interst on investment + tax + insurance) / initial cost	7.0%	7.0%	7.0%

Source: JICA Survey Team

Fixed cost and variable cost of implements

The fixed costs of the implements are calculated using the same approach employed to calculated estimates for tractors. Variable costs consist of fuel consumption, the price of fuel[93], lubricants and the operator's wages. As can be seen in the table, fuel cost is the highest variable cost with the exception of mowers. Costs could be higher than the rate depicted in this table because the age of the machinery may impact fuel efficiency.

Table 2-44: Variable Cost of Attachments

Unit: MDL

A)	Fixed Cost	Calculation/Unit	Plow	Harrow	Seeder / Planter	Boom Sprayer (large)	Combine harvester	Boom Sprayer (small)	Rotary Tiller	Speed Sprayer	Mower
1	Fixed Cost	Initial cost - salvage value / life of machine	17,000	40,800	11,040	46,000	436,757	11,500	19,000	30,420	12,500
2	Initial cost of machine		170,000	170,000	48,000	200,000	1,612,500	50,000	76,000	117,000	50,000
3	Fixed Cost Rate	total fixed cost / initial cost x 100	10.0%	24.0%	23.0%	23.0%	27.1%	23.0%	25.0%	26.0%	25.0%
4	Depreciation	(initial cost - salvage value) / life of machine	10.0%	10.0%	10.0%	10.0%	14.3%	10.0%	10.0%	10.0%	10.0%
5	Repar cost	{life repare cost + mainte cost)/life of machine}/initial cost	4.0%	2.0%	4.0%	4.0%	4.3%	4.0%	4.0%	7.0%	4.0%
6	Machinery shed	Cost of machinery shed / initial cost	5.5%	5.0%	2.0%	2.0%	1.5%	2.0%	4.0%	2.0%	4.0%
7	Other cost	(Interst on investment + tax + insurance) / initial cost	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
B)	**Variable Cost**	**Calculation/Unit**	**642.1**	**252.2**	**126.3**	**49.9**	**247.9**	**61.5**	**435.4**	**44.7**	**129.6**
1	Fuel Cost	(2) x (3) / field capacity(ha/h) = MDL/ha	430.8	163.6	73.9	31.3	181.0	31.3	243.8	22.7	45.0
2	Fuel consumption	(litter / hour)	14.0	12.0	6.5	9.0	38.0	4.0	6.5	4.0	5.0
3	Unit price of fuel	(MDL/litter)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
4	Lubricant	30% of fuel cost (fuel cost x 1.3)	129.2	49.1	22.2	9.4	54.3	9.4	73.1	6.8	13.5
5	No. of operator		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	Wage of operator	(MDL/hour)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
7	Wage of operator	(MDL/hector)	82.1	39.5	30.3	9.3	12.7	20.8	118.5	15.2	71.1

Source: JICA Survey Team

[93] The price of diesel has fluctuated dramatically, thus the team applied average of fuel price for the last 10 years.

(3) Estimation of Cost Efficiency of Farm Machinery

The following tables show the operation costs of tractors and their attachments per ha according to four different sizes of operation. In order to estimate cost efficiency, each table consists of a set of machines which correspond to their related crops.

Table 2-45 reveals the minimum set of machines required for grain cultivation such as wheat, barley and corn. A 100 hp tractor has been used for these calculations because of its popularity and widespread use. Field coverage, annual fixed costs and variable costs have been extracted from the estimation in the previous section. The maximum field coverage of this set of machinery is 88 ha. Hence, the appropriate scale of operation is potentially 100 ha. Use of a boom sprayer could be optimized by leasing or providing machinery services to other farmers. It should also be noted that for farmers who possess fewer than 100 ha, operating these kinds of machines would be a liability. Instead, to optimize the use of these machines, farmers need to integrate small pieces of arable land or organize themselves as a company or cooperative to share the machinery more effectively.

Distribution of other sets of machines which could be applied at smaller scales which suit the majority of farmers in Moldova would be another possible approach to optimize the use of farm machinery.

Table 2-45: Cost Estimation of Machineries Used for Grains

Input	Specification	Field Coverage (ha)	Annual Fixed Cost (MDL)	Variable Cost / ha (MDL)	Cost/Area (MDL)			
					50ha	100ha	150ha	200ha
Tractor	100hp		292,320	-	5,846	2,923	1,949	1,462
Plow	1.8 working width	82	17,000	642	982	812	755	727
Harrow	2.7m working width	88	40,800	252	1,068	660	524	456
Seeder / Planter	3m working width	112	11,040	126	347	237	200	182
Boom Sprayer (large tank)	18m working width (1,500-2,000l)	160	46,000	50	970	510	357	280
Combine Harvester	150hp (grains)	87	436,757	248	8,983	4,616	3,160	2,432
				Total Expense/ha	12,350	6,834	4,996	4,076

Source: JICA Survey Team

The sets of machineries shown in Table 2-46 and Table 2-47 are specifically used for vegetable farming. Like fruit and vineyard cultivation, vegetable farming is more labor intensive than the farming of grains or industrial crops. Therefore, it is beyond the scope of average farming capacity in Moldova to have large scale vegetable farms especially considering the ongoing labor shortage. One vegetable farmer interviewed by the team stated the reasons that they hadn't expanded the scale of their farming activities were due to the lack of finance and insufficient number of available workers.

Due to these reasons, vegetable farmers have no other choice but to run small scale farms; for which small scale machines (such as the "mini-tractor") are necessary. Though the sales numbers of mini-tractors are still very limited, they are gradually gaining popularity among vegetable and fruit producers, according to the machinery dealers. The mini-tractors mentioned in the following two tables are chosen to illustrate the examples. There are many similar machines supplied by other manufacturers but small size tractors are still rare. A 50 hp tractor is the smallest version that can be sold brand-new, but there currently exist smaller tractors such as 30 hp. In this estimate, the team compared two different tractors namely the 50hp and 30hp using the same attachments. These attachments can be operated by both 30 and 50hp tractors.

Since the scale of a farm is confined by the lowest field coverage, the appropriate size of a vegetable farm serviced by this set of machinery would be around 30 - 40 ha. These two different tables prove that farmers can reduce the cost of machinery use by choosing an appropriate size tractor which is 30hp in the case of this example. As the table demonstrates, the annual fixed cost of the 30 hp mini-tractor is less than half that of the 50 hp mini-tractor. When a farmer operates 30 ha of farm land uses this combination of machinery, they can cut costs by nearly 50%. In the context of Moldova, where small and medium scale farmers are the prominent producers of vegetables, dissemination of small size of tractors will be important for facilitating cost-effective farming and stimulating vegetable production.

Table 2-46: Cost Estimation of Machineries Used for Vegetables (50hp)

Input	Specification	Field Coverage (ha)	Annual Fixed Cost (MDL)	Variable Cost / ha (MDL)	Cost/Area (MDL)			
					5ha	10ha	30ha	50ha
Mini-tractor(50hp)	50hp	-	204,627	-	40,925	20,463	6,821	2,500
Rotary Tiller	1.5m wrking width	37	19,000	435	4,235	2,335	1,069	815
Boom Sprayer (small)	30-50hp (vegetables)	71	11,500	61	2,361	1,211	445	291
				Total Expense/ha	47,522	24,010	8,334	3,607

Source: JICA Survey Team

Table 2-47: Cost Estimation of Machineries Used for Vegetables (30hp)

Input	Specification	Field Coverage (ha)	Annual Fixed Cost (MDL)	Variable Cost / ha (MDL)	Cost/Area (MDL)			
					5ha	10ha	30ha	50ha
Mini-tractor(30hp)	30hp	-	90,303	-	18,061	9,030	3,010	1,806
Rotary Tiller	1.5m wrking width	37	19,000	435	4,235	2,335	1,069	815
Boom Sprayer (small)	30-50hp (vegetables)	71	11,500	61	2,361	1,211	445	291
				Total Expense/ha	24,657	12,577	4,524	2,913

Source: JICA Survey Team

Table 2-48 and Table 2-49 show the combination of machinery for permanent crops such as fruits and nuts. The maximum area that can be covered by the set of machinery below is around 50 ha though the current size of fruit and nut farms is much smaller than the maximum field coverage due to lack of labor. The farmers that own machinery for comparatively small field coverage will be forced to operate at inefficient levels by continuing to use current machines or else should optimize cost-benefits through leasing or providing other machinery services.

As it was proved in the case of vegetable production, the comparison between the two tables proves that a 30 hp mini-tractor has the potential to incur lower operating costs than 50hp mini-tractors in the case for small and medium scale farmers.

Table 2-48: Cost Estimation of Machineries Used for Fruits (50hp)

Input	Specification	Field Coverage (ha)	Annual Fixed Cost (MDL)	Variable Cost / ha (MDL)	Cost/Area (MDL)			
					5ha	10ha	30ha	50ha
Mini-tractor(50hp)	50hp	-	204,627		40,925	20,463	6,821	4,093
Speed Sprayer	8m working widt Orchard	82	30,420	45	6,129	3,087	1,059	653
Mower	1.5m working width Orchard	51	12,500	130	2,630	1,380	609	380
				Total Expense/ha	49,684	24,929	8,488	5,125

Source: JICA Survey Team

Table 2-49: Cost Estimation of Machineries Used for Fruits (30hp)

Input	Specification	Field Coverage (ha)	Annual Fixed Cost (MDL)	Variable Cost / ha (MDL)	Cost/Area (MDL)			
					5ha	10ha	30ha	50ha
Mini-tractor (30hp)	30hp	-	90,303	-	18,061	9,030	3,010	1,806
Speed Sprayer	8m working widt Orchard	82	30,420	45	6,129	3,087	1,059	653
Mower	1.5m working width Orchard	51	12,500	130	2,630	1,380	609	380
				Total Expense/ha	26,819	13,497	4,678	2,839

Source: JICA Survey Team

Analysis of cost efficiency of machinery proved that the currently employed farm machinery such as tractors and their attachments typically exceed the necessary specifications for the majority of farmers (small and medium). The situation has been compounded by the sluggish replacement process for machinery following the Moldovan independence. Many farmers are still using machines distributed during the period of Soviet rule, so there are few options but to integrate available farm land, share use of large scale machines, or depend on leasing machinery and machinery services.

(4) Profitability of Major Crops

In the following sections, the team estimates the gross income of major productions and major costs, so that the team will be able to estimate the cost-benefit of these crops[94]. The estimation of gross income is based on statistical data collected from FAOSTAT and NBS. The table proves that the gross incomes per ha of vegetables are higher than others. The gross income earned by apples is higher than that of wheat, but cost-benefit of plums and grapes is comparatively low.

Table 2-50: Gross Income per ha by Major Crops

Crops	2011	2012	2013	2014	2015	Average (USD/ton)	ton/ha* (2015)	Gross Income/ha in 2015 (USD)	Gross Income/ha in 2015 (MDL)
Wheat	169.3	203.4	146.6	141.5	129.1	158.0	3	387	7,669
Tomato	187.8	227.2	233.9	186.0	151.8	197.3	31	4,706	93,175
Cabbage	169.8	158.3	100.1	142.7	171.0	148.4	35	5,985	118,503
Cucumber	293.8	328.9	317.7	265.0	195.1	280.1	24	4,682	92,712
Apple			138.7	89.4	149.5	125.9	13	1,944	38,481
Plum			174.0	118.2	138.5	143.6	9.5	1,316	26,052
Grapes	277.7	355.7	245.6	200.4	213.4	258.6	7.1	1,515	30,000

*Data collected by AGROinform

Source: FAOSTAT and NBS

Other costs are estimated based on the data collected from the dealers of agricultural inputs[95], hearings with farmers and observations made on farms. The following tables are cropping calendars and major inputs of each crop. It is based on verbal feedback from farmers who produce these crops. The cropping calendars are a basic resource to assess the potential period of on-farm work. It assists in accurately predicting the number of days used for activities and the number of required laborers to complete the set of activities within a given period. The estimation of field coverage of machinery shown in Table 2-42 is also applied to estimating the required days for farm work conducted by farm machinery.

[94] How the team estimated cost of machinery use is explained in the section 2.4.

[95] The team applied price of fertilizer, pesticides, fungicides and herbicides and standard amount of application per hector collected from Agrostoc, one of the biggest cooperatives for producers which supplies most of the necessary agricultural inputs except for large scale agricultural facilities and machineries.

The cost efficiency of farm machinery utilization has been estimated in section 2.4, and the number of laborers and days required for farm work are elaborated in the cropping calendars. Based on cost-benefit projections of the crop production, the gross income per ha, and the unit cost of chemicals and fertilizers used should be considered to constitute the major expenditures. The gross income per ha is calculated based on the value of production per ha and the actual production per ha (Table 2-50). The chemicals applied to each type of fruit are diverse; therefore, it is difficult to specify the cost of chemicals and spraying for each crop. As a result, the team applied an average cost of chemicals applied per ha. Table 2-51 shows the average cost of chemicals and fertilizers applied to major crops.

Table 2-51: Cost of Chemicals and Fertilizers for Major Crops

Inputs	Crops						
Chemicals	Wheat	Cucumber	Cabbage	Tomato	Apple	Plum	Grape
Insecticides	11.1	9.2	9.4	12.6	16.2	12.4	14.1
Fungicides	18.6	44.8		40.3	23.4	29.9	28.8
Herbicides	11.3	31.2	44.9	26.0	34.6		22.2
Seed dressing	37.5						
Sub-total	79	85	54	79	74	42	65
Fertilizer	60	54	54	54	5		103
Total (USD)	139	139	108	133	79	42	168
Total (MDL)	2,521	2,534	1,970	2,416	1,436	770	3,058

Source: JICA Survey Team produced based on Agrostoc catalog

The tables below analyze the cost-benefit of major crops. Though the costs estimated in this section were calculated based on theoretical data, it serves to illustrate some features and bottlenecks in production.

Wheat

As previously mentioned, Moldovan wheat production is highly mechanized. It is natural that the cost of employing machinery (which totals 53.2% of the total cost) is much higher than other costs. In this sense, the optimization of machinery may help farmers reduce production costs and increase profits.

Table 2-52: Cost-benefit of Wheat (100ha)

Input	Formula / Reference	Cost (MDL)	Ratio
Machinery Operator	114 labors x MDL 200	22,800	3.1%
Seed/seedling	MDL 294 x 100ha	29,400	4.0%
Fertilizer & Chemicals	see Table 2-39	216,381	29.6%
Machineries	see Table 2-27	407,642	55.7%
Transportation	Applied standard rate	25,000	2.8%
Other cost	Applied standard rate (water, electricity, fuel, etc)	30,000	4.1%
	Total Cost	731,223	
	Gross income	894,663	
	Profit	163,440	
	Profit / ha	1,634	

Source: JICA Survey Team

Vegetables

Vegetable production is generally labor intensive. The ratio of total cost to labor cost is 42.5% for cucumbers, 40.7% for cabbage and 37.4% for tomato production. These crops require more laborers especially for harvesting. Considering the labor market situation in Moldova as outlined in Section 2.3, the mechanization of some of agricultural work may be necessary in order to reduce production costs. As the scale of vegetable cultivation is usually small, access to 30 to 50hp tractors needs to be improved. Chemicals and fertilizers are available at reasonable prices according to farmers, but horticultural facilities such as greenhouses equipped with air-conditioning and drip irrigation are not accessible to medium and small scale farmers.

Given that vegetables are vulnerable to many kinds of diseases, fungi and weeds, technical knowledge on the use of chemicals and fertilizers is a significant factor that helps to ensure the quality of production. Technical knowledge is accessible to farmers through the providers of agricultural inputs, but farmers who do not directly access the suppliers of these agricultural inputs may not have opportunities to receive advice or training.

While the profit of wheat is MLD 1,634 per ha, the profits of vegetables, namely cabbage, cucumbers and tomatoes are more than MDL 50,000 per ha.

Table 2-53: Cost-benefit of Cucumber (1ha)

Input	Formula / Reference	Cost (MDL)	Ratio
Machinery Operator	6 labors x MDL 200	1,200	3.3%
Labor	77 labors x MDL 200	15,400	42.5%
Seed/seedling	Applied standard rate	1,000	2.8%
Fertilizer & Chemicals	see Table 2-39	2,534	7.0%
Machineries	see Table 2-28	10,114	27.9%
Transportation	Applied standard rate	4,000	4.3%
Other cost	Applied standard rate (water, electricity, fuel, etc)	2,000	2.2%
	Total Cost	36,248	
	Gross income	92,712	
	Profit / ha	56,463	

Source: JICA Survey Team

Table 2-54: Cost-benefit of Cabbage (1ha)

Input	Formula / Reference	Cost	Ratio
Machinery Operator	10 operators x MDL 200	2,000	5.3%
Labor	77 labors x MDL 200	15,400	40.7%
Seed/seedling	Applied standard rate	1,000	2.6%
Fertilizer & Chemicals	see Table 2-39	1,970	5.2%
Machineries	see Table 2-28	11,448	30.3%
Transportation	Applied standard rate	4,000	3.4%
Others	Applied standard rate (water, electricity, fuel, etc)	2,000	1.7%
	Total Cost	37,818	
	Gross income	118,503	
	Profit / ha	80,685	

Source: JICA Survey Team

Table 2-55: Cost-benefit of Tomato (1ha)

Input	Formula / Reference	Cost	Ratio
Machinery Operator	18 labors x MDL 200	3,600	8.9%
Labor	48 labors x MDL 200	15,200	37.4%
Seed/seedling	Applied standard rate	1,000	2.5%
Fertilizer & Chemicals	see Table 2-39	2,534	6.2%
Machineries	see Table 2-28	12,338	30.3%
Transportation	Applied standard rate	4,000	9.8%
Others	Applied standard rate (water, electricity, fuel, etc)	2,000	4.9%
	Total Cost	40,672	
	Gross income	93,175	
	Profit /ha	52,503	

Source: JICA Survey Team

Fruits

The costs of both laborers and machinery are high for fruit production. Machinery is mainly used for spraying and mowing. The laborers are required for harvesting (like as vegetables) and for plant management. Labor costs for apples is the highest among the major fruits, while the cost for machinery use is higher for plum and grape production. Fruits require regular spraying of chemicals in order to prevent a wide variety of diseases. Spraying may be required anywhere in the vicinity of 10 to 15 times depending upon environmental conditions and the condition of the plants.

Profit per ha for fruits are around MLD 15,000 which is higher than grains but lower than vegetables.

Table 2-56: Cost-benefit of Apple (5ha)

Input	Formula / Reference	Cost	Ratio
Machinery Operator	37 labors x MDL 200	5,400	4.4%
Labor	140 labor x MDL 200	28,000	23.0%
Fertilizer & Chemicals	see Table 2-39	7,181	5.9%
Machineries	see Table 2-30	72,098	59.3%
Transportation	Applied standard rate	5,000	4.1%
Others	Applied standard rate (water, electricity, fuel, etc)	4,000	3.3%
	Total Cost	121,679	
	Gross income	192,407	
	Profit	70,727	
	Profit per ha	14,145	

Source: JICA Survey Team

Table 2-57: Cost-benefit of Plum (5ha)

Input	Formula / Reference	Cost	Ratio
Machinery Operator	13 labors x MDL 200	2,600	4.2%
Labor	63 labor x MDL 200	12,600	20.2%
Fertilizer & Chemicals	see Table 2-39	3,848	6.2%
Machineries	see Table 2-30	39,219	63.0%
Transportation	Applied standard rate	2,000	3.2%
Others	Applied standard rate (water, electricity, fuel, etc)	2,000	3.2%
	Total Cost	62,267	
	Gross income	137,115	
	Profit	74,848	
	Profit per ha	14,970	

Source: JICA Survey Team

Table 2-58: Cost-benefit of Grape (5ha)

Input	Formula / Reference	Cost	Ratio
Machinery Operator	9 labors x MDL 200	2,700	3.7%
Labor	96 labor x MDL 200	19,200	26.4%
Fertilizer & Chemicals	see Table 2-39	15,292	21.1%
Machineries	see Table 2-30	29,422	40.5%
Transportation	Applied standard rate	3,000	4.1%
Others	Applied standard rate (water, electricity, fuel, etc)	3,000	4.1%
	Total Cost	72,615	
Gross income	Table	147,886	
	Profit	75,271	
	Profit per ha	15,054	

Source: JICA Survey Team

In general, profit margins for major crops may not provide sufficient sources of annual income. On the other hand, considering the practical requirements of farmers who usually depend on family laborers, the cost of labor can be borne by family members. Since grain productions depend on machinery, the income of family laborers is less than that of vegetable and fruit production. Moreover, machinery operators are usually provided by the service providers. Thus, grain farmer's actual incomes could potentially be less than those of vegetable and fruit farmers.

(5) Development of Conservation Agriculture as Sustainable Management Method

According to research by the Soil Institute, soil erosion and landslides occur in 1.5 million ha of agricultural land in Moldova. Soil loss is an estimated 18.5t per ha per year on average. They say that the main cause of soil loss is intensive agricultural activity; this environmental problem has a critical impact on agricultural productivity in Moldova. In order to prevent further soil erosion and landslides, the MoAFI has taken initiative to encourage farmers to apply conservation agriculture following the guidelines of sustainable land management

Conservation agriculture primarily involves generating public awareness on the positive effects of its implementation. It requires a complex approach to practicing agricultural business activity through investments focused on and targeted at the efficient use of soils, a transition (or conversion) period from traditional agriculture to a forward-looking one by mobilizing all efforts

(projects, local public authorities, scientists, entrepreneurs, etc.) to implement such a land management form.

Sustainable land management in rural communities contributes to sustainable development and requires special attention within investment programs at national, regional and local levels. Conservation systems implemented in rural areas must rely on less intensive breaking up of the soil, carried out by different methods without ploughing and ensuring the preservation of the soil by maintaining a certain amount of plant residue on the surface, which is considered a viable strategy for environmental conservation.

To assess and rapidly integrate a tillage technology system into the conservation category, a simple and practical indicator of direct and immediate evaluation in the field was introduced, namely the degree of coverage of the soil surface with plant residue or cover crops. By this measure, in periods after sowing or at times when the soil was not being cultivated, the coverage of soil surface with plant residue left over from the preceding crop must be at least 30%.

The implementation of conservation tillage models integrate the guidelines of sustainable land management as below:

- Actions focused on accelerated accumulation of organic matter in soil;
- Measures focused on ensuring an optimal air and water environment and optimal hydrothermal processes for humus formation and migration;
- Provision of a nitrogen source necessary for the process of humus formation by mandatory inclusion of legumes in the crop rotation schemes. At the current stage of development of the food market, it is appropriate that legumes cover an area of about 30% of the technical crops.
- Optimizing the physical characteristics of the agrogenic layer of the arable soils.

Towards that same end, the processes of humus formation and accumulation shall be intensified. The trend for restoring the organic matter system is shown in the tables below.

Table 2-59: The Development Stages of Organic Matter System within Alternative Farming Technologies

Initial stage	Transition stage	Formation stage	Stabilization stage
Restoration of the structural aggregates	Increase of the apparent density of soil	Large amount of crop residues	Accelerated accumulation of crop residues
Low content of organic matter	Enhance content of organic residue	High rate of carbon content	Continuous variability of nitrogen and carbonates
Low amount of organic residue	Increase of organic matter content	Increase of cationic exchange capacity	Very high carbon content index
Restoration of soil biomass microbiota	Increase of phosphorous content	Increase of humidity content	Increase of humidity content
Increase of nitrogen content	Nitrogen fixation. Mineralization	Nitrogen fixation. Reduction of mineralization. Intensification of biologic circuit of substances, optimization and increase of their volume	Large circuit of nutrients. Reducing consumption of nitrogen and phosphorus
Time, years			
0 - 5	**5 - 10**	**10 - 20**	**> 20**

Source: Guidelines: Sustainable Land Management

The concept of "soil conservation works" promoted by MoAFI is extremely flexible and the term may encompass a variety of soil uses (tillage) depending on specific local conditions. Most of them have already been tested and provide a number of benefits that can be achieved in rural areas, as follows:

- Tillage time is reduced;
- Fuel consumption per unit of area is reduced;
- The need for use of agricultural machinery per unit of area is reduced;
- The soil structure is restored and the surface and in-depth compaction is reduced;
- The organic matter content in the soil is increased;
- The water permeability is increased and the overall drainage of the soil is improved;
- Soil erosion is reduced;
- Restoration of humus making residue in the soil is ensured along with typogenetic reproduction processes, pedogenetic reconstruction processes, etc.;
- Soil functions in their relationship with the environment factors are improved.

Further, the stages for improvement of soil conditions in alternative agriculture are considered.

Table 2-60: Stages of Soil "Healing" under Alternative Agriculture

No.	Recovery element	Recovery effect
1	**2**	**3**
1	Increasing organic matter content in soil	1. Restoring and enhancing biological diversity of soil biota. 2. Restoring transformation and decomposition processes of organic waste. 3. Restoring biogeochemical circuits of substances in paedogenesis. 4. Restoring system of organic matter in soil and ecological reconstruction of pedogenetical processes. 5. Restoring soil structure and reducing the risk of erosion. 6. Making better use of water, retention and conservation of water in soil. Reducing vulnerability to drought and irrigation costs.
2	Biodiversity conservation	1. Increasing the number and variety of animals, plants, microorganisms. 2. High levels of agro-biodiversity. 3. Maintaining healthy soils and soil fauna. 4. Reducing the risk of water pollution. 5. Energy efficiency. 6. Reducing carbon dioxide emissions to reduce global warming.
3	Biologization of the production process	1. Liquidation of erosion processes. 2. Improving the physical condition of soil. 3. Improving the soil water balance. 4. Reducing weediness of farmland. 5. Reducing vulnerability of crops to diseases. 6. Reducing the number of pests. 7. It will lead to reduced energy consumption.

Source: Guidelines: Sustainable Land Management

For the adoption of conservation agriculture in rural areas, it is essential to identify a complete package of practices for each region. Due to the long-term impact of this technology on culture, soil and water conservation and the overall economy of each community, conservation agriculture is adopted primarily by entrepreneurs that are receptive to new alternative production systems that allow them to reduce costs, enhance productivity and improve soils.

3. Agricultural Policy

3.1 Position of Agriculture in the National Development Plan

There are several Moldovan development plans and strategies of various qualities in circulation; the two most relevant ones are analyzed below.

The "Moldova 2020 - National Development Strategy: 8 Solutions for Economic Growth and Poverty Reduction" focuses on the following development priorities:

1) Better education system to enhance labor productivity and increase employment in the economy;
2) More public investment in the national and local road infrastructure
3) Reduced financing costs by increasing competition in the financial sector
4) More suitable business climate by promoting competition policies and streamlining the regulatory framework
5) Reduced energy consumption by increasing energy efficiency and using renewable energy sources
6) Better pension system
7) More efficient justice system and fight corruption
8) Agriculture and rural development; competitiveness of food products and sustainable rural development

The last point was added 2014 as the GoM has since realized the importance of the agricultural sector.[96]The Moldova 2020 Strategy now stresses the importance of the agricultural sector and intends to maintain a decent standard of living of the population and employment in rural areas. Concerning the broad choice of agricultural products, this strategy focuses on stimulating the production of goods with high added value.

Besides describing main agricultural risks such as climate changes and drought, insufficient access to irrigation, limited use of modern agricultural technologies (e.g. drought-resistant varieties, hail protection nets) and the lack of an innovative agricultural insurance system (such as index-based insurance programs) it also mentions the high prices of agri-inputs (e.g. fertilizers, fuel, and machinery) as an obstacle.

The strategy recognizes the dominance of low value crops in agricultural production over HVCs. A significant part of agricultural production (90%) is represented by seven products: cereals, grapes, vegetables, fruit, milk, pork and poultry. Cereals (including sunflower) are the main products of arable land because of the high percentage of the total area sown - almost 70%. The reasons to focus on grain production are mechanization that includes large-scale, relatively low capital requirements with low labor intensity, reliable markets and profit opportunities, and the need for limited irrigation. All these factors demonstrate that larger farms currently dominate cereal farming.

Currently, the limited number of Moldovan farmers grow HVCs because of high investment requirements, limited irrigation potential and strict food safety requirements. Nevertheless, the GoM developed a strategic vision aiming to increase the competitiveness of Moldovan agricultural products at comparable products as grown in the EU Member States; the strategic goal is to encourage a diversified agricultural production focusing on high value-added products and to consider food security and safety.

The expected impact and benefits will be to increase exports of agricultural products with high added values.

[96] Strategy name of 07/03/14 modified by Law 121, from 10.03.14 art. 603

3.2 Policy, Development Issue and Budget in Agricultural Sector

3.2.1 Moldova Agriculture and Rural Development Strategy 2014-2020

In 2014, the government adopted the national agriculture and rural development strategy for 2014-2020 and in 2015 developed an action plan to complement the strategy. At the end of 2016, Mr. Iurie Uşurelu, Deputy Minister at MoAFI, stated that "Agriculture is a priority sector out of 8 priorities in total."[97]Given the trend to focus more on agricultural and rural issues, combined with the awareness raised by the MoAFI of the shortcomings of the existing national strategy and some adoptions, it is reasonable to expect the proposal of a revised version soon.

The current "Moldova Agriculture and Rural Development Strategy 2014-2020" is elaborated in 6 chapters.

Chapter 1: Current Situation and Problems Identified in Agriculture

Out of 64 pages in total, this chapter analyses the problems on 48 pages and is therefore the largest chapter. The existing problems of the agricultural sector have been described in detail without presenting relevant ideas about how to overcome these constraints. Some of the major issues are the deteriorating agri-food trade balance, the limited access to modern seeds and fertilizers (due to overly complicated and costly governmental procedures), the agricultural education system and more.

Chapter 2: Strategic Vision and Objectives for the Years 2014-2020

This chapter is quite short as it is only 5 pages.

2.1. Vision and Scope
The vision of the Strategy is “A competitive restructured and modernized agri-food business sector. Improved living and working conditions in rural areas. Agri-food activities existing in harmony with the natural environment maintaining the biodiversity, cultural and traditional values for future generations.”

The objective derived from the vision consequently is also based on the achievement of synergies among economic, agricultural resource management and social areas: To ensure that the agri-food sector contributes to the sustainable achievement of the national economic and social development goals.

The scope of the Strategy is to raise the competitiveness of the agri-food sector through comprehensive restructuring and modernization and to improve conditions for living and working in rural areas whilst achieving synergies between agri-food activities and the natural environment.

2.2. General and Specific Objectives
The vision of this strategy is “a competitive restructured and modernized agri-food business sector. Improved living and working conditions in rural areas. Agri-food activities existing in harmony with the natural environment maintaining the biodiversity, cultural and traditional values for future generations.”

The following sub-chapter "2.2. General and Specific Objectives" is divided into 3 general objectives and each of them is again elaborated in 3 specific objectives. These objectives guide the agricultural policy until 2020 and propose the following:

[97] Meeting with Mr. Iurie USURELU, Deputy Minister at MoAFI in December 2016

General Objective No. 1: Increase competitiveness of the agri-food sector through modernization and market integration.

At the table, "Investment needs to implement the Agriculture and Rural Development Strategy - in thousand EURO (EUR 1 = MDL16.5)" the required budget was projected to cost EUR 1,149,958,000 over the period 2014 – 2020. At that time, this specific objective required more than 50% of the overall foreseen budget. In October 2015,[98] the GoM approved the Action Plan on Implementation of the National Strategy for Agriculture and Rural Development for the Years 2014-2020 and estimated a required budget of EUR 394,127,667. Given these two figures calculated one year apart – from 2014 to October 2015 – the financial requirements have been downsized substantially.

Specific Objective 1.1. Modernization of agri-food chain in order to meet EU requirements on food safety and quality.

(1) Support the modernization and restructuring of farms specialized in the production of traditional agricultural produce (F&V, milk, meat) and other competitive agricultural products.
(2) Support agri-food processing businesses by investing in modern technologies in order to meet EU food safety and quality requirements.
(3) Cooperation between agri-food primary producers and agri-business downstream operators (processors, wholesalers, retailers) to increase income opportunities and provide access of Moldovan agri-food products to national and international markets.

Here the Action Plan on Implementation of the National Strategy for Agriculture and Rural Development for the Years 2014-2020 lists several actions to be undertaken; major actions are among others:

- Finalize and approve the lists on EU Acquis Communautaire related to Agriculture and Rural Development and Sanitary and Phytosanitary (SPS) measures, to be transposed into national law
- Develop and start implementation of strategies/development programs for strategic sectors of agriculture, including livestock (meat and milk, conservation of animal genetic resources), vegetal (F&V), wine and vine and aquaculture.
- Create and/or modernize post-harvest infrastructure in rural areas
- Implement the e-Agriculture principle through development and implementation of automated information systems
- Comprehensive mechanization and upgrading technological processes of grapes production and processing

At the mentioned table the required budget for the Specific Objective 1.1. was calculated at EUR 944,208,000 for the period 2014 – 2020. The estimated budget required for this specific objective is EUR 289,354,498.

Specific Objective 1.2. Facilitate access to capital, inputs and output markets for farmers.
Investment support programs currently in place offer important tools for improving farmers' access to capital. According to the strategy, measures that could help farmers get better access to funds should focus on:

(1) Efforts to create a functioning framework for collateralized commodity transactions (guarantee fund, warehouse receipts);

[98] The exchange rate at that time was MDL 100 = EUR 4.76, or EUR 1 = MDL 22.67 (http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/index_en.cfm)

(2) Efforts to stimulate the market for land, thus turning it into a more liquid and attractive asset to banks; and
(3) Efforts to reduce agricultural risks, by both mitigating risks and insuring against them.
(4) An open regime for the import of seeds and seedlings, as well as for fertilizers and pesticides, would improve farmers' access to modern technology and help them compete with EU farmers. Farmers' access to output markets, particularly critical for small and medium farmers, could be addressed by supporting farmers integration into supply chains, i.e. through facilitating linkages to downstream operators, including processors wholesalers and retailers; producer associations which enable, among other things, improved access to post-harvest infrastructure, as well as facilitating their access to the market.[99]

Selected actions according to the Action Plan on Implementation of the National Strategy for Agriculture and Rural Development for the Years 2014-2020 are among others:

- Ensure domestic market with quality seeds
- Stimulate lending to farmers, including to households by commercial banks and non-banking financial institutions

The stimated budget require for this specific objective is EUR 17,764,320.[100]

Specific Objective 1.3. Reform education, scientific research and rural extension services in the agri-food sector, and creation of integrated agriculture information system.

(1) Support to the restructuring and modernization of the education base to meet market demand.
(2) Modernization and restructuring of agricultural research and strengthening its relationship with the private sector including the possibility of creating Public Private Partnerships.
(3) Upgrading extension services to meet the needs of the agri-food business sector – also in cooperation with agricultural research and education; making use of synergies within the three areas.

Selected actions are among others:

- Increase capacity of extension services, including outplacement them to market requirements
- Develop the plan for restructuring of specialized medium education institutions in agriculture

The estimated the budget requried for this specific objective is EUR 49,898,604.

General Objective no. 2: Ensure sustainable management of natural resources in agriculture.

Specific Objective 2.1. Support sustainable agricultural land and water management practices.

Selected actions are among others:

- Implement land consolidation projects
- Develop and promote the Land Code of the Republic of Moldova, including improvement of the technical and methodological basis for land consolidation activities

The estimated budget required for this specific objective to be EUR 7,835,769.

[99] This number 4 was inserted by the JICA Study Team as it seems to be an additional point.
[100] The exchange rate at that time was MDL 100 = EUR 4.76 or EUR 1 = MDL22.67 (http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/index_en.cfm)

Specific Objective 2.2. Support environmentally-friendly production technologies, organic production and products that ensure biodiversity. Another way of ensuring sustainable management of natural resources in agriculture is the provision of environmentally-friendly production technologies and products. Organic production should be supported in this regard, especially as demand for such products is increasing on international markets. Organic farmers should also be assisted in meeting the standards and implementing the procedures required by international markets and organizations. Supporting the development of agricultural sources of energy including energy crops production makes agricultural production sustainable and profitable at the same time. Moreover, low quality and unproductive agricultural land should be considered for afforestation in order to increase biodiversity as well as decrease soil erosion while also contributing to water conservation.

Selected actions are among others:

- Improve the energy efficiency and increase use of renewable energy resources
- Restoring the forest belts to protect agricultural fields

The estimated budget required for this specific objective with EUR 16,901,570.

Specific Objective 2.3. Support to adaptation and mitigation of climate change's effects on agricultural production. Risk management tools, including agricultural insurance should be supported in order to mitigate the negative consequences of climate risks and the negative effects of natural disasters on agricultural production and competitiveness of farming.

Selected actions are among others:

- Identify and registering the Catalog of Plant Varieties of the Republic of Moldova, new varieties of seeds, highly productive and resistant to adverse environmental conditions, and transfer of these technologies to local producers of seeds
- Diversify and promote risk insurance mechanisms in agriculture, including the development and promotion of the Law on award of damages in case of natural disasters in agriculture

The estimated the budget required for this specific objective is EUR 9,247,252.

General Objective no. 3: Improve standards of living in rural areas.

Specific Objective 3.1. Enhance investment in physical infrastructure and rural services. Support is needed for improving physical rural infrastructure and services by investing in aspects such as the renovation and reconstruction of water supply and sewage systems, telecommunications, electricity and local roads in support of the development of the agri-food sector. Modern infrastructure is also one of the most important prerequisites for further capital investment.

Selected actions are among others:

- Technical assistance for development and implementation of activities related to development of rural public economic infrastructure, including modernize and/or construction of road segments and bridges that enhance the access of farmers/traders to areas of production, processing and marketing of agricultural products
- Upgrade and/or construct the water supply and irrigation networks, to develop entrepreneurial activities in agri-food sector

The estimated budget required for this specific objective is EUR 2,911,454.

Specific Objective 3.2. Increase employment and income opportunities in rural areas in the non-agri-food sector. Support is needed for creation of off-farm working possibilities in rural areas. These might take the form of supporting creation and development of agri-tourism services or non-agricultural micro-businesses aimed at manufacturing and providing services in rural areas in support of the agri-food sector and assisting already existing small and medium agri-food enterprises to increase their business capacities.

Selected actions are among others:

- Facilitate the creation and development of agro-tourism services in rural areas
- Facilitate development of businesses in rural areas

The estimated budget required for this specific objective is EUR 214,200.

Specific Objective 3.3. Stimulate local community involvement in rural development. Local community involvement is essential in creating incentives for rural residents to contribute to the welfare of their society. It is very important to enhance the attractiveness of rural areas by improving the social and cultural aspects of local services and develop the infrastructure of rural communities.

Selected actions are among others:

- Organizing competitions and disseminate good practice
- Establishment and operation of local action groups in rural development based on best practices and principles of the EU LEADER Programme (pilot activity)

The JICA Survey Team completely agrees that a needs-based assessment has to be undertaken and that the development strategy has to be written in a participatory way including all stakeholders.

The estimated the budget required for this specific objective to cost EUR 0.

Chapter 3: Cost and Impact Assessment (Financial and Non-financial) related to Implementation of the Strategy

The expected impacts related to achievement of the strategic objectives of the Strategy are as follows:

a) the efficiency of production and processing will have increased through restructuring and modernization;
b) the Moldovan agri-food sector will have grown in value;
c) the market share both domestically and externally will have grown;
d) access to new high value markets will have increased;
e) the balance between low-value primary production and high-level processing will have improved;
f) education and research output will have been linked to market needs;
g) land resource structure and usage will have been optimized;
h) agri-food water resource management will have been improved;
i) soil quality and resistance to erosion will have been improved;
j) resistance to risks affecting agri-food business will have been improved;
k) rural economic activity will have been increased;
l) rural infrastructure will have been improved;
m) out-emigration trends from rural areas will have been reversed;
n) responsibility for development of rural areas will have been assumed jointly by local authorities and rural inhabitants.

MoAFI admits that the success of the Strategy will largely be dependent on the funds available for its implementation.

Chapter 4: Strategy Expected Results and Progress Indicators

This chapter provides a table with the expected results as well as the progress indicators.

Chapter 5: Implementation Stages

In this chapter, it states that the implementation of the Strategy will be achieved through the involvement of ministries and other central public authorities, stakeholders concerned, and with the active participation of business and civil societies. Furthermore, it is mentioned that the Strategy will be implemented in two phases: 2014-2017 and 2018-2020; for the last phase a new plan of action will be developed and approved based on the recommendations and the results of implementation in Phase I.

Chapter 6: Reporting and Monitoring Procedures

This last chapter describes the Monitoring of the Strategy and the related reporting in a few short paragraphs.

3.2.2 Progress of Policy and Development Issue

ENPARD continues to provide support to long-term reforms of the agriculture and rural development sectors. It is particularly useful in helping to improve competitiveness and to quickly adapt to the standards for producing safe, high-quality agricultural products, in line with EU SPS rules and quality requirements. Only by integrating EU directives in national law will Moldova be able to receive the full benefit of the EU market opportunities offered by the DCFTAs. Ongoing support from the EU has also helped Moldova to withstand the consequences of having limited market access to Russia, its major agricultural export destination. Additional support is provided through the Neighbourhood Investment Facility (NIF) – together with the European Investment Bank (EIB) – to help Moldova modernize its agricultural sector and to assist the growth of SMEs within it.

The Progress Report on the Implementation of the Republic of Moldova – EU Association Agenda for the period September 2014 to March 2016 highlights the following concerns regarding agriculture and rural development.

The action plan related to the Agriculture and Rural Development National Strategy for 2014-2020 has been developed and approved. It also states that the Strategy defines the priorities and activities. Furthermore, it states that sectoral development policies were drafted, for example, the sheep and goat productivity improvement program for the years 2014-2020; the cattle breeding program for the years 2014-2020; the horticulture development program for the years 2016-2020, and the conservation agriculture program for the years 2016-2020.

The 2014-2016 progress reports give more information about the current status of laws, marketing requirements regarding fresh fruit quality and raw-milk quality and dairy products, the establishment of the Rapid Alert System for Food and Feed (RASFF), training on the EU farm advisory system for rural agriculture and rural development, the modification of the Regulation on the organization and functioning of the AIPA (Paying Agency) and others.

It also lists the state support for agricultural producers in view of increasing competition in

agricultural production and the diversification of economic activities in rural areas. Among others it mentions that perennial plantations (over 6,700 ha) have been established, vine plantations (over 3,500 ha), over 250 livestock farms have been renovated and more. Finally, in this chapter, the report mentions that over 500 units of post-harvest infrastructure have been developed, e.g. refrigerators, packing houses and processing equipment.

At the end, it mentions that ENPARD 2015–2017 with a total budget of EUR 64 million was signed and the financing agreement with the International Development Association for implementing the "Competitive Agriculture" project had a total budget of USD 12 million. Also, the signing of the EIB financed "Fruit Garden" project with a total budget of EUR 120 million is listed.

It is important to integrate all EU requirements into local laws and regulations, especially to enable Moldova to better access EU markets. In this respect, the EU heavily supports the local administration to conform with the requirements; e.g. the mentioned training on the EU farm advisory system which helps the MoAFI and subordinated institutions to fulfill cross compliance regulations [101] and must be fulfilled to get EU direct payment subsidies. It makes sense for Moldova and the EU but does not necessarily provide the farm with the necessary advisory services that make the farms in Moldova more competitive. Here, non-EU development partners might see opportunities to intervene for the sake of the farmers and not the CAP system.

On the other hand, however, the entire action plan as the strategy is an unstructured mixture between EU requirements and a local needs of support for everyone like livestock (meat and milk, conservation of animal genetic resources); vegetal (F&V); wine and vine; and aquaculture – except for large farmers who form the majority of all farms and grow cereals, sunflower and sugar beets. Consequently there is a risk to make the paper weak in contingency between budget and direction and actions to achieve the targets set in the paper.

Moreover, while the Strategy is well developed, the financial sources and implementation scheme are not necessarily secured by the state government. Together with the ambiguous indicators, the lack of clear role and responsibility makes the policy progress evaluation difficult. At last, JICA survey team could not retain the official evaluation document during the survey period, in spite of the all efforts to request it from MoAFI.

The Progress Report also deals with efforts to simplify tax administration. For example, there is a land tax, which follows a rather complicated procedure and even smallholders are obliged to pay. On the other side, the MoAFI is eager to pay subsidies to individual farmers. It might be cheaper for the involved administration to cease collecting land tax from all owners and to reduce agricultural subsidies accordingly.

Concerning development issues in the agricultural sector, the WB recommends [102] - to achieve progress - focusing on improvements of the competitiveness of the agricultural produce by:

1) Improving productivity through improved production processes, such as: using fertilizer and pesticides appropriately and applying other best-practice production techniques; e.g. irrigation, chemical thinning, soil, water, and plant tissue analysis, and using varieties that are best-suited to production conditions in Moldova.

[101] Cross compliance regulations are a set of basic rules related to the main public expectations on environment, public and animal health, as well as, animal welfare.
[102] The WB - Moldova Trade Study Note 3, Competitiveness in Moldova's Agricultural Sector; 2016

In the JICA survey team's view, such recommendations are valuable; however, it raises questions about why farmers are not doing so. One reason is the risk-averse behavior of farmers; considering the risk of future drought and other difficulties, farmers do not want to spend too much on fertilizers and chemicals as they are not ensured a return on their investment. Regarding using best-suited seeds, there might be some institutional bottlenecks involved because the registration of seeds is slow and expensive and seems to serve the "testing institutions" more than the farming community.

2) Increasing quality through improving harvest and post-harvest processes and infrastructure: sorting, grading, and packaging products to retain their quality, reducing time from harvest to storage (especially for table grapes), using cold storage, and improving greenhouses (for vegetable production).

   These recommendations also make perfect sense. The JICA survey team wishes to expand upon two issues in greater detail. Firstly, this would require governmental investment in public agricultural infrastructure such as packing houses and others.

   Currently there is not much public infrastructure in place; instead of publicly-funded infrastructure, cold storage facilities for farmers' cooperatives have been heavily supported through WB financing. These coops are often established by five acquaintances who are all grape farmers. The coop then sets up a heavily co-financed cold facility where each of the five cooperative members has access to one cooling chamber for their products. These products are stored and sold whenever the individual farmer thinks it is the best time to do so. There is no cooperative spirit behind this set-up and it favors the big farmers who can easily manage the co-financing requirements. An alternative would be to set up even bigger cold storage facilities with a cooling chamber that allow many individual farmers to rent a cold storage unit for a limited time. Similar set-ups could be used primarily for collection and packaging centers.

3) Improving the ability of producers to compete, including producers' understanding of product characteristics demanded in end markets (e.g. sizing, quantity, packaging) and requirements for entering those markets (e.g. food safety standards and traceability); producers' ability to meet Global G.A.P. for the most advanced markets and product-specific standards, such as "Marketing Standards for Apples" in the EU; and producers' understanding of seasonality vis-à-vis competitors from other countries and their ability to spread marketing over time (with cold storage or by using greenhouses for vegetables). Organic farming can also be promoted as a way to differentiate products and compete in higher-value market segments. This would require farmers to increase their levels of education, adopt appropriate production methods, and obtain appropriate certification.

3.2.3 Governmental Expenditure for Agricultural Policy

The Annual Budget for MoAFI and its institutions was MDL 1,589,892,000 (= EUR 73,359,880) in 2016; from this budget, MDL 155,306,100 (= EUR 7,166,044) was used for human resources (salaries). In 2017, the data appeared as follows: MDL 1,723,163,700 (= EUR 81,953,947) and for human resources MDL 161,026,200 (= EUR 7,658,432).

Interestingly, agriculture has a larger budget allocation than education and a much bigger one than defense. Education has been earmarked fora budget of MDL 1,623,331,100 (= EUR 75,062,830) and from that, human resources accounts for MDL 537,936,900 (= EUR 24,874,202); transport MDL 2,477,495,800 (= EUR 114,559,406) and of that figure, human resources receives

MDL 7,152,300 (= EUR 330,722) and finally defense MDL 553,875,200 (= EUR 25,611,189) and within that category, human resources receives MDL 370,158,900 (= EUR 17,116,148).[103]

3.2.4 Regulation on Food Safety

In 2005, the Moldovan government and EU signed the action plan for promotion of efficient policy harmonization for future integration. Since then, the Moldovan government has undertaken actions to adopt legislation related to agriculture and food safety to conform with European laws. As part of the legislation, Moldova's food standards and regulations will mostly align itself with European food hygiene requirements. According to NFSA, around 670 European (CEN) and international (ISO) standards have been adopted by the Moldovan food sector, of which 482 are the CEN standards. Table 3-1 describes the main components of Moldovan food safety legislation.

Table 3-1: Laws and Regulations on Food Safety in Moldova

	Name / Title of Law	Year of Enforcement (Amendment)
General Laws	Law on Food Products	No.78-XV/2004
	Law on Consumer Protection	No.105-XV/2003
Sanitary and epidemiological protection	Law on Sanitary and Epidemiological Protection of the Population	No.1513-XII 16.06.93, amended by No.727/06.02.96; No.788/26.03.96
	Norms and Sanitary Rules Regarding Food Additives	Approved by Ministry of Health (MoH), 2001
	Norms on Labeling of Food Products	Approved by the Ministry of HG No.996/2003
	Products Obtained from Genetically Modified Organisms	Approved by the MoH, 2004
Phytosanitary quarantine	Law on Phytosanitary Quarantine	No.506-XIII 22.06.95
	Law on the Protection of Plant Varieties	No.915, 11.07.96
	Law on Fertilizer on Phytosanitary Products and Fertilizers	No.119, 22.04.2004
	Government Decision on Approval of the Regulation on the Import, Marketing and Use of Phytosanitary Substances	No.599, 21.06.2000
	Law on Vineyards and Vines	No.131, 02.07.94
	Law on Fruit Growing	No.728, 06.02.96
	Seed Law	No.659.29.10.99
Veterinary activity	Law on Veterinary Activity	No.1539-XII 23.06.93
Others	Law on Product Conformity Assessment	No.186-XV 24.04.2003
	Law on Standardization	No.590-XIII 22.09.95
	Law on Technical Barriers to Trade	No.866 10.03.2000

Source: NFSA

Based on following agreements, NFSA is collaborating with other ministries and institutions in tackling cross-sectional food safety issues.
Agreement of cooperation No.5 from 22.04.2016 between NFSA and MoAFI
The purpose of the Agreement is to cooperate and coordinate the activities in following areas of competence: sanitary-veterinary activities; plant protection; plant quarantine; food safety, quality control and food hygiene; seeds control; and livestock. The document defines the competencies and responsibilities, establishes good communication rules in drafting and promotes legislation in the field of competence.

[103] MDL 1 = EUR 0.04624

Agreement of cooperation No. from 07.06.2016 between NFSA and Customs Service (which is under the authority of the Ministry of Finance)
This agreement establishes the methods of cooperation between the Customs Service and the NFSA in state control of the imports, exports and transit of goods subjected to sanitary-veterinary and phytosanitary control. Also, it includes cooperation in the field of certification of the preferential origin of goods, in order to ensure the implementation of effective single window principle, and the optimization of state border crossing of goods and passengers.

Agreement of cooperation No.9 from 13.10.2016 between NFSA and the MoH.
The purpose of the Agreement is to ensure the official control system and an appropriate coordination of the activities by the signatory competent authorities which are officially responsible for food safety control throughout the food chain and food safety risk prevention for public health, protection of consumer interests and disseminating accurate information.

Table 3-2: Sanitary Regulations Harmonized with the EU Regulations and Approved by the GoM

Field of Harmonized Regulations
Food supplements
Stating and continuation formulas of the substances for infants and small children
Nutritional and health notes, written on food products
Maximum limits of residue of phytosanitary products
Maximum residue levels of pesticides
Public catering enterprises
Contaminants from food products
Plastic objects and materials, designated to come into contact with foodstuffs
Materials and objects, which come into contact with food
New food products (Novel foods and novel food ingredients)
Food enzymes
National system for epidemiological supervision and control of communicable disease and public health events
Food additives
Early alert and rapid response system to prevent and control communicable disease and public health events

Source: NFSA

Most Moldovan food safety regulations which were mentioned above have been harmonized with EU legislation, but 700 of the former Soviet Union's GOST standards are still in force. At the governmental policy level, harmonization of food safety regulation is steadily advancing; however, at field level, actors such as farmers and food industries tend to follow previous GOST standards due to their familiarity. One of the fruit processing factories which the JICA survey team visited were still using the GOST standard for their processing procedure. Awareness building activities of new legislation for food business operators through audit by the NFSA subdivision staff is necessary to instill the implementation of new standards.

3.3 Legal and Taxation System in Agricultural Sector

3.3.1 Major Legal System

There are 13 agriculture related laws in Moldova. The laws cover all kinds of crops and livestock and the use and management of agricultural inputs such as seed and fertilizers. Although the major laws adopted at present are more or less regulatory in nature, the laws which promote or facilitate agri-business and enhance the competitiveness of the agriculture sector are few. For example, the

Government of Japan recently decided to do away with its Law on seeds which protected and promoted quality seeds developed in Japan. It has also abolished the law on agricultural mechanization promotion. These laws had contributed to the development of agriculture sector in Japan until today. Thus, there needs to be further development of the Corpus Juris which serves to facilitate achievement of the goals outlined in Moldova's agricultural strategy.

Table 3-3: List of Laws Related to Agricultural Sector

No.	Name / Title of Law	Year of Enforcement (Amendment)
1	Law on official controls for verification of compliance of animal feed and food legislation with the health and welfare of animals standards	No. 50 of 28/03/2013 // Official Gazette 122-124 / 383, 07.06.2013
2	Law on seeds	No. 68 of 04/05/2013 // Official Gazette 130-134 / 417, 06.21.2013
3	Law on establishing general principles and requirements of food safety legislation	No. 113 of 18/05/2012 // Official Gazette 143-148 / 467, 13.07.2012 (effective 13 January 2013).
4	Law on plant protection and phytosanitary quarantine	No. 228 of 23.09.2010 // Official Gazette 241-246 / 748, 10.12.2010
5	Law on tobacco and tobacco ware	No. 278 of 14.12.2007 // Official Gazette 47-48 / 139, 07.03.2008
6	Law on Sanitary-Veterinary activity	No. 221 of 19.10.2007// Official Gazette 51-54 / 153, 14.03.2008
7	Law on Vineyards and Wine	No. 57 of 10.03.2006 // Official Gazette 75-78 / 314, 19/05/20
8	Law on grain storage and storage certificates regime for grain	No. 33 of 24.02.2006 // Official Gazette 75-78 / 310, 19.05.2006
9	Law on plant protection products and fertilizers	No. 119 of 22.04.2004 // Official Gazette 100-103 / 510, 25.06.2004
10	Law of the manufacture and circulation of ethyl alcohol and alcoholic products	No. 1100 of 30.06.2000 // Official Gazette 130-132 / 917, 19.10.2000
11	Livestock Law	No. 412 of 27.05.1999// Official Gazette 73-77 / 347, 07.15.1999
12	Law on horticulture	No. 728 of 02.06.1996 // Official Gazette 17-18 / 188, 03.21.1996
13	Law on selection &breeding of animals.	No. 371 of 02/15/1995 // Official Gazette 20/182, 06.04.1995

Source: JICA Survey Team

3.3.2 Major Taxation System

The Moldovan Tax Code provides the following:

1. When a company registers sales revenues over 600,000 MDL for 12 consecutive months, it is required to register as a Value Added Tax (VAT) payer; a VAT registered company must conduct monthly bookkeeping (an accounting employee is necessary); it is required to submit a VAT report on the 25th day of each month, while the annual income tax is 12% of the total profit before tax.
2. In all other cases, where the sales revenue does not exceed 600,000 MDL for 12 consecutive months, the entrepreneur is not obliged to register as a VAT payer. The income tax is calculated as 3% of the sales revenue of the company.
3. Most small and medium farmers (unincorporated family farms) do not submit official records and they often purchase agricultural inputs by paying in cash, and selling their agricultural products often without documentation. It constitutes a risk, but these actors prefer to do so to avoid paying taxes and dues, given their difficult social-economic conditions and because they are most disadvantaged in the business environment. The farmer is obliged to submit a

tax return annually by 31 March and if the farmer obtains a profit from farming activities, he/she has to pay 7% of their profit in tax.

4. Agricultural holdings (farmers, agricultural companies, etc.), which have an annual procurement budget higher than 200,000 MDL, are recommended to register as VAT payers and they generally comply. Any entrepreneur who has made an economic transaction (even as little as one MDL) and submitted an application for voluntary VAT registration can become a VAT payer. For agricultural inputs and seed material, the VAT is 8% while for processed agricultural products it is 20% (except for social products such as bread, milk, which are regulated in the Tax Code). All other goods and services are subject to the VAT in the amount of 20%.

Separate activities of farmers result in higher costs for business administration and de-capitalization of their cash flow. This conclusion was arrived at based on the following facts: all inputs and services from out of country are purchased by farmers at a rate of 20% VAT (paid by farmers), and when agricultural products are sold, the prices are negotiated without VAT of 8%, thus causing them to lose 8% of the transaction value of cash flow.

The result is that, cash flows on farms are undercapitalized by 28% which make it more difficult for the farmers to effectively manage their businesses. A cooperative can become an umbrella for farmers, which can carry out all purchase transactions jointly (based on the requests of members) and negotiate a higher price during the sale of agricultural products (higher amounts - better prices) and will obtain prices that include VAT (provided it gets VAT).

When a typical VAT registered company purchases agricultural inputs, the VAT (20% excluding seeds, for which VAT is 8%) builds up as a debit and when goods or services are sold, the VAT is transferred to the client (buyer) which offsets the debit of the enterprise in the available amount. For agricultural enterprises, it is convenient (though not for processing companies) because the accumulated VAT amount is sufficient to ensure the sale of produced products without having to pay additional VAT to the state.

Businesses that are not VAT payers (most small and medium farmers, as well as households fall under this category) do not accumulate VAT debits, and when they sell agricultural products, obtain prices that are not inclusive of VAT, effectively causing them to lose 28% of their operational cash flow. As a result, not only is cash flow less efficient and but they also lose money through such costs.

Table 3-4: Agriculture Related Taxes

No.	Tax	Payer	Tax Rate
1	Corporate income tax	Enterprise	12%
2	Contributions to social fund	Farmers (enterprise and individual)	23%
3	Land tax	Farmers (enterprise and individual)	Approx. MDL 1.5 /ha
4	Contributions to medical fund	Farmers (enterprise and individual)	4.5 %
5	Irrigation tax	Farmers (enterprise and individual)	MDL 0.3/ ton

Source: JICA Survey Team

3.3.3 Incentive Program for Farmer

(1) Agricultural Subsidy Program

Moldova has an agricultural subsidy program which provides incentives for agricultural activities. Agricultural subsidies are secured as “National Development Fund for Agriculture and Rural Area”. The budget for the agricultural subsidy includes contributions from international development partners which are deposited into this fund. The subsidy is managed and operated based on the Subsidy Law which is usually passed every year though the contents do not change dramatically.

The main objectives of the 2016 Subsidy Law were as follows:

a) increasing the competitiveness of the agri-food sector and rural areas by upgrading and restructuring the market;
b) ensuring sustainable management of natural resources in agriculture;
c) improving living standards in rural areas;
d) modernizing the food chain in order to comply with EU requirements on food safety and quality requirements;
e) facilitating access to capital markets, inputs and outputs for farmers;
f) reforming of education, scientific research and rural extension services in the agri-food sector and creating integrated information system in agriculture;
g) supporting the management practices of agricultural land and water;
h) supporting environmentally friendly production technologies, organic products, including biodiversity;
i) supporting the adaptation and mitigation of climate change on agricultural production;
j) allocating investments for physical infrastructure and services in rural areas;
k) increasing employment in non-agricultural employment and increase incomes in rural areas;
l) involving the local community in rural development;

Government

- Proposes the budget to the Parliament for approval according to the State Budget Law for allocation of financial resources required to promote the state policy on agriculture and rural subsidies, the granting of direct payments and the amount for the respective year;
- Approves the National Strategy for Agricultural and Rural Development, including the action plan for its implementation;
- Forecasts and identifies sources for National Fund for Agriculture and Rural Development

MoAFI

- Develops, implements and monitors the National Strategy for Agricultural and Rural Development;
- Ensures the allocation of financial assistance to support the agriculture sector and rural areas through AIPA;
- Evaluates the impact of the subsidy policies for agriculture and rural areas, and based on the data obtained, the Government proposes to adapt them to the national economy;
- Takes the necessary steps to inform the widest possible spectrum of agricultural producers regarding the conditions of access to subsidies for agriculture and rural development;
- Ensures the attraction of international programs of technical and financial assistance, for increasing or supporting the National Fund for Agriculture and Rural Development;
- Provides, in coordination with the Ministry of Finance, distribution / redistribution means of the National Fund for Agriculture and Rural Development;
- Approves reference prices when calculating the grant for technical equipment and equipment eligible for subsidies;
- Approves procedures manuals related to the support measures.

AIPA

- Manages the resources of the National Agriculture and Rural Development and the resources of other development partners;

- Examines applications and grant files submitted by applicants and their eligibility to receive funds from the state, according to the procedures and regulations issued under the powers provided by law;
- Authorizes the payment of subsidies / grants direct payments to beneficiaries;
- Carries out on-site checks to determine eligibility investment payments;
- Monitors the eligibility criteria and contractual conditions for granting financial aid to the beneficiaries after the grant of payments;
- Ensures the promotion, communication, information and control, ensuring the smooth progress of the projects financed by the National Fund for Agriculture and Rural Development;
- Develops procedure manuals for each measure of support;
- Exercises intervention measures in established markets under the limits of the law.

(2) Procedures for Application and Distribution of Subsidy Fund

AIPA is the main actor for operation of the agriculture subsidy fund. It has 10 regional offices responsible for receiving and verifying requests from farmers. The submitted documents will again be verified at the central office and MoAFI for approval, and then finally the fund is distributed to farmers through commercial banks.

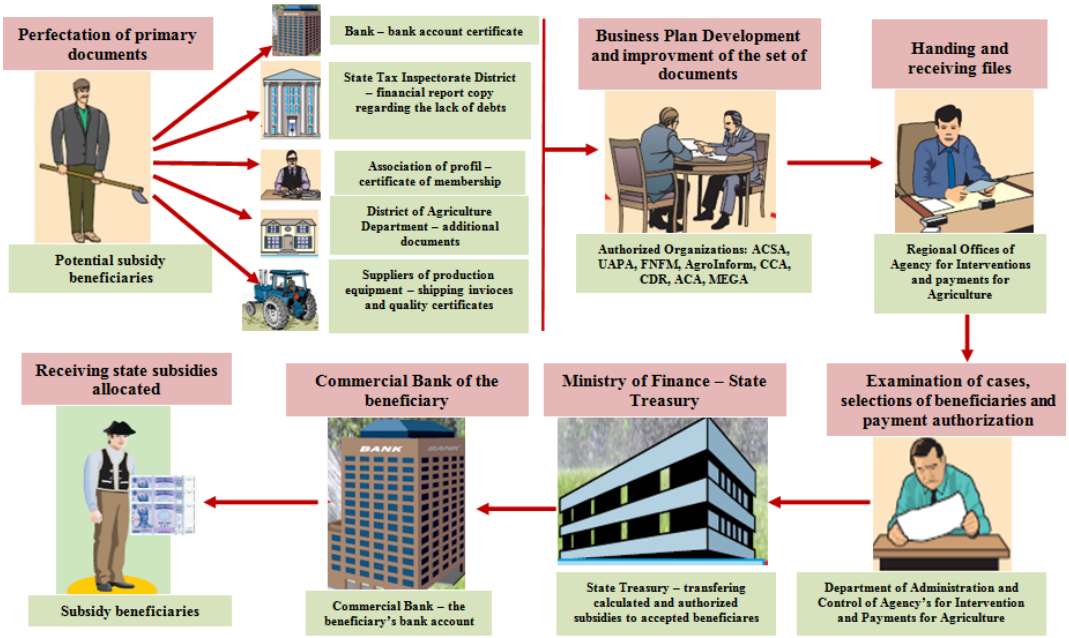
The examination procedure of the applications is conducted according to the following 3 steps:

1. Receipt of application files and registration;
2. On-site check of the object of investment;
3. Examination of cases and approval for the requests for payment.

Field level registration and verification

Steps 1 and 2 are handled by the regional office. The application has to be checked by regional offices of AIPA within a timeframe that should not exceed 2 months from the application date.

For each field check of approved beneficiaries, a note of inspection will be created, which will include information such as: the field inspectors, a short description of the project and the amount that was required as a subsidy, purpose, schedule, results and conclusion of the inspection. The field check must be completed within 30 days.



Source: AIPA

Figure 3-1: Application and Distribution Procedure of Agricultural Subsidy

Authorization procedure in the central level

The central office of AIPA is responsible for the third step. The documentation for payment will be examined and verified at the head office. After the selection and approval of the applications, AIPA submits the documents to State Treasury, Ministry of Finance, within 5 days from the moment a favorable decision has been granted to the beneficiary. The payments will be processed in the order of their submission to the State Treasury. The applications that could not be financed due to shortages in the National Fund will take priority for payment in the next year.

The detailed measures of authorization are described below;

- The list of eligible investment-related assets/goods is approved by the Government at the proposal of central specialized body (MoAFI).
- The amount of grants per each measure of support varies depends on the development objectives promoted in the strategic policies in agriculture and rural development, whose ceiling (in percentage points) is determined by the central body through consultation with associations of agricultural producers with overall profile and external development partners and will not exceed 50% of the total investment;
- The amount of subsidy is compensatory in kind: an applicant / farmer, in a measure of support, has the right to receive a grant only once a year.
- The maximum amount that can be requested by one farmer is to be established by the Government at the proposal of the specialized central body, based on the priorities set out in the National Strategy.
- Depending on the size of the Fund, at the proposal of the specialized central body, the government can set a maximum limit of the grant given to the applicant. The maximum subsidy limits may be increased for young farmers and women farmers, start-ups, investments made by producer groups, projects related to organic agricultural production and the ones from disadvantaged areas. (The disadvantaged areas are selected by the government).

(3) Eligibility Criteria and Special Considerations

Eligibility criteria are set by AIPA in light of national policies. The criteria set as of fiscal year 2016 are as follows;

General eligibility criteria:

1. Made investment corresponding to the objectives and areas of action for the financial support measures;
2. Have a business plan by which to demonstrate the feasibility of the project, if the investment is exceeding MDL 0.5 million;
3. The investment goods have been procured from eligible suppliers and distributors;
4. The applicant is the legal holder of the immovable property in / on which the investment is being made;
5. The applicant has no debts of taxes to the national budget at the time of submitting the grant application;
6. The applicant is part of at least one of the associations belonging to farmers with general or sectoral profile.
7. The applicant has evidence of making the investment (invoices, orders, acts of commissioning, etc.);
8. The applicant is not included in the list of Prohibited Subsidy Recipients.

Ineligible subsidization costs and goods:

1. Purchase of goods from related persons;
2. The purchase of second-hand goods;
3. Investments in the cities of Chisinau and Balti;
4. Value added tax;
5. Bank charges, costs of bank guarantees and similar charges;
6. Foreign exchange costs, taxes and losses due to currency exchanges;
7. Acquisition of immovable property;
8. Installation, assembly, mechanical works, transport, customs charges, etc;
9. Payments made in barter transaction clearing and assignment contract.

The government is paying a direct annual fixed amount to all the agro-producers considering their crops, the size of the land area (at least 1 ha), the species and no. of animals. 50% of the funds from the National Fund are used for direct payments.

To encourage ecological food production, support agro-SMEs and attract youths and rural women to get involved in the agriculture business, subsidies will be provided considering the amount for investment according to the following distribution, with a minimum:

1. 15% to young farmers and women;
2. 20% to farmers concerned engaged in the cultivation of organic crops or livestock;
3. 15% to farmers engaged in agricultural activity that is eligible for subsidization in disadvantaged areas;
4. 10% to farmers who purchased eligible goods for subsidization of domestic production.

If one applicant is eligible for several of the above, he or she must decide for which quota they are applying.

For Start-up projects, there is the possibility of receiving advanced payment, amounting to at most 50% of the investment, under the following conditions:

1. Ensure co-financing of the applicant's contribution of at least 10% of the project;

2. Investment amount is not less than MDL 1 million;
3. Project to be implemented in a rural village;
4. Implementation period to 24 months at most;
5. Jobs creation;
6. The existence of preparation and training in entrepreneurship;
7. The project does not have other subsidy components;
8. Founder / founders of the application are not affiliated to another producer;
9. The subsidization of the start-up projects will be provided with the amount of the fund in mind. The highest scored investments will be prioritized.

3.4 Organization Structure of Ministry and Public Agency related to Agriculture

3.4.1 MoAFI

As shown in the organogram below the MoAFI is headed by the minister who is supported by 3 deputy ministers; furthermore there are several departments directly under the minister.

The key department within MoAFI to develop Agriculture & Rural Development strategy and key policies is the Department of Rural Development, Agriculture Statistics and Marketing; the department head is Mr. Marin Mortean.

Looking at the organogram, it is worthwhile to mention that there is no irrigation department at MoAFI as water issues are currently still under the Ministry of Environment.

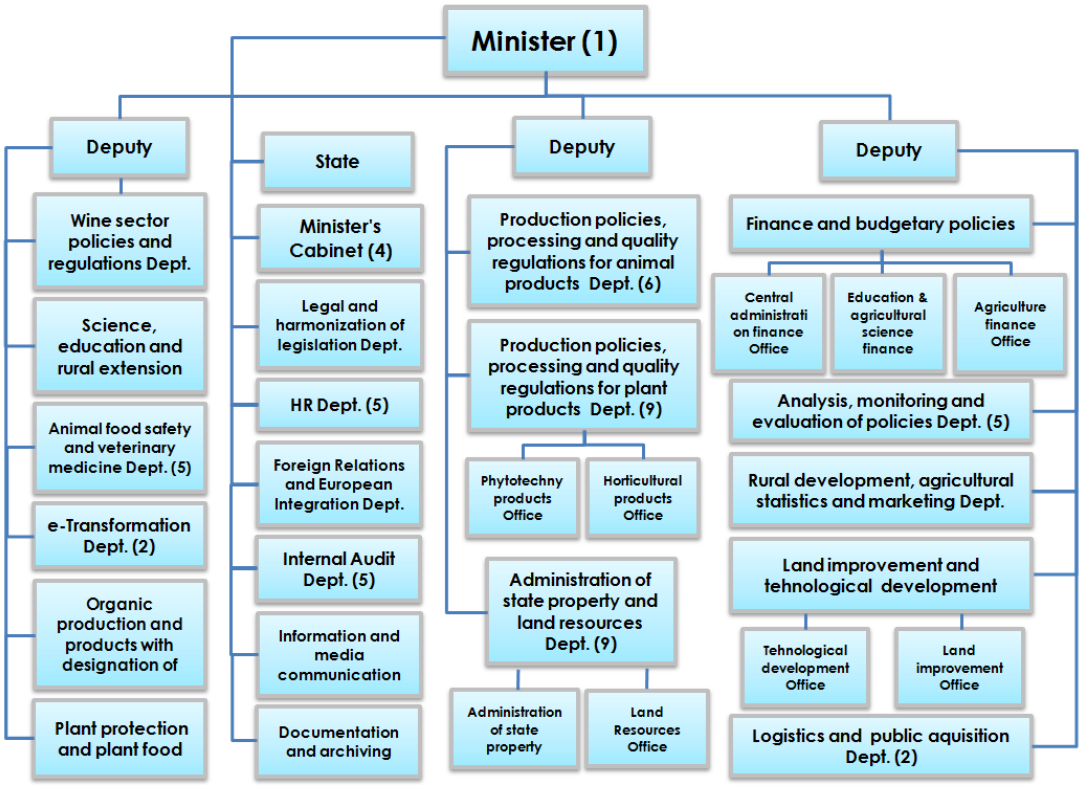


Figure 3-2: Organogram of MoAFI

According to the HR Department at MoAFI, the ministry should be staffed with slightly over 100 persons; however, there are currently 10 vacancies as not enough qualified people have applied

for the open positions. It is often the case that young people who start their professional careers at the ministry try to make as many contacts as possible within a short period of time. It is not uncommon for staff to quit their job after two years once they find a more lucrative engagement in another sector. This is not surprising given that the salary for a junior expert in the MoAFI is EUR 140 per month.

This is discouraging for the remaining staff and does not allow for the accumulation of an institutional memory; however, many employees of the ministry would like to see some perspectives in their professional life. Thus, trainings for permanent staff would be warmly received, and there is a demand for foreign language training amongst other things.

A special case is formed by the research institutions. During the Soviet era, the governmental agricultural research institutions played an important role in deciding what to grow and where; most of them did not manage a successful transition and continue to struggle to offer the required services. Currently, the sector of agricultural research is represented by 8 state institutions, including the State Agricultural University of Moldova. Research institutes are subordinated to the MoAFI as well as to the Academy of Sciences of Moldova, and are mainly financed from the state budget. The Academy of Sciences of Moldova has an annual budget of USD 15 - 20 million (MDL 300 - 400 million). Having insufficient funds and low performing personnel, the research institutes cannot offer viable solutions for agricultural sector development.

Furthermore, MoAFI is involved in many public institutions and owns or co-owns a broad range of state enterprises and joint stock companies; this is a relic from Soviet times and although it was agreed long ago at the highest level that these state enterprises should be restructured under a governmental agency, this restructuring never took place and the current situation – despite officially being only temporarily – could be considered permanent. The enterprises under MoAFI are not obliged to apply the very unattractive civil servant payment schemes.

List of public institutions in which the MoAFI is as a founder

1) State Agrarian University of Moldova (UASM), Chisinau
2) Public Institution "Center of Excellence in Horticulture and Farm Technology Taul"
3) Public Institution "College of Veterinary Medicine and Agricultural Economics from Bratuseni"
4) Public Institution "Agricultural Technical College in Svetlii"
5) Public Institution "Agricultural Technical College from Soroca"
6) Public Institution "Center of Excellence in Viticulture and Winemaking in Chisinau"
7) Public Institution "Agroindustrial College Riscani"
8) Public Institution "Agroindustrial College" Gheorghe Răducan "village Grinauti, Oknitsky"
9) Public Institution "Agroindustrial College Ungheni"
10) Methodical Center for Education under the MoAFI
11) Special Service for Active Influence on Hydrometeorological Processes, mun.
12) State Commission for Variety Testing
13) Public Institution "Research Institute of Field Crops" selection", Balti
14) Public Institution "Institute of Plant" Porumbeni " in Paşcani, Criuleni
15) Public Institution "Institute of Soil Science, Agrochemistry and Soil Protection" NicolaeDimo Chisinau
16) Public Institution "Scientific and Practical Institute of Horticulture and Food Technology", Chisinau
17) Public Institution "Scientific and Practical Institute of Biotechnologies in Animal Husbandry and Veterinary Medicine" Maximovca, AneniiNoi

18) Public Institution "Consolidated Unit for the implementation and monitoring of the Programme of Restructuring Wine"
19) Public Institution "Implementation Unit and Project Management Increasing Food Production"
20) Public Institution "National Office of Vine and Wine"
21) Republican school specialized equestrian and modern pentathlon, Chisinau
22) Newspaper magazine "Agriculture Moldova" SE, Chisinau
23) Public Institution "implementation unit credit support provided by the Government of the Republic of Poland"

List of state enterprises and joint stock companies in which the MoAFI is as a founder or cofounder

1) State Enterprise "Republican Center for Animal Breeding and Reproduction" Maximovca, AneniiNoi
2) State Enterprise "Institute of Agricultural Machinery" Mecagro "Chisinau
3) The state farm "Flowers", Singera, Chisinau
4) State Agricultural Enterprise "Vivaflora" Chisinau
5) State Enterprise "Moldresurse" Chisinau
6) SE "Project Institute" Indalproiect "Chisinau
7) State Enterprise "Enterprise Auto Repair and Operation", Chisinau
8) State Enterprise "State Machinery Testing Station", Chisinau
9) State Enterprise "Agricultural Information Center" Chisinau
10) State Enterprise for Research in selection and hybridization pigs "Moldsuinhibrid" Orhei
11) State Agricultural Enterprise "Western Grove", Chisinau
12) State Enterprise "Center of Standardization and Quality Testing Production of Canned" Chisinau
13) State Enterprise "Plant Protection", Chisinau
14) State Enterprise "Center of breeding birds Abaclia" Basarabeasca
15) State Enterprise "Center of breeding birds Brinzeni" Telenesti
16) State Enterprise "technological-experimental Station" Balti "
17) State Enterprise "technological-Experimental Station" Pascani "Criuleni
18) State Enterprise "technological-Experimental Station" Maximovca "AneniiNoi
19) State Enterprise "technological-Experimental Station" woods ", Chisinau
20) State Enterprise "National Center for Verification and Certification of plant and soil", Chisinau
21) State Enterprise "State Center for Certification and Approbation of Phytosanitary Means and Fertilizers", Chisinau
22) State Enterprise "Univers-Agro", Chisinau
23) State Enterprise "Center of Economic and Production elaborations" Victory, Sîngerei
24) State Enterprise "Didactic Experimental" Petricani "Chisinau
25) State Enterprise "Didactic Experimental", Chetrosu
26) State Enterprise "Didactic Experimental", Criuleni
27) State Enterprise "Quality Wines" MilestiiMici "Ialoveni
28) State Enterprise "winery Stăuceni"
29) State Enterprise "Food factory", Balti
30) State Enterprise "National Center for Alcohol Production Quality Checking", Chisinau
31) State Enterprise "Plant Wine" National-Vin ", Chisinau
32) State Enterprise "City of Wine", Chisinau
33) State Enterprise "Terra"
34) Joint Stock Company "Franzeluţa", Chisinau
35) Joint Stock Company "Tutun - CTC", Chisinau
36) Joint Stock Company "Agricultural and Food Center", Chisinau

37) Joint Stock Company "Fermentation Plant Tobacco", Orhei
38) Joint Stock Company "Wines" Cricova ", Chisinau
39) Joint Stock Company "White Stork", Balti
40) Joint Stock Company "Aroma", Chisinau
41) Joint Stock Company "Ialoveni Wines"
42) Winery in Lvov "Moldvinprom", Lvov, Ukraine
43) Joint Stock Company "Glass Container Company" Chisinau

Due to political reasons, an open discussion about the future of these organizations never took place; however, anecdotal evidence suggests that many people believe – especially when comparing costs against benefits – that these institutions should be closed without replacement as soon as possible, which would free up funds which are more urgently needed elsewhere, such as in public agricultural infrastructure, for example.

Role of MoAFI and relevant departments in dissemination of agricultural technologies[104]

The dissemination of information by MoAFI about agricultural technologies is performed by the National Agency of Rural Development (ACSA), on the basis of the acquisition contract of services and rural extension from 22 April 2013 signed with MoAFI. According to this contract, ACSA provides services in four areas:

a) Technological consulting services;
b) Legal consultancy services;
c) Consultancy services of financial / economic;
d) Marketing consulting services.

State Budget for 2017 of the MoAFI

In the 2017state budget for the MoAFI there are set costs and non-financial assets in the total amount of MDL 1,723,163,700 from which MDL 24,694,700 are meant as funding and subsidies from the state budget for enterprises which subordinate as follows:

MDL 3,899,300 in order to achieve the set objectives for projects in the field of science and innovation, including:

a) MDL 3,136,400 for the State Enterprise "Institute of Agricultural Machinery "Mecagro" for two projects with the theme “Developing technical means for technological processes in the food sector” (Head of project: Ion Habasescu)- in the amount of MDL 1,471,600 and “Developing technical means for plant protection and conservative technologies” in the amount of MDL 1,664,800.
b) MDL 762,900 to the Center of Water Resources Research branch of Republican Center for Amelioration and Animal Reproduction (CRARA) for the project with the theme “Amelioration, conservation and management of water energetic resources; improvement of biological aquaculture from ponds and elaborating a system of fish protection.”

MDL 20,795,400 for the creation and maintenance of the genetic background and of agriculture activities, including:

a) MDL 75,000 to the State Enterprise P.P. Journal “Agriculture of Moldova” to edit and to promote scientific and practical achievements in the field of food;
b) MDL 300,000 to the State Enterprise Vivaflora to create and maintain the genetic background and decorative plants;

[104] According to email 06 April 2017 from Mr. Sergiu GHERCIU, Advisor of the Minister

c) MDL 1,607,200 to create and maintain the fruit growing genetic background previously managed by the State Enterprise "Resort of Experimental Technology Codru" which is in a state of insolvency and is being solicited by the Public Institute of Scientific Practice of Horticulture and Food Industry to be transferred to it, but at this point, the terrains have not yet been registered.
d) MDL 5,875,000 State Enterprise CRARA to coordinate and to direct the processes for amelioration and cattle breeding
e) MDL 1,526,700 to the State Enterprise of Research, Selection and Pig Hybridization, "Moldsuinhibrid" to maintain the genetic background of pigs in the Republic, its value in the course of exploitation, pork meat growing farms in the country for S.E. Moldsuinhibrid.
f) MDL 1,595,600 to research and maintain the genetic background of viticulture administrated by SE"Statiunea Experiemntala Codru" which is in a state of insolvency and are being solicited by the Institutions of practical Science of Horticulture and Food Technologies to be transferred to it, but at this moment the terrains have not been registered.
g) MDL 9,815,900 to the SE "Centrul Informational Agricol" to finance the automatic informational system, "National Register of Animals"

3.4.2 NFSA

(1) Legal Status of the Organization

The NFSA is the administrative authority which was established on January 16 2013. The agency is supervised by the Government under the Prime Minister's Office. It is responsible for implementing state policy to regulate and control food safety and veterinary medicine, animal husbandry, plant protection and phytosanitary quarantine, seed control, food and feed product quality control.

(2) Budget

NFSA is fully funded by the state budget. The total budget of NFSA fluctuates, but for 2016 the budget allocation was MDL 180 million. For the upcoming year 2017, the budget will be set at MDL 194 million (see table below).

Table 3-5: Evolution of the 2013-2020 NFSA Budget

(MDL)

2013	2014	2015	2016	2017	2018	2019	2020
141 mln.	193 mln.	168 mln.	180 mln.	194 mln.	203 mln.	211 mln.	218 mln.

Source: NFSA

(3) Main Activities

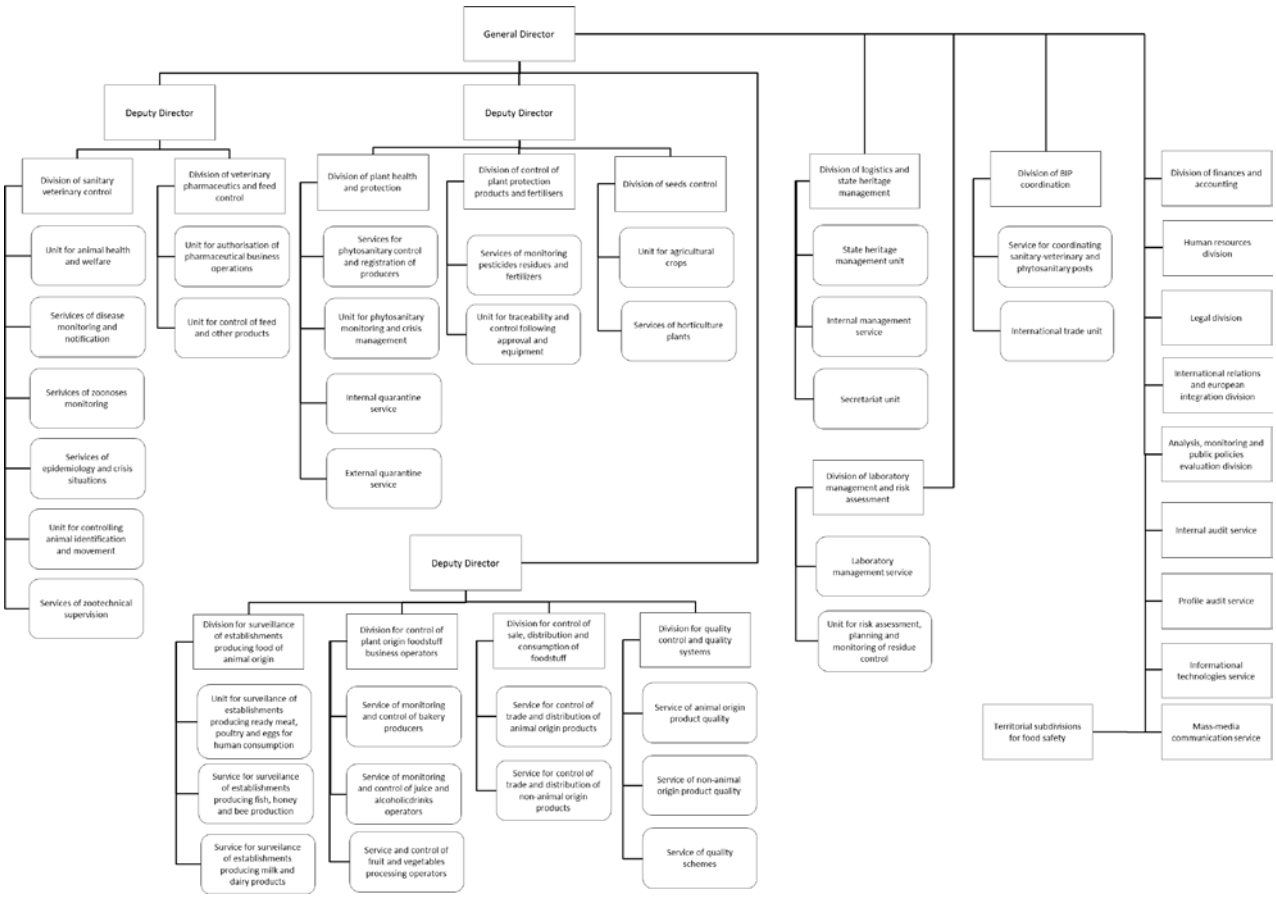
- Ensure health protection, animal welfare, quality of veterinary products and production company to prevent transmission of infectious disease from animals to humans
- Ensure plant health to prevent occurrence and dissemination of harmful organisms
- Supervise and control veterinary medicines
- Supervise and control pesticide and fertilizers
- Supervise the production and marketing of seeds
- Perform registration of economic entities of seeds and seedlings
- Supervise and monitor the safety of food and agricultural products
- Supervise catering, trade, storage, distribution and consumption of food
- Control and supervise the requirements of current legislation of food safety
- Implement policies and strategies related to food safety, animal and plant health

(4) Human Resources

There are total of 1,422 staff working for the NFSA. 171 staff members work at Headquarters with 110 located at the border points. The structure of NFSA consists of the following four main role positions:

- Headquarters office (Central NFSA)
- District / Municipal Food Safety Units: 37 units
- Border inspection for veterinary and phytosanitary: 10 positions
- Republican Center of Veterinary Diagnosis (RCVD)

Figure 3-3 shows organization structure of NFSA at the headquarters office. There are three main departments: animal health, food safety and phytosanitary, and four complementary departments: internal management, laboratory management and risk assessment, coordination of border inspection and regional food safety. A description of working staff numbers at the border inspection points are described in table 3-6.



Source: NFSA

Figure 3-3: Organization Structure of NFSA

Table 3-6: Number of Working Staff at Checkpoints of Veterinary and Phytosanitary

No	Location of veterinary and phytosanitary control	Number of staffs (max)
1	Criva	14
2	Giurgiulesti, Galati / Port / Reni, Cahul	14
3	Otaci, Ocnita	10

No	Location of veterinary and phytosanitary control	Number of staffs (max)
4	Valcinet, Ocnita	6
5	Tudora, Palanca, Stefan Voda	14
6	Leuseni	14
7	Sculeni, Ungheni	10
8	Ungheni	6
9	Chisinau (portable terminals, railway and mail)	11
10	Chisinau	11
Total		**110**

Source: NFSA

3.4.3 AIPA

(1) Legal Status of the Organization

AIPA is a public organization under the MoAFI that became an independent administrative agency at the end of 2016. It is responsible for the administration of agricultural subsidy funds, allocating resources to support producers, and controlling the usage of public money for such purposes. It has 10 regional offices responsible for receiving and verifying the files submitted by farmers.

(2) Missions and Functions

Missions
1. To manage financial resources intended for supporting agricultural producers
2. To monitor the allocation of such resources
3. To evaluate the quantity and quality impact of the state's measures intended to support farmers

Functions
1. To ensure the correct and legal management of the funds allocated for supporting the agricultural producers;
2. To examine the requests and applications submitted by the applicants, as well as their eligibility to benefit state-provided funds, according to the established procedures and regulations;
3. To create and maintain a register of agricultural holdings;
4. To run an internal control system with the aim to ensure the integrity of the applied procedures and systems, as well as to measure their performance.

(3) Budget, Subsidy Funds Distributed through AIPA

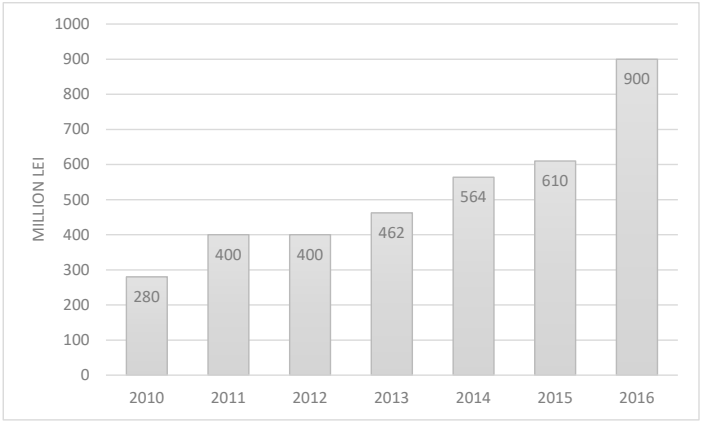
The budget of AIPA over the last 5 years is shown in the table below. The budget of AIPA consistently ranges between EUR 350,000 to 400,000. According to the Subsidy Law, AIPA is entitled to be allocated2% of the subsidy fund as its operational budget. For example, if the subsidy fund allocated by the government for the year is MDL 100 million, then the operational budget to be allocated for AIPA should be MDL 2 million. Because the subsidy in 2016 was MDL 900 million (approximately EUR 40 million) AIPA should have been allocated about MDL 1.8 million or EUR 800,000. In reality, AIPA was allocated less than half of that amount (See Table 3-7). At the end of 2016, the government enacted a law on AIPA's legal status as an independent administrative agency.

Table 3-7: Budget of AIPA

	2012	2013	2014	2015	2016
Budget(in EUR)	400,000	416,000	356,445	321,299	355,660

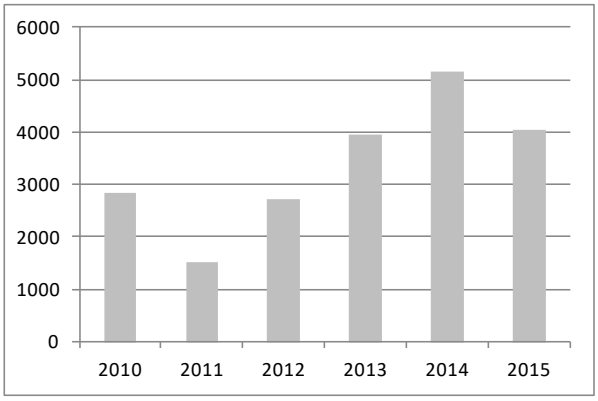
Source: AIPA

The figure below shows the size of the subsidy funds since AIPA was established. The amount of annual funding that AIPA has subsidized has been increasing dramatically. Though some fluctuation can be observed in the table, the number of beneficiaries shows an increasing trend.



Source: AIPA

Figure 3-4: Trend of Subsidy Funds



Source: AIPA

Figure 3-5: Number of Beneficiaries

(4) Human Resources

As described in the figure below, the number of AIPA personnel is 65 in total. 35 personnel are stationed at the central level and 30 are stationed at regional offices. The director controls all activities in AIPA, but is directly involved in the activities undertaken by the five divisions located in the central office. There are two Deputy Directors. One for administration and regional offices and another one for inspection, authorization and accounting related departments.

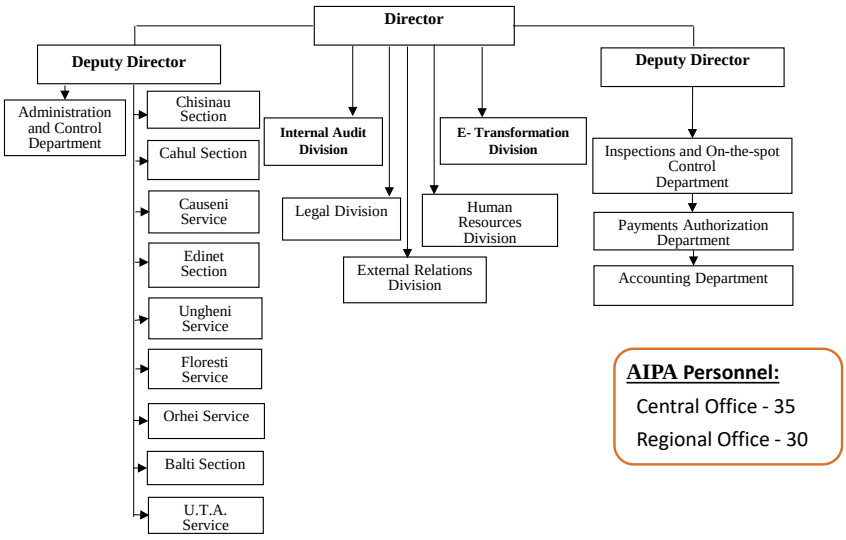


Figure 3-6: Organizational Structure of AIPA

3.4.4 2KR PIU

(1) Legal Status of Organization

The PIU for the Increase of Food Production was established in 2001 for the purpose of implementing the Increase of Food Production Project 2KR, financed by the Government of Japan. The PIU for the Increase of Food Production is a statutory body under the MoAFI of the Republic of Moldova, with separate accounts and management system, designed to ensure greater transparency in operations and to have clear responsibilities in its operation.

(2) 2KR scheme and Revolving Fund

The 2KR PIU has been responsible for implementing the projects known as the 2KR scheme. Though the project ended in 2011, the 2KR PIU sustains services by revolving reserved funds accumulated through 2KR scheme.

The funds granted by the Government of Japan through 2KR scheme have been mobilized to purchase machinery and farmer's sales. The payment by farmers was deposited in the account of 2KR in Moldova-Agroind based on Exchange of Note. The GoM was supposed to reserve money recovered through the payment by the farmers at least the amount of half of the given grant. That reserved fund has been utilized for other development projects based on JICA's consent. Since the initial stage of the 2KR scheme in 2001, the 2KR Unit has been recovering payments from farmers and depositing them in the revolving fund successfully. The rate of reserve fund against the committed amount (which is more than half of the grant) has been 100% or more.

Even after the end of project, the fund provides services based on the module of 2KR scheme. The 2KR-Unit provides machinery and equipment purchased through the reserved fund for small farmers through a leasing scheme without interest rates, VAT applications and even collateral. 6% of sales are utilized for administration and after services such as guarantee, spare-parts, operation and maintenance and trainings that are provided by Agrofermotec S.R.L. Payment schedules depend on the number of candidates willing to purchase the equipment. The initial schedule can be a 25% down payment with 25% yearly payments until fully purchased. In case of a bigger number of candidates, the payment scheme could change to a 50% down payment with 25% yearly payments until fully purchased.

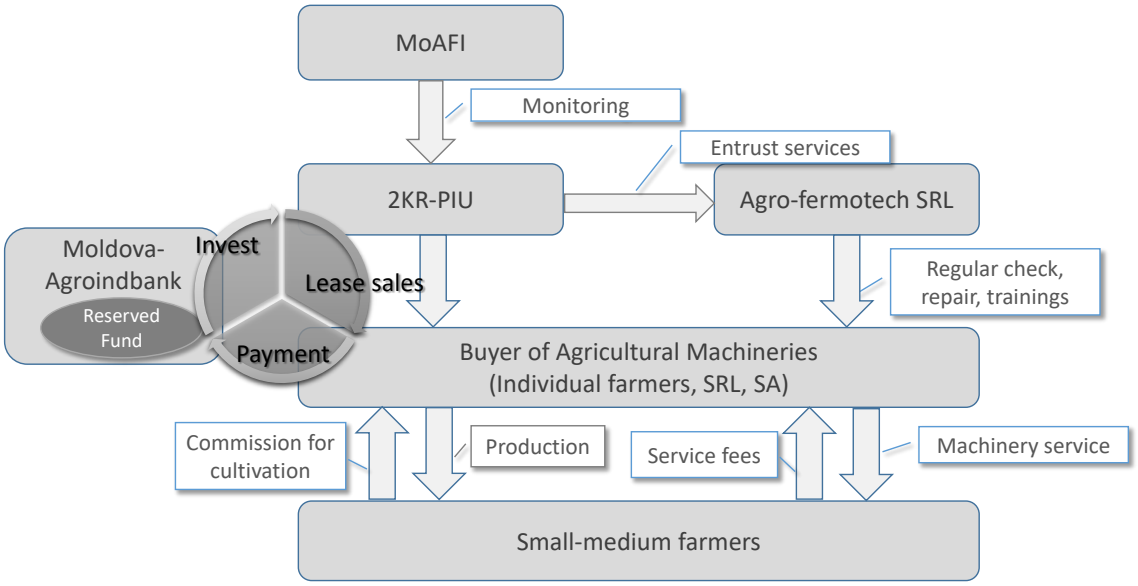


Figure 3-7: Structure of 2KR Scheme

(3) Major Responsibilities

1. To implement agricultural projects such as 2KR (which had been implemented through the grants given by Government of Japan from 2000 to 2011, and sustained by the 2KR Unit), the project for the effective use of biomass fuel, development of small-scale irrigation systems and others;
2. To supply agricultural machinery and equipment through 2KR and its counterpart funds which are a portion of savings accumulated through recovering money from granted machinery from Japan, and other funds;
3. To provide technical support and trainings for the farmers who purchased machinery and equipment through the projects.

(4) Budget

The budget of 2KR PIU is increasing year by year. The total budget of 2KR PIU in 2016 was MDL 5,995,281 (approximately USD 300,000). There is no allocation of budget from MoAFI. 2KR PIU sustain the 2KR scheme with the funds recovered from the 2KR projects that have been implemented for over a decade. Scale of budget becomes larger when any other project provide fund for 2KR scheme.

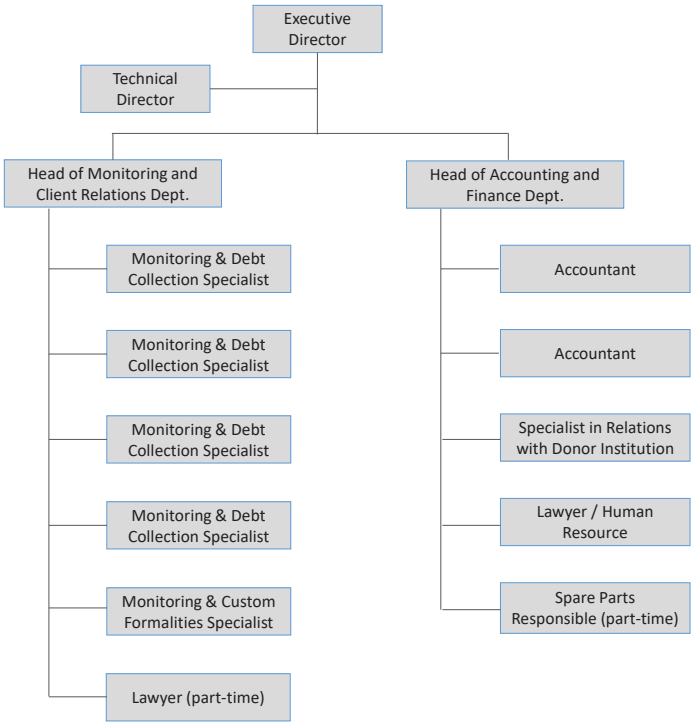
Table 3-8: Budget of 2KR PIU

	2012	2013	2014	2015	2016
Budget	4,797,788	4,676,244	5,179,606	5,265,019	5,995,280

Source: 2KR PIU

(5) Human Resources

The 2KR PIU is headed by one Executive Director. A Technical Director is assigned to assist the Executive Director. There are two different divisions under Executive Director; namely, Monitoring and Client Relations and Accounting and Finance. There is a head of department and technical staffs in each department. There are 15 permanent employees and 3 part-time employees in 2KR PIU.



Source: 2KR PIU

Figure 3-8: Organizational Structure of 2KR Unit

3.4.5 NFFM

(1) Legal Status of the Organization

The NFFM is a non-governmental, apolitical and non-profit farmer's organization, founded at 8 December 1995 on the basis of the decision of General Assembly of farmers and landowner's representatives.

(2) Missions

1. Facilitate knowledge transfer among farmers.
2. Improve access to markets.
3. Develop direct channels between farmers and consumers

(3) Budget

- 65% of the budget comes from development partner NGOs:
  We Effect (Swedish Cooperative Center)
  HEKS (Relief organization of the Protestant churches in Switzerland)
  CRPE (The Romanian Center for European Policies)
- 35% of the budget comes from:
  15% membership fees, 10% provided paid services for farmers, 5% donations, 5% other sources

(4) Human Resources

Decision Making Body: The General Assembly (310 delegates from all regions)
Executive Body:

- President and National Board: 13 members (4 women)

- Central staff: Executive Director and 3 Departments: Strategic, Extension and Rural Development
- 5 Regional Organizations in Balti, Edinet, Orhei, Chisinau, South: 5 Boards and Directors
- 11 Informative and Consulting Centers:11 advisors
- Rural Women Association: President and 13 members

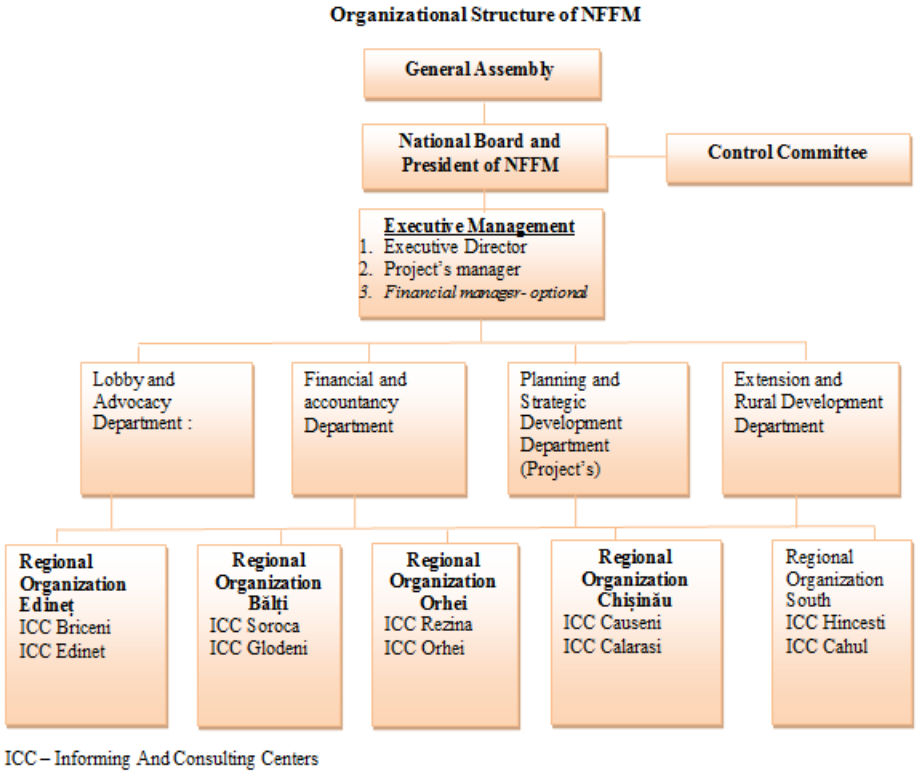


Figure 3-9: Organizational Structure of NFFM

3.4.6 AGROinform

(1) Legal Status of the Organization

AGROinform is a non-profit organization that began assisting agricultural producers as an individual enterprise through privatization and restructuring campaigns during post-kolkhoz/ sovkhoz period. AGROinform has transformed itself into an organization comprised of experts who provide technical services and advice to the national federation of agricultural producers. There are around 5,000 members in the federation as of today. It has established regional offices in 15 regions to expand its outreach to rural areas.

(2) Vision, Mission and Values

The vision, mission and values of AGROinform are described as below[105]:

Vision

[105] Vision, mission and values are found on the website (http://www.agroinform.md/en/about/vision-mission-values.html).

The National Federation AGROinform (the official name of AGROinform) aims to create a favorable framework for sustainable rural development, enhance the capacities of rural entrepreneurs and their ability to reach the external markets.

Mission
AGROinform, a national federation of agricultural producers from Moldova, is a network of 15 regional organizations that support the sustainable economic development of rural communities by providing complex assistance in business development and marketing, implementation of advanced technologies, and represents the interests of its members by promoting policies for sustainable rural environment development.

Values
Professional competence, accountability towards its members, openness and client-orientation, equality, respect, team harmony, positive public image, representation power, shared results, sincerity, and respect towards identity and autonomy of the regional NGOs from the AGROinform network.

(3) Main Fields of Services

AGROinform works on the fields mentioned below:

- Agriculture and Rural Development
- Training and Education
- Social development
- Environment conservation
- Lobby and networking of stakeholders in agricultural sector

The services delivered on the above mentioned fields by AGROinform are the following:

- Extension services/Consultancy and information provision
- Studies and surveys, using diverse tools including interviews in focus groups
- Marketing researches and trade facilitation
- Development and management of marketing information systems
- Assistance in Farmers' Cooperation
- Gender equality assessment and mainstreaming
- Development of training modules and provision of training
- Editorial activity (own newspaper)
- Projects Evaluation
- Assistance in access to finance

(4) Budget

Table 3-9 shows the financial situation of AGROinform over the past 5 years. The budget varies year by year, but the average over the last 5 years is around USD 570,000. It demonstrates that AGROinform has the organizational capacity to operate projects valued around USD 800,000.

Table 3-9: Budget of AGROinform for Last 5 Years

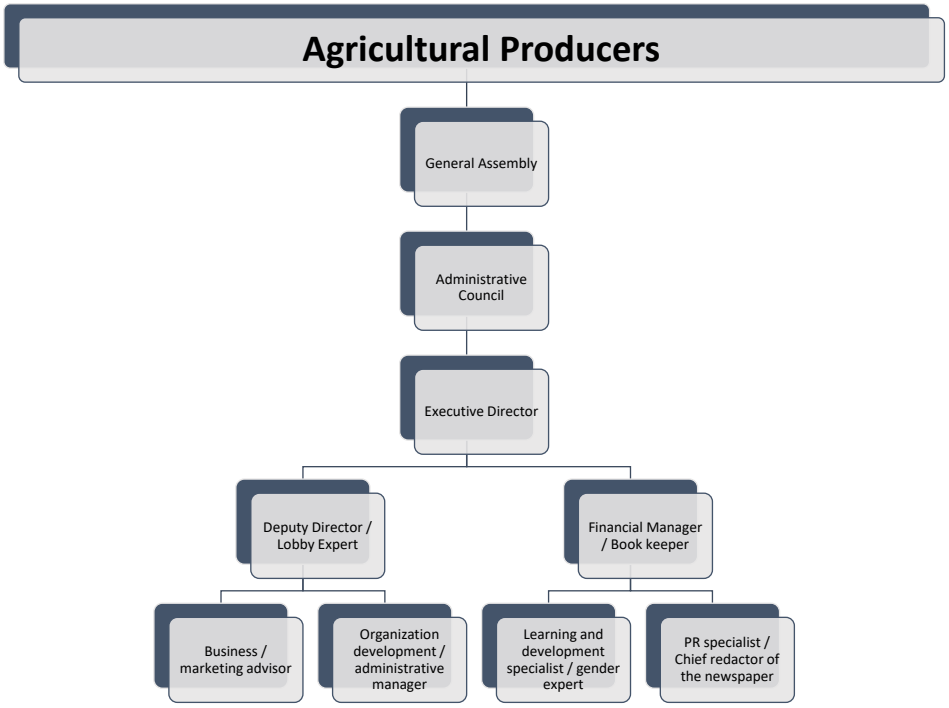
Unit: USD

	2012	2013	2014	2015	2016
Budget	752,326.00	833,816.00	451,340.00	246,227.00	803,542.00

Source: AGROinform

(5) Human Resources and Organizational Structure

Since AGROinform is a federation or non-profit public association for agricultural producers, the agricultural producers are the top of the organization. It has a General Assembly which consists of producers and an administration for decision making, and Administrative Council is charged with the responsibility to make decisions on management. Any programs and projects are operated or managed by the implementation bodies headed by Executive Director.



Source: AGROinform

Figure 3-10: Organizational Structure of AGROinform

3.4.7 Ministry of Economy and Infrastructure

(1) Legal Status of the Organization

The Moldovan Government is currently reorganizing its ministerial structure. After this reorganization, the current 16 ministries will be integrated to 9 new ministries. The Ministry of Economy is also included as the reorganization scope, and it will be integrated as the Ministry of Economy and Infrastructure (MoEI). The following statement of this section refers to the MoEI, based on the information as of August 2017.

(2) Vision, Mission and Values

The Ministry has the mission to analyze the situation and the problems in the areas of activity, to elaborate efficient public policies in the areas of Economics; Information technology and communications; Construction; Transportation; Quality Infrastructure; Energy security and efficiency, to monitor the quality of the policies and normative acts and to propose justified interventions of the state to provide solutions efficient in the fields of activity, ensuring the best relationship between the expected results and the expected costs.

(3) Functions

The MoEI is supposed to have following functions.

1. elaboration of the policy documents, draft normative acts in the fields of economy and infrastructure, including those for ensuring the execution of the normative acts and decrees of the President of the Republic of Moldova after their publication in the Official Gazette;
2. monitoring Moldova's score and position within the international indicators and rankings related to the specific fields of activity of the ministry and drafting proposals for their improvement.
3. continuous elaboration and improvement of the multilateral and bilateral legal framework at the interstate, intergovernmental and inter-ministerial level, which regulates Moldova's commercial and economic relations with other countries and contributes to the economic growth;
4. the collaboration, according to the national legislation, with foreign institutions in the fields of economy and infrastructure;
5. the implementation of the normative acts and the implementation of the international treaties of the Republic of Moldova in the areas of economy and infrastructure, the elaboration of the reports on their execution;
6. examination and approval of draft normative acts elaborated by other public administration authorities and sent for examination;
7. elaborating and presenting the budget proposals in the areas of economy and infrastructure, elaborating the annual activity plan, as well as the annual monitoring of the degree of implementation by elaborating and publishing the respective reports;
8. organizing the systems of planning, execution, accounting and budget reporting within the Ministry and, as the case may be, within the subordinated budget authorities / institutions;
9. the coordination and monitoring of the activity of the subordinate administrative authorities and of the public institutions in which the ministry has the founding capacity.

(4) Human Resources

Total number of staff is expected to be around 160 after the reform.

3.4.8 MIEPO

(1) Legal Status of the Organization

MIEPO is a public institution coordinating policy implementation for competitiveness, export promotion and investment attraction in Moldova.

(2) Mission

MIEPO’s mission is to contribute sustainably to the economic development of the Republic of Moldova, by strengthening the competitiveness of companies that operate or plan to initiate activity in Moldova in diversifying markets, export growth and development of investment projects.
Extensive partnerships with specialized international organizations, central and local public authorities, businesses and associations are geared towards offering comprehensive, one-stop consultancy services, increasing the awareness about business opportunities in Moldova and building the image of the state as an attractive destination for tourism, trade and investments.

(3) Main Activities

MIEPO's main activities are as follows;

- assists companies in expanding to other markets, promoting investment and supporting companies wishing to expand their businesses in the Republic of Moldova;
- contributes to business development by supporting companies in their efforts to diversify markets and export growth, as well as to increase international competitiveness;
- assists in promoting image / brands, according to their competencies and to administrate the related information resources.

(4) Budget

Starting with 2016, MIEPO's annual budget consists of MDL 21 million.

(5) Human Resources and Organizational Structure

According to the official structure of MIEPO (presented below), the institution is consisted of 14 personnel:

1. General Director
2. Executive Director
3. Lawyer
4. International relations specialist
5. Investment Attraction Expert, Chief of the Investment Attraction Department
6. Export Promotion Expert, Chief of the Export Promotion Department
7. Textile sector specialist
8. Automotive sector specialist
9. IT sector specialist
10. Agri-food sector specialist
11. Planning, control and reporting of economic performances specialist
12. Communication specialist
13. Office manager
14. Accountancy and Human resources

3.4.9 ODIMM

(1) Legal Status of the Organization

ODIMM is a public, non-commercial, non-profit institution created by the Government Decision no.538 of May 17, 2007, which operates under the coordination of the MoEI and other central and local authorities, business associations, business support providers and having the aim to increase SMEs' competitiveness, thus contributing to the country's sustainable economic development and creation of new jobs.
Within 10 years of activity, ODIMM developed and implemented programs with positive impact on SME sector: Efficient Business Management; Program on Attracting the Remittances into the Economy; State Credit Guarantee Fund; National Program for Economic Empowerment of Young People; Women in Business Program. ODIMM created and maintains the Business Incubators Network composed of 11 Incubators, National Business Excellence Centre and is the national contact point of Enterprise Europe Network, offering internationalization services.

(2) Vision, Mission and Values

ODIMM is a public institution that develops and implements programs and tools to support the SME sector with the aim to increase the performance and the competitiveness thereof, thus contributing to the country's sustainable economic development and to creating new jobs.
ODIMM mission is carried out by the following strategic objectives:

- Creating opportunities for launching and developing successful businesses, particularly in rural areas;
- Formation and amplification of entrepreneurial skills and culture;
- Facilitating the SMEs access to advantageous and diversified financial resources;
- Facilitating the SMEs access to information resources and innovations;
- Stimulating public-private dialogue;
- Promoting the development of business support infrastructure;
- Facilitating access to business advisory services for the purposes of development/growth;
- Developing businesses with high growth potential or those prepared for export;
- Facilitating business linkages for SMEs with large national and international companies.

(3) Functions

According to the Regulation of the Organization, ODIMM has the following core functions:

- analysis of the SME sector and its evolution;
- evaluating the effectiveness of government support of the sector, preparing proposals for the improvement of forms and methods of stimulating entrepreneurship;
- preparing proposals for the improvement of the legislation;
- implementing programs to support SME development;
- facilitating public-private dialogue;
- granting financial guarantees;
- creating information infrastructure;
- contributing to the development of supporting infrastructure for the sector development;
- facilitating the participation in national and international exhibitions and fairs;
- production and distribution of informative material about business opportunities;
- organizing themed events to encourage entrepreneurship and increase their competitiveness;
- provision of consultancy, information and training services for micro-, small and medium enterprises and business service providers;
- attracting and managing donor financial and technical assistance to implement activities in the SME sector, etc..

(4) Human Resources and Organizational Structure

The ODIMM staff has the necessary qualifications to perform the tasks set, with the possibility to develop their knowledge and skills, following the business needs and new strategic directions of the activity of the Organization.

- Management staff - 14
- Executive staff - 24
- Technical staff - 2

The functions and activities of the Organization are distributed into ten strategic Divisions that carry out the following basic tasks:

1. Financial Division:
   - Provides bookkeeping for the Organization;

- Ensures the planning and management process of the ODIMM annual estimate;
- Provides financial planning and management for the state programs carried out by the Organization;
- Ensures the financial control of the implementation of assistance programs and of the budget;

2. Business Support Infrastructure Division:
   - Manages the MBIN (Moldova Business Incubators Network);
   - Contributes to the creation of BIs, clusters and i-hubs;
   - Assists local authorities with planning and development of the area and with the implementation of projects;
   - Supports and conciliates SME representatives to develop and strengthen their business;
   - Develops new tools for the development of business support infrastructure.
3. Analysis, Innovation and Training Division:
   - Analysis the impact of SMEs policy and strategy;
   - Collects and processes information on the SME sector;
   - Develops studies and launches researches for the SME development;
   - Conducts entrepreneurial training courses;
   - Searches, detects and selects innovations, ensures transfer towards mobilizing the innovation potential of SMEs;
   - Develops new programs and mechanisms to promote and support the SME sector;
   - Examines international best practices for SME support.
4. SME Financing Division:
   - Identifies solutions and opportunities for SMEs to access non-refundable/refundable finance to develop thereof;
   - Provides support SMEs in accessing nonrefundable financial resources;
   - Support SMEs during the start-up period;
   - Monitors the SMEs and gives advice on their economic growth;
   - Identifies and supports SMEs to participate in exhibitions by subsidizing part of the costs.
5. Communication and Public Relation Division:
   - Develops and implements the external communication strategy;
   - Promotes the image of the institution;
   - Conducts promotion and media campaigns for ODIMM programs and activities;
   - Maintains close contact with mass media and updates the websites of the institution.
6. Fundraising and International Relations:
   - Accesses and attracts grants to strengthen and develop SMEs and ODIMM;
   - Contributes to expanding institution's relations by establishing sustainable international partnerships;
   - Maintain permanent contact with donor institutions and with external partners.
7. Credit Guarantee Fund:
   - Facilitates the access of SMEs to bank loans;
   - Advises SMEs on accessing financial resources;
   - Establishes and maintains contacts with banking and non-banking financial institutions;
   - Identifies best practices in the field of guarantees and develops new SME guarantee scheme;
   - Monitors the SME guarantee and lending.
8. National Business Excellence Center:
   - Advices on entrepreneurship;

- Performs organizational diagnosis and identifies the impediments for company's development;
- Provides entrepreneurs with information and know-how for accessing and obtaining financial resources for business development;
- Contributes to the development of entrepreneurship, managerial skills and business management skills.

9. Women in Business Program Implementation Unit:
   - Implements the National Program on Supporting Women in Business;
   - Organizes trainings and guidance for women planning to launch their business;
   - Provides small scale investment as support for business development;
   - Provides large scale investments for expanding the export market and export competitiveness.
10. Technical and Administrative Division;
    - Secretariat;
    - Manages the IT network;
    - Provides logistical functions.

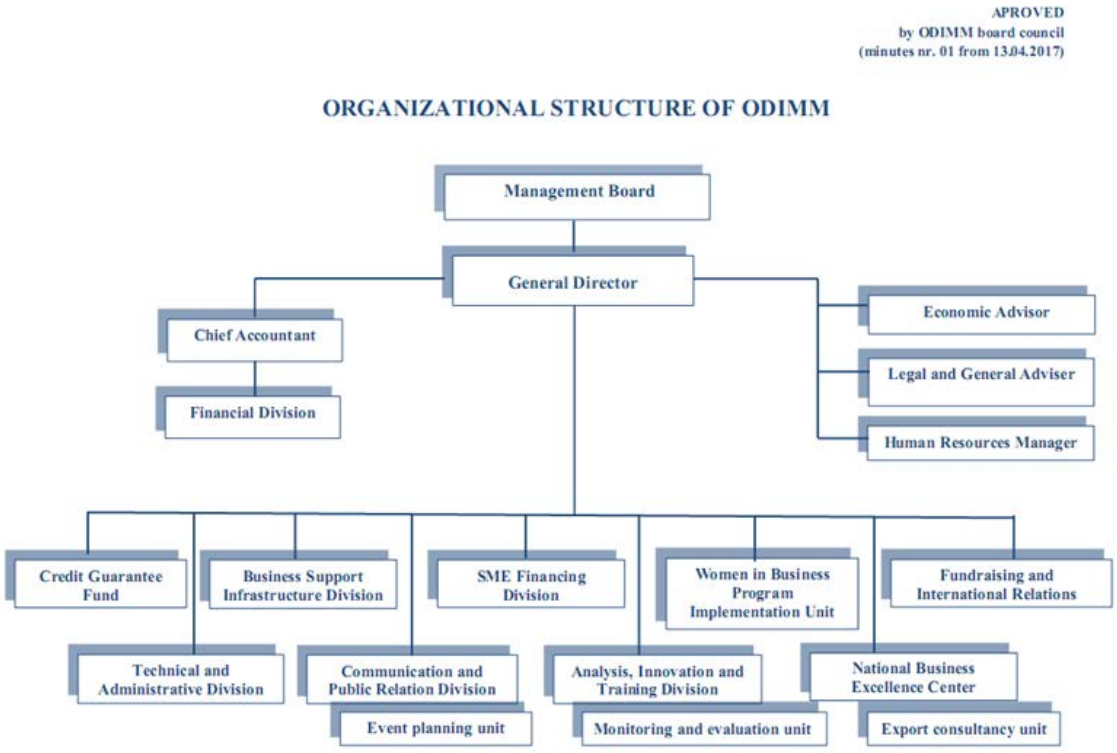


Figure 3-11: Organizational Structure of ODIMM

4. Current Status and Issue of Agricultural Sector

4.1 Current Status and Issues of Small-scale Farmers

4.1.1 Survey Methodology

The survey on "Socio-economic Situation of Farmers and their Farming System in Rural Area" had been entrusted one of the NGO named National Federation of Agricultural Producers of Moldova or AGROinform. The survey has started in December 2016 and ended in April 2017. The methodology and steps taken for data collections are described as below.

Mode: Data collection from each household using a structured questionnaire with face-to-face interview with representative of household.

Target of Data Collection: 90 households: 30 households from 2 villages in northern, central and southern areas were sampled by the sampling method. 6 limited companies operating agriculture business: One limited company from target villages for household survey.

Recruitment and training of surveyors: Necessary number of surveyors were recruited and trained prior to the field survey. The Contractor needs to conduct interviews in 90 households and 6 agriculture limited companies in 6 target villages within 2 weeks. Thus, the Contractor recruits necessary number of qualified surveyors to accomplish all the interviews in time.

Selection of villages and households: The target villages were selected by the contractor with rational reasons such as typical structure of households, number of small scare farmers, typical crops cultivated and so on. The sampling method were specified after the discussion between the Project Team and the Contractor.

Survey plan: The contractor works out the details of activities and implementation schedule for the Survey. The survey plan should had been approved by the Project Team before arrangement of the field survey.

Arrangement of the field survey: All the necessary arrangements were made for the field survey by the contractor, including a pilot survey to pre-test the questionnaire at one village.

Field survey: The field survey and data collection should be conducted as planned.

Supervision of field survey: Monitoring and supervision to the field survey should be ensured for the quality of data collection.

Data entry and processing: The collected data were entered to computer, processed and edited. Data entry were done by the "double entry" method, in which two separate teams enter the data respectively with checking and correction for all mismatches between the datasets.

Data analysis: Processed and edited data were analyzed to extract the findings.

Report writing: The contents of the final report were agreed between the Project team and the Contractor. Draft final and final report were submitted to and approved by the Project Team within the set timeframe.

4.1.2 Farming System

The survey includes data and information analyzed by age group as required when filling in questionnaires, while the division and analysis of data into two age cohorts, up to 40 and over 40, were based on the considerations that, in the Republic of Moldova, young entrepreneurs are persons aged 18-40 years, while the rest are old people (those aged 40-60 are capable of working, and those older than 60 years are elderly).

The data in the table below are provided for the analysis of barriers and strengths that were identified in the management system of farms owned by the interviewed farmers.

Table 4-1: Analysis of Barriers and Strengths in the Interviewed Farmer

Specifications	TOTAL survey						No. of Interviewed	%
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	6	23	29	15	46	61	90	100.0%
What hampers your agriculture business most?								
a) Weak financial arrangements	5	21	26	13	40	53	79	87.8%
b) Insufficient subsidies	0	2	2	1	6	7	9	10.0%
c) Insufficient access to credit and collateral for credit	1	6	7	7	14	21	28	31.1%
d) Weak insurance system	2	6	8	7	16	23	31	34.4%
e) Condition of access road to farms and markets	3	6	9	4	18	22	31	34.4%
f) Insufficient power supply / disturbance due to power cut	0	1	1	1	0	1	2	2.2%
g) Providing agricultural inputs and their quality	2	4	6	2	0	2	8	8.9%
h) Lack of irrigation sources and high costs for irrigation	2	6	8	7	10	17	25	27.8%
i) Insufficient agricultural information on production	1	2	3	3	7	10	13	14.4%
j) Insufficient agricultural information on marketing	1	6	7	3	15	18	25	27.8%
k) Difficulty of access to market	2	7	9	2	9	11	20	22.2%
l) Weak certificate system	0	1	1	1	1	2	3	3.3%
m) Others	0	2	2	1	3	4	6	6.7%
What are the key points in managing business success?								
a) Good history of activity / enterprise development	3	10	13	12	28	40	53	58.9%
b) Access to infrastructure	2	3	5	2	7	9	14	15.6%
c) Orientation to HVCs	3	14	17	6	20	26	43	47.8%
d) Developing value chains for products based	0	5	5	4	11	15	20	22.2%
e) The good economic and financial situation of enterprise	3	0	3	2	7	9	12	13.3%
f) Using quality farm inputs	3	7	10	6	18	24	34	37.8%
g) Advanced production technology / intensive[106]	0	4	4	1	5	6	10	11.1%
h) Qualified personnel	1	5	6	8	10	18	24	26.7%
i) Good material and technical base	3	1	4	4	11	15	19	21.1%
j) Advantageous marketing channels for selling the production / services	0	0	0	2	3	5	5	5.6%

[106] Commercial farmers apply modern and intensive technology (particularly in cultivation of HVCs), but their number is not significant, while subsistence farmers use only minimal technological operations and a minimum of the required inputs (most frequently, they do not use mineral fertilizers, plant protection use is minimal – they use almost no fungicides).

Specifications	TOTAL survey						No. of Interviewed	%
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
k) Diversification of products / services	2	2	4	7	14	21	25	27.8%
l) The high quality and appropriate packaging production	1	7	8	3	9	12	20	22.2%
m) Access to quality information	3	12	15	3	9	12	27	30.0%
n) The association and joining associations specialized products	0	2	2	3	6	9	11	12.2%
o) Cooperation with farmers have activities and homogeneous products	2	3	5	7	17	24	29	32.2%
p) Others	0	2	2	0	0	0	2	2.2%

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

In the management system of farms owned by farmers, the biggest barriers were insufficient financial resources for the case of 87.8% of the surveyed farmers, followed by poor infrastructure and weakness of the insurance system against agricultural risks. Several important limiting factors, which halt agricultural development are the lack of access to sources of irrigation, lack of access to favorable credit facilities and collateral provision and lack of a marketing and information system on prices and future trends in local and regional markets.

Small and medium sized farmers are not insured against risks in agriculture, since such services are expensive (but there is access to such services). In addition, in case of force majeure of the insured risk, the amount of compensation is minimal and is very difficult to obtain for farmers, because there is no institution to mediate the resolution of the conflict between the farmer and the insurance company. There is no framework regulation stating clearly and concisely how to determine damages (damage/loss) and how to compensate for such damages (payment of the insurance policy).

At the same time, interviewed farmers mentioned the following strengths, which facilitated farm development: 58.9% - a good development history, 47.8% - practicing high-value farming, 37.8% - use of high quality agricultural inputs. Cooperation - the association of farmers (32.2%) and access to high quality information (30%) have contributed in recent years to the welfare development of farmers and such activities are increasingly requested by small producers.

(1) Major Crops for Sale

The main farming systems currently practiced worldwide are: conventional agriculture, biological (ecological) agriculture, organic, natural, biodynamic, extensive low-input agriculture, and sustainable and precision agriculture.

1. **Conventional agriculture.** Conventional agriculture was widespread before 1989. Intensive mechanization and intensive use of chemicals are specific to the system of conventional farming. It consists of: execution of numerous mechanical works such as ploughing, disking and repeated maintenance works; fertilization with high doses of fertilizers; practicing monoculture; intensive chemical treatments for control of weeds, diseases and pests. Today it is widely accepted that this system of farming degrades the environment from chemical, biological, and physical viewpoints.
2. **Extensive agriculture (subsistence).** Subsistence agriculture with low subsistence inputs and low competitiveness of production can also create

imbalances within the environment, especially in respect to nutrition. If conventional farming system exaggerates in applying mechanical works, chemical treatments and fertilizer quantities, in subsistence farming only very small quantities of such substances are applied. Currently this system is practiced by many individual farmers.

3. **Biologic agriculture.** In this biologic system, products are subject to strict control of applied technology with respective labeling and higher prices.
4. **Organic agriculture.** Organic farming consists in exclusive use of organic fertilizer in relatively high doses. Natural farming consists in shallow tillage; no chemical pesticides are used in the system. In biodynamic agriculture, biodynamic preparations are used to treat diseases and pests.
5. **Precision Agriculture.** Precision farming is the most advanced form of agriculture practiced in developed countries in Europe and the US, which implies the involvement of modern technologies, information technologies, satellites, in assessing indicators of soil fertility, vegetation factors and in dosing inputs and plant protection.

Based on the above-mentioned systems, we find that most farmers in Republic of Moldova focus on conventional and subsistence farming, which is not sustainable, does not ensure competitiveness, and does not allow them to effectively manage small plots in a sustainable manner.

The low profitability in agriculture is determined by the dominance of low-value crops in agricultural production at the expense of HVCs. Over 80% of the cultivated area in the Republic of Moldova is covered by low value crops (such as cereals, oilseeds, sugar beet and fodder crops), while F&V occupy less than 20%. Only cereals (wheat, corn and barley), occupy more than half of the sown areas in the Republic of Moldova.

The table below was created on the basis of data collected from the questionnaires of 90 interviewed farmers, where the cultivated areas totaling a size of 3,115.5 ha were characterized. Here is also shown the harvests for major crops produced in 2016.

Table 4-2: Cultivated Areas and Production Volume in the Interviewed Farmers

Plot No.	Major Production	Area of the Plot (ha)	Output		Gross margin (gross profit)
			Gross Production (kg)	Yield (kg/ha)	
1	Winter wheat	763.00	2,803,950	151,500	1,697,730
2	Barley	110	348,500	45,100	253,779
3	Corn	659.56	2,560,860	251,296	1,742,494
4	Sunflower	1,065.70	2,068,400	88,235	4,776,579
5	Soy beans + beans	35.50	43,900	9,400	83,956
6	Green house	2.55	165,260	363,519	397,300
7	Vegetable	35.86	669,200	374,833	1,223,250
8	Stone fruit	98.42	571,220	116,583	681,268
9	Seed fruit	26.50	259,800	80,967	649,200
10	Berry	0.95	1,350	2,778	10,600
11	Nuts	81.40	11,550	1,654	445,000
12	Fruit tree nursery	21.55	703,000	776,120	5,211,900
13	Grapes	157.92	1,296,950	244,061	4,039,090
14	Alfalfa - clover	12.50	28,700	11,633	22,350
15	Others	44.10			

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Analyzing the data in the table, we conclude that interviewed farmers are entrepreneurs who produced a significant amount of agricultural raw materials. At the same time, the farmers have considerable reservations regarding the economic efficiency and the degree of specialization / intensity for their products to be competitive on local and regional markets.

The table below represents the calculations of the economic efficiency for the interviewed farmers.

Table 4-3: Analysis of the Results Obtained from the Cultivation of Crops per unit of Area in the Interviewed Farms

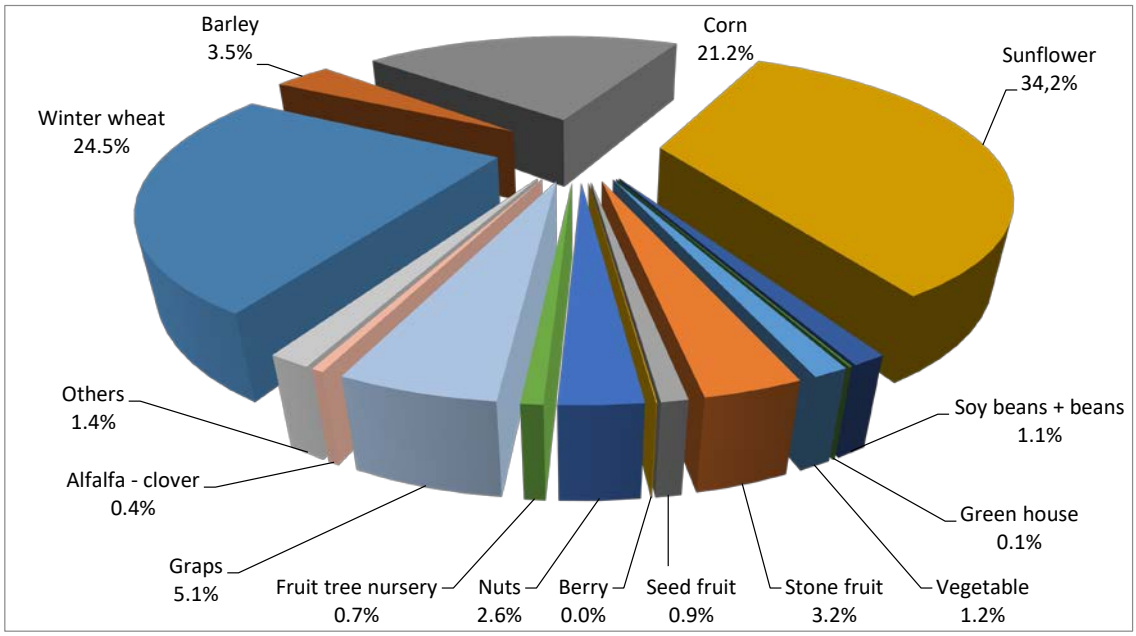
#	Major Production	The number of farmers who cultivate that culture	Average area per (ha)		Output - Gross Production, kg		Output - Yield (kg/ha)	Gross margin (gross profit), lei		
			Farmer that cultivates culture	Farmer interviewed	Farmer that cultivates culture*	Farmer interviewed**		per ha	Farmer that cultivates culture	Farmer interviewed
1	Winter wheat	42	18.17	8.48	66,761	31,155	3,674.9	2,225	40,422	18,864
2	Barley	16	6.88	1.22	21,781	3,872	3,168.2	2,307	15,861	2,820
3	Corn	65	10.15	7.33	39,398	28,454	3,882.7	2,642	26,808	19,361
4	Sunflower	44	24.22	11.84	47,009	22,982	1,940.9	4,482	108,559	53,073
5	Soy beans	6	5.92	0.39	7,317	488	1,236.6	2,365	13,993	933
6	Green house	18	0.14	0.03	9,181	1,836	64,807.8	155,804	22,072	4,414
7	Vegetable	19	1.89	0.40	35,221	7,436	18,661.5	34,112	64,382	13,592
8	Stone fruit	29	3.39	1.09	19,697	6,347	5,803.9	6,922	23,492	7,570
9	Seed fruit	11	2.41	0.29	23,618	2,887	9,803.8	24,498	59,018	7,213
10	Berry	2	0.48	0.01	675	15	1,421.1	11,158	5,300	118
11	Nuts	10	8.14	0.90	1,155	128	141.9	5,467	44,500	4,944
12	Fruit tree nursery	20	1.08	0.24	35,150	7,811	32,621.8	241,852	260,595	57,910
13	Grapes	27	5.85	1.75	48,035	14,411	8,212.7	25,577	149,596	44,879
14	Alfalfa - clover	4	3.13	0.14	7,175	319	2,296.0	1,788	5,588	248
Total		**X**	**91.82**	**34.13**	**362,173**	**128,140**	**X**	**6,816**	**X**	**235,939**

*** - Farmers that cultivate culture** (Farmer who cultivates certain crops) is the farmer who, during the interview, said that he/she is growing the respective crop, while data for calculation related to such item show the average for the interviewed farmers. For example, 42 farmers out of 90 cultivate winter wheat". The column of "farmer that cultivates culture" in "average area per (ha)" shows average area for cropping winter wheat within the farmers who cultivate winter wheat. In this case, it shows the average of 42 farmers.
**** - Farmer interviewed** (interviewed farmers) are the 90 farmers interviewed within the survey, while calculation data shows an average for all surveyed unincorporated family farms.
Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Analyzing the table, we find that farmers have obtained modest results pursuing entrepreneurship in agriculture. With reference to the increases in economic efficiency, all efforts must be directed at farmers and all stakeholders who facilitate the development of this sector in order to increase the degree of intensity and competitiveness of products in the domestic and export market.

(2) Land Use and Specification of Agricultural Machineries and Equipment

The dual and fragmented structure of farms is a potential and significant constraint partially due to the competitiveness of the agricultural sector, which consists of two large subsectors: corporate sector, comprised of large enterprises, and the individual sector which includes small farms and backyard (privately owned) households.

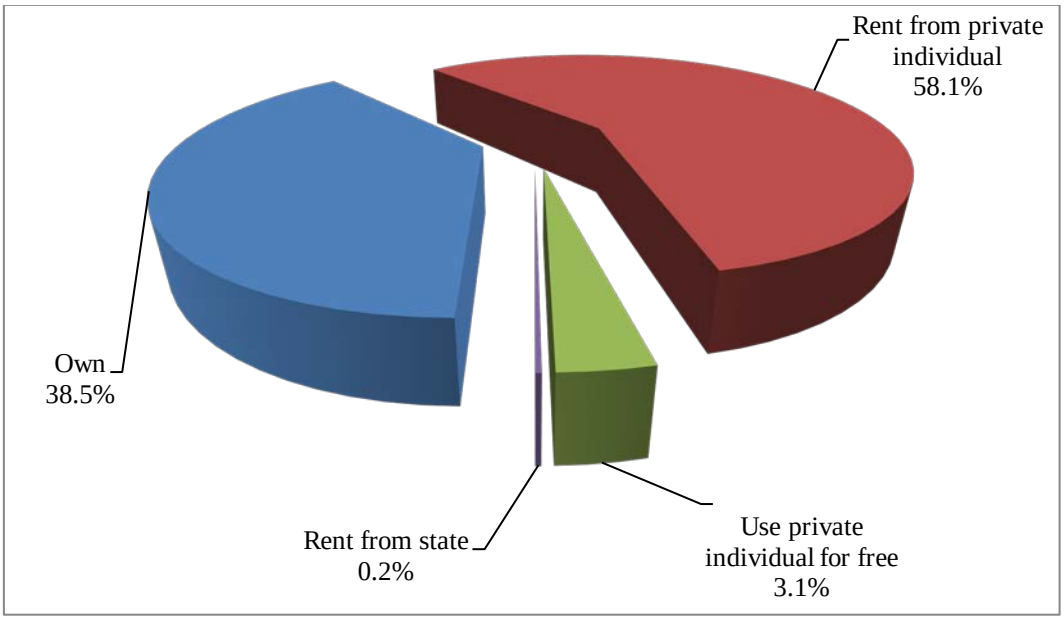


Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Figure 4-1: Surface Structure of Agricultural Crops in the Interviewed Farms

The most important crops cultivated by interviewed farmers are field crops (wheat, corn, barley, sunflower and soybeans), but these are combined with the cultivation of HVCs (fruits, grapes, vegetables).

Further analysis for ownership land use by the farmers surveyed. Looking at the figure below, we conclude that interviewed farmers owned a large area in the estate 38.5%. Furthermore, most of the land is leased from private individuals (58.1%).



Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Figure 4-2: Surface Ownership Structure in the Interviewed Farms

The table below is proposed for analyzing access to irrigation and irrigation source for farmers surveyed.

Table 4-4: Water Source of Irrigation in the Interviewed Farmers

#	Specification	Structure, %	Area, ha
1	Rain water	97.0%	3,020.95
2	Irrigation (ground water)	1.4%	43.90
3	Irrigation (river / pond water)	1.6%	50.66
Total		**100.0%**	**3,115.51**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Analyzing the sources of water for irrigation, we found that only 3% have access to irrigation, which limits the ability of farmers to apply an intensive agriculture and HVC cultivation.
Unlike the significant increase in overall labor productivity, the land productivity has increased only marginally over the last decade, with stagnant and extremely volatile yields. One of the causes of such lower productivity and volatility is the unstable rain water and lack of irrigation facilities.

(3) Investment Plan

Small and medium farmers face problems in accessing financial resources, setting up efficient management, executing proper selection of investments based on the development strategy of their company (which many do not have) and formulating directions of development for current consumption markets and anticipating future development. All these have a cumulatively negative effect on the development of the domestic agricultural sector which mainly affects the small farms, who are not able to quickly overcome such barriers without the adequate and genuine support of the state.

Actual access to agricultural finance and insurance system as risk finance

The financial sector of the country has two tiers: (1) financial and banking institutions (11 commercial banks are currently operational) and (2) microfinance businesses, which are rapidly growing and consist of microfinance organizations and savings and credit associations (SCAs or farmers' banks). In addition, the loans of financial resources from individuals or from relatives is also practiced (it has the largest share of the total).

The table below shows the analysis of interviewed farmers' access to loans from entities and difficulties in accessing such loans.

Table 4-5: Analysis of Access to External Funding in the Interviewed Farms

Specifications	TOTAL survey						Total farmers surveyed	Structure, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	**6**	**23**	**29**	**15**	**46**	**61**	**90**	**100,0%**
Financial Arrangement, Investment Plan and Insurance								
1.1 Finance Arrangement								
(1) How much money do you need for agricultural activity annually? MDL	**2,100,000**	**5,640,000**	**7,740,000**	**3,220,000**	**13,300,000**	**16,520,000**	**24,260,000**	**269,555.6**
(2) Do you take out a loan for agricultural activity regularly? YES	**3**	**6**	**9**	**7**	**21**	**28**	**37**	**41.1%**
(3) How much loan do you take annually for agricultural activity? MDL	**360,000**	**663,000**	**1,023,000**	**1,050,000**	**3,315,000**	**4,365,000**	**5,388,000**	**145,621.6**
(4) What are the main purposes to take a loan or credit (pay by kind after harvesting) regularly?								
a) Fertilizer, herbicide or pesticide	**2**	**2**	**4**	**5**	**18**	**23**	**27**	**30.0%**
b) Seeds and seedlings	**3**	**4**	**7**	**5**	**16**	**21**	**28**	**31.1%**
c) Feed and veterinary preparations	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**2.2%**
d) Spare parts of machinery	**1**	**0**	**1**	**3**	**12**	**15**	**16**	**17.8%**
e) Maintenance / repair of machineries	**0**	**0**	**0**	**1**	**5**	**6**	**6**	**6.7%**
f) Machinery service (lease / contract work)	**0**	**1**	**1**	**1**	**3**	**4**	**5**	**5.6%**
g) Capital investments (technical, perennial plantings, etc.)	**3**	**6**	**9**	**3**	**14**	**17**	**26**	**28.9%**
h) Others	**0**	**0**	**0**	**0**	**3**	**3**	**3**	**3,3%**
(5) What are the financial institutions to get a loan?								
a) Commercial bank	**3**	**4**	**7**	**5**	**14**	**19**	**26**	**28.9%**
b) Leasing company	**0**	**1**	**1**	**0**	**1**	**1**	**2**	**2.2%**
c) Microfinance organization	**1**	**1**	**2**	**1**	**7**	**8**	**10**	**11.1%**
d) Credit association (union – farmer bank)	**0**	**1**	**1**	**1**	**7**	**8**	**9**	**10.0%**
e) Agricultural cooperative bank	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
f) From an individual	**0**	**1**	**1**	**0**	**3**	**3**	**4**	**4.4%**
g) Others	**1**	**2**	**3**	**4**	**4**	**8**	**11**	**12.2%**
(6) What percent of your total investment is covered by the loan for agricultural activity in this season? %	**22.7**	**18.8**	**32.7**	**24.1**	**47.2**	**35.6**	**34.2**	
(7) Why don't you take out a loan?								
a) No need / sufficient funds are available	**1**	**1**	**2**	**2**	**1**	**3**	**5**	**5.6%**

Specifications	TOTAL survey						Total farmers surveyed	Structure, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
b) Do not want to take risk	**2**	**13**	**15**	**5**	**20**	**25**	**40**	**44.4%**
c) No eligible to get a loan	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**1.1%**
d) Commission and interest rate are very high	**1**	**11**	**12**	**4**	**13**	**17**	**29**	**32.2%**
e) Others	**0**	**1**	**1**	**1**	**7**	**8**	**9**	**10.0%**
(8) What are the main risks to take out a loan?								
a) Crop failure due to climate irregularity	**4**	**16**	**20**	**10**	**33**	**43**	**63**	**70.0%**
b) Unstable market price of productions	**5**	**17**	**22**	**7**	**31**	**38**	**60**	**66.7%**
c) Others	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**1.1%**
(9) Why can you not take out a loan? What are the major barriers for getting a loan?								
a) Outstanding loans	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
b) Negative credit history	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
c) Insufficient income	**0**	**1**	**1**	**1**	**8**	**9**	**10**	**11.1%**
d) Instability of income	**2**	**12**	**14**	**4**	**18**	**22**	**36**	**40.0%**
e) Insufficient mortgage such as house and land	**1**	**6**	**7**	**4**	**7**	**11**	**18**	**20.0%**
f) Others	**0**	**1**	**1**	**1**	**2**	**3**	**4**	**4.4%**
(10) Are you in long-term farm related debts? If yes, what is the purpose?								
a) Procurement of agricultural machineries	**2**	**1**	**3**	**2**	**6**	**8**	**11**	**12.2%**
b) Procurement of agricultural facilities	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**2.2%**
c) Losses from core activities from previous years	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1.1%**
d) Others - I have debts	**1**	**8**	**9**	**4**	**16**	**20**	**29**	**32.2%**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Farmers face problems in accessing credit, which limits their development and causes abandonment of businesses by young people. The biggest obstacles to accessing credit are: instability of sales (40%) and insufficient collateral (20%). The risks existing in domestic agriculture, including the high risk of climate conditions, as well as an aversion to risky loans (44.4%) and exaggerated interest rates and fees of banks (32.2%) have exerted a negative impact on farmers; they refuse loans and choose to cope with their own resources, applying mostly simple agriculture with small steps in their development.

Another problem for the real economy sector is insurance against risks, which is the critical impediment in the development of small and medium enterprises. The state should focus their efforts on the development of such a sector through an environmentally friendly legal framework for small and medium businesses, development of a guarantee fund and regulations for transparency in the sector.

The table below shows information relating to the access to insurance of small farmers and their problems are considered.

Table 4-6: Risk Insurance Analysis in the Interviewed Farms

Specifications	TOTAL survey						Total farmers surveyed	%
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	**6**	**23**	**29**	**15**	**46**	**61**	**90**	**100.0%**
1.3 Insurance								
(1) Do you take out an agricultural insurance? YES	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
(2) What is the main purpose to take out the insurance?								
a) To minimize loss due to crop failure	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
b) To investment in high value agricultural business	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
c) Others	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
(3) Have you ever received insurance payment due to any loss coved by the insurance? YES	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
(4) What was the reason for receiving insurance payment?								
a) Crop failure	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
b) Loss of agricultural facilities due to disaster, fire or other inevitable accidents	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**1.1%**
c) Injury due to accident	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**1.1%**
d) Others	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0%**
(5) Why do you not take out an agricultural insurance?								
a) No eligibility, what eligibility requirements	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1.1%**
b) Insufficient compensation	**4**	**11**	**15**	**4**	**27**	**31**	**46**	**51.1%**
c) Unaffordable insurance fee	**5**	**18**	**23**	**12**	**38**	**50**	**73**	**81.1%**
d) Other reasons - I do not trust	**2**	**5**	**7**	**9**	**26**	**35**	**42**	**46.7%**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Insurance against risks in agriculture both for the insurance companies and for farmers is in a total crisis and is not developing. In fact, no farmer is insured against risks in agriculture, though the state subsidizes a part of the costs by offsetting them from the subsidy fund.

The main reasons that is hindering insurance in agriculture which were mentioned by interviewed farmers are: (i) the cost of insurance policies is exaggerated (81.1%); (ii) in case of a disaster, the amount of compensation is insufficient and difficult to obtain, as it is the deficiency of the current system and of the legal framework as related to the methodology for assessing insurance damage and the lack of some entity to defend affected farmers in their interactions with insurance companies that are acting in a dictatorial manner (51.1%) and; (iii) 46.7% simply do not trust the local insurance companies.

Thus, access to finance and insurance for most farmers is limited which hinders development of farms and of small businesses in the country.

Actual result of investment

Farmers have been very slow in modernizing the business processes in their enterprises in recent years (2010-2016) as the financial situation of the farms and the situation in the country have

directly affected the development of agriculture. The agricultural enterprises are undercapitalized resulting from a lack of reasonable financial resources and low expected profits (intermediaries dictate prices) from the core business, funds being limited to savings and the accumulation of funds for implementation of future investment projects.

In the next two tables, we intend to analyze the investments implemented over the last five years and those which are to be invested over the next five years for the interviewed farmers.

Table 4-7: Analysis of Investments Implemented in the Interviewed Farms during the Last 5 Years

Specification of investment	Total - 90 farmers					
	Summ, MDL	Structure, %	Sources of funding			
			Own	Credit	Grant	Subsidies
Warehouses, refrigerators	6,272,000	18.4%	4,316,000	620,000	120,000	0
Agricultural machinery and equipment	17,608,732	51.5%	10,859,450	4,607,341	862,000	2,002,320
Multiannual plantations	3,155,215	9.2%	2,815,215	0	0	366,500
Greenhouses + irrigation	1,798,000	5.3%	1,005,800	686,600	0	499,600
Farms and purchase of animals	700,000	2.0%	700,000	0	0	0
Means of transport	375,000	1.1%	465,000	0	0	0
Agricultural land - purchase	1,330,000	3.9%	1,080,000	250,000	0	0
Processing of agricultural products	2,268,000	6.6%	1,796,800	0	0	471,200
Connection to electricity	525,000	1.5%	250,000	85,000	0	53,000
Connection to gas system	0	0.0%	0	0	0	0
Connection to water/sewer systems	25,000	0.1%	25,000	0	0	0
Repair of the access road	102,500	0.3%	102,500	0	0	0
Other	0	0.0%	0	0	0	0
Total	**34,159,447**	**100.0%**	**23,415,765**	**6,248,941**	**982,000**	**3,392,620**
Structure, %	**100.0%**		**68.5%**	**18.3%**	**2.9%**	**9.9%**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

While analyzing the data in the table, we conclude that farmers have invested considerable amounts in developing their businesses over the last 5 years, of which 86.8% came from their own sources (including 18.3% attracted as loans). The most discouraging fact is that support, or assistance in promoting investment in agriculture from the state has been minor, amounting to only 12.8%, which has not been equitable to the support that farmers in the European Community have received; who share common borders and these farmers must compete with.

Table 4-8: Analysis of Investment Project Implemented in the Interviewed Farms during the Next 5 years

Specification of investment	NORTH area		CENTER area		SOUTH area		Total- 90 farmers	
	Summ, MDL	Struc-ture, %	Summ, MDL	Struc-ture, %	Summ, MDL	Struc-ture, %	Summ, MDL	Struc-ture, %
Warehouses, refrigerators	8,320,000	27.0%	3,620,000	24.9%	13,350,000	50.9%	25,290,000	35.3%
Agricultural machinery and equipment	14,758,000	47.8%	7,223,800	49.7%	9,326,000	35.5%	31,307,800	43.7%
Multiannual plantations	1,495,000	4.8%	560,000	3.9%	2,670,000	10.2%	4,725,000	6.6%
Greenhouses + irrigation	3,120,000	10.1%	640,000	4.4%	750,000	2.9%	4,510,000	6.3%

Specification of investment	NORTH area		CENTER area		SOUTH area		Total- 90 farmers	
	Summ, MDL	Struc-ture, %	Summ, MDL	Struc-ture, %	Summ, MDL	Struc-ture, %	Summ, MDL	Struc-ture, %
Farms and purchase of animals	649,000	2.1%	210,000	1.4%	150,000	0.6%	1,009,000	1.4%
Means of transport	0	0.0%	66,000	0.5%	0	0.0%	66,000	0.1%
Agricultural land – purchase	1,060,000	3.4%	124,500	0.9%	0	0.0%	1,184,500	1.7%
Processing of agricultural products	60,000	0.2%	870,000	6.0%	0	0.0%	930,000	1.3%
Connection to electricity	586,000	1.9%	145,000	1.0%	0	0.0%	731,000	1.0%
Connection to gas system	185,000	0.6%	125,000	0.9%	0	0.0%	310,000	0.4%
Connection to water/sewer systems	0	0.0%	250,000	1.7%	0	0.0%	250,000	0.3%
Repair of the access road	420,000	1.4%	705,000	4.8%	0	0.0%	1,125,000	1.6%
Other	210,000	0.7%	0	0.0%	0	0.0%	210,000	0.3%
Total	**30,863,000**	**100.0%**	**14,539,300**	**100.0%**	**26,246,000**	100.0%	**71,648,300**	**100.0%**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Over the next five years, farmers plan to invest more money for business development and increase competitiveness, but such intentions have to be encouraged, so that the population invests the available financial resources (savings) in the real sector of the economy. The real sector of the economy - all entities with financial autonomy, including those which benefit from budgetary subsidies, regardless of their branch subordination, ownership type and legal form.

Regarding access to warehouses for accumulation and storage of agricultural products, the situation is even worse for the 90 interviewed farmers; in the northern region, 11 farmers have agricultural equipment, in the center, 24 and in the south, just 5 farmers. This compels farmers to sell agricultural production during the harvesting season, when prices are lowest, thus registering low profits.

Estimated annual funds to be raised

Under market economy conditions, Moldova has considerable reserves regarding the increase of agricultural production volume to meet domestic needs and export volumes, as there is a guaranteed demand and prerequisites for continuous growth, both in the domestic and in the international markets.

The liberalization and monopolization of markets requires farmers to target their activities by practicing business which observes and complies with the following key aspects: quality and productivity, implementation of modern and intensive technologies, development of value chain for the product, combining HVCs (commercial agriculture) with subsistence farming (subsistence agriculture), development of marketing infrastructure, association by interest in similar products in professional organizations and cooperation for the promotion and penetration of new advantageous markets etc. Moldovan agriculture will recover only if farmers can comply and practice sustainable agriculture in all sectors.

The result of the survey indicated corruption and centralization of all public services in state organizations (which involves interaction with civil servants) imposes serious constraints on entrepreneurs and reduces their motivation to get involved in agriculture and develop their own businesses. The table below contains information regarding corruption:

Table 4-9: Analysis of Corruption and Bribes Given by the Interviewed Farms in Their Interaction with Public Authorities

Specifications	TOTAL survey						Total farmers surveyed	Structure, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	6	23	29	15	46	61	90	100.0%
1.5 Corruption								
(1) In the past three years have offered bribes / contentment state officials? YES	2	2	4	2	12	14	18	20.0%
(2) What services have given bribes / thanksgiving?	0	0	0	0	0	0	0	0.0%
a) Registration and obtaining documents	1	1	2	0	5	5	7	7.8%
b) Obtaining subsidies and grants	0	0	0	0	0	0	0	0.0%
c) Others (Police)	1	2	3	2	7	9	12	13.3%
(3) What is the average annual amount of bribes offered to civil servants?								
Approximately, MLD	2,000	1,550	3,550	1,800	26,050	27,850	31,400	1,744

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

During discussions with farmers, all interviewees were reluctant to provide information on this subject, but the severity of corruption is much higher which hinders the development of agribusiness and of the economy as a whole.

Moldovan farmers often have to interact with state authorities, and to speed up work or obtain documents (authorizations, approvals, etc.) they are likely to bribe the officials in charge. Often such people create obstacles and collude amongst themselves to induce the farmer to pay them for such services, in cases where the consideration or waiting period to obtain a document is long, and the farmer needs such documents quickly. To eliminate corruption and remove the potential for obstruction by officials, it is necessary that all assistance programs and projects be well regulated (formulate eligibility criteria, guidelines for assistance, etc.), so that a civil servant has no space for (mis)interpretation.

All programs and projects which are being implemented need to establish supervisory bodies (supervisory boards), consisting of senior officials of the state, but emphasis should be placed on inclusion in such boards of associations specialized by product, members of agribusiness (representative producers, competent people with high integrity). This will promote proper functioning of the program which is being implemented. Donors should clearly set the composition of the supervision boards and recommend it as condition for implementation to the responsible institutions.

The GoM is subsidizing the development of the agricultural sector by offsetting part of the cost of investments made by farmers. Annually, the Regulation on use of the Subsidy Fund is negotiated and approved and are distributed amongst farmers based on such regulation subsidies. The agricultural year for subsidies in agriculture starts on November 1 of the current year and ends on October 31 of the following year. Subsidies are distributed to farmers by subsidy measures, while farmers apply to each measure by completing an application file for accessing subsidies.

In 2016, the Law on subsidies in agriculture was adopted, which provided for mechanisms and a legal framework for collection of the Subsidy Fund. For 2017, it is proposed to develop a Subsidy Regulation which will be valid for five years and thus, will ensure stability for farmers who want to invest in the development of their agribusinesses.

The table below contains information on the number of interviewed farmers who have accessed subsidies in 2016 and measures within which they have benefited from state aid.

Table 4-10: Access to Subsidies by the Interviewed Farms in the Surveyed Areas

Specifications	TOTAL survey						Total farmers	Struc-ture, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	6	23	29	15	46	61	90	100.0%
Access of subsidies								
(1) Have you applied for subsidy on agriculture this season? YES	4	5	9	3	17	20	29	32.2%
(2) What was the purpose of subsidy that you apply for?								
a) New agricultural business	0	0	0	0	4	4	4	4.4%
b) New no agricultural business	1	0	1	1	1	2	3	3.3%
c) Agricultural facilities / equipment for processing of products(large scale)	0	0	0	0	1	1	1	1.1%
d) Farm machineries	2	1	3	2	11	13	16	17.8%
e) Establishment of perennial plantations	1	3	4	0	5	5	9	10.0%
f) Rebuilding farm animal breeding and procurement	0	0	0	0	0	0	0	0.0%
g) Procurement of breeding animals	0	0	0	0	0	0	0	0.0%
g) Irrigation systems	0	1	1	0	1	1	2	2.2%
h) Interest compensation for credit	2	1	3	0	4	4	7	7.8%
i) Others	2	1	3	1	1	2	5	5.6%
(3) What percent of your total investment have been covered by the subsidy scheme? %	18.6	16.3	17.5	18.0	49.6	33.8	25.6	

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

While analyzing the data, we came to the conclusion that only 32% of the surveyed farmers accessed subsidies in 2016, while the subsidy measures most in demand were those for the purchase of agricultural machinery and planting of orchards and vineyards.

Subsidies in Moldova are provided only if the farmer is eligible for the subsidy, has implemented the investment properly and has applied for the subsidy. Only 26 farmers have applied for and received subsidies. If they were not eligible for subsidies, the AIPA would reject the subsidy file of the farmer in question.

Furthermore, we present data on subsidy areas that the interviewed farmers would the state to provide.

Table 4-11: Interest Areas for Accessing Subsidies by the Interviewed Farms in the Surveyed Areas

Specifications	TOTAL survey						Total farmers surveyed	Struc-ture, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	**6**	**23**	**29**	**15**	**46**	**61**	**90**	**100.0%**
What kind of subsidy scheme do you expect from the government in future?								
a) Subsidies ha depending on the crop	4	14	18	10	34	44	62	68.9%
b) Supporting farmers' cooperation	1	6	7	3	11	14	21	23.3%
c) Culture under shelter	0	2	2	3	8	11	13	14.4%
d) Perennial plantings	4	14	18	4	26	30	48	53.3%
e) Livestock	0	2	2	0	8	8	10	11.1%
f) Subsidizing targeted investment processing and investment in agricultural production value chain	1	10	11	6	25	31	42	46.7%
g) Compensation expenses for interest on credit for agriculture	3	11	14	7	23	30	44	48.9%
h) Farm machineries	4	13	17	12	35	47	64	71.1%
i) Agricultural facilities - subsidies for infrastructure development	2	9	11	5	16	21	32	35.6%
j) Promotion of agricultural production on the strategic markets	0	4	4	5	11	16	20	22.2%
k) Others	0	2	2	0	2	2	4	4.4%

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

For the 90 interviewed farmers, the most attractive areas for subsidies are the following: the measure in highest demand was further provision of subsidies for agricultural equipment (71.1%), direct per ha subsidies (68.9%), while the specific amount should be a function of cultivated crop and applied technology, state support for the establishment of perennial plantations (53.3%) as it is beneficial for smallholder farmers to pursue HVCs on small plots.

4.1.3 Engagement Style

(1) Age and Gender

The table below shows general information about the interviewed farmers of the three development areas segregated by gender and age.

Table 4-12: Interviewed Farmers by Gender and Age in the Farms Located in the Surveyed Areas

Age	Female	Male	Total	Structure, %
Up to 40 years	6	15	21	23.3%
After 41 years	23	46	69	76.7%
Total	29	61	90	100.0%
Structure, %	32.2%	67.8%	100.0%	X

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

While analyzing the data in the table, we find that only 23.3% of the farmers were aged 20-40 while the rest were over the age of 41, which shows that young people are not enthusiastic about practicing agriculture possibly because of the lack of adequate support. From the gender perspective, men have the highest share in the small farms (67.8%), while woman have only 32.2%.

(2) Number of Labor and Type of Employment

The rapid structural changes in the economy of the Republic of Moldova have conditioned the emergence of new opportunities for employment other than agriculture, which has led to the outward migration of the rural population. The migration process has two sides: migration from rural to urban areas and migration of local labor to markets abroad in search of higher income. Although employment in agriculture is declining, the sector still occupies an important socio-economic role as an employer.

Farms are small businesses that are mostly managed by family members with small cultivated areas and primarily growing field crops; however, when areas over 5 ha are managed and HVCs are grown, such farms need to hire workers from outside the family (as permanent employees or day laborers).

The legal aspects pertaining to the official hiring of employees poses difficulties for farmers, as they need to keep records of work time and usually the permanent workers are paid decent wages, but it is in cash (which allows for them to circumvent the social fund tax and all state taxes). In the hiring of day laborers, all relationships are informal, wages are paid in cash, depending on the daily wage levels of the specific region.

The wage of a day laborer also depends on the following factors: (i) whether he/she is fed at lunch; (ii) whether he/she is hired more or less frequently, (iii) the complexity of the manual work, and (iv) the means of commuting to the work place (i.e. using owner's vehicle or independently).
Employees on small farms are as follows: managing staff in addition to family members (agronomist, mechanic, technologist, accountant / economist, warehouse worker) and technical staff (machine operator, foreman, guard, etc.).

(3) Age, Educational Background, Gender of Labor

In Moldova, the Law regarding day laborers (people who provide work on a daily basis in agriculture) was adopted in 2016; it is aimed at formalizing the shadow economy salary expenses of these people, however, the law is not being enforced yet. In the agricultural sector, the aging of farm employees has been recorded, while day laborers mainly consist of the elderly.

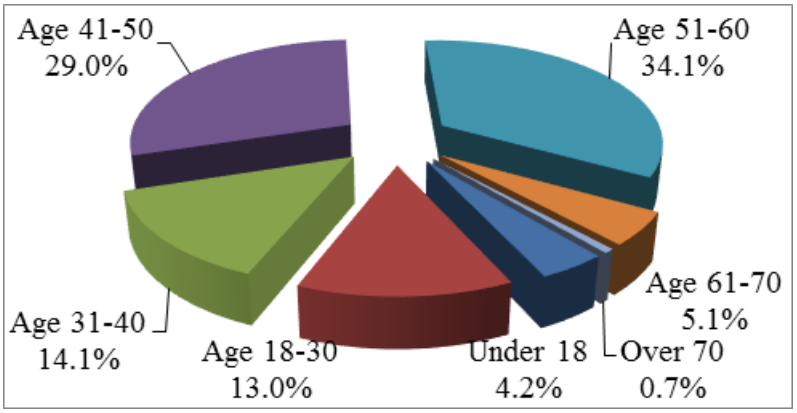
Table 4-13: Age of Persons Employed in the Interviewed Farms in the Surveyed Areas

Age	No. of Family Members		Members involve in farming		Total, pers.	Structure, %
	Male	Female	Male	Female		
Under 18	12	7	0	0	19	4.2%
18-30	37	16	2	4	59	13.0%
31-40	23	18	5	18	64	14.1%
41-50	26	20	32	54	132	29.0%
51-60	42	36	37	40	155	34.1%
61-70	13	8	2	0	23	5.1%
Over 70	1	2	0	0	3	0.7%
Total	**154**	**107**	**78**	**116**	**455**	**100.0%**
Structure, %	**33.8%**	**23.5%**	**17.1%**	**25.5%**	**100.0%**	**X**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

While analyzing the data in the table, we conclude that, by age, the majority of workers involved

in agriculture are over 40, while young people amount to only 27.1%. As young people leave villages and migrate for higher wages, this has become an alarming trend for the agricultural sector. In the aspect of gender, male and female workers are employed in almost equal proportion.



Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Figure 4-3: Structure of Age of Persons Engaged in the Business of Interviewed Farms

The table below shows the analysis of the level of education of employees of the surveyed farms.

Table 4-14: Education of Persons Employed in the Interviewed Farms in the Surveyed Areas

Education	Family Members		Members involve in farming		Total, pers.	Structure, %
	Male	Female	Male	Female		
None	9	5	0	0	14	3.1%
Primary	10	9	23	20	62	13.6%
Secondary	69	46	54	95	264	58.0%
High	66	47	1	1	115	25.3%
Graduate	0	0	0	0	0	0.0%
Total	**154**	**107**	**78**	**116**	**455**	**100.0%**
Structure, %	**33.8%**	**23.5%**	**17.1%**	**25.5%**	**100.0%**	**X**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

While analyzing the education level amongst employees, we concluded that education level was satisfactory with 25.3% having obtained a university education and 58% receiving a vocational education. On the other hand, the acquired knowledge could be obsolete and there is need to "refresh" the existing skills to improve effective management of current land holdings and production technologies.

Furthermore, we propose to analyze the non-agricultural sources of income for family members of the farms interviewed in the Survey.

Table 4-15: Sources of Additional Income of Persons Employed in the Interviewed Farms in the Surveyed Areas (except Agriculture)

Income source	Approximate sum, lei	Approximate Ratio, %	No. of Family Members		Pers.	On average per person, lei
			Male	Female		
Business	523,000	12.8%	259,000	264,000	6	87,167
Employment	1,484,800	36.4%	869,400	615,400	38	39,074
Pension	590,856	14.5%	184,000	406,856	31	19,060
Dividend	100,000	2.4%	50,000	50,000	2	50,000
Real estate	68,000	1.7%	0	68,000	1	68,000
Remittance	966,000	23.7%	966,000	0	10	96,600
Others	351,900	8.6%	323,900	28,000	11	31,991
Total	**4,084,556**	**100.0%**	**2,652,300**	**1,432,256**	**99**	**41,258**
Structure, %	**100.0%**	**X**	**64.9%**	**35.1%**	**X**	**X**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

The family members of farmers obtain most of their revenues from other sources such as non-farm payroll jobs with outside employers (36.4%), followed by remittances from abroad (23.7%) and pensions (14.5%). The income level is quite low and allows just for the minimum subsistence of farm family members.

The table below shows the annual income from farming and non-farming activities of interviewed farmers (90 unincorporated family farms) both for the entire household and for each member separately.

Table 4-16: Analysis of Annual Income Obtained by Interviewed Farmers (for 2016)

Description	Total - income (profit) obtained for the 90 interviewed farmers, MDL	Average income (profit) obtained per one interviewed farmer, MDL	Structure, %
Income obtained from non-agricultural activity	4,084,556	45,384.0	16.1%
Gross profit obtained from agricultural activity	21,234,496	235,938.8	83.9%
Total income	**25,319,052**	**281,322.8**	**100.0%**

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

While analyzing the data in the table, we concluded that the average earnings among the interviewed farmers was approximately 281,300 MDL per year, while the largest source of income for farmers is agricultural activity, which generates 83.9% of all their income.

Gross profit from agricultural activity does not include monthly wages to household members, while the profit gained remains at their disposal, part of it is used for subsistence while the remainder is used for the development of further agricultural activity. The average gross profit gained by the interviewed farmers amounted to MDL 97,007.9 per household member in 2016.

(4) Expected Human Resources for the Agricultural Development

Human resources play an important role in the sustainable development of farms. In the near future, skilled labor will become a great luxury and farmers will find it increasingly difficult to

hire the necessary laborers, especially during periods when the demand for laborers is high (April-May, August-October). Young people massively migrate away from rural areas while the villages continue to age.

Farmers who practice labor intensive agriculture have to source the necessary workforce through the daily transportation of workers from neighboring villages (located 15-60 km away), which incurs additional costs and loss of time. Farmers must modernize technologies and automate business processes to reduce labor requirements (where possible) and to adequately motivate workers to provide for the risks of remaining without workers.

4.1.4 Farming Environment

(1) Information about Advisories Services for Farmers and Access to Infrastructure

Rural Extension Service in the country tends to be consistent with the principles of the modern system of performance consulting. The two most important operating principles of a modern rural extension are: on the one hand, a value chain that brings knowledge and information at all levels, from producers to market and; on the other hand, demand and commercial orientation of the services provided. Rural extension network should provide knowledge and information requested by customers, therefore, the system must operate interactively, providing new knowledge of the customer and responding simultaneously to requests.

Farmers are continually forced to meet the demands along different links of the value chain. These requirements lead to increased demand for services from service providers and rural extension of the agricultural sector. Experience and tradition have delayed development of noncommercial extension services. To remedy the situation, activities are necessary to inform, stimulate and educate, which are granted through the network of rural extension and other institutions and organizations, such as universities, research institutions, educational centers and others.

(2) Availability, Condition and Ownership of Major Agricultural Infrastructure

Infrastructure and access routes are important for business development. With the privatization of all enterprises, many businesses have emerged and the agricultural products processing industry has undergone essential changes. These changes have had a negative impact on the agricultural sector; the development of local cooperation and association of farmers' homogeneous products have also played a major role.

To examine the current situation and determine opportunities for development, farmers assessed the existing infrastructure and their level of access in the following table:

Table 4-17: Analysis of Infrastructure and Access Roads in the Interviewed Farms

Specifications	TOTAL survey						Total farmers surveyed	Structure, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	**6**	**23**	**29**	**15**	**46**	**61**	**90**	**100.0%**
1.1 Infrastructure								
(1) Do you have access to the facilities?								
a) Electricity connection	4	8	12	4	17	21	33	36.7%
b) Gas connection	0	6	6	2	4	6	12	13.3%
c) Connection to water supply	1	3	4	1	3	4	8	8.9%
d) Connection to sewer	0	0	0	0	0	0	0	0.0%
e) Other No.	0	2	2	3	5	8	10	11.1%
(2) How is the condition of access road to farm?								
a) Paved road (wide / narrow)	0	0	0	1	2	3	3	3.3%
b) Partially paved road (wide / narrow)	1	13	14	4	13	17	31	34.4%
c) Unpaved road (wide / narrow)	5	10	15	9	30	39	54	60.0%
(3) How is the condition of access road to market where you transport the products?								
a) Paved road (wide / narrow)	2	2	4	6	13	19	23	25.6%
b) Partially paved road (wide / narrow)	4	19	23	8	27	35	58	64.4%
c) Unpaved road (wide / narrow)	0	2	2	2	7	9	11	12.2%
(4) Does power cut disturb your agricultural activities? YES	5	15	20	9	30	39	59	65.6%
(5) What activities are disturbed by power cut?								
a) Preparatory activity	1	6	7	6	13	19	26	28.9%
b) Growing period	4	9	13	4	19	23	36	40.0%
c) Harvesting/post harvesting	5	12	17	9	21	30	47	52.2%
d) Parceling of land	5	8	13	8	19	27	40	44.4%
e) Processing	1	3	4	0	7	7	11	12.2%
f) Others	0	2	2	1	6	7	9	10.0%

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Analyzing the data table, we conclude that farmers' access to infrastructure and access roads are poorly developed (practically non-existent), which requires large investments to improve the situation for farmers. It is appropriate for the farmers to invest in developing value chains for their products, and that the state should create conditions suitable for and stimulate these initiatives by facilitating access to the necessary infrastructure that allows them to effectively manage their businesses.

Further sources of information are analyzed in marketing and information access for households of farmers in the areas examined.

Table 4-18: Sources of Information and Access to Information for Interviewed Farms in the Areas Examined

Specifications	TOTAL survey						Total farmers surveyed	Stru-cture, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	**6**	**23**	**29**	**15**	**46**	**61**	**90**	**100.0%**
1.2 Information and skill development								
(6) What types of source do you use to get information on agriculture related business such as actual market price, new trend of sales, customers needs, etc.?								
a) Newspapers	1	9	10	5	10	15	25	27.8%
b) TV program	2	15	17	3	17	20	37	41.1%
c) Information from market and shops	6	21	27	12	38	50	77	85.6%
d) Internet	5	20	25	14	34	48	73	81.1%
e) Specialized advisory organization or suppliers	1	16	17	5	22	27	44	48.9%
f) Local institutions such as cooperatives, local government, business partners, neighbors	0	1	1	0	4	4	5	5.6%
f) Others	0	1	1	1	1	2	3	3.3%
(7) Do you monitor trends of market through such source of information? YES	5	21	26	13	41	54	80	88.9%
(8) How you try to meet the needs of the market? Please give any examples.	1	5	6	5	16	21	27	30.0%
(9) Why are you not interested in trends of market of agriculture?								
a) No way to access such market	0	1	1	0	0	0	1	1.1%
b) No funds to meet needs of market	1	0	1	1	0	1	2	2.2%
c) Not enough money to meet the needs of market	1	1	2	0	2	2	4	4.4%
d) No knowledge, skills or technology to meet the needs of market	0	0	0	3	3	6	6	6.7%
(10) How can you get opportunities for training on agriculture related technologies, skills and knowledge?								
a) Media (mentioned in Q1)	0	3	3	2	5	7	10	11.1%
b) Trainings / seminars provided by the government	0	1	1	1	5	6	7	7.8%
c) Trainings / seminars provided by NGOs	6	22	28	13	41	54	82	91.1%
d) Trainings / seminars provided by private company (suppliers of agricultural inputs)	2	10	12	4	18	22	34	37.8%
e) Others	0	0	0	1	1	2	2	2.2%
(11) Do you have opportunities to receive agriculture related extension services? YES	6	19	25	13	37	50	75	83.3%
(12) Who are the providers of extension services?								
a) The government	1	2	3	1	1	2	5	5.6%
b) NGO	6	22	28	15	40	55	83	92.2%
c) Donor projects	2	12	14	7	14	21	35	38.9%
d) Others	0	0	0	0	0	0	0	0.0%

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Analyzing the data table, we find that farmers utilize various streams of information, with market information and the Internet each constituting a large share. This also affirms that the role of specialized organizations and farmers' associations is indeed important. Farmers need support and guidance for their development based on the principles of market competition.

Extension services are provided through participation in group activities and individual consultations (often at a fee, as they incur time and transportation costs), such as specific training, experience exchanges, study visits, study circles, topical round tables, field days, topical conferences, and fairs. Oral and written consultations are provided, such as printed thematic materials, written individual consultations, brochures and professional publications. Extension services cover a number of areas, which include: technology, economics, marketing and legal issues.

For 81.1% of the interviewed farmers, they stated that the Internet was an important source of information for them. Moldova's population has good, high-quality Internet access, in terms of speed and accessibility. Younger household members are engaged in providing information that is relevant for businesses and more are open to the use of information technology.

Mobile phone operators cover practically all of Moldova and provide a range of services, such as stationary security and video monitoring, GPS monitoring, fuel consumption record keeping, IP terminals for other types of control.

Besides that, commercial farmers may set up weather forecasting stations that allow for online delivery of comprehensive data relevant for carrying out plant protection measures, data storage (temperature evolution, rainfall amount etc.) and high precision weather forecasts for the next 2-4 days which is important for planning work (e.g. sowing, fertilization, plant protection, harvesting etc.).

There are enterprises that implement integrated farm management systems; however, these are few and far between. As a rule, such systems are used by companies engaged in a range of activities, when the owners need to remotely verify how the business is going.

(3) Training Opportunities for New Technologies and Business Management

The agricultural education system in Moldova has largely been overlooked. As the educational plans, curricula, teaching and training mode were all inherited from the previous Soviet system, there is a prevailing mismatch between the skills taught by the vocational training system and the needs of the current labor market. Furthermore, there is still no training program for self-employed agricultural entrepreneurs.

Similar to the system of agricultural education, the agricultural research system has failed to transition from the old system and establish links with the private sector, and has operated in relative isolation resulting in it being quite weak. It is therefore important to create an open-easy import of latest technologies in the country, to allow Moldovan farmers to become more competitive.

There is a need to further analyze farmers’ areas of interest in accessing information extension to promote sustainable business development.

Table 4-19: Areas of Interest of Interviewed Farms on Expanding Services in the Examined Areas

Specifications	TOTAL survey						Total farmers surveyed	Stru-cture, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers – total	**6**	**23**	**29**	**15**	**46**	**61**	**90**	**100.0%**
(13) What kind of extension services have you received?								
a) Land preparation / soil conservation	0	3	3	4	3	7	10	11.1%
b) Management of crops - crop rotation	1	8	9	4	9	13	22	24.4%
c) Modern technologies of crop production	3	19	22	8	20	28	50	55.6%
d) Weed or pest control	4	20	24	8	38	46	70	77.8%
e) Post-harvesting technique	0	6	6	4	9	13	19	21.1%
f) Food processing	0	1	1	1	2	3	4	4.4%
g) Hygiene and food safety	0	1	1	0	4	4	5	5.6%
h) Livestock (artificial insemination, vaccination, fattening)	0	1	1	0	4	4	5	5.6%
i) Development of value chains for food products	2	11	13	7	18	25	38	42.2%
j) Marketing food products	3	7	10	5	10	15	25	27.8%
k) The passage of soil conservation (minimum works)	1	3	4	2	5	7	11	12.2%
h) Others	0	0	0	0	2	2	2	2.2%

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Farmers that were interviewed required assistance and training for skills to effectively manage the theoretical and practical business and ensuring the competitiveness of their products. The most requested areas of information for farmers were the technological aspects (protection of Plataea - 77.8%, production technologies - 55.6%). At the same time, farmers were interested in developing value chains (42.2%) and the marketing of agricultural products (27.8%).

The information requested by farmers should include data applied for the correct information and ensure a long-term vision for business activities on development strategies and future trends of marketing agricultural products.

(4) Standard for Quality and Control System in Farm's Enterprises

Control of compliance with quality standards is one of the indispensable basics that ensures proper functioning of the common market organization of the agri-food sector. The concept of quality agricultural products is a complex notion that can be analyzed in the following aspects: agronomic, commercial, organoleptic, nutritional and health. The concept of quality is determined by the commercial aspects of the fresh produce offered for sale by the visual characteristics (freshness, size, shape and color) and conditioning (sorting, packing, labeling and presentation) thereof. As a result, the provision of these quality standards, which are called marketing standards, ensure uniformity of classification of agricultural products, according to the commercial characteristics of these products through a unique system of evaluation, irrespective of cultural technologies and area of production.

Common market organization of the agricultural sector through standards-based classification marketing indicators provides a reference framework that allows:

- achieving a balance between supply and demand of agricultural products;
- ensuring food market transparency and establishing trade relations based on fair competition;
- eliminating products of unsatisfactory quality from the market;
- guiding manufacturers to achieve production that satisfies consumer demands and at the same time ensures a balance between quality and price;
- penetrating farmers with quality products in foreign markets;
- increasing the profitability of agricultural production.

Quality control achieved by the provision of these standards ensures compliance with commercial parameters that must meet the marketing promises made by the entire supply chain of agricultural products to the final consumer. Further analysis examined the perception of farmers on issues of quality and compliance of their products and the desire to pursue business development based on cooperation / association.

Table 4-20: Certification and Cooperation of Interviewed Farms in the Areas Examined

Specifications	TOTAL survey						Total farmers surveyed	Struc-ture, %
	Female			Male				
	Up to 40 years	After 41 years	Total	Up to 40 years	After 41 years	Total		
Number of farmers - total	**6**	**23**	**29**	**15**	**46**	**61**	**90**	**100.0%**
1.3 Certificates								
(1) Do you have any certificate for adding value on your products?								
a) Global GAP	0	0	0	0	0	0	0	0.0%
b) ISO certificate	0	1	1	0	0	0	1	1.1%
b) Organic certification	0	2	2	0	0	0	2	2.2%
c) Others	0	0	0	0	0	0	0	0.0%
(2) Do you prepare for apply for such certificate? YES	2	7	9	7	14	21	30	33.3%
(3) What certificate do you want to apply for in future?							0	0.0%
a) Global GAP	0	0	0	0	1	1	1	1.1%
b) ISO certificate	2	2	4	3	1	4	8	8.9%
b) Organic certification	0	5	5	3	12	15	20	22.2%
c) Others (No determined)	0	0	0	1	0	1	1	1.1%
1.4 Cooperation / association of the farmers								
(1) You cooperate or associate with farmers to do activities together? YES	2	18	20	8	18	26	46	51.1%
(2) Plan to join an association or associates specialized by product? YES	6	20	26	8	33	41	67	74.4%
(3) What status has these activities cooperative / association?								
a) Formal	0	6	6	1	6	7	13	14.4%
b) Informal	4	16	20	10	26	36	56	62.2%
(4) Plan to join an cooperative?	3	14	17	12	25	37	54	60.0%

Specifications	TOTAL survey						Total farmers surveyed	Structure, %
	Female			Male				
	Up to 40 years	After 41 years	**Total**	Up to 40 years	After 41 years	**Total**		
YES								
(5) What areas of interest for cooperation / association request farmers in the future, that will facilitate the development of own business?								
1. In common with supply and quality inputs (price optimization)	3	12	15	8	20	28	43	47.8%
2. Public consultation on technology issues and homogenization processes	3	9	12	6	15	21	33	36.7%
3. Taking advantage of technological services in common	2	7	9	7	18	25	34	37.8%
4. Investments in jointly-oriented development value chain	2	8	10	5	14	19	29	32.2%
5. Joint marketing of production at reasonable prices	4	18	22	14	29	43	65	72.2%
6. Development value chain by attracting investments in common and grants to concessional	0	6	6	4	12	16	22	24.4%
7. Institutional development and support for farmers association early years together	2	5	7	5	14	19	26	28.9%
8. Protection of market interests and the rules of the game for common business	2	7	9	2	9	11	20	22.2%
9. labor interests and roughly equal activity against the State authorities	0	4	4	1	7	8	12	13.3%

Source: Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas

Based on the information regarding the farmers, fewer focus on quality aspects and product certification to ensure their traceability at every stage of production. Future plans that envision quality assurance through a certification process is not particularly popular among farmers; only 33.3% intend to certify the production process, while even less opt for organic production (22.2%). Moldovan soils are fertile and farmers use minimal amounts of pesticides and fertilizers, which is a prerequisite to the implementation of organic farming. With this in mind, commercial farmers are interested in organic farming (particularly with regards to vegetables, stone fruits and berries), they are willing to engage in it, but require assistance and the development of practical skills for proper organic farm management. A mechanism to support organic farming is necessary (particularly during the formative years of conversion as they switch from conventional farming to organic farming).

It is worth mentioning that 60% of farmers want to join a cooperative, which accumulates homogenous products in batches at an industrial scale. Doing so is appealing because it allows their produce to fetch a better price (72.2%), enables cooperative members to receive the joint optimum prices of inputs (47.8%) and develops the value chain group (37.8%).

They are aware of the benefits (shared marketing costs, optimized supply and trade costs, joint implementation of modern technology and streamlined quality, production of scale allowing for setting lower prices, added value production) and disadvantages (the highest risk they refer to is

the loss of trust and misunderstanding between members) of cooperation.
The cooperative functions as the intermediary between farmers and the market. In such cases, the farmer acts as a client for the cooperative, as he sells his goods to it, and at the same time he may benefit from its economic advantages (savings, added value, capitalization can be distributed between members depending on their contribution). VAT may be calculated for the whole cooperative and the cooperative may provide services to its members. The Law on Cooperatives provides that if services are delivered to the members of a cooperative they are exempt from VAT. Hence, the VAT amounts will remain on the accounts of the cooperative and may be used when selling the agricultural products of the members.

Besides, if the cooperative is registered (accredited by the MoAFI and the Agency for Interventions and Payments in Agriculture) as a group of producers, they are entitled to certain facilities regarding access to grants (subsidy ceilings are higher for offsetting interest on loans of up to MDL 300,000 per group of producers, while in other cases the ceiling is set at MDL 120,000), and the ceiling on investment in value chain development by setting up refrigerators and packing houses is also higher.

The groups of producers have access to lending with a grant component for value chain development (the Competitive Agriculture Project (MAC-P) provides such financing and the ceiling is set at USD 350,000 dollars on the condition that the group invests the entire amount). So far, the project has been successful and is currently in its second phase. The project has contributed to setting up refrigerators and packing houses for horticultural production.

(5) Perception of Small-scale Farmers in Production of High-value-added Crops

The proposals for the development and implementation of new businesses in rural areas may be implemented and need support and assistance from the state in promotion and diversification of businesses. In the report, the data was analyzed based on the income and costs per area unit (1 ha) which were compared against one another, analyzed by project management and identified implementation opportunities. The development of economic indicators of proposed businesses would be beneficial. New businesses should be considered for funding and implementation; they allow for the diversification of products in the region as well as income (very important for the villages), efficient use of production facilities (including natural ones); intensive crops are useful and the creation of jobs and sources of income for the locals is made possible; simultaneously, yields can also enjoy favorable prices and enhanced demand on the market from consumers.

4.1.5 Promotion of the Development of Agribusiness with HVCs

The fruit and vegetables sector consists of two subsectors: fresh and processed products. The sector of processed products includes four major product groups: canned, dried, and frozen products as well as juices. The production of fresh F&V for market provides the highest value to farmers, and is therefore the most profitable. Production of F&V for the processing industry offers farmers lower incomes as the requirements for product quality are lower which can be justified by lower production costs.

The results of the economic calculations related to the amount of investment, subsidies and terms of recovery for high value agricultural plantations are shown below. The budgets are calculated and cover all planting and maintenance costs until the trees bear fruit.

Table 4-21: Estimation of Necessary Investments and Term of Recovery for Growing HVCs in the Republic of Moldova (calculated per 1 ha)

No	Description	Term of recovery for investments, years	Average yield per ha, t/ha	Necessary investment, lei/ha	Available subsidies, lei/ha
1	Apples - MM 106	10.6	25.0	131,759	10,000
2	Apples - M 26	7.7	41.2	177,884	15,000
3	Apples - M 9	7.3	60.3	429,988	96,700
4	Plums	11.0	20.0	116,333	7,500
5	Peaches	9.0	20.0	107,792	7,500
6	Nectarines	8.0	15.0	110,679	7,500
7	Pears	9.5	21.4	133,464	10,000
8	Pears Abbé Fétel	9.7	53.3	650,934	96,600
9	Apricots	8.1	14.6	123,516	7,500
10	Cherries Mahaleb	7.1	8.0	92,362	7,500
11	Cherries Maxima 14	6.0	12.0	123,528	14,200
12	Cherries Gisela 6	6.7	16.3	312,646	92,000
13	Cherries	6.9	12.0	101,784	7,500
14	Nut	11.1	2.2	156,537	10,000
15	Almond	7.9	1.6	147,247	10,000
16	Currant trellis	2.5	6.0	120,979	66,700
17	Currant bush	2.2	5.2	86,289	66,700
18	Raspberry	3.4	7.0	151,716	68,000
19	Blackberries	2.4	16.7	154,399	68,000
20	Strawberry	4.0	17.8	312,212	68,000
21	Remontant strawberry	3.1	23.7	312,212	68,000
22	Wine grapes	29.1	12.9	201,338	20,000
23	Table grapes	10.8	14.4	218,100	25,000
24	Greenhouse cucumbers	4.8	104.6	3,372,000	1,340,000
25	Greenhouse tomatoes	4.2	153.8	3,372,000	1,340,000
26	Greenhouse peppers	4.1	76.9	3,372,000	1,340,000
27	Outdoor tomatoes, seedling	0.1	70.0	24,000	8,000
28	Outdoor tomatoes seeds	0.2	60.0	24,000	8,000
29	Outdoor cucumbers	0.1	40.0	20,000	6,700
30	Outdoor peppers	0.1	45.0	24,000	8,000
31	Eggplant	0.1	60.0	24,000	8,000
32	Early potatoes	0.3	22.0	24,000	8,000
33	Late season potatoes	0.3	38.0	24,000	8,000
34	Onion	0.2	50.0	27,000	10,800
35	Garlic	0.1	12.0	27,000	10,800
36	Late season cabbage	0.3	80.0	24,000	8,000
37	Cauliflower	0.2	25.0	24,000	8,000
38	Broccoli	0.2	22.0	24,000	8,000
39	Carrot	0.1	45.0	27,000	10,800
40	Beet	0.3	50.0	24,000	8,000
41	Courgette	0.5	50.0	20,000	8,000
42	Watermelon	0.5	40.0	24,000	8,000
43	Melon	0.4	30.0	24,000	8,000
44	Salad	0.2	20.0	24,000	8,000
45	Celery	0.1	20.0	24,000	8,000

Source: The JICA Project Team's calculations based on investment budgets (period from planting to fructification).

Note: The costs include all expenses, a 10-percent contingency fund – meant to mitigate risks and offset unexpected expenses – and depreciation (yearly depreciation was determined based on the optimal operating period of perennial plantations).

Based on the information presented in the previous table, entrepreneurs/farmers can make qualitative decisions regarding the sector in which they wish to invest. At the same time, owners need to analyze the dynamic evolution of the consumer market and mainly decide whether to increase, decrease or keep production at the same level. These complicated decisions regarding production offers fewer risks and has a range of advantages compared to other agricultural sectors.

Table 4-22: Estimation of Economic Results of the Operational Activity of Growing HVCs in the Republic of Moldova (calculated per 1 ha)

No	Description	Sales incomes, lei/ha	Sales costs, lei/ha	Gross profit, lei/ha	Economic profitability, %	Economic calculations per 1 kg of production, lei/kg		
						Average sales price	Unit cost	Gross profit (commercial excess)
1	2	3	4	5	6	7	8	9
1	Apples - MM 106	75,500	49,177.7	26,322	53.5%	3.02	1.97	1.05
2	Apples - M 26	134,235	73,000.0	61,235	83.9%	3.26	1.77	1.49
3	Apples - M 9	223,778	121,996.2	101,782	83.4%	3.71	2.02	1.69
4	Plums	63,200	41,263.7	21,936	53.2%	3.16	2.06	1.10
5	Peaches	72,000	39,077.8	32,922	84.2%	3.60	1.95	1.65
6	Nectarines	91,500	38,949.3	52,551	134.9%	6.10	2.60	3.50
7	Pears	92,143	42,734.0	49,409	115.6%	4.30	1.99	2.31
8	Pears Abbé Fétel	235,062	117,640.1	117,422	99.8%	4.41	2.21	2.20
9	Apricots	99,167	42,722.5	56,444	132.1%	6.80	2.93	3.87
10	Cherries Mahaleb	118,400	42,141.4	76,259	181.0%	14.80	5.27	9.53
11	Cherries Maxima 14	170,400	62,645.8	107,754	172.0%	14.20	5.22	8.98
12	Cherries Gisela 6	230,750	98,275.2	132,475	134.8%	14.20	6.05	8.15
13	Cherries	144,444	41,550.2	102,894	247.6%	12.04	3.46	8.57
14	Nut	110,000	39,062.9	70,937	181.6%	50.00	9.77	40.23
15	Almond	112,500	39,294.0	73,206	186.3%	70.00	11.00	59.00
16	Currant trellis	172,800	64,937.7	107,862	166.1%	28.80	10.82	17.98
17	Currant bush	149,760	57,345.6	92,414	161.2%	28.80	11.03	17.77
18	Raspberry	147,000	86,625.6	60,374	69.7%	21.00	12.38	8.62
19	Blackberries	306,667	91,573.8	215,093	234.9%	18.40	5.49	12.91
20	Strawberries	266,667	142,041.0	124,626	87.7%	15.00	7.99	7.01
21	Remontant strawberries	398,222	168,358.6	229,864	136.5%	16.80	7.10	9.70
22	Wine grapes	47,947	40,434.8	7,512	18.6%	3.72	3.14	0.58
23	Table grapes	83,778	50,676.8	33,101	65.3%	5.80	3.51	2.29
24	Greenhouse cucumbers	999,077	578,409.5	420,667	72.7%	9.55	5.53	4.02
25	Greenhouse tomatoes	1,037,037	550,046.9	486,990	88.5%	6.74	3.58	3.17
26	Greenhous peppers	1,038,462	538,280.4	500,181	92.9%	13.50	7.00	6.50
27	Outdoor tomatoes, seedling	233,800	119,249.6	114,550	96.1%	3.34	1.70	1.64
28	Outdoor tomatoes seeds	138,889	65,417.4	73,471	112.3%	2.31	1.09	1.22
29	Outdoor cucumbers	206,000	70,203.0	135,797	193.4%	5.15	1.76	3.39
30	Outdoor peppers	239,583	112,185.7	127,398	113.6%	5.32	2.49	2.83
31	Eggplant	260,000	95,934.8	164,065	171.0%	4.33	1.60	2.73
32	Early potatoes	118,800	68,274.0	50,526	74.0%	5.40	3.10	2.30
33	Late season potatoes	133,760	81,723.9	52,036	63.7%	3.52	2.15	1.37
34	Onion	150,000	72,117.2	77,883	108.0%	3.00	1.44	1.56
35	Garlic	195,000	82,060.5	112,939	137.6%	16.25	6.84	9.41
36	Late season cabbage	124,000	75,024.3	48,976	65.3%	1.55	0.94	0.61
37	Cauliflower	153,750	84,451.6	69,298	82.1%	6.15	3.38	2.77
38	Broccoli	170,500	76,250.3	94,250	123.6%	7.75	3.47	4.28
39	Carrots	185,400	66,776.1	118,624	177.6%	4.12	1.48	2.64
40	Beet	117,000	61,578.7	55,421	90.0%	2.34	1.23	1.11

No	Description	Sales incomes, lei/ha	Sales costs, lei/ha	Gross profit, lei/ha	Economic profitability, %	Economic calculations per 1 kg of production, lei/kg		
						Average sales price	Unit cost	Gross profit (commercial excess)
41	Courgette	67,500	41,342.0	26,158	63.3%	1.35	0.83	0.52
42	Watermelon	70,000	39,601.6	30,398	76.8%	1.75	0.99	0.76
43	Melon	87,500	43,398.1	44,102	101.6%	2.92	1.45	1.47
44	Salad	198,000	96,476.8	101,523	105.2%	9.90	4.82	5.08
45	Celery	230,000	105,075.2	124,925	118.9%	11.50	5.25	6.25

Source: JICA Project Team's calculations based on cultivation budgets for the fructification period.

Based on the observed results and comparative economic analysis of practice of HVC, we can conclude that under market economy conditions, small and medium farms (with a cultivated area from 1 ha to 50 ha) should concentrate on implementation of intensive agriculture, applying advanced technologies mainly based on high-value agriculture and narrow specialization.

At the same time, economic results of operational activities differ considerably for HVCs through value of sales income and gross profit, depending on the intensity level. The comparative analysis of budget data presents an economic argument for activities in the vegetable sector: with a justified increase of the production costs (intensity level), economic efficiency and results of operational activity can be enhanced.

As a result of calculations realized when budgeting incomes and costs for HVCs, it was shown that it is possible to systemize data regarding related costs and their componence for crops.

Table 4-23: Costs Budgeting and its Componence at Growing HVCs in the Republic of Moldova (calculated per 1 ha)

No.	Description	Sales costs, MDL/ha					
		Total	Including				
			Means for production	Machinery services	Manual operations	Other costs and fees (including amortization)	Unexpected expenses
1	Apples - MM 106	49,177.7	16,836.4	4,943.2	14,784.3	8,143.0	4,470.7
2	Apples - M 26	73,000.0	18,456.4	6,531.4	22,292.9	19,082.9	6,636.4
3	Apples - M 9	121,996.2	20,256.4	7,905.9	35,151.8	47,591.6	11,090.6
4	Plums	41,263.7	11,260.4	3,605.1	14,879.7	7,767.2	3,751.2
5	Peaches	39,077.8	8,880.7	3,758.0	13,460.1	9,426.5	3,552.5
6	Nectarines	38,949.3	9,240.7	3,507.6	11,663.1	10,997.0	3,540.8
7	Pears	42,734.0	9,264.0	3,521.9	15,120.2	10,943.0	3,884.9
8	Pears Abbé Fétel	117,640.1	12,684.0	6,936.8	36,885.7	50,439.0	10,694.6
9	Apricots	42,722.5	5,568.3	2,709.4	14,783.9	15,777.1	3,883.9
10	Cherries Mahaleb	42,141.4	5,055.7	2,375.9	18,742.5	12,136.3	3,831.0
11	Cherries Maxima 14	62,645.8	6,675.7	3,655.8	25,732.5	20,886.7	5,695.1
12	Cherries Gisela 6	98,275.2	9,195.7	4,599.3	34,999.5	40,546.5	8,934.1
13	Cherries	41,550.2	4,480.9	2,578.2	25,732.5	4,981.4	3,777.3
14	Nut	39,062.9	6,746.3	2,329.0	14,827.5	11,609.0	3,551.2
15	Almond	39,294.0	6,746.3	2,307.3	13,958.9	12,709.3	3,572.2
16	Currant trellis	64,937.7	8,600.1	10,904.3	17,572.7	21,957.2	5,903.4
17	Currant bush	57,345.6	9,386.8	10,863.8	15,024.7	16,857.1	5,213.2
18	Raspberry	86,625.6	10,466.8	11,314.1	20,057.7	36,912.0	7,875.1
19	Blackberries	91,573.8	10,768.4	4,755.9	31,846.0	35,878.6	8,324.9
20	Strawberries	142,041.0	9,736.1	6,283.3	24,662.7	88,446.1	12,912.8

No.	Description	Sales costs, MDL/ha					
		Total	Including				
			Means for production	Machinery services	Manual operations	Other costs and fees (including amortization)	Unexpected expenses
21	Remontant strawberries	168,358.6	13,219.7	6,856.0	35,462.7	97,515.0	15,305.3
22	Wine grapes	40,434.8	9,484.6	3,016.2	15,102.0	9,156.1	3,675.9
23	Table grapes	50,676.8	12,254.4	3,388.3	18,581.8	11,845.3	4,607.0
24	Greenhouse cucumbers	578,409.5	149,488.8	18,439.7	90,220.7	267,677.6	52,582.7
25	Greenhouse tomatoes	550,046.9	175,793.3	23,837.7	78,751.7	221,660.0	50,004.3
26	Greenhouse peppers	538,280.4	131,576.0	15,242.9	68,413.7	274,113.3	48,934.6
27	Outdoor tomatoes, seedlings	119,249.6	67,557.1	10,784.0	22,096.0	7,971.7	10,840.9
28	Outdoor tomatoes, seeds	65,417.4	29,304.3	8,520.1	17,936.0	3,710.0	5,947.0
29	Outdoor cucumbers	70,203.0	24,541.0	7,081.0	18,900.0	13,298.9	6,382.1
30	Outdoor peppers	112,185.7	67,691.2	9,100.0	21,485.8	3,710.0	10,198.7
31	Eggplant	95,934.8	51,972.1	9,239.4	22,292.0	3,710.0	8,721.3
32	Early potatoes	68,274.0	41,505.7	5,840.7	10,102.0	4,618.9	6,206.7
33	Late season potatoes	81,723.9	49,530.0	7,738.6	12,952.5	4,073.4	7,429.4
34	Onion	72,117.2	28,277.0	7,623.4	20,523.0	9,137.7	6,556.1
35	Garlic	82,060.5	41,416.2	5,434.7	17,103.6	10,646.0	7,460.0
36	Late season cabbage	75,024.3	38,729.9	10,000.5	14,700.0	4,773.4	6,820.4
37	Cauliflower	84,451.6	49,505.0	8,550.1	13,296.0	5,423.0	7,677.4
38	Broccoli	76,250.3	42,530.6	8,080.4	10,803.0	7,904.5	6,931.8
39	Carrots	66,776.1	20,561.2	7,009.6	19,986.5	13,148.2	6,070.6
40	Beet	61,578.7	22,675.9	7,375.1	18,561.5	7,368.2	5,598.1
41	Courgette	41,342.0	12,637.0	6,591.4	13,250.0	5,105.3	3,758.4
42	Watermelon	39,601.6	15,201.2	6,444.8	9,068.0	5,287.5	3,600.1
43	Melon	43,398.1	18,202.1	5,762.7	11,778.0	3,710.0	3,945.3
44	Salad	96,476.8	42,874.3	8,667.6	26,378.0	9,786.4	8,770.6
45	Celery	105,075.2	59,181.2	8,515.0	15,524.0	12,302.7	9,552.3

Source: JICA Project Team's calculations based on cultivation budgets for the fructification period.

In Moldova, the trade balance of F&V is generally positive. This is due to the fact that the country typically records a positive balance of exports for fruits, but in the case of vegetables it has a significant negative balance. A main reason is that local farmers cannot ensure production and sale of fresh vegetables during the year and thus requires huge volumes of imports. The dominance of agriculture in Moldova's economy is confirmed by the highest share of food exports. This is supported by the processing industry that constitutes the majority of food exports and contributes 7-8% to GDP and around 5% of the total labor force.

The processing industry of fruit and vegetables is a traditional industry in Moldova, oriented mainly to export. At the moment, it has a total capacity of around 200 thousand tons and is focusing its efforts on diversification of markets and products.

Canned goods play an important role in the food industry. This sector includes 63 companies, of which seven are companies with high output capacity. The total combined capacity of this branch amounts to 185-200 thousand tons per year, of which 30 thousand tons are contributed by small and medium enterprises. The potential of canneries exceeds 400,000 tons of processed goods a year; however, the competitiveness of the goods needs to be enhanced and the market needs to be diversified.

The traditional range of goods manufactured by processing enterprises includes fruit and vegetable juices (apples, grapes, peaches, apricots, cherries, blackberries, tomatoes and carrots),

concentrated juices (particularly concentrated apple juice), processed fruit and vegetables (jams, marmalades, preserves, etc.) and canned fruit and vegetables (cucumbers, tomatoes, sweet peppers, etc.).

Now, the processing industry of F&V includes 8 large enterprises that process 70-80% of the total volume of production with around 90 small and medium enterprises contributing 20-30%. Currently, the food industry uses just 45-50% of the total processing capacity, which is proof of the inefficiency of this sector in diversifying the range of products and markets, enhancing the quality and production conformity, guaranteeing prices for the F&V purchased in advance, and modernizing its technology and processing methods, etc.

The total output of processed fruit and vegetables amounts to 65-70 thousand tons. The largest markets for canned goods were the CIS (above 50%) and the EU (30-40%); while 10% of exports went to other markets. EU countries purchase the majority of the apple juice concentrate produced in Moldova, while most fruit juices are exported to Austria, Germany, Poland and Romania.

The implementation of ISO (quality management) and HACCP (Hazard Analysis and Critical Control Point) by food processing companies is a clear advantage. The promotion and implementation of these systems should be one of the key aspects of promoting the export of processed goods.

Under market economy conditions, Moldova has considerable reserves regarding increasing production volumes of F&V to ensure local needs and volumes of export because there is a guaranteed demand and meets the prerequisites for continuous growth for the local and international markets.

4.2 Agricultural Actor Analysis

4.2.1 Actor Analysis

The agricultural sector in Moldova is characterized by a huge number of new smallholders working with less than 2.5 ha and having little agricultural management experience. This is due to the redistribution of former state farm lands. In terms of the number of farms, more than 90% are registered under smallholders, yet they cultivate only about a third of the agricultural land. These smallholders primarily provide agro-products on the domestic market although some grow table grapes and other fruits for export. In this case, they are usually managed by bigger farmers or intermediaries. About two-thirds of the agricultural land is cultivated by limited companies, cooperatives, large-scale corporate farms, and other types of holdings, mostly with more than 50 ha. Some farmers have sought to increase their farm size by forming agricultural cooperatives or in other cases agri-preneurs rent land for agro-businesses through a limited company. The MoAFI also facilitates land consolidation which allows for more efficient farming through extension services which are contracted out to an NGO.

Every type of farmer produces cereal crops including smallholders but most smallholders are inhibited from growing HVCs for export purposes due to financial, technical, and marketing constraints. Vegetables and fruits are mainly grown by small to medium sized farmers in a haphazard manner while large-scale corporate farms with average around 370 ha cultivate sugar beets, wheat, and sunflowers which require less labor, but more land and machinery. Agricultural inputs such as seeds, seedlings, agro-chemicals, and fuel are mainly imported.

Animal husbandry does not play a prominent role in the agricultural industry due to cheaper livestock imports, limited feed supply, longer production cycle when compared with cereals, and

an inability to fulfilled food safety requirements for exportation. Production is mostly concentrated on the domestic market as the local production does not meet demand.

Producer groups for F&V are rare except for marketing groups formed by the NGO "Agroinform". In many cases, buyers go to producers to purchase their products. Smallholders also sell their products on streets at local markets nationwide or bring their products to wholesale markets in Chisinau and Balti where permanent wholesale markets exist. Consumers mainly make their purchases on streets or in open-air markets, while supermarkets are playing an increasingly important role in the sale of fruit and vegetables. Traders and producers supply their products to supermarkets, which are fraught by operational inconsistencies. Supermarkets would be able to meet larger suppliers at one place if wholesale markets were better developed. It is clear that Moldova is still in the process of consolidating production and wholesale trade. Opportunities for farmers to sell their products are very limited, which result in poor farm gate prices and little incentive to experiment with new HVCs.

Exporters include large-scale producers and intermediaries such as traders who buy products from farmers at their gate. Importers are mostly wholesalers who sell to retailers and supermarkets or retail themselves. Large importers dominate more than 50% of the import market. Some supermarket chains also act as importers for their own supplies. Buyers from foreign countries also come to farm gates in order to directly purchase their products at low prices. Moldova Fruct, an exporters association, is working to enhance the fruit export process.

Some cooling facilities in Moldova are available at either producers, traders, or companies renting out cold storage space. But most of the F&V are not channeled through a cold chain system as the cooling facilities are not well equipped.

Exporters and importers use local logistics companies for the transport of their goods while some larger exporters have their own transport facilities; trucks are often rented through logistics companies. Producers also use brokers for customs documentation. Moldovan producers, wholesalers and exporters only ask for transport facilities. Moldovan food distributors authorized to import international brands have their own warehouses and distribution centers.

Agri-food industry accounts for a significant portion of the total industry workforce, the weakness of which is characterized by the majority of small companies which lack the horizontal and vertical coordination of supply chains, leading to discrepancies between the farm gate prices and the consumer prices. This in turn results in low investment and lower quality as smallholders cannot grow sufficient quantities to participate in the processing industry. On the other hand, larger farmers prefer to continue to grow cereals instead of investing in expensive vegetable harvesting equipment.

NFSA is the administrative authority responsible for the implementation of plant and veterinary quarantine inspection. In Moldova, there is no private laboratory for agricultural products and food stuffs. The Republic center for veterinary diagnostics and safety of food products is a state-run laboratory under NFSA that implements tests for both private entities such as food manufacturers and public authorities including the NFSA's monitoring tests. By providing those test results, the manufacturer can receive approval for export from the NFSA. Livestock animals are required to be registered with NFSA when they are vaccinated.

In the Soviet era, governmental agricultural research institutions played an important role in decision making about what to grow and where; most of them did not manage a successful transition during the change in government and still do not offer the required services. Few institutional linkages exist today among agricultural research, extension and education/training institutions.

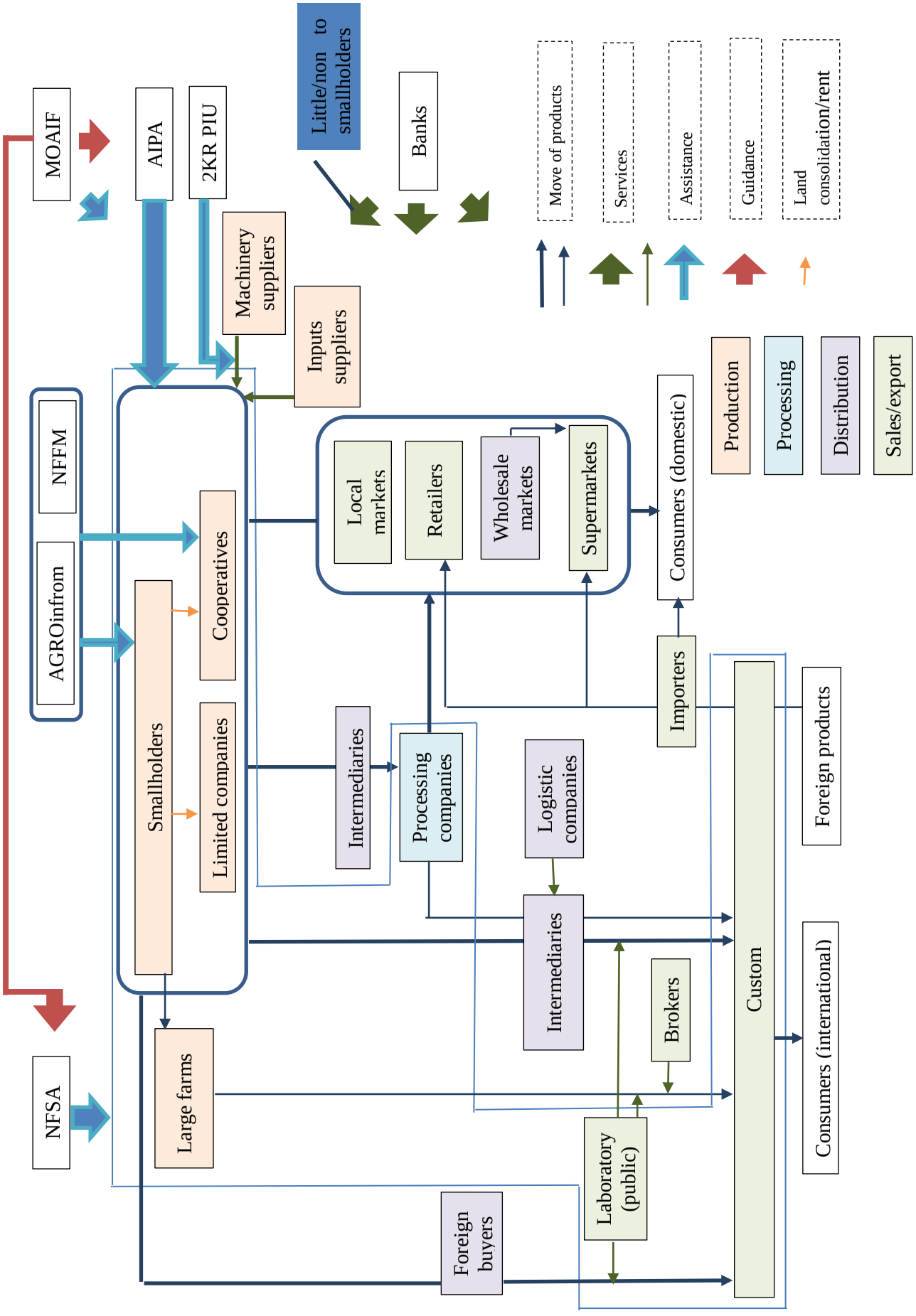
From production to sales, there are huge investment inadequacies in the agriculture sector in Moldova; however, access to credit in rural areas is limited because of high interest rates, lack of collateral, and so on.

In order to address the issues for agricultural development, the Moldovan government is implementing the National Agriculture and Rural Development Strategy which focuses on three pillars:

(1) Enhanced competitiveness through restructuring and modernization
(2) Sustainable management of natural resources
(3) Improved conditions for living and working in agricultural and rural areas

Major interventions are subsidies and services (research, education, food safety, and extension services) directed mainly to producers with policy guidance of MOAFI. While MOAFI provides services in various areas, NFSA works primarily on food safety and AIPA is engaged in activities designed to provide subsidies to farmers. NGOs also provide their services to member farmers.

The figure below shows the relationship among major actors:


MOAIF
AIPA
2KR PIU
Little/non to smallholders
Banks
Move of products
Services
Assistance
Guidance
Land consolidation/rent
Machinery suppliers
Inputs suppliers
NFFM
AGROinfrom
Cooperatives
Smallholders
Limited companies
Local markets
Retailers
Wholesale markets
Supermarkets
Consumers (domestic)
Production
Processing
Distribution
Sales/export
Importers
Foreign products
Intermediaries
Processing companies
Logistic companies
Intermediaries
Brokers
Custom
Consumers (international)
NFSA
Large farms
Laboratory (public)
Foreign buyers

The role of the agriculture actors and relationships with the public agencies at each stage of production, processing, distribution, sales and export is shown in the tables below:

1. Production	
Agricultural producers cooperative	Producer cooperatives have been mainly formed through donor funded projects as receivers of financial assistance to procure and operate agricultural facilities such as cold storage, grain mills and irrigation systems. The cooperatives usually produce common crops, store and sell jointly. They sometimes possess sorting and/or packing machinery. Buyers come to their stores to purchase regularly. They procure agricultural inputs such as seeds, fertilizer, pesticides and others in bulk to minimize the prices and distribute within the members of cooperative. Cooperatives are not able to take loans from commercial banks.
Stock company	Stock companies usually operate large-scale farming with management staff, many permanent and non-permanent laborers and large-scale facilities, machinery and equipment. It may have an agronomist as its advisor. Lands are consolidated through rent or purchased from small scale farmers. Cropping patterns are generally monocultures of grains and industrial crops and sometimes fruits. They have contact with buyers or processors who sell products both at national and international markets. These are sufficiently financed by commercial banks.
Limited company	Small and medium sized companies for agricultural production. Small farmers rent land to the company and the company cultivates cereals and HVC commercially. It owns basic machinery such as tractors and attachments, but may depend on machinery services provided by large scale farmers or stock companies. Agricultural inputs are procured from local dealers or cooperatives. It can also develop connections with buyers such as processors or brokers.
Large-scale farmer	Individual farmers conducting large-scale farming but cropping patterns may be similar to stock companies. Large-scale farmers usually cultivate grains and industrial crops with advanced machines and equipment that can manage large scale farming. It has contact with buyers such as processors and retailers. It procures agricultural inputs through an association or cooperatives such as Agrostock, and also receives technical advice from specialists. They can gain technical knowledge or assistance from dealers of agricultural inputs.
Middle-scale farmer	Middle-scale farmers run farms with family members and seasonal laborers. They cultivatea variety of crops such as grains, root crops, vegetables, nuts and fruits. They have their own machinery such as tractors and attachments, but could depend on machinery services or lease. Procurement of agricultural inputs from local dealers or cooperatives with technical advice. They may have access to extension services from NGOs entrusted by MoAFI.

Small-scale farmer	The majority of farmers in the country operate small scale farms with 1-2 ha of land. Small-scale farmers basically cultivate grains and other crops that are produced by large scale farmers or companies, because they depend on their agricultural machinery. Small-scale operations also produce small amounts of HVC within a manageable scale for families such as vegetables, fruits and nuts for self-consumption or sale to brokers, processors or storage owners. Agricultural inputs are procured through local dealers. They sell their products at local markets, to dealers, and to local processors. In order to optimize farming, extension services of MoAFI facilitate the aggregation of land for broader cultivation.
Agricultural inputs dealer (seed, fertilizer, pesticide, fodder)	Agricultural inputs are distributed through local dealers or cooperatives. One of the biggest cooperatives is Agrostoc which consists of more than 100 members including dealers of agricultural inputs. Agrostoc does not distribute the inputs but imports and distributes through member companies. The members of Agrostoc can purchase inputs at a lower rate.
Machine dealer	There are seven major dealers of agricultural machineries. Some dealers are entitled to official dealership of major manufacturers such as John Deer, Massey Ferguson, New Holland, etc. They usually provide spare-parts, maintenance services and technical support with mobile workshops. For newly introduced machinery, they also provide technical training on operation and maintenance.
NGOs	NGOs in the agriculture sector are mainly service providers for small and medium scale farmers. They are usually, if not always, entrusted with public extension services by MoAFI or project implementation by donor agencies. NGOs such as AGROinform and NFFM consists of members of small farmers who have the right to vote for decision making.
Agricultural finance	There are seven major banks that provide finance for agricultural businesses. Due to the financing conditionality such as collateral, interest rate, limited grace period and so on, small and medium farmers do not have access to the finance provided by commercial banks. Main customers of these major banks generally include joint stock companies, LLC, large farmers and associations.

2. Processing	
Food maker	Companies that process domestic and international agricultural raw materials into food are rare in Moldova. Large scale processors may not be able to secure domestic raw material due to farmers' lack of capacity to produce a sufficient amount of raw materials, which fosters dependency on imported materials. But small scale processors can procure raw materials locally. Suppliers of raw materials are usually small to medium size farmers cultivating produce in the areas around the factories. There is no contractual relationship between processor and farmers, but they depend on informal networking within communities.

Packaging manufacturer	Companies packaging fresh agricultural products and processed agri-food are also in short supply as processors. National level agri-food products are not well packed but sold in simple wooden boxes that are also manufactured outside of Moldova, for example in Romania and Greece. Packaged fresh products are basically for export. Companies specializing in packaging are rare or may not exist, but usually do packaging as a process of storing and sorting.
Food additive manufacturer	Based on investigations, there are no food additive manufacturers in Moldova. All food additives are imported, mainly from EU countries. Importers of food additives are the main actors of distribution of food additives in Moldova.
Production machine manufacturer	Companies manufacturing parts of or entire machines for the agricultural and agri-food sector. They do not have the capacity to manufacture complicated or high-tech machinery, but can produce attachments for tractors or assemble machinery.
Food safety and inspection agency	NFSA handles food safety issues and inspection nationwide. There are staffs under the NFSA that inspect the hygiene conditions at food factories and the safety of food stuff at domestic markets and boarding points.
Agricultural finance	Seven major commercial banks provide loans for agri-food processing business such as procurement of processing machinery and other related facilities.

3. Distribution	
Transporter/distributer	In the agriculture sector, there are different sizes of transporters. Large scale trailers with more than 20 ton loading capacity are used for grains, industrial crops and fodder. If they have refrigeration function, then they can be used for transporting vegetables and fruits. Transporters collect crops from villages where there are large stores or cold stores. Small and medium size trucks collect crops from farm gates and transport them to wholesale markets. Owners of small and medium size trucks are sometimes farmers. They carry neighboring farmers' crops in addition to their own to wholesale markets. Rail transportation is not common for agricultural products, but agricultural inputs such as chemicals and fertilizers are transported by train. There is only one river port namely Giurgiulesti from where agri-food items are exported, through marine transport (via Black Sea), to central and south Asian countries.
Warehouse	Farmers have their own warehouses for agricultural crops according to their farming scale. Thus, owners of warehouses operated as businesses are often farmers who operate medium to large scale farms. Basically, they establish warehouses for their own crops, and rent space to other farmers in order to collect service fees for operation.
Wholesaler	Wholesalers are available in Chisinau and other regional centers. Large scale wholesalers basically deal crops in one public and two private markets in Chisinau. In the markets, small to large scale famers or distributors/transporter sell

	wholesalers their crops. Wholesalers sell agricultural products to retailers, exporters and individual customers.
Agricultural finance	Seven commercial banks also give loans to distributers. Conditionality for taking out a loan is the same as for other businesses.

4. Sales and export	
Retailer	Retailers procure agri-food items from producers, distributors or wholesalers. They sell agri-food products to consumers or food-related business operators.
Exporter	National or international companies ship the agricultural and agri-food products out of Moldova. Exporters occasionally purchase agri-food items directly from producers.
Inspection agency	Necessary documents for export items are verified by Customs Inspectors at border check points. If a transporter has TIR authorized by IRU, there is no physical inspection but only the verification of documentation.
Sanitary agency	NFSA deploys their inspectors at border check points and inspects food safety in terms of phytosanitary. Inspectors basically check documents issued by NFSA for agri-food products. If their documents are not available, Inspectors send samples of agri-food items for examination at the head office.

4.2.2 Current Status and Issues of Production and Processing

(1) Diffusion Level and Issues of Cultivation Technology and Agricultural Inputs

Current status of different categories of producers

Figure 4-1 demonstrates features or typical situations of four different types of farmer[107]. Every type of farmer produces some form of cereal crop, but perennial plantations such as apples, plums, table grapes and other fruits and nuts are cultivated by type A, B and C, though it is assumed that type A operates comparatively smaller scale perennial plantations than that of grains or it can be referred to as a medium scale perennial plantation. On the other hand, horticultural crops are mainly produced only by type C. This is due to the fact that horticultural crops are basically labor intensive and usually Moldovan famers have trouble sourcing sufficient laborers. Types B and D could also produce vegetables but this may not be conducted on a commercial basis, in other words, these represent backyard garden crops.

[107] The figure is produced by KB-Walkoma, a consulting company for agriculture in Moldova. Though the figure is not demonstrated based on statistical or numerical data, it describes typical situations for the farmers in Moldova based on the operational scale of farming.

Table 4-24: Features of Different Scale of Farmers

FARM PRODUCTION SIZE (HA)	EQUIPMENT	LABOUR	MARKET	ORGANIZATION	CONTRACT
600+ Cereal Crops &/or 150 ha Perennial Plantation **A** Gross Annual Sales **$300 000- $1 000 000**		▪ Stand alone accounting and legal department; ▪ Owners live in Chisinau; ▪ May have links abroad; ▪ Has access to well trained consultants; ▪ Has at least 3 capable managers.	▪ Access to export markets; ▪ Direct to port; ▪ Can coordinate the logistics of Director to port scenarios.	▪ Owners live in Chisinau; ▪ Has e-mail & business cards; ▪ Uses credit cards; ▪ Minimum transaction time; ▪ Managers have bussines/ commercial background; ▪ LLC/ Grup/ Holding.	▪ 3-7 year rent contracts; ▪ Registered nationally form D; ▪ Active land consolidation; ▪ Active land purchases.
Farming <50 ha of Cereal Crops or 10 ha of Perennial Plantation **B** Gross Annual Sales **$100 000- $300 000**		▪ Typically has a large number of low paid employees; ▪ Low labor productivity.	▪ Acces to export Markets but still relies on domestic sales; ▪ Sales through brokers; ▪ Ability to coordinate regional/ local logistics.	▪ S.R.L. ▪ Owners live in the region, typically age +55; ▪ May have e-mail but it's not frequently used; ▪ 1-2 days transaction time.	▪ 3 year rent contracts; ▪ Registered locally; ▪ Purchases land if someone offers however has limited; ▪ Coordinates with other firms to consolidate fields by contract.
10-50 ha of Cereal or 2 ha of Perennial Horticulture **C** Gross Annual Sales **$10 000- $100 000**		▪ May work for A farms as A manager; ▪ Family run; ▪ One family member typically has off-farm income; ▪ 1-2 emplyees.	▪ Domestic and "raion" level based sales; ▪ Limited ability to coordinate logistics; ▪ Typically sells produce to brokers directly from the field.	▪ G.T. ▪ Shared accounting or self accounting; ▪ Most often these enterprises rely on skills of extended family members.	▪ Owned land; ▪ Little rented; ▪ Coordinates with other farmers to consolidate parcels by verbal agreement.
>1- 10ha **D** Gross Annual Sales **$500- $10 000**		▪ Family run; ▪ Labor in exchange for Goods; ▪ Minimal Hired Labor+	▪ Village & "raion" level sales; ▪ Brings produce to market by public transportation.	▪ Little to no documentation; ▪ May not even have a valid ID (i.e soviet passport) which limits development.	▪ Verbal land exchange with other small farmers; ▪ Rents land to category A farmers.

Source: KB-Walkoma

Issues of dissemination of technology and information

As described in 2.4.1, technical knowledge about agricultural production is disseminated through both private and public services. Public services are provided by NGOs and associations such as ACSA, UNIAGROPROTECT and AGROinform. They are entrusted to deliver services by MoAFI. Technical skills and knowledge are also provided by the private sector through the sale of agricultural machineries and inputs. For example, Agrostoc sells seeds, chemicals and fertilizers; while they provide knowledge about their products, timing of use, appropriate amounts for each crop. Agricultural machinery dealers also provide technical skills for the operation and maintenance of machinery and equipment when they sell their products. Joint stock companies, LLCs, cooperatives and large scale farmers sometimes hire specialists for their advice. On the other hand, small farmers can gain access to technical skills and knowledge through public services.

One of the major issues in dissemination of technical knowledge and skills is quality control of extension services provided by NGOs and associations. The services provided by the private sector are ensured through competition though they are still limited due to the number of the service providers. On the other hand, the services of NGOs and associations are not standardized and well monitored. As we have discussed, the contents of extension services as a public service are different in the entrusted service providers. AGROinform provides different kind of trainings along with a textbook and methodology developed through donor assistance; however, the topic of their extension service is more focused on management. Others also develop their own materials and methods of technology transfer, but the content, quality and approaches are not the same. This may lead to gaps in knowledge and technology between the farmers, especially for small ones.

Issues of agricultural machineries and equipment

As explained in section 2.4, the use of machinery and equipment is an influencing factor in the crops chosen for cultivation and the scale of operations. The large scale famers who operate more than 600 ha of grain cultivation need large scale tractors with 150 to 200 hp and applicable attachments or they may need to operate more than two tractors in order to conclude farm work in a timely manner. Category B, C and D farmers usually rely on the machinery services or leases provided by the other farmers. Due to the dependency on machinery services, small and medium farmers are not able to operate farm work in an appropriate period. For example, the appropriate period of land preparation of winter wheat is only one month from August to September. If they fail to complete preparations within that period, the outputs of the crops will be lower than usual. Thus, the availability of machinery is crucial issue. The quality of available machinery in terms of technology and age may impinge on the cost efficiency of agricultural activities. If one uses old or unreliable machinery, it will require more time for maintenance during the farming season, and field efficiency, which is mentioned in Table 2-42 (Field coverage of major implements) decreases. The available types of machinery are limited, too. Many available machines are large scale and are only suitable for grain production, not for F&V. Due to the use of large scale tractors on vineyards, Moldovan farmers plant trees in wider rows than in vineyards of other countries', resulting in lower productivity.

Issue of finance and transformation from low value crops to HVCs

The transformation of the agriculture sector from production of low value crops to HVCs is a key goal of the agricultural strategy. Though MoAFI encourages producers to cultivate HVCs such as F&V through subsidies provided by AIPA, small and medium farmers who constitute a significant part of the F&V market are not able to start or expand production of HVCs due to the lack of financing. As mentioned in the Section 2.3, there are 11 commercial banks that provide loans for agricultural business, but in reality, the banks are reluctant to provide loans to agricultural businesses due to the unstable nature of the industry. This is especially true in the case of small and medium farmers who have neither stable income sources nor assets as collateral which are valued at more than 130% of the loan. These actors face difficulties in accessing finance from commercial banks. High interest rates also discourage farmers from taking loans from the commercial banks. The lack of finance prevents farmers from procuring agricultural inputs such as farm machinery, irrigation equipment and facilities like greenhouses, storage units and refrigerators. These machineries and facilities are crucial for the production of HVCs.

Issue of market oriented production

When famers select crops to cultivate, they may decide based on various factors, for example, land area, knowledge, skills and experience, available machineries and facilities, market prices, decisions made by affiliated associations and so on. Usually, they produce what they have produced in the past, unless a farmer is particularly adventurous or has encountered an opportunity to secure a buyer. As described in Section 4.1 (Table 4-18), the small farmers collect information on technologies and markets from different sources. Thus, they know which crops are more profitable or can be easily sold. The issue, however, is in finding or connecting with buyers for these crops, which is not so simple a task.

The farmers who belong to category A and B may contact with buyers directly or indirectly and personally or as a member of association. They also have the capacity to collect a certain amount of crops in bulk to meet the demand of buyers. By disclosing their products through the internet, or at fairs held in and out of Moldova, the farmers of these categories can proactively market their products, and have opportunities to recognize the needs of the national and international markets. For example, MIEPO supports associations, and large scale producers disseminate information about their products to participate in international fairs. On the other hand, the farmers of category

C and D are usually dependent on the intermediaries who simply collect their products to sell them where they can find buyers.

The issue here is that the category C and D farmers who produce significant shares of F&V do not have the means to know the needs of better market such as kind of varieties, size, purpose of use, etc. Thus, they are not able to adjust their cropping patterns proactively and increase their profitability.

In relation to the market oriented production, another issue is the record keeping. When it comes to small and medium farmers (category C and D), record keeping of farming process such as use of variety, chemicals and fertilizers is not common practice. One reason is that there is no incentive to keep records under current conditions. Record keeping will be required when farmers need to be held accountable as judicial person or as producers to consumers. For example, record keeping is required in order to be certified by Global GAP which is a minimum requirement for producers who sell their crops on the EU market. Companies and large scale farmers may keep records, if not always, for the purposes of financial management that may be required to apply for a loan, or for meeting export requirements. There is no technical support for farmers to keep records regarding their agricultural practices at present situation.

(2) Current Status of and Issues of Agricultural Infrastructure

Irrigation facilities

As we have discussed in the Section 2.4, most of the irrigation facilities existing in Moldova had been developed during the age of Soviet Union. After the Liberation of Moldova, privatization and land reform had taken place in every sector including irrigation facilities, and operation and maintenance of irrigation facilities have collapsed. Field coverage of irrigation facilities at present is only 14,000 ha; however, the irrigation facilities that had been managed by the state enterprises had the capacity to irrigate an area almost 10 times larger. In other words, Moldova has the potential to expand its irrigated area of land.

Irrigation facilities established along the major rivers in Moldova have been rehabilitated by the fund of MCC. MCC may provide further assistance in this sector, and other donors are also interested in assisting rehabilitation of pump stations and distribution channels. On the other hand, there are two major issues to be tackled: one is to facilitate farmers` investments to allow them to purchase and install irrigation equipment to utilize water through state owned irrigation facilities. Most of the farmers who are major producers of F&V usually require more stable water supply and are small or medium in size. Many of farmers do not have access to finance to invest money on irrigation equipment. Needless to say, sales of F&V products that are produced with the irrigation facilities should be associated with the investment on irrigation.

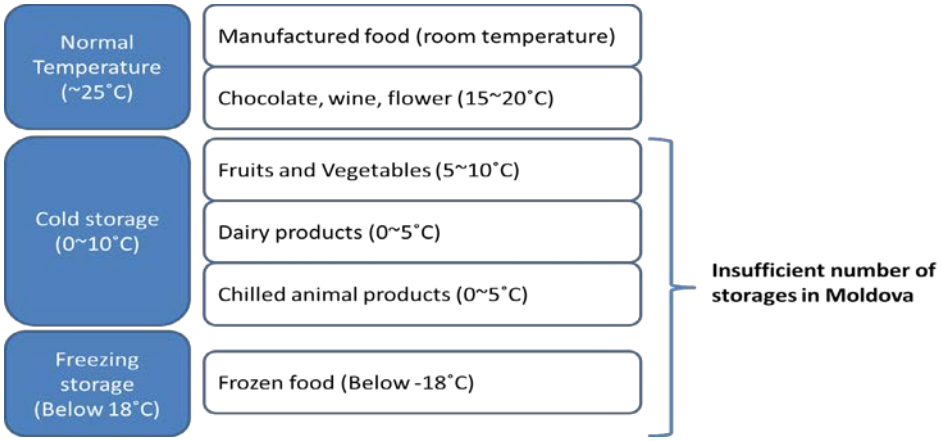
The second issue is the institutional arrangements for operation and maintenance of irrigation facilities. The irrigation facilities that had been rehabilitated through MCC funded projects are managed by WUAs. SDAM, which used to be called “Millennium Development Account Moldova” claimed that 9 WUAs out of 10 are operating the irrigation facilities satisfactorily, but the researchers of Institute of Soil Science, Agrochemistry and Soil Protection “N. Dimo” under MoAFI argues that WUAs could manage irrigation facilities during the project period, but they do not manage them after the project. Thus, it is said that the capacity development of WUAs is necessary for sustainable management of irrigation facilities.

Storage Facilities

According to “National Strategy on Agriculture and Rural Development for the Period 2014-2020”, the lack of modern post-harvest infrastructure which divides vertical coordination of F&V

supply chains is one of the most significant challenges. If cold chain systems which include pre-cooling, cold storage, grading, sorting, packaging, cold transportation are not well developed, then distribution of domestic agricultural products are limited during the farming season as farmers have no choice but to sell their products within a limited time frame. The Moldovan fruit production sector produces a sufficient volume for domestic consumption and for export, but Moldova still imports fruit which it might otherwise produce locally for domestic consumption (the exception being exotic tropical fruits). Most fruit production and distribution in Moldova is concentrated on the harvesting season, and many varieties of fruit which can potentially be produced in Moldova are imported during the off season. Lack of cold storages is one of the reasons that this potential remains untapped. Development of cold storages is a key factor to adding value to Moldovan agricultural products.

Generally, the temperature zones for storage and distribution of agricultural products and food can be classified into following three groups: normal temperature storage, cold storage (refrigerator), freezing storage (Figure 4-4).



Source: JICA Survey Team

Figure 4-4: Temperature Zone of Storages

Table 4-25 describes the general features of the main types of storage facilities for agricultural products. Although all types of storage are scarce, there is a particular demand for cold storages in rural areas. Currently, there are around 170 cold storage facilities for keeping F&V in Moldova (as of 2014). The approximate total storage capacity of those facilities is 146,000 tones. In addition to the shortage of facilities, the distribution of storages across the country is not well balanced. Costesti village in Ialoveni district is the most advanced and concentrated village for cold storage. There are 30 refrigerators in the village which benefits from support provided by development partner agencies and the government. At a minimum, there is demand for one cold storage for agricultural products for each village or town. As there are about 17,000 local towns and villages in Moldova, more than 1,000 cold storages are needed to store the volume of products that can satisfy year-round demand. If there were cold storages in local areas, farmers could store their products past the harvesting season and sell them out of season when farm-gate prices are higher. In order to fulfill demand for cold storage, it is essential to improve financial access for farmers.

Table 4-25: Types of Storage for Agricultural Products

	Storage for farmer	Storage for food factory	Storage for distributor
Location	Rural area	In a factory area	Market in terminal city (Chisinau, Balti)
Object	Fresh agricultural products (fruit, vegetable)	Raw material Manufactured food	Fresh agricultural products (fruit, vegetable) Manufactured food
Temperature zone	Refrigerator (0~10˚C)	Normal temperature Refrigerator Freezer	Normal temperature Refrigerator Freezer
Pictures	  	 	 

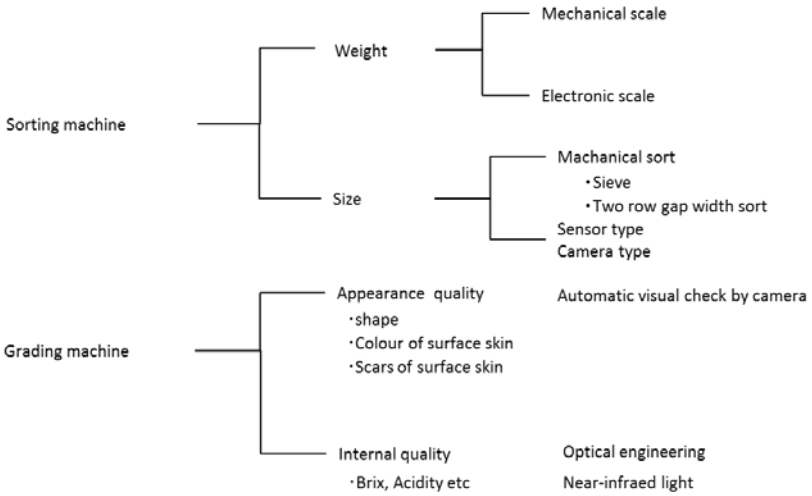
Source: JICA Survey Team

Sorting facility

A process to sort products according to size, color, shape and taste allows for the selection of good-quality produce which in turn leads to value addition. The following

Source: JICA Survey Team

Figure 4-55 describes a general pattern followed by sorting machines for agricultural products.



Source: JICA Survey Team

Figure 4-5: General Pattern of Sorting and Grading Machine

In Moldova, dissemination of sorting facilities for fruit and vegetables is still at a primitive stage. Most agricultural products such as grapes and apples are exported without being sorted or with only simple sorting at the farmer level. Cooperative sorting and shipping are still not commonplace in the country. For nuts and cereals, processing companies are purchasing products

from farmers and performing sorting or grading activities in their factories. Therefore, from the meaning of value addition by sorting, most farmers are missing out on the opportunity to add value to their products in Moldova.

In 2015, the first sorting line for table grapes was established in Costesti village with assistance from USA and Romanian government. The case of Costesti village is a model case for the facilitation of exports of agricultural products from a local production area. Another case is that of Revenco market in Chisinau. Revenco market is a privately-owned agricultural market for all food consumers including the final consumers, intermediaries and food caterers. At Revenco market, there is a sorting line for table grapes. In both cases, the procurement of a sufficient volume of raw materials and the existence of cold storage facilities are prerequisite conditions to allow the distribution of required volumes of products consistently to customers for export.

Development of sorting facilities is necessary to facilitate exports of high-quality value added agricultural products. In addition, from the perspective of employment issues in rural areas, increases of packing houses will contribute to resolving unemployment issues, especially for females. The primitive level of sorting agricultural products is hugely labor-intensive work and dependent on manpower. Development of packing houses in rural areas will be a valuable workplace for female farmers; however, there are still very limited numbers of sorting and packing facilities for agricultural products in Moldova. Lack of financial access for the purchase of sorting facilities and an aversion to cooperative activities stemming from historical experience of the former Soviet Union regime are obstacles to the development of sorting and packaging of agricultural products.

(3) Current Status of and Issues of Processing and Quality Control

Food processing

The agricultural sector is a key supplier to the agri-food industry in Moldova, though the current situation is unsatisfactory; the agri-food industry is not doing well and not achieving its potential to add as much value to agricultural products as it could. There might be at least two reasons for this: Smallholders cannot grow sufficient quantities required by the processing industry, e.g. in vegetable canning. The other reason is that bigger farmers prefer to run a low-risk and low-investment strategy; instead of investing in expensive vegetable harvesting equipment, they prefer to grow cereals which they can manage with existing machinery. To overcome this situation, a closer (perhaps contractual) relationship between processors and growers is necessary. Farmers might be willing to work with new products in instances where they have opportunities to find reliable partners among the agri-food processors who will purchase these goods. That being said, fostering these types of relationships is difficult. Processors are also often faced with financial difficulties, as they do not have their own harvesting equipment to employ on the fields of contracted farmers. Neither side appears willing nor able to invest, thus overall production is declining and spawning a vicious cycle of underinvestment.

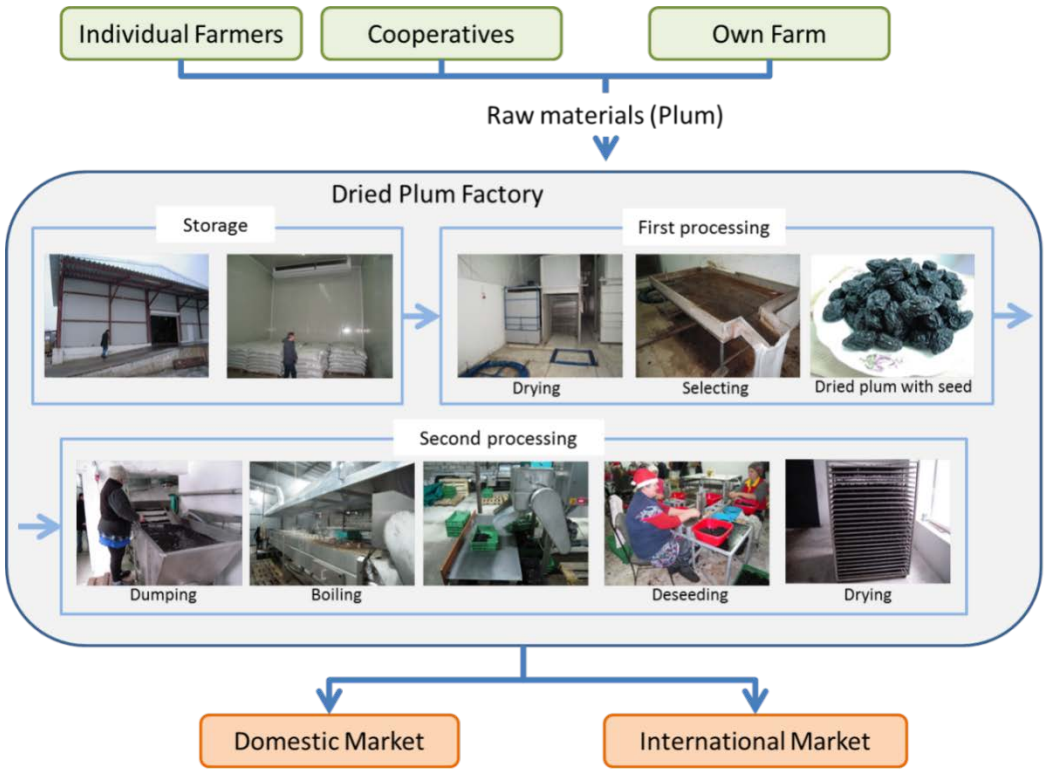
Quality Control

Quality control of agricultural products and food stuffs can be divided into two components: process control and product control. In order to produce food safely, products should be produced according to the appropriate procedures (process control) and the final products should be tested to determine whether the product is up to standard (product control). Of course, the methods of process control and product control vary from product to product and manufacturer to manufacturer. The following examples of quality control of animal products and fruit product indicate specific situations of food processing by products. Situations of actual quality control in factory settings are different for each manufacturer, but common observations of quality control from the following examples show a lack of product control especially for the final product.

Figure 4-6 and Figure 4-7 describe two examples (an animal product and a fruit product) of general product flow from "Farm to Folk" (from primary producers to final consumers).

The first example is the quality control of plums. Plums are one of the most common fruits in Moldova. During the harvesting season, dried plum manufacturers procure raw materials from company farms and other sources which include individual farmers. When the factory receives the raw materials, factory inspectors implement acceptance inspections (moisture content, mold, size, splits in the fruit surface) in order to filter out low-quality raw materials. The factory installed cold storage with support from the Moldovan government in 2014.
By employing cold storage, they are able to store fresh raw plums for a longer period than they were before. The beginning of April to mid-September is the harvesting season for plums though fresh plums can be stored until the end of September by utilizing cold storage.

Cold storage is important for both quality and quantity of production. The total investment cost for cold storage was USD 150,000 of which USD 25,000 was granted. During the harvest season, the drying facilities are run for twenty-two hours a day for first processing and during the off-season they are mainly used for secondary processing. The manufacturer applies to have laboratory tests conducted for heavy metals, pesticide, aflatoxin, salmonella, moisture content, cesium and strontium every year. By providing these test results, the manufacturer can receive approval to export from NFSA.

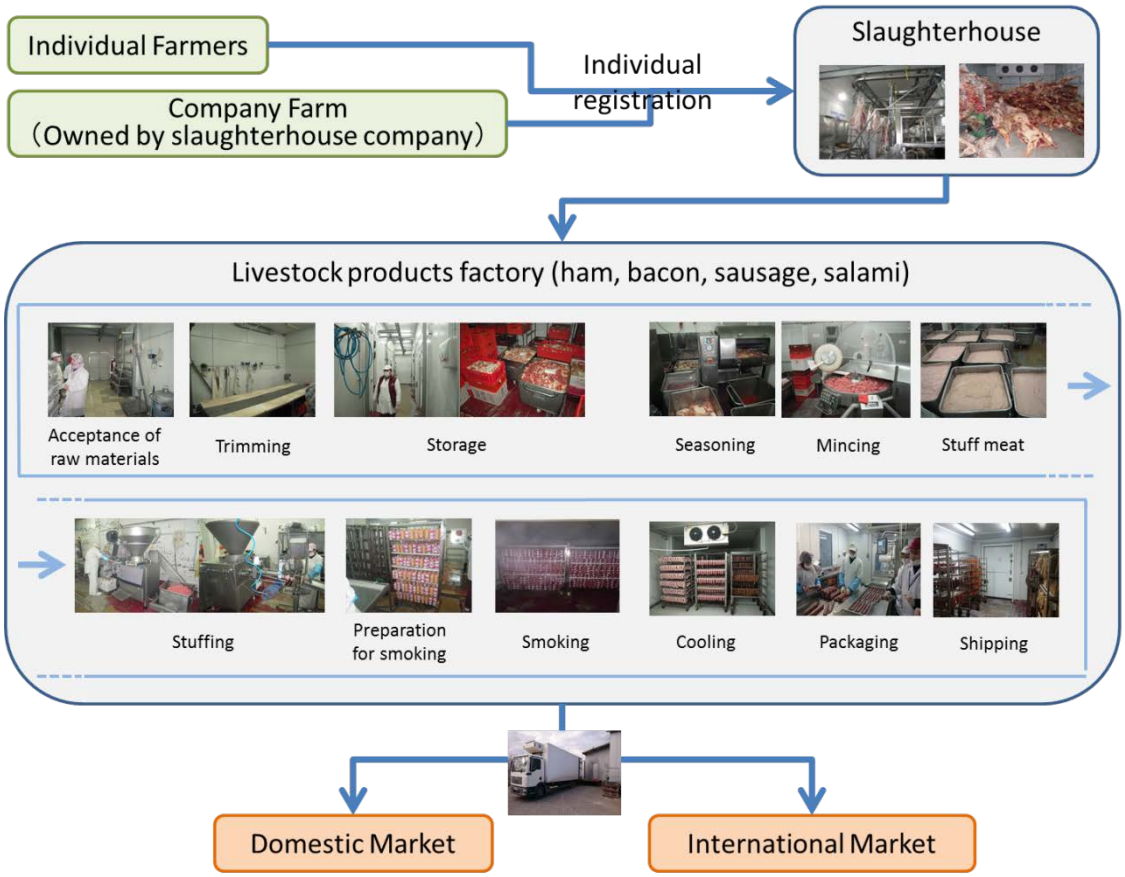


Source: JICA Survey Team

Figure 4-6: Product Flow of Dried Plum

In Moldova, livestock animals are required to be registered to NFSA when they are vaccinated. According to the Agricultural Information Center which operates the digital registration system of livestock animals with NFSA, increasing registration for animals destined for self-consumption poses a major challenge. Generally, farmers implement individual registration for each unit of livestock, otherwise the slaughterhouse applies the registration when they receive the animals.

The following livestock animal product factory is certified ISO 22000 and ISO 9001 by Romanian certification authority which conducts an external audit every year. Although their meat products are only sold to domestic markets and cannot be exported to EU markets due to gaps in food safety regulations between EU and Moldova, the manufacturer has applied for international certificates in order to achieve a high level of food safety control and for the future possibility of exporting to international markets. There is a quality control department and all production processes are recorded. Product tests are out-sourced to the NFSA laboratory twice a year by the manufacturer and NFSA also samples their products every month for monitoring. In addition, inspectors from the NFSA inspect the quality of equipment and hygiene conditions at the factory twice every month. According to the director of the factory, one challenge related to quality control is establishing an internal laboratory. The products are distributed for domestic consumption but if they wish to export their products, a higher level of quality control will be required.



Source: JICA Survey Team

Figure 4-7: Product Flow of Livestock Product

The following Table 4-26 describes the current quality control measures undertaken by Moldovan food processors.

Table 4-26: General Situation of Product Control by Food Processor

	Product Control	
	Raw material	Finished products
Pesticide	✕ : Most of processors don't do any acceptance test. And also not requiring any test result from raw material supplier.	—
Additives	—	✕ : Most of processors don't test volume of food additives contain in the final products.
Microbiological	△ : Most of processors don't do any acceptance test. And also not requiring any test result from raw material supplier.	△ : Most of processors don't have internal laboratory in the factory. So, most of them request testing to NFSA's laboratory. (but frequency of external testing is low)
Specification (humidity etc)	◯ : Testing items are varies depending on features of raw materials, but most of processors do some sort of acceptance test. (e.g. visual check, document check)	◯ : Testing items are varies depending on final products, but most of processors do some sort of final products test. (e.g. tasting test)

Source: JICA Survey Team

Based on the results of interviews with more than 10 food processing companies and the public sector, most food factories in Moldova do not have internal laboratories, therefore they use external laboratories (state laboratories under NFSA or laboratories abroad) for testing the quality of their products except for one case of a nut processing company. If food processing companies are seeking to promote their products for export, internal quality control is an essential factor for proving the quality of the products. Final product tests are important to exhibit the quality of the products to potential customers, but it is not sufficient without process control. According to technical regulations concerning food safety, process control based on HACCP is required in Moldova. But it currently doesn't require the acquisition of an actual HACCP certificate. Basically, requirements for HACCP face a similar situation in the EU; but in a practical sense, HACCP certificates will be required by importers in EU countries when Moldovan food manufacturers attempt to export their products to them in the future. In any case, creating accountability for food safety and quality control by providing information about product control and process control is one of the key unresolved issues for the food processing industry in Moldova.

4.2.3 Current Status of and Issues of Distribution and Marketing

(1) Division of Roles and Issues of Distribution

In this section, the current situation of the distribution channels of agri-foods in Moldova is described, towards a comparison of small and big farmers.

Distribution Route of Vegetables and Fruits (Domestic)

There are 5 main distribution channels for small farmers; however, considering the variety of risks, most small farmers choose to sell their products to intermediaries. More detailed information regarding each market and key player is described in part "d)" of this section.

1. Selling on Roads Near the Farm
   Households sell their products on the streets, targeting local residents and restaurants. This method cannot be expected to command a sufficient price and customers.
2. Selling at a Local Market
   Households sell their products at the local public market, targeting local residents and restaurants. This is one of the main channels for small farmers, though the profit is not high due to the high loss rate and cost of selling.
3. Selling at a Wholesale Market
   Households bring their products using small trucks to wholesale markets in Chisinau and Balti, targeting customers and companies such as restaurants. The price can be higher than through other channels; however, households have to consider the transportation cost, commission fee and potential losses at the point of sale.
4. Selling to a Processing Company
   Intermediaries come to the farm with their own trucks and purchase a certain quantity of produce, which are then resold to processing companies. It is possible for small farmers to directly sell the products to processing companies, but it is quite difficult to conclude preferable contracts within such a short time frame.
5. Big Supermarkets
   Only large farmers and cooperatives can sell their products to supermarkets, because supermarkets request farmers to sell the products which are sorted and managed in a preferable manner.

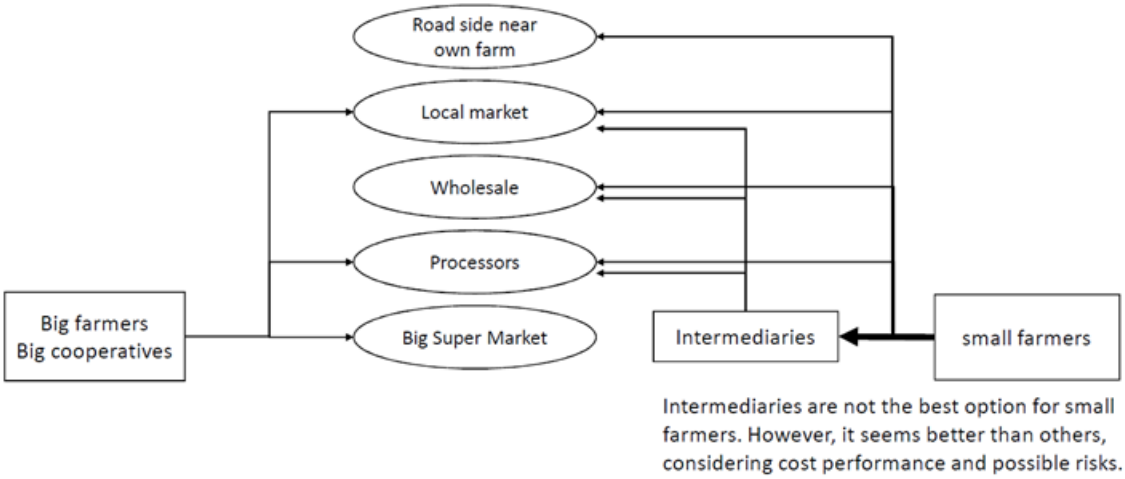


Figure 4-8: Main Domestic Distribution Channels

Distribution Route of Vegetables and Fruits (Export)

1. EU Market (High value market)
   The EU market is the biggest market near Moldova; however, small farmers cannot access this market due to the lack of necessary equipment. In order to sell their products to the EU market, farmers must meet 4 basic conditions: certain amount of produce (18 tons/lot for export transportation), sorting (same color, size, taste), packaging (for quality control), certification (traceability, food safety certification such as global GAP). On the other hand, big farmers and cooperatives that own the requisite equipment can access the EU market (and other high value markets).

2. CIS and Other Markets
   There are around 200 exporters in Moldova. These exporters visit farm gates of small farmers with mini-vans and collect a certain quantity of agro-products. After which they

call trucks for exporting, load the collected products and send them to CIS and other markets. As these products have not been sorted, they will go to unprofitable markets in CIS and other markets as low quality products. Conversely, big farmers and cooperatives can sell their products to the high value markets in CIS and other markets, because their products are sorted and well-managed.

3. Exports by Companies who own Wholesale Markets
   The companies that own the wholesale markets can procure specific quantities of agricultural products and export them to foreign markets. These exporting activities are simply the activities of private companies, seeking to generate own profit, rather than activities designed to promote exports of the country. It can be said that these existing wholesalers are more similar to intermediaries who have their own equipment such as cold storage and sorting machines.

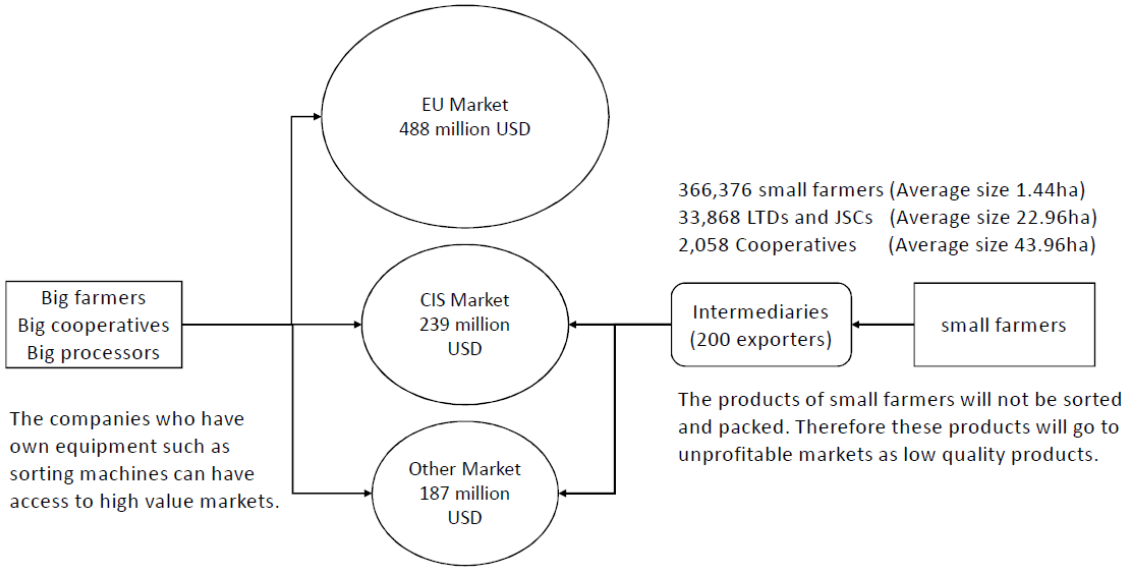


Figure 4-9: Main Distribution Channels for Exports

Main actors for each distribution channel in Moldova are as follows:

Table 4-27: Large Companies on Distribution in Moldova

Transporter	Intermediate	Storage	Retail Seller
Iuginteriortrans SRL(Moldova) Bercoltrans SRL(Moldova) Loredentrans SRL(Romania) Ilandro-Trans SRL(Moldova)	Dodon SRL(Moldova) Agrodeni Dan SRL(Moldova)	Codru ST SRL(Moldova) GT Victor Scutaru(Moldova)	Metro(Germany) Green Hills (Ukraine) Market(Moldova) Fidesco(Moldova) Fourchette(Ukraine) Supermarket No.1(Moldova)

Location of main domestic markets

The population of Moldova is concentrated around Chisinau; Balti also has a moderately built up population. There are only two wholesale markets in Chisinau, and one in Balti. The map in Figure 4-10 illustrates the population density of Moldova.

Figure 4-10: Map of Population Density

Type of markets (stores)

1. Public market
   A characteristic of the big cities in the Republic of Moldova, each neighborhood has a public market administrated by the local authorities, where people can buy fresh and preserved food (fruits, vegetables, seeds, meat, fish, sweets and fast-food), together with small home appliances and electronics.
   The JICA Survey Team visited the biggest public market in Chisinau, located very close to the city center, and with regards to its F&V market noticed the following:
   - ✧ For a daily fee amounting approx. 0.70 USD, each seller can use a table of approximately $2m^2$ and as well as the space below the table and an additional $3\text{-}4m^2$ behind the selling table. One seller can rent more than one selling table per day, but the administrators of the market are the ones that decide the amount of space offered for each individual seller, depending on the demand and personal relationship. Toilet facilities, clean water, mechanical weigh-in, and garbage disposal are all covered by the daily renting fee;
   - ✧ Chisinau central market has around 200 selling tables in the fruit and vegetables market section, that are sheltered by a metal roof, but other than that, in the cold season, sellers have to endure low temperatures with no possibilities of heating.
   - ✧ Not all sellers run a registered agricultural holding, and even for the ones that are registered, they do not purchase their products as a legal entity, but as individuals.

Subsequently, they do not provide receipts, keep booking records nor pay taxes for their selling activity;

- ✧ Each seller has contacts of domestic producers and for periods when domestic producers cannot cope with the demand, they use intermediaries;
- ✧ The price of acquisition of products is negotiated independently from case to case, but intermediaries and producers take into consideration the loyalty of their regular clients. On the other hand, in the merchandise acquisition process, sellers from the central market do not seem to have much power in negotiating prices with the intermediaries or producers;
- ✧ There are no promotional activities being done in the F&V market section;
- ✧ The level of education of sellers in the central market is rather low and very often the customer and seller get into verbal conflicts;
- ✧ Overall, the public markets in Moldova are very popular and a majority of the people still choose to purchase F&V from them rather than from supermarkets.

As for opinions of the sellers, their feedback was as follows:

a) "We would really need to have a clean indoor market which would protect us from hot/cold periods."
b) "People are still used to purchasing F&V from the sellers on the side of the road, that are located at all the entrances of the market and by so doing, they are taking a big part of our potential customers. These people also charge higher prices than us and they don't pay any tax."

Figure 4-11: Public Market

2. Road side sellers, in the proximity of public markets

The JICA Survey Team observed the common practice of street sellers that situate themselves in close proximity to the entrances of the public markets. The products that are being sold in this way can vary from fruits, vegetables, flowers, clothes and antiques. Although this type of activity is illegal by law, performed without any legal entity, and the police or economic inspectors sometimes give fines, they continue to proceed selling their merchandise at the same price of the public market and attract many customers, because of the high visibility of their selling point.

As a particularity, for the F&V sellers, most of the products that can be grown in Moldova are actually produced themselves, while the imported products (bananas, kiwi, oranges, etc.) are often sourced from the same intermediaries as the people that sell in the central market.

The feedback coming from these road side sellers is as follows: "We would really prefer selling in the central market, rather than doing it in the street, but the administrators of the market will keep the 200 selling tables for some specific sellers and would give us selling tables in other sections of the market and we would never be able to have a sufficient number of customers."

Figure 4-12: Road Side Sellers

It really seems that public market administrators from Moldova really have a big influence and keeping or having good relationship with them is crucial for the individual seller to continue doing their business.

3. Supermarkets

The JICA Survey Team visited the biggest supermarket chain in Moldova, "No.1", and with regards to its F&V market noticed the following:

- ✧ Only around 10% of the F&V are sourced from the domestic market. Depending on the season, the percentage of domestic products varies, with a slight increase in the post-harvesting periods;
- ✧ The quality of the products is very good and proportionally, the price of the vegetables and fruits is the highest that one can find in any retail store in Moldova;
- ✧ The products from the F&V corner look very attractive from the customer's point of view. The products are placed on colorful and well positioned shelves. The shelves are regularly cleaned and the alternated products removed;
- ✧ The typical customer of the fruit and vegetable section at the supermarket is part of middle and upper class. The opinion of one customer, a bank employee is as follows: "For most Moldovans, the prices at the supermarket, including those of F&V, are too expensive for daily purchasing, but I have to admit that it is more convenient and the quality of the products is always very good."

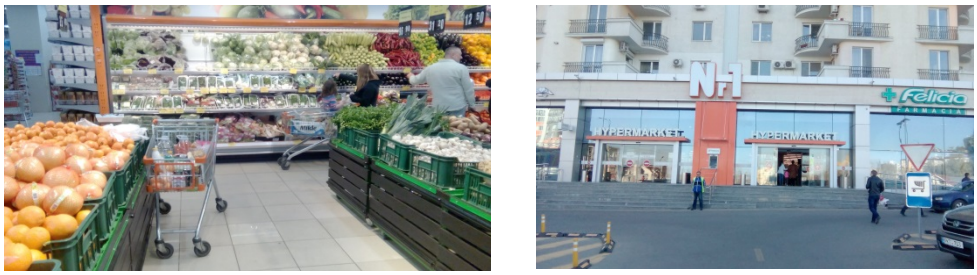


Figure 4-13: Supermarket

However, the management of the supermarket chains is very secretive about its food and vegetables suppliers and it did not want to provide detailed information about the suppliers with whom they are dealing with.

Based on the data from MoAFI, less than 5% of the domestic production of F&V is being sold through the supermarket chains.

4. Wholesale Market

The JICA Survey Team visited the biggest agri-food wholesale market in Chisinau, Amir Market, also known as "Revenco" Market and observed the following:

- ✧ The market covers 2.5ha of land and has a modern appearance, as the owner has been continuously investing in the infrastructure;
- ✧ There are 100 parking places for trucks and vans, which can also be used as direct selling points. These are subject to rental at a rate of 60-70MDL/day, but there are additional expenses, such as: 50-80MDL for a garbage bin, 50MDL/day for a pallet to be used in the selling process.
- ✧ With regards to cold storage facilities, there are 2 storage units of around 100m^2 each. Usually, the occupation rate for cold storage is very high;
- ✧ The market has 140 spaces that are rented as selling points for small business (12-15m^2);
- ✧ All kinds of potential customers can be seen at this market: from end-users to small shop owners, sellers from the markets in Chisinau and supermarket representatives;
- ✧ The owner also produces F&V and sometimes exports through intermediaries. The declared purpose of the Amir Market is "to be a hub for F&V that should supply not only Chisinau, but the entire central Moldova, populated by approx. 1,000,000 people";
- ✧ On average, one shop owner sells between 1-3 tons of products per day;
- ✧ There is no bus station close to the market;
- ✧ The market also has a laboratory for testing, but the owner did not describe what specific testing or certification can be performed.

Figure 4-14: Wholesale Market

Overall, it can be observed that the private wholesale market in Chisinau is a growing business and even if small sellers who are renting spaces and individuals that are selling from their own vehicles may be unsatisfied with their income, for the owner it represents a profitable investment. From the position of the owner, the infrastructure will continue to be updated, with a special interest in extending the cold storage facilities.

On the other hand, for over 400,000 small farmers in Moldova, it is almost impossible for their products to arrive at the wholesale market, due to the costs of transportation, reduced quantities, inadequate or missing safety and quality certifications, lack of business experience, or fear of product alteration, etc.

Market-Price Formulation on the Distribution Channels

The JICA Survey Team observed that the small and medium farmers sell their products to intermediaries at a relatively low price.

The first-hand intermediary usually takes around 25% of the margin, in comparison to the wholesale market in Chisinau, where products are sold with 30 to 50 % of margin. For exported products, the price is twice at which famers sell at the farm gates. For example, when it comes to table grapes, a small farmer sells at 0.5 USD/kg, but this reaches 1.5 USD/kg at the wholesale market in Russia.

Table 4-28: Price of 1kg of Raw Plum for Each Main Player on the Distribution Channel

Sellers	Producers	Local Market	Intermediaries	Wholesale Market	
Prices of PLUM	2 MDL/kg	3MDL/kg	3.5MDL/kg	4 MDL/kg (sell to intermediaries)	6 MDL/kg (sell directly to end customer)

Adding to the above table, some Plum Producers can sell directly to processing companies at a price of 2.5 MDL/kg. Processors sell the dried plums to the wholesale market at a price that ranges between 25-35 MDL/kg. Retail stores buy the dried plums at the wholesale market and sell them at a price between 50-70 MDL/kg.

The price of the products varies depending on the season, the quality and quantity of the harvest, but insofar as small farmers are concerned, limited by their facilities and capabilities, they cannot add value to their product and are pressured by the continuous risk that their products may incur damage, as most of the products have an alteration period of no longer than 2 weeks.

Influence of Major Players on the Distribution Channels

1. Producers

At the beginning of the distribution channel there are 2 types of producers: small farmers and big farmers. The small farmers mainly sell their products to intermediaries who visit them at their farm gates or alongside the main road in proximity to their farms. For the small farmers, it is almost impossible to reach the wholesale markets, not to mention pursue exporting activities, simply because many of them do not obtain safety certificates for their products. The potential transportation is also considered a big risk and even if they manage to reach the wholesale market, they do not have the certainty of getting a better price. Finally, as mentioned above, the intermediaries and wholesale markets know that the quality of the products can alternate within a short duration of time (2 weeks) which they often use as leverage against the producers.

On the other hand, if the small farmers could access facilities that big farmers have, such as: washing machines, sorting machines, grading machines, packaging machines, atmosphere controlled cold storages; the leverage of the intermediaries and wholesale markets would be reduced and their negotiation position would allow them to add value to their products.

For the big farmers, who have access to the necessary facilities mentioned above, and additionally accounting, sales, marketing, legal and certification departments, it is much easier to sell high value-added products. They can access not only the wholesale market, but also the big markets in the cities, processing companies, supermarket chains or even export (if fulfilling specific quality and safety standards) directly to Russia or the EU markets. At present, around 5 big companies in Moldova meet the EU requirements for Hygiene and Food Safety for agricultural products.

The Russian embargo on Moldovan F&V has now been partially lifted, opening a new potential market for Moldova's agricultural producers. But,since 2013, the required standards of the Russian market have come very close to the requirements set by the EU markets, which Moldovan farmers find very difficult to cope with. Basically, the Russian buyers need same color, same size, same taste of products through sorting and packing. As the small farmers do

not have these necessary facilities and functions, they cannot sell to Russia. For example, the price of one sorting machine is at least 0.5 million USD, which is out of reach for small farmers. Even contracting a loan is extremely risky, as the interest rate for investing in facilities is around 19-22%; therefore, for small farmers, investing in facilities is extremely difficult.

2. Local Markets

Most small farmers try to sell their products at the local/regional markets, as the local buyers can be reached without the need for marketing or sales activities. Of course, the prices offered at the local markets do not represent a big margin for the small farmers, but it is the easiest place that potential buyers can be found.

3. Intermediaries

Intermediaries can be considered main players in the distribution channels for agricultural products across Moldova. During the post-harvesting period, intermediaries travel across the country, where they must use their network of contacts, accumulated experience and the fact that most small farmers are ready to sell their products at a low price, just to make a small profit margin, which is considered "better than nothing". As the intermediaries understand their position on the distribution channel very well, they pursue their advantages. Some intermediaries also act as exporters, although this scenario is rare, simply because exporting activities requires conforming with quality standards, as well as dealing big quantities of homogeneous products, conditions that are hard to meet.

4. Processors

Big processing companies usually do not approach small farmers, because they have other options to assure certain amounts of their desired products. Also, the products of small farmers are not sorted, so that they have to consider additional costs in order to maintain quality of the products. As a result, big processing companies tend to hesitate in dealing with small farmers. On the part of small farmers, it is difficult for them to generate a set quantity of homogeneous products that meet a required level of quality while simultaneously having little price negotiating power. Before the products undergo alteration, small farmers must negotiate with the processing companies and decide whether they will sell the products to them or to intermediaries. Considering each's merits and demerits, few small farmers sell their products to big processing companies. In this scenario, it is difficult for small farmers to maintain stability on the quantity of production which means that big processing companies hesitate to make long term contracts with small farmers.

5. Wholesale Markets

At present, there are only two private wholesale markets in Chisinau and Balti as previously mentioned. The intermediaries sell their products at Amir Market and merchandise can be re-sold to the shop owners that have rented space on the premises of the wholesale market, to the shop owners from the markets in Chisinau or from the ones located in the central part of Moldova. The owner also acts as a producer, who is seeking to export, but given the current situation, cannot satisfy the requirements of providing a set quantity of certified and homogeneous products to foreign clientele.

6. Exporters

There are approximately 200 exporters in Moldova that can be divided into 2 categories: those purchasing products from intermediaries and those that perform the intermediaries' function themselves.

The flow of collecting a product is as follows:

- ✧ Exporter contacts farms and ask about the product, quality, amount, and price. If these conditions are met, the exporter visits the farm gate in order to check the product and prepare for collection.
- ✧ Exporters usually visit villages by mini-van, for the direct collection of the product;
- ✧ After checking the mandatory safety and quality certificates (certificates can be obtained at the local offices of NFSA), they purchase the product, scheduling the collection of approx. 18 tons of the product (size of a loaded cold truck). At the same time, the exporter already has made arrangements to rent the cold truck (18 tons) for transportation, that will be filled through the coordination of mini-van(s);
- ✧ The truck departs for its destination.

(2) Current Routes Among and Issues of Agro-Product Distribution

Regarding the distribution of agricultural products, the main issues and factors are as follows:

Dysfunctional wholesale markets and shortage of cold storage facilities in villages are of particular importance from the perspective of distribution.

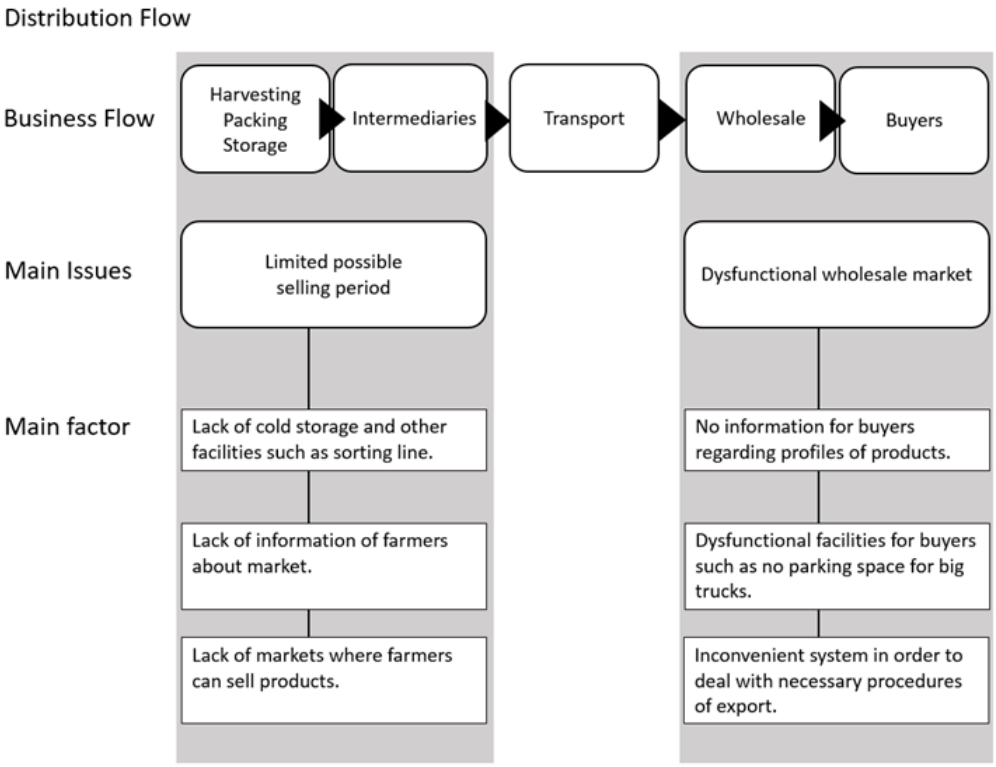


Figure 4-14: Main Issues and Factors on Distribution of Agricultural Products

Limited Possible Selling Period.

According to a representative of JNPGA (Japanese Non-Project Grant Aid), in Moldova, there are around 1600 villages and each of them needs one or two cold storages. Farmers without access to cold storage have suffered from the following issues:

1. Difficulty maintaining the quality of products after harvest.
2. Imperative to sell products in a short period of time
3. Inability to deal with buyers who need products in different seasons. (In each market, each buyer has their own selling season.)

Note: JNPGA
JNPGA was launched by the Japanese Government in 1987 as a part of its ODA program, representing a new form of aid program that could quickly and effectively finance the supply of production equipment in selected developing countries.

Dysfunctional Wholesale Market.

According to FAO, the arable land per person of Moldova is 0.58 ha which placed it as 15th highest in the world in 2011. (USA came in at 14th.) Currently, Moldova produces fresh vegetables and fruits at a rate of almost 1 million tons annually though MoAFI anticipates that the potential output is double this amount. Therefore, it is necessary for farmers to export a large volume of their products in order to achieve a preferable and stable amount of sales.

However, while the Amir Market can meet the requirements for domestic consumption for Chisinau and central Moldova, from an exporter's point of view, a different kind wholesale market would be needed. It should be one with bigger cold storage facilities, washing functions, grading, sorting lines, packaging lines, parking, truck loading areas, certified laboratories, along with an administration experienced not only with managing the market, but also that is knowledgeable about exporting.

In regard to wholesale environment, the Government of Moldova regards the improvement of wholesale markets as crucial for increasing domestic sales and exports, because the new wholesale market is expected as a key infrastructure facility which can solve the undervalue of agricultural products caused by farmers' fragmented sales activities followed by failure to meet the quantity requirement, and eventual loss of some good sales channels.. Generally, the price of agricultural products tends to increase if there is a stable sales structure at the central wholesale market, compared to when each farmer sells their product separately. If the Moldovan Government can improve the current wholesale market, it can be expected that the selling prices at each village will adjust to the average market price.

MoAFI has indicated the expected improvements as follows.

Table 4-29: Governmental Direction for Market Improvement

Theme	Expected improvements
Transparency	・ Visibility of more than 500 operators in the fruit and vegetables trade. (Producers, Wholesalers, Exporters, Brokers, etc.) ・ Accessible information of products (Origin, producers, profile of cultivation, etc) ・ Transparency on price formation. ・ Transparency on market transactions. ・ Improved informational support and a coordinated marketing policy.
Operations	・ Consolidated import operations with essential price reduction effect. ・ Reduction of losses while trading in fresh products. ・ Consolidated platform for taxes due to formalized trade.

Theme	Expected improvements
	• Higher food security due to modern infrastructure, consolidated operations.
Convenience	• Habit-formation for consumers to buy products from a single place. • Traffic flows in the city center. • Diversification of agri-food products. • Enlarged range of high value food products.
Distribution	• Integration of primary producers into a modern marketing and distribution chain. • Direct access to high quality products for local distribution networks and wholesalers. • Direct sales by farmers.
Price formulation	• Price stabilization. (stable and accessible) • Reduction of exaggerated price variation.
Others	• Permanent presentations and exhibitions of agri-food products. • New job creation.

Source: JICA survey team made, based on the materials provided by the Embassy of the Republic of Moldova in Japan

The following text is a description from a strategic paper written by MoAFI regarding the importance of developing a new wholesale market:

"The most important idea behind the physical building construction is to create a platform, where demand can meet supply, where a large number of companies located in one place face identical conditions for leasing the trading area and consequently face the same initial conditions of competition. Also, the new Wholesale Market needs to be designed as a key component of a complete supply chain from farmers to retailers and consumers. Therefore, the establishment of several assembly points in major production areas from where fresh produce is shipped to Chisinau and exports market is recommended."[108]

Source: The embassy of the republic of Moldova in Japan

Figure 4-15: Image of Agri-Food Center in Chișinău

[108] "Project Concept on Development of the Fresh Fruit & Vegetable Wholesale Market in Chisinau" distributed by the Embassy of Moldova in Japan.

Although there is currently no public wholesale market in Moldova, MoAFI has set a target of opening 9 wholesale markets with each complete functionality in 9 regions, and expressed interest in developing a central wholesale market in Chișinau. As the preparation, the Government of Moldova founded a joint stock company "Centrul Agroalimentar din Chișinău," sourcing 34 hectares of land in Chișinău for this market.

By developing the new wholesale market "Agricultural Center" in Chisinau, the Government of Moldova plans to increase the amount of exports in the future, but in the first stage, the purpose of the public wholesale market is to supply the domestic market. With the establishment of this center, the Government of Moldova wants to replace the imported products from the retail stores such as supermarkets, with domestic products, not only within the Chisinau area, but for the entire central Moldova area. The Government of Moldova eventually wants to develop this area as the main hub for exporting agricultural products.

So far, one feasibility study supported by EIB has been made in 2012, and was updated in 2014, containing the following figures:

- ✧ 33ha land provided by the Government
- ✧ Initial cost: 17.64 million EUR
- ✧ Operating revenue after 2017: 2.49 million EUR (per year)
- ✧ Operation cost: 0.64 million EUR (per year)
- ✧ Income before depreciation and interest: 1.90 million EUR (per year)
- ✧ Income before tax: 0.46 million EUR (per year)

(3) Current Routes and Issues of Agro-products Distribution

The Current Status of Road Routes

a) The Current Status of Roads (Domestic)

The improvement of domestic roads in Moldova has proceeded as planned by the Government, which has also been financially supported by international donors (EBRD, EIB and the European Commission) for the rehabilitation of 400km of national road. For the near future, the conditions of domestic roads appears to be improving, as the Government managed to attract additional 80 million USD from the WB, within of project that aims for the rehabilitation of 300km of local roads within the next 4 years (2016-2020).

Source: Ministry of Transportation and Road Infrastructure

Figure 4-16: Implemented Plans of Road Improvement (Left) and New Plans of Road Construction (Right)

b) The Current Status of Village Roads

The Ministry of Transportation and Road Infrastructure does not have a national strategy plan for the development of village roads (access roads). As part of the international donors' assistance, IFAD funded the improvement of village roads through IFAD, a rehabilitation project for 12.4km of village roads, though this was an isolated situation. Moreover, village roads are not included in the WB project for the improvement of local roads.

In order to support local authorities' efforts to improve the local and village roads in their areas, the Ministry decided that the local authorities will receive budget from the collection of tax levied on car users', formally known as the Road Fund. The funds will be distributed based on the number of population living within the area administrated by each local authority (e.g. approximately USD 5,900 for a population of 1,000).

According to the explanation provided by Mr. Oleg Tofilat, State Secretary within the Ministry of Transportation and Road Infrastructure, in 99% of cases, the road conditions do not represent a source for potential issues in the domestic distribution of agro-products.

On the other hand, results based on the "Survey on Socio-economic Situation of Farmers and their Farming System in Rural Areas", conducted within this project, 34.4% of the farmers that were interviewed indicated that "the conditions of access roads to farms and markets is hampering our agricultural business. "Moreover, their opinion is that the general quality of the roads increases their business costs. In the case of the survey sites, the Survey concluded that, "after analyzing the data table, conclusion is that farmers' access to infrastructure and access roads are poorly developed (practically does not exist), requiring large investments to improve the situation of farmers. It is appropriate that the farmer invests in developing value chains for its products, and the state should create conditions and stimulate these initiatives by facilitating access to necessary infrastructure to effectively manage their businesses".

c) The Current Status of Roads (linked with neighboring countries)

Exports from Moldova use roads as the primary means of transportation and well managed roads have significant impact on promoting export. Main roads which link to neighboring countries appear in the diagram below.

Figure 4-17: Main Roads which Connect Moldova with Other Neighboring Countries

According to Mr. Dumitru Albulesa, Chairman of the Transporters Union of Moldova, roads are the most important means of transportation and approximately 6,000 trucks (3,000 equipped with cold storage facilities) are being driven today throughout Moldova; however, 70% of the drivers

work abroad in Turkey, Russia and Greece, because the loads for domestic distribution are small. On the other hand, many workers transporting shipments for other countries pass through Moldova. This means that there is a sufficient number of cold trucks to meet domestic demand in Moldova.

Long route drivers work inside and outside of Moldova in neighboring countries including the EU countries. Therefore, the average salary of long route drivers is competitive with those of neighboring countries (such as EU countries), and as such, is regarded as a job with a high salary, especially in relation to other jobs in Moldova (Approx. EUR 1500/Month). This condition seems to be a key reason for the sufficient number of trucks in Moldova.

The JICA Study Team endeavored to find out the amount of domestically transported merchandise by road, but neither the MoAFI, nor the Ministry of Transportation and Road Infrastructure could provide that information. The Customs Office did not share this data at the behest of transporting companies that asked for the figures to be kept confidential, to prevent any influence on their business, if this statistic were to be made public. Therefore, the latest figures are from 2014, when the transportation volume by road amounted to 64% (9.2 million tons), railway at 35% and river at 1%.[109]

The Current Status of Sea Routes

With regards to exports from Moldova by sea route, the most frequented route starts from the river side of Danubein Giurgiulesti to the Black Sea. In order to promote exports from Giurgiulesti, the GoM has invested in port facilities and enhanced its functions. The GoM has opened a Free Economic Zone in Giurgiulesti, which will last until 2030 in order to solicit interest from companies.

Giurgiulesti Free Economic Zone (G-FEZ)

- **Summary**

  G-FEZ is operated by ICS Danube Logistics SRL and forms an integral part of Giurgiulesti International Free Port, located on the maritime section of River Danube in the Republic of Moldova. Companies residing within G-FEZ benefit from key advantages such as strategic location, unique transportation links to EU and CIS markets, favorable tax and customs regimes, know-how of G-FEZ management and more.

- **Tax Incentives & Favorable Customs Regime**

  The favorable tax and customs regime applicable to G-FEZ residents can be summarized as follows:

  - 75% reduction of corporate income tax during the first 10 years of operation (currently 3% instead of 12%) and a 50% reduction for the remaining period until 2030;
  - exemption from excise taxes and import VAT
  - exemption from import and export duties
  - exemption of import duties into the rest of Moldova for goods that originate from Giurgiulesti International Free Port
  - exemption of foreign employees from social insurance contributions

  Unlike in other Moldovan free economic zones, where activities are typically limited to certain types of activities, the residents of G-FEZ have the right to undertake any

[109] Source: "Social-economical situation of the Republic of Moldova in year 2014"

activity that is ordinarily allowed throughout the Republic of Moldova. Investors may also be 100% foreign owned, freely repatriate their profits and are not subject to minimum investment obligations.

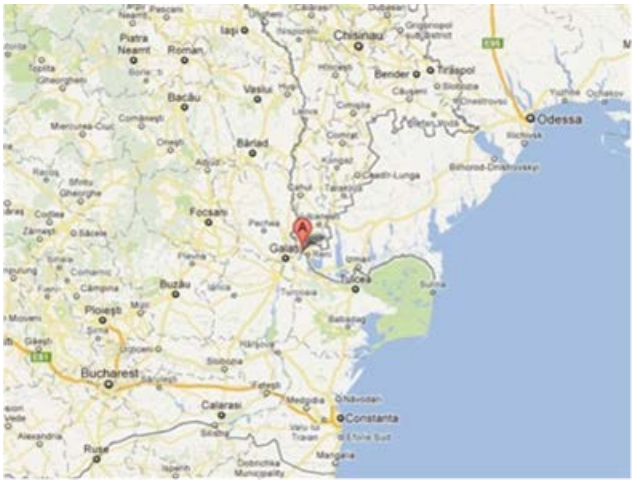


Figure 4-18: Location of Giurgiulesti International Free Port

Figure 4-19: Port in Giurgiulesti

Figure 4-20: Current Status of Free Economic Zone in Giurgiulesti

The Current Status of Rail Routes

At the interview, Mr. Dumitru Albulesa, the Chairman of the Transporters Union of Moldova, explained that the current situation of rail routes is as follows. During the days of the former Soviet Union, rail routes were the main means of export for agricultural products. After the collapse of Soviet Union, necessary facilities and metal equipment were damaged and stolen due to inappropriate management. According to Mr.Anatol Salaru, the Minister of Transportation in 2011, out of 7,000 train wagons used for the transportation of goods, 80% are very old and 1,000 are in unusable condition. As a result, rail routes are not suitable for the transportation of agricultural products such as fresh vegetables, fruits and so on.

While the port of Giurgiulesti has been improved, there is also a rail station. The GoM has plans to enhance the function of the station, and to improve the facilities in order to make it possible to transport agricultural products by rail. The government plans to develop Giurgiulesti as an important trade hub.

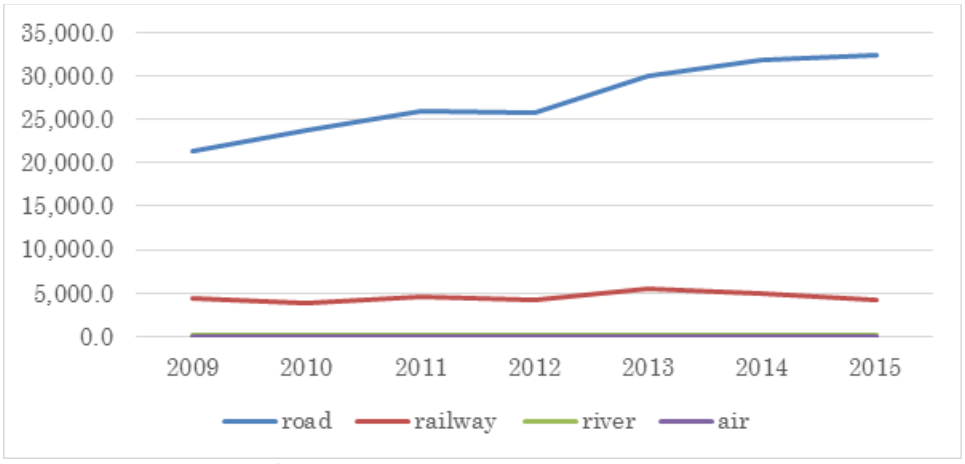
a) Amount of Transported Goods by Means

88% of transported goods were delivered by road transportation in 2015.

Table 4-30: Changes of the Amount of Transported Goods by Means

	2009	2010	2011	2012	2013	2014	2015
Total, 1000 tones	**25,988.5**	**27,781.2**	**30,717.6**	**30,022.6**	**35,674.1**	**37,143.1**	**36,711.8**
Railway	4,414.9	3,852.1	4,554.0	4,163.8	5,430.6	5,008.4	4,157.9
Road	21,390.8	23,800.6	26,012.9	25,713.0	30,079.6	31,906.7	32,401.3
River	182.0	127.2	149.1	144.2	162.6	227.2	152.0
Air	0.8	1.30	1.6	1.6	1.3	0.8	0.6

Source: NBS of Moldova



Source: National Statistics of Moldova

Figure 4-21: Changes of Transported Goods by Means

(4) TIR and IRU

Road constitutes the main means of transportation in Moldova. To this end, IRU and TIR play significant roles.

a) IRU (International Road Union).

IRU consists of over 100 countries, aimed at the facilitation of road transportation. IRU provides various standards on load transportation such as the standard procedure at customs, utilizing International Road Transport (TIR).
Under UN mandate, IRU manages the international guarantee chain for payment of duties and taxes, produces and distributes TIR carnets through IRU member associations
Moldova has been a member of IRU since 1992.
HP: https://www.iru.org/

b) TIR
TIR is based on the standard of IRU. If transporters have a TIR, which was issued at the IRU office in each country, they can cross the border without having their loads checked at customs. In this way, TIR can drastically streamline procedures for international transport to make them simpler and more efficient.
HP: https://www.iru.org/tir

Figure 4-22: Sample of TIR

(5) Issues to be Tackled by Farmers Organization

Extend Selling period and Verify Buyers

- Shortage of Cold Storage
  According to a representative of JNPGA, the biggest number of requests for financial support from small farmers has been related to cold storage. In Moldova, there are around 1,600 villages for which each needs one or two cold storage units; however, if those villages were to cooperate with neighboring villages, the required number of cold storages could be reduced.
- Disadvantages in price negotiations with buyers
  If farmers do not have access to cold storage, they face severe constraints in the time frame to sell their products. Consequently, they must sell the products at the prices offered by buyers who visit the farm gates. Additionally, without cold storage, the price they command tends to fall, due to the inability to maintain the products' quality.

4.2.4 Current Status of the export Markets

(1) Export Markets

In 2016 the export of agricultural goods from the Republic of Moldova represented USD 945.54 million covering a 46.22% share in total exports.

In addition to the data presented in Table 2-11: Comparison of export and import data for agri-food sector, this sub-chapter provides more details about the important export destinations and the 10 most exported agricultural products.

The following table shows Moldova's main export partners for agricultural products in 2016; due to trade restrictions towards the Russian market, exported goods decreased sharply. Neighboring Romania became the major trading partner.

Table 4-31: Value of Exported Agricultural Goods and the Share in Total Exports

Country	USD mln.	(%)
Romania	134.21	6.56
Russian Federation	118.78	5.80
Belarus	72.96	3.56
Bulgaria	22.75	1.11
Italy	17.10	0.83
Ukraine	8.79	0.42
Spain	8.65	0.42
Austria	2.80	0.13
Azerbaijan	1.04	0.05
Australia	0.42	0.02
Armenia	0.21	0.01

Source: Ministry of Economy, 2017

By value, the following tables show that around USD 372 million constitute the revenues from sunflower and cereals incl. maize, USD 107 million from wine and grapes, USD 85 million from other fruits (fresh or dried), almost USD 26 million from fruit juices and finally almost USD 25 million from apples, pears and quinces.

In 2014, the total value of exports of agri-food products was USD 987.9 million, including USD 37.2 million - live animals and animal products, USD 550.9 million – plant products and USD 399.9 million – processed food products. Thus, agri-food exports, last year, were comprised predominantly from unprocessed cereals, F&V (mainly sunflower seeds, walnuts, wheat, corn, barley, apples). About 40% were exports of processed food products and beverages (mainly grapes wine, ethyl alcohol, fruits juice and sugar) and a very small share of about 4% were products of animal origin (Table 2-11). Almost 19.9% of the agri-food products exported from the Republic of Moldova are bound for the Russian market - 53.7% of products of animal origin, 18.9% of plant products and 18.2% of processed food products. Although Russia is the main market for perishable products exported by Republic of Moldova – for meat, vegetables, and fruits, the share of some of these products can reach as high as 100% - beef meat (100%), carrots, turnips, red beet (99,8%), fresh or chilled cucumbers (100%), fresh apples, pears and quinces (91%).[110]

[110] STRATAN, A. et al: Risks to the agri-food sector of Republic of Moldova associated with restrictions imposed by the Russian Federation on Moldovan imports. Procedia Economics and Finance 32 (2015) 324 – 331

Table 4-32: 10 Most Exported Agricultural Products

CN Code	Description	Unit of measure	2016	
			Quantity	Value USD mln.
1206	**Sunflower seeds, whether or not broken**	**kg**	**446,201,641**	**178.71**
	Romania		156,973,414	59.21
	Great Britain		115,834,573	42.77
	Turkey		53,982,658	20.99
	Switzerland		46,828,569	17.24
	Bulgaria		43,870,096	16.78
2204	**Wine of fresh grapes, including fortified wines; grape must other than that of heading 2009**	**litre**	**133,310,342**	**107.94**
	Belarus		40,877,280	23.84
	Russian Federation		16,104,265	11.02
	Ukraine		20,224,221	10.27
	Czech Reoublic		7,660,721	8.97
	Romania		10,027,179	8.73
	China		3,792,238	8.81
	Georgia		13,792,319	6.97
1001	**Wheat and meslin (a mixture or wheat and rye)**	**kg**	**661,966,164**	**96.51**
	Italy		94,085,670	13.31
	Romania		130,559,864	18.63
	Greece		74,098,009	10.32
	Malaysia		62,224,852	10.23
	Great Britain		69,241,254	8.86
802	**Other fruits, fresh or dried, whether or not shelled or peeled**	**kg**	**15,795,207**	**85.46**
	France		4,344,498	25.18
	Austria		1,339,293	9.77
	Germany		1,330,900	9.15
	Italy		1,217,446	5.62
	Turkey		2,099,364	5.31
1512	**Sunflower-seed, safflower or cotton-seed oil and fractions thereof, whether or not refined, but not chemically modified**	**kg**	**60,322,351**	**51.48**
	Irak		13,798,512	16.42
	Spain		20,676,112	15.59
	Italy		18,020,045	13.57
1005	**Maize (corn)**	**kg**	**256,149,874**	**45.85**
	Greece		52,266,696	7.68
2208	**Undenatured ethyl alcohol of an alcoholic strength by volume of less than 80 % vol; spirits, liqueurs and other spirituous beverages**	**litre pure alcohol**	**6,665,868**	**42.68**
	Belarus		1,083,623	9.23
	United States of America		1,569,941	9.87

1701	**Cane or beet sugar and chemically pure sucrose, in solid form**	**kg**	**66,037,889**	**38.83**
	Bulgaria		29,163,200	17.01
	Romania		36,563,889	21.62
2009	**Fruit juices (including grape must) and vegetable juices, unfermented and not containing added spirit, whether or not containing added sugar or other sweetening matter**	**kg**	**37,545,433**	**25.93**
	Poland		14,134,160	8.54
	Germany		7,095,207	5.67
808	**Apples, pears and quinces, fresh**	**kg**	**131,881,774**	**24.83**
	Russian Federation		107,308,745	22.21

Source: Ministry of Economy, 2017

Bearing mind that processing sunflowers into sunflower oil and grapes into wine are not high value-adding procedures, especially when wine is exported mainly in bulk. One can see from this table that Moldova exports mainly commodities without added values.

As wine and grapes are important export products, the table below indicates the export volumes by country, ranked according to the 2016 data.

Table 4-33: Export Markets for Table Grapes Ranked according to Volumes[111]

Export in tones to	2015	2016
Russia	14,208.82	24,530.17
Romania	8,594.00	10,300.35
Belorussia	13,854.00	9,271.44
Ukraine	623.30	1,223.20
Iraq	322.20	631.90
Latonia	32.63	293.67
Estonia	190.36	158.66
Mongolia	17.55	128.76
Poland	62.16	119.03
Spain	150.00	91.80
Georgia	0.00	19.00
Arabic Emirates	0.52	0.05
Kazakhstan	117.31	0.00
Lithuania	4.98	0.00
Sweden	41.58	0.00
Vietnam	0.22	0.00

Russia continues to be the most important importer of Moldovan table grapes. The main problem faced by Moldovan grape producers is that they do not have direct access to the Russian market – even as Rosselkhoznadzor lifted restrictions on the supply of fruits from Moldova to Russia. Nowadays in order to ship produce to Russia, the exporter should be included in the list of exporters approved by Federal Service for Veterinary and Phytosanitary Control of Russia. At the moment, only the limited number of companies has the possibility to export to Russia, other farmers are obliged to intermediate the production.

[111] According to email 08 April 2017 from Mr. Ion SULA, President of Table Grapes Producers and Exporters Association from Costesti (slightly modified and based on data from custom office)

The above table clearly shows the dominance of Russia, Romania and Belorussia as major export destinations. It is worthwhile to note that wine and grapes exports to Russia increased significantly in 2016 compared to 2015; however, that might reflect more the current embargo situation rather than a trend.

(2) Russian Export Procedures and Obstacles

As mentioned on several occasions, Russia is using "embargos" to sanction political decisions by the Republic of Moldova which are considered hostile from Russia's point of view – such as signing the Association Agreement with the EU. The official justification is always the non-compliance with Rosselkhoznadzor, Federal Service for Veterinary and Phytosanitary Surveillance.

Formally, the export procedures for Moldovan products to Russia should follow the following steps:

1) Submit copies of company registration certificate, tax identification number assignment certificate and a registration application to local Customs Service bureau (find local Customs Service offices at: http://www.customs.gov.md/index.php?id=44) and register as an exporter.
2) Sign a sales contract with a foreign client.
3) Find a certification company and perform a Product Conformity Certification. (Visit website of CAECP Evaluation: http://www.acreditare.md/doc.php?l=ro&idc=36&id=350&t=/Noutati/Legislatie-si-Utilitati/Registrul-organismelor-de-evaluare-a-conformitatii-acreditate).
4) For exports to UE27, CEFTA and CIS countries, request a Certificate of Origin from Customs Service local office: type “A”, “CT-1”, “EUR.1” certificates of origin (see Annex 2 of the Customs Code to learn about the Certificate of Origin issuance fees: http://vama.md/menu/Anexa%202-3%20la%20Legea%20Nr.%201380%20cu%20privire%20la%20tariful%20vamal.html)
5) For export to other countries, request a Certificate of Origin from the Chamber of Commerce and Industry of Moldova local office (type “C” non-preferential certificate of origin). Find Trade and Industry Chamber local offices at: http://yellowpages.md/rom/rubrics/tree/7480/7484/8311-servicii-vamale/).
6) At least 24 hours prior to export, apply to the local office of National Agency for Food Safety for a phytosanitary certificate and submit: sales contract and invoice copies, certificate of origin, import permit from destination country (this procedure refers to unprocessed agriculture products), phytosanitary certificate of the country of origin (locate District office of NAFS within the district public administration bodies at: http://yellowpages.md/rom/search_rub/primaria/7711/autoritatile-locale/).
7) Find a customs broker to prepare a customs declaration; http://vama.md/company/public/membrii
8) Submit copies of company founding documents, sales contract, invoice, phytosanitary certificate to local office of Customs Service. Pay customs duties (see customs duties at Annex 2 at: http://lex.justice.md/index.php?action=view&view=doc&lang= 1&id=319952).
9) Submit to local office of Tax Service (http://www.fisc.md/IFSTeritorialeContacte.aspx/) in order to apply for a VAT refund: VAT declaration (see https://servicii.fisc.md/formulare.aspx?tm=5&pt=0 / to download the template and find completion guidelines). The application for VAT refund request and the actual calculation of the amount for refund are contained in Annexes 1 and 2 of the Regulation on VAT refund approved by GD no. 1024 of 01.11.2010. The procurements and deliveries register (states company’s domestic and foreign procurements and deliveries; is completed by accountability software when invoices are accounted, see for reference:

http://www.fisc.md/ro/baza/TVA/evidenta/), export contract, export contract invoice, export customs declaration, copy of international transport documentation. According to local regulations, VAT refund has to be made within 45 days of submission.

Russia regularly publishes a list of Moldovan export companies which are entitled to conduct export activities with Russia; these companies can be found on the website www.fsvps.ru/fsvps/news/actual-fito-restrictions.html.[112] It is most likely the case that MoAFI has no influence on Moldovan export licenses for Russia.

(3) Export to Russia

Russia has always been one of the main export partners for Moldova, especially during the transition period; however, the share of exports to Russia decreased both as a natural outcome of diversification of trade partners of a country that had recently obtained its independence and as a result of unclear interpretation of rules on the part of the Russian Federation in trade relations towards Moldova.

From September 2013, Russia deployed a series of trade restrictions with Moldova. The majority of these measures concerned agri-food products and were based on allegations of non-conformity with Russian safety requirements. The first measures in September 2013 were timed to discourage Moldova from initializing the AA/DCFTA with the EU, which actually took place at the Vilnius summit in November 2013. Similar measures followed in April and July 2014, i.e. shortly before and after the signing of the AA/DCFTA on 27 June. In August, Russia broadened its punitive measures by suspending the tariff-free preferences under the 2011 Russia-Moldova CIS Free Trade Agreement for 19 categories of mainly agri-food products. It is notable that there were no technical justifications.[113]

In 2014, exports to Russia also decreased significantly because of the lower demand resulting from more difficult economic condition and economic crisis coming over the country.

In mid-2015, a resolution on the introduction of import duties in respect of imported products whose country of origin is the Republic of Moldova, especially beef, pork, chicken, vegetables, some fruits, cereals, sugar, wine grapes, alcohol, and furniture has been adopted. This situation increased tension among domestic farmers and food producers and sparked concerns among decision makers, due to the high concentration of some of these products on the Russian market.

Trade embargoes in particular have been applied by Russia Federation as leverage to solve non-economic disagreements, maintaining the dependence of the country and dampening its initiatives to promote proper policies that develop its national competitiveness.[114]

Nowadays, it is very difficult for ordinary companies to get Russian import licenses. The solution

[112] SRL „Айдын”, SRL „Диамандгалс”, SRL „БизимЕрь”, SRL „МайклКом”, SRL „МегалексКом”, SRL „ДоброужаСалкымы”, SRL „Аушфартком”, „Лидия„ SRL „Бешпармак”, „РотаренкоНикита” , SRL „Пробизнесгруп”, SRL „Пэмынтдеаур”, SRL „ЕсталикАгро”, SRL „CAR — D.I.M.AGRO”, SRL „КотовАгро„ SRL „Монилюкс”, „ТопчуМ.Х.-Томай„ К/Х „МитулЗахар”, SRL „Бакайан”, SRL „Акпадон”, asociația „ТомайФрукт”, SRL „АрамонВин”, SRL „ЯлконГруп”, SRL „РеалПродус”, К/Х „Памужак”, К/Х „НикологлоИ.”, SRL „БасарабияАгроэкспорт„ „ЯламаВалерий”, ÎI „КапсамунИван”, SRL „МесутАрго”, SRL „ДемирАгро», SRL „Монолтоп”, SRL „Узвигком”, „ТерзиВасилий”, SRL „АгропаркМенежмент”, SRL „ТарымЖевис”, SRL „Агрокомпание”, SRL „ИваноглоСелемент”, „ЧобанАлександр”, „БелекчиКонстантин” , SRL „АгроЭкспорт”, „Transstrim-M” SRL, SRL „ARCIandVHGrou”

[113] CENUSA, D. et al.: Russia's Punitive Trade Policy Measures towards Ukraine, Moldova and Georgia; CEPS Working Document, No. 400 / September 2014

[114] STRATAN, A. et al: Risks to the agri-food sector of Republic of Moldova associated with restrictions imposed by the Russian Federation on Moldovan imports. Procedia Economics and Finance 32 (2015) 324 - 331

for Moldova is to focus more on the EU market, even if Moldovan agri-food processors and exporters have to increase quality and food safety efforts.

Several factors have undermined Russian power in Moldova. First, the Moldovan government is dependent on Western financial assistance, especially since 2010. This assistance is channeled through programs from the EU, other financial institutions, and through bilateral deals with Western countries; such assistance now amounts to EUR 300-400 million per year. This financial assistance is important both for the Moldovan state and Moldovan elites stabilizing the budget and the currency, as well as funds development projects. Economic aid also satisfies the financial needs of some interest groups in Moldova. This financial aid has increased Western influence tremendously whereas Russia is not ready to compete with the West in this area.[115]

Wine

In 2003, exports of wine from Moldova reached $162 million, making it the country's largest export, and comprising 21% of all exports. But Russian trade restrictions over the last decade have made it harder for Moldovan wine makers to sell their products in their markets. By 2013, wine exports plummeted to $81 million – then just five percent of the country's total exports, making wine rank 4th of all Moldovan export products, despite having been 1st in 2003.[116]

Like several other agri-food products, the wine sector was very much oriented towards Russia. Exports to Russia over the years are hardly comparable to any other countries as Russia imposed an embargo on Moldova in 2014 and 2015 while today, many products are excluded from exports – or at least it has become more difficult to access export channels.

Consequently, the share of the Russian Federation in Moldovan wine exports has decreased from 75% in 2005 to 23% in 2013. In 2005, wine exports had a volume of 250.7 million liters and 26.7 million liters in 2013. So far, Moldova was not able to completely redirect its exports to other countries while the volume of exported wine to all destinations decreased significantly during this period, recording 123.3 million liters in 2013 or 38.4% compared to the 321.4 million liters of wine supplied in 2005.

According to a report from 2015, the main exports of food products to Russia are fruits, predominantly apples, wines and beef meat.[117]In 2016, the export of all agricultural products to Russia had a volume of USD 80.13 million. The main exported agricultural goods have been wine, fresh fruits, frozen meat of bovine animals, prepared or preserved vegetables and others.[118]

(4) Current Status of and Issues of Sanitary and Inspection System

Territorial subdivisions

NFSA has 37 rayonal / municipal territorial subdivisions and subordinated laboratories. The main role of territorial subdivisions is to provide supervision and official control in the areas of competence.

As described in the following Table 4-34 , there is a maximum of 1,422 staff in territorial, rayonal / municipal food safety subdivisions in total, a number which includes border check points and the central body of service to the country; however, there are many vacant positions due to

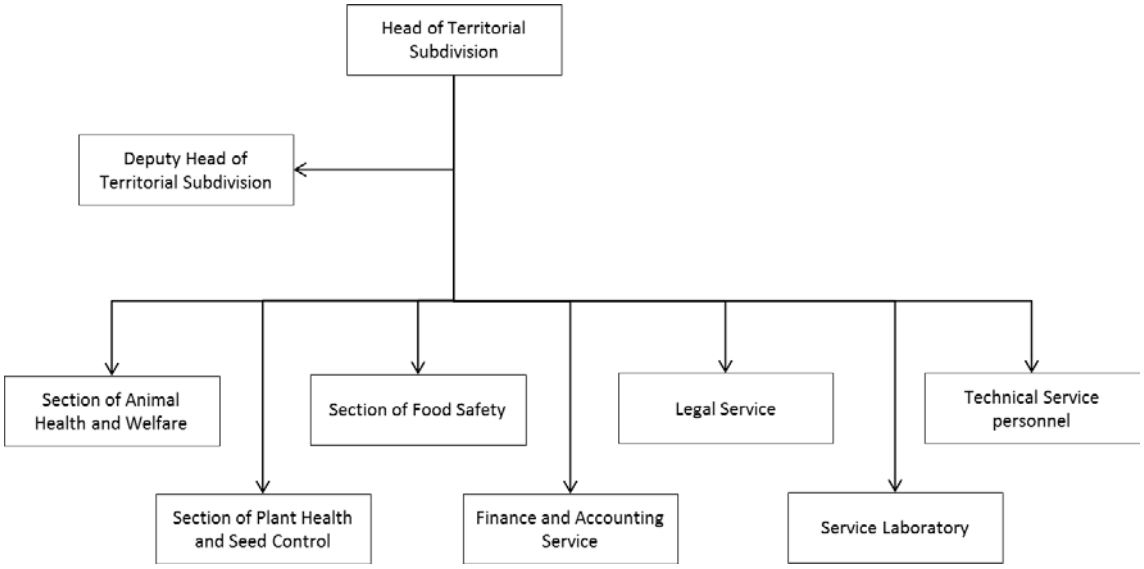
[115] Foreign Policy Research; http://www.fpri.org/article/2017/03/dynamics-russian-power-moldova/
[116] http://www.worldbank.org/en/news/feature/2016/05/27/from-wine-to-cables-moldovas-shifting-export-basket
[117] STRATAN, A. et al: Risks to the agri-food sector of Republic of Moldova associated with restrictions imposed by the Russian Federation on Moldovan imports. Procedia Economics and Finance 32 (2015) 324 - 331
[118] According to email 08 April 2017 from Mr. Ion SULA, President of Table Grapes Producers and Exporters Association from Costesti (slightly modified and based on data from custom office)

difficulties in finding skilled specialists for these positions. Lack of specialists of territorial food safety subdivisions (local NFSA staff) is a crucial issue for implementation of planned annual monitoring. According to interviews for local NFSA inspectors, a huge amount of paper work for monitoring reports and a lack of specialists hamper the efficient operation of their activities.

Table 4-34: NFSA Personal Number per Territorial Subdivisions

Territorial, rayon/municipal food safety subdivision (Department, section, service)		Maximum number (persons)
1	Anenii Noi	26
2	Basarabeasca	17
3	Briceni	31
4	Cahul	32
5	Cantemir	19
6	Calarasi	28
7	Causeni	31
8	Cimislia	27
9	Criuleni	30
10	Donduseni	27
11	Drochia	30
12	Dubasari	16
13	Edinet	36
14	Falesti	31
15	Floresti	37
16	Glodeni	27
17	Hincesti	36
18	Ialoveni	28
19	Leova	26
20	Nisporeni	25
21	Ocnita	27
22	Orhei	38
23	Rezina	28
24	Riscani	28
25	Singerei	30
26	Soroca	35
27	Straseni	27
28	Soldanesti	24
29	Stefan Voda	27
30	Taraclia	27
31	Telenesti	27
32	Ungheni	38
	Autonomous Territorial Unit of Gagauzia (Gagauz-Yeri)	74 Including Comrat-30 Ceadir Lunga-24 Vulcanesti-20
	Chisinau Municipality	101
	Balti Municipality	50
	Border check points	110
	In total per service created in the territory	**1141**
	Central body of the service	**171**
	In total per country	**1422**

Source: NFSA, 2016, "Multi-Annual National Control Plan 2016-2020"



Source: NFSA, 2016, "Multi-Annual National Control Plan 2016-2020"

Figure 4-23: Organization Chart of the Territorial Food Safety Subdivisions

Figure 4-23 above describes the organization of territorial food safety subdivisions. The Section of Animal Health and Welfare is dealing with surveillance of animal health. The Inspectors are verifying all farmers, animal movements and implementing the Annual Plan of action for inspection.

Section of Plant Health and Seed Control consists of specialists for phytosanitary use, phytosanitary quarantine and seeds. Phytosanitary specialists deal with the evidence of import, storage, usage and commercialization of preparations of phytosanitary use. The Section elaborates annual, quarterly and monthly reports on how many chemicals have been imported to the region, how many were used, and the remaining inventory. Seed specialists deal with all seed sectors in the region, and keep evidence of all farmers who produce seeds. The specialist implements seed inspection, seed analysis and issues certificates for final seed products. Specialists on phytosanitary quarantine are responsible for preventing contamination of the agricultural lands by pests and disease and for verifying the appropriate implementation of protective measures. The specialist also monitors agricultural production for export or internal commerce on local markets. Monitoring experts monitor the phenology, and development of diseases and pests related to agricultural production; then recommends ways to treat diseases and issues warnings.

Section of Food Safety is dealing with control of all trade in food products, production sections, slaughterhouses and agro-markets in the jurisdiction. Specialists monitor all food-related business operators including schools and children gardens in the region.

Laboratory bacteriology and serology are conducted in two separate rooms. Specialists conduct laboratory tests except for the samples which are sent to laboratories in the central laboratory.

Monitoring

Based on the data from monitoring programs of NFSA, out of 567samples tested in 2016, 4 samples failed due to pesticide residues and 52 samples due to nitrate residues. On the other hand, out of the total 41,211 investigations conducted by rayon and municipal Public Health Centers (PHCs) which is under the MoH regarding nitrate contents and pesticide residues over the course of 2010-2015, 1914 investigations (4.7%) proved to be non-compliant. Although there is a difference in the observed rates of sample failure between the NFSA and that of the PHC, the

noncompliance rate is about 5 to 10% higher than the Japanese monitoring result of imported food which recorded 0.14% or 140 legal violation cases out of 96,580 samples in 2014.
From a perspective of food safety, MoH is responsible for the prevention of food borne illness, epidemiological investigation of foodborne outbreaks and development of preventive measure. Until the establishment of NFSA in 2013, monitoring of distributed food and agricultural products in Moldova was conducted by MoAFI and MoH. MoAFI was responsible for inspecting, monitoring and enforcing legislation related to the safety of food of animal origin. And MoH was responsible for responsible for inspecting, monitoring and enforcing legislation related to food of non-animal origin. Under the MoH, there is a National Center of Public Health in central and there are 2 municipal and 34 district (rayon) Centers of Public Health. Out of these 37 centers, 1 center in central and 10 centers in district have laboratory testing facilities. These laboratories can test multi-residual analysis for pesticide residues and mycotoxins, toxic metals and contents of radionuclides in food products based on EU standards. However, these laboratories are currently not fully utilized due to the limitation of food control activities being conducted under MoH as most of the food control activities have transferred under NFSA.
Synergy of NFSA data with those of other agencies such as the MoH who is implementing monitoring programs is limited as they generally work independently. Review and integration of similar monitoring programs across the division and ministries is needed for the efficient monitoring of operations.

Monitoring of agricultural products on field level is conducted by local NFSA staffs. All farmers have to present a declaration on their own production and the spray record to local NFSA. The specialist from local ANSA inspects the spray records and if the pesticides were sprayed properly, the specialist gives inoffensive certificate to farmers. But if, the farmer doesn't have spray record or the record is insufficient, farmer has to bring their products to the laboratory to test the pesticide residue. After this confirmation process, famer can receive the certificate from local NFSA if the result is under the standard.

Border Inspection

In the Republic of Moldova, NFSA is the administrative authority responsible for implementation of plant and veterinary quarantine inspection. General Law of animal and plant quarantine, No.506-XIII was adopted.

The following map (Figure 4-24) indicates check points of veterinary and phytosanitary borders in the country. There are ten checkpoints and 110 staff (maximum) who work at the border points. The main purpose of their work is to inspect food safety of cargo from the perspectives of phytosanitation and food safety. WB supported facilities and equipment for inspection at border inspection points in a country were installed as part of the “Moldova Agriculture Competitiveness Project (MAC-P)”.

Source: JICA survey team

Figure 4-24: Check Points of Veterinary and Phytosanitary Border

Generally, exports and imports in and out of Moldova do not require any licenses except for specific goods such as the export of arms and ammunition and import of tobacco. However, the documents below (see Table 4-35) should be prepared and submitted to the relevant authorities.

Table 4-35: Necessary Documents for Import and Export of Agricultural Products

Import	Export
• Import declaration • Veterinary and phytosanitary certificate • Certificate of origin • Purchase invoice • Transport document (TIR: Transportation International Routier, CMR: Condition of Convention on the Contact for International Carriage of goods by Road) • Cargo list	• Export declaration • Positive feedback from NFSA • Certificate of origin • Invoice • Transport document (TIR, CMR) • Cargo list • Procurement Contact • Veterinary and phytosanitary certificate

Laboratory

In Moldova, there is no private laboratory for agricultural products and food stuffs. The republic center for veterinary diagnostics and safety of food products is a state laboratory under the NFSA which implements tests for both private entities such as food manufacturers and public authorities including NFSA which conducts monitoring tests. The laboratory conducts procedure according to procedures defined by ISO 17025[119] which is

[119] ISO 17025: Standard for testing and calibration (metrology) laboratories. Appropriate for analytical chemistry testing laboratories using analytical instruments.

required for export to EU countries. In order to maintain management and testing level, the laboratory implements internal audits every month and is audited externally by National Center of Accreditation of the Republic of Moldova (MOLDAC) which is a referenced institution.

Following table describes public laboratories for monitoring test conducted by NFSA. Laboratories for monitoring test are selected by each testing item through bidding process every year.

Table 4-36: Laboratories involved in the official control and accreditation areas

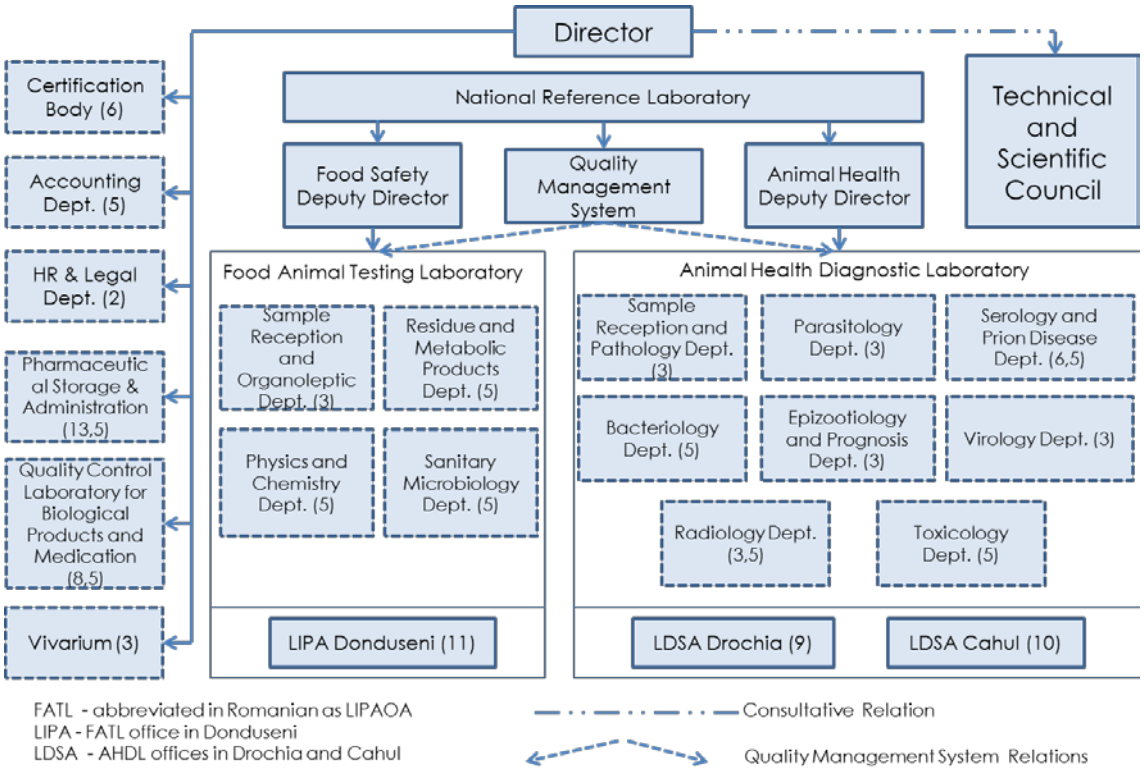
Name of the laboratory / Testing Items
Testing laboratory for food of animal origin of the Republican Veterinary and Diagnosis Center, Chisinau, Moldova National accreditation MOLDAC
1. Determination of moisture (meat products, milk products, honey) 2. Determination of dry substances (milk products) 3. Determination of fat (meat products; 4. Determination of the content of chlorides (meat products, milk products) 5. Determination of the content of starch (meat products) 6. Determination of protein (meat products) 7. Determination of acidity (milk products) 8. Determination of free acids (natural honey) 9. Determination of mass fractions of invert sugar and sucrose (natural honey) 10. Determination of hydroxymethyl furfural (natural honey) 11. Determination of diastatic index (natural honey) 12. Determination of mass fractions of nitrites (meat products) 13. Determination of the content of arsenic (meat, fish, milk) 14. Determination of the content of radionuclides: Cesium-137; Strontium-90 (meat, milk, eggs, fish, honey) 15. Determination of tetracycline (meat, milk, natural honey) 16. Determination of streptomycin (meat, milk, natural honey) 17. Determination of chloramphenicol (meat, milk, natural honey) 18. Determination of nitrofurans (meat, milk, natural honey) 19. -21. Determination of heavy metals Cd, Hg, Pb (meat, fish, eggs, milk, honey) 22. Determination of sulphamid (natural honey) 23. Determination of purity of fats (milk products) 24. Determination of Salmonella (meat and meat products, milk and milk products, fish and fish products, eggs and egg products) 25. Determination of Listeria monocytogenes (meat and meat products, milk and milk products, fish and fish products, eggs and egg products) 26. Aerobic colony count at 30°C (meat and meat products, milk and milk products, fish and fish products, eggs and egg products) 27. Determination of Staphilococcus aureus (meat, milk, eggs) 28. Determination of Escherichia Coli (meat, milk) 29. Determination of Enterobacteriaceae (meat, milk, eggs) 30. Determination of Sulfite-reducing clostridia (meat products;) 31. Industrial sterility (canned meat)
Testing laboratory for food of the Republican Veterinary and Diagnosis Center Donduseni, Moldova National accreditation MOLDAC
Items 1-12; 24; 25; 26; 27; 28; 29; 31 from the list above, additionally: • Determination of solubility index (natural honey) • Determination of density (milk and milk products) • Determination of phosphatase (milk and milk products) • Determination of sodium bicarbonate (milk and milk products) • Determination of yeast and mold (meat and meat products, milk and milk products, fish and fish products

Name of the laboratory / Testing Items
National Center for Verification and Certification of Plant Production and Soil, Chisinau, Moldova National accreditation MOLDAC and Accreditation RENAR Romania (3 indicators)
1. Determination of residues of organochlorine, organophosphate pesticides and other types of pesticides by liquid chromatography MS/MS-Products of non-animal origin; 2. Macro- and microscopic identification of seeds of quarantine and non-quarantine weeds – cereals, cereal mixes, cake, mixtures thereof, soil, fodder products; 3. Isolation and cultivation in culture media of quarantine bacterium Erwinia amylovora – Leaves, flowers, branches, plants Rozaceae; 4. Determination of Plum pox virus by enzyme linked immunoassay ELISA – leaves, flowers, fruits and branches of species Prunus spp.; 5. Macro- and microscopic identification of quarantine and non-quarantine pests – Products of non-animal origin subject to phytosanitary quarantine; 6. Isolation and cultivation in growth media, detection of phytopathogenic fungus Monilinia fructicola – leaves, flowers, fruits and branches of Rozaceae; 7. Determination of nematodes Ditylenchus destructor and Ditylenchus dipsaci, Morphological and morpho-biometric identification – seeds, bulbs and tubers.
Center for Standardization and Experimentation of Quality of Canned Production, Chisinau, Moldova National Accreditation MOLDAC
Determination of several indicators in canned meat and meat with plants, canned fish and fish with plants, products prepared from vegetables, fruits and other edible parts, nuts, sugar and sugar products, vegetable oils, natural honey, fresh fruits and vegetables, dried fruits and vegetables, quick-frozen fruits and vegetables, coffee, tea, cocoa and spices, cereals, cereal grains.
National Center of Alcoholic Beverages Testing, Chisinau, Moldova National Accreditation MOLDAC
1. Organoleptic analysis – alcoholic products; 2. Determination of total dry extract. Determination of dry substances - French brandy, ardent-spirit Ethyl alcohol Soft drinks; 3. Determination of relative density - Wines, must and concentrated must; 4. Determination of ethyl alcohol - Alcoholic beverages (distillates, French brandy, brandy, rum, whisky, schnaps, vodka, gin, liqueurs, balms, cocktails, appetizers etc.) Soft drinks Wine and wine-based products Low-alcohol beverages Must and concentrated must, liqueurs, beer; 5. Determination of relative density - alcoholic products; 6. Determination of total acidity - Grape must and concentrated must Wine and wine-based products Alcoholic beverages (liqueurs, balms, appetizers etc.) Ethyl alcohol Beer Soft drinks; 7. Determination of volatile acidity - Wine and wine-based products Alcoholic beverages and raw material for the production thereof (French brandy, brandy, distillates etc.); 8. Determination of alkalinity – Vodka; 9. Determination of sugars - Wine and wine-based products Alcoholic beverages (French brandy, brandy, liqueurs, balms, cocktails, appetizers etc.); 10. Determination of free and total sulfur dioxide - Wine and wine-based products Alcoholic beverages and raw material for the production thereof (wine and fruit distillates), must and concentrated must; 11. Determination of aldehydes - Alcoholic beverages and raw material for the production thereof (distillates, French brandy, brandy, whisky, schnaps etc.); 12. Determination of esters - Alcoholic beverages and raw material for the production thereof (distillates, French brandy, brandy; 13. Determination of tanning substances - French brandy and wine distillates; 14. Determination of pH - Alcoholic beverages and raw material for the production thereof (wines, distillates, French brandy, brandy) Grape concentrated must; 15. Determination of water soluble substances - Grape concentrated must; 16. Determination of total extract - Alcoholic beverages (liqueurs etc.) and low-alcohol beverages; 17. Determination of pressure - Sparkling, effervescing, aerated, semi-sparkling wines. Carbonated alcoholic beverages;

Name of the laboratory / Testing Items
18. Determination of iron - Alcoholic beverages and raw material for the production thereof; 19. Determination of optical density (OD), color - French brandy and distillates, brandy, beer; 20. Determination of arsenic Alcoholic beverages and soft drinks; 21. Determination of Folin Ciocalteu index Concentrated must; 22. Determination of lead - Alcoholic beverages and soft drinks; 23. Determination of copper Alcoholic beverages and soft drinks; 24. Determination of radionuclids: Cesium -137, Strontium-90 - Alcoholic beverages and soft drinks; 25. Determination of malvidin diglucoside - Rose, red wine and musts; 26. Determination of ochratoxin A Wines, juices and musts; 27. Determination of residues of phthalates (DBP) - Alcoholic products; 28. Determination of methanol and higher alcohols - Alcoholic beverages and raw material for the production thereof (distillates, French brandy, brandy, whisky, schnaps etc.); 29. Determination of microimpurities - Alcoholic beverages (vodka, schnaps etc.) ; 30. Determination of organic acids : malic acid lactic acid tartaric acid citric acid acetic acid Wine and wine-based products - Raw materials for wines and distillates Alcoholic beverages and low-alcohol beverages ; 31. Determination of preservatives (sorbic acid, benzoic acid - Wine and wine-based products Low-alcohol beverages and soft drinks; 32. Determination of total dry extract - Wine and wine-based products; 33. Content in extract - in malt must Beer; 34. Physicochemical stability: - tendency to protein disorders - tendency to crystalline disorders - tendency to reverse colloidal disorders - the presence of a gelatin overdose in Wine material and treated wine French brandy, brandy Soft drinks; 35. Presence of synthetic dyes - Wine and wine-based products; 36. Presence of furfural - Ethyl alcohol; 37. Microscopic analysis of sediment in wine - Wine and wine-based products; 38. Purity test - Refined ethyl alcohol; 39. Oxidability test - Refined ethyl alcohol.
Laboratory testing center of the National Center for Public Health Chisinau, Moldova National Accreditation MOLDAC
1. Determination of toxic metals: (Pb, Cd, Cu, Zn) Iron Nickel- Food Oils and fats Oils and fats Food additives, dietary supplements; 2. Determination of toxic metals: Mn, Pb, Ni, Cu, Zn, Cr, Cd, Fe, Ca, Mg, Sr - Mineral and potable water; 3. Determination of mercury - Food; 4. Determination of nitrites - Meat and meat products, eggs infant food (up to 1 year) Mineral and potable water; 5. Determination of the content of pesticides derivatives of dithiocarbamic acid (mancozeb, etc.) - Tobacco and tobacco products Fruits, vegetables, berries and their derivatives, juices;
Institute for Diagnosis and Animal Health, Bucharest, Romania National Accreditation RENAR
1. Determination of Avian Influenza 2. Determination of Newcastle disease Note: areas contracted by the NFSA are specified only
Institute for Hygiene and Veterinary Public Health, Bucharest, Romania National Accreditation RENAR
1. Determination of residues of veterinary medications in food of animal origin. Note: areas contracted by the NFSA are specified only

Source: NFSA, 2016, "Multi-Annual National Control Plan 2016-2020"

The following chart (Figure 4-25) is an organizational chart for the Republican Center for Veterinary Diagnostics under the NFSA and Table 4-37 describes general features of the Republican Center and its branches.



Source: NFSA

Figure 4-25: Organizational Structure of the Republican Center for Veterinary Diagnostics

Table 4-37: General Features of the Republican Center for Veterinary Diagnostics

Name of laboratory	Number of staffs	Target	Assists from donors agency
the Republican Veterinary and Diagnosis Center	95	Animal origin products safety	World Bank, EU, Japan (for human resource)
Branch of Veterinary and Diagnosis Center in Donduseni	15	Animal origin products safety	World Bank, EU
Branch of Veterinary and Diagnosis Center in Drochia	15	Animal health	World Bank, EU
Branch of Veterinary and Diagnosis Center in Cahul	15	Animal health	World Bank, EU

Source: JICA Survey Team

As explained above, the laboratory accepts testing requests from the private sector and the public sector. Regarding testing orders from the public sector, inspectors of NFSA sample food stuffs, agricultural products, fish products and animal products at border points and domestic markets and send sealed sample bags to the central laboratory based on the annual monitoring plan. For the private sector, food processing companies often apply for tests to confirm whether their products are appropriate to meet food safety standards. If the private entities receive satisfactory results from the laboratory, they can apply for food safety certificates with NFSA.

Human resources (Training system)

Trainings for inspectors are conducted by four types of trainings: initial training, self-training, internal training and external training based on annual and multi-annual professional development plan (see figure 4-26). The 2016-2020 multi-annual training plan (5-year scheduling cycle) was approved in June 2016. Most of training activities are provided by academy of public administration, state or public organizations and institutions including educational institutions, training centers under the public bodies, and training service providers. In addition to these training activities, on-the-job training is one of the most popular and practical training for inspectors.

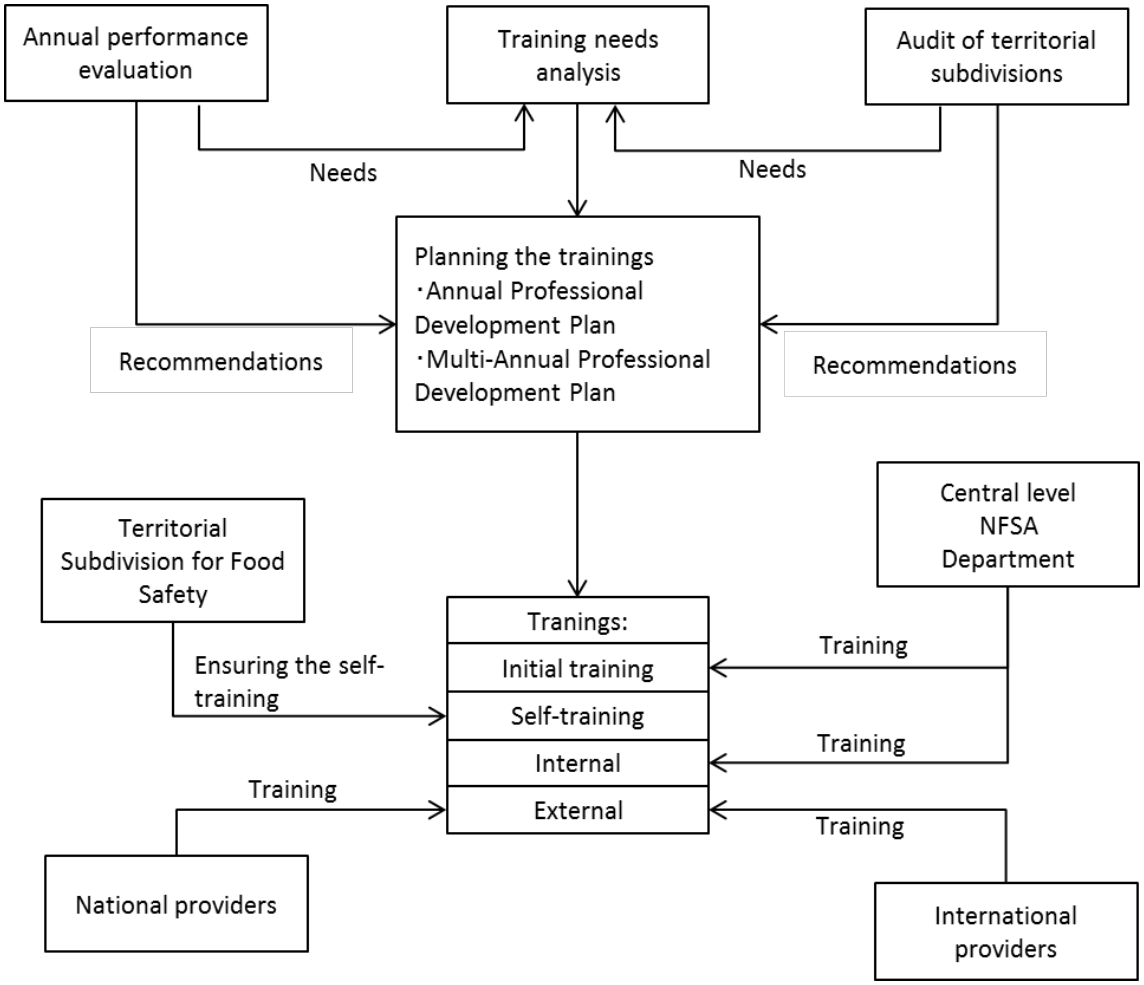


Figure 4-26: Chart of Human Resource Development in NFSA

Source: NFSA, 2016, "Multi-Annual National Control Plan 2016-2020"

Training for laboratory staffs also is conducted based on annual training plan. By utilizing information of internal audit report and results from on-site visits

Many donor agencies such as World Bank, GIZ supported procument of testing equipment and machinery for different laboratories. Although there are still many requests to fulfil demands for testing machinery such as liquid chromatography and gas chromatography for food analysis, but there are overlapping of testing machinery and testing contents under the different ministries. In order to develop seamless food safety monitoring system, training for laboratory staff is an essential factor and most demanded issues. According to the staff of food testing laboratory, most

of fresh graduates don't know how to deal modern testing machinery because most of machinery in Moldovan universities or colleges are not renewed from old type machinery and equipment. Therefore, new staffs in laboratory have to learn how to use machinery through on-the-job training from the beginning. Procurement of modern testing equipment and machinery for educational institutions are highly demanded.

Education system

NFSA and MoAFI insist that food safety is one of the bottlenecks to enhanc exports of agricultural products which is a key strategic pillar of agricultural development in Moldova. After the establishment of NFSA since 2013, the system and function of public food safety management has been developed. As explained before, more than 1,000 staff are working for NFSA who are responsible for these management systems. Development of human resources related to the food safety sector is a fundamental factor for the operation of an effective management system. According to interviews with staff of NFSA territorial subdivision and laboratory, it is hard to recruit skilled employees who have a strong enough academic background and work experience related to the food safety field.

University of Technology, faculty of food technologies is the only university that offers education related to the food safety field in Moldova. Students in the faculty learn about a wide range of food hygienics from Moldovan food safety standards, international food safety management systems such as ISO and HACCP to testing methods. 1,000 students are enrolled in the bachelor's course and 100 students in the master's course. The main fields of the faculty are 1) food technology with specializations (meat and meat products, baking, milk and dairy products, F&V), 2) technology of wine and fermented products, 3) technology of public catering, 4) industrial biotechnology, and 5) engineering and management of food industry. Food safety is a common issue to each field and the university offers a master degree of "Quality and Safety of Food Products". Most alumni work for the food industry, laboratories and public institutions after graduation. In recent years, the university started to collaborate with the private sector such as milk processors and restaurants and catering services sectors. Due to this partnership, students can gain field experience of the food industry and practical knowledge based on academic study from the university. On the other hand, the business sector can recruit industry-ready employees from the university.

Table 4-38: List of Educational Institutions Related to Agriculture and Food Safety

Name of Institution	Location
University of Technology	Chisinau
State Agrarian University	Donduseni
Center of Excellence in Horticulture and Farm Technology Taul	Chisinau
Center of Excellence in Viticulture and Winemaking in Chisinau	Edinet
College of Veterinary Medicine and Agricultural Economics from Bratuseni	Comrat
Agricultural Technical College in Svetlii	Comrat
Agricultural Technical College in Soroca	Soroca
Agro industrial College in Riscani	Rascani
Agro industrial College in Ungheni	Ungheni
Agro industrial College "Gheorghe Raducan" in Grinauti	Ocnita
Moldovan High School of Agriculture	Chisinau
Moldovan Specialized School of Equestrian and Modern Pentathlon	Chisinau
Methodical Center for Education	Chisinau

Source: MoAFI

5. Analysis of Assistance Trend of Development Partners

5.1 Past Cooperation History of JICA/Japan

JICA has a long history of cooperation with the country of Moldova, having committed assistance over the past 20 years, since 1997. The recent projects have been created in line with Japan's national assistance policy, as directed by the Japanese Ministry of Foreign Affairs.

The assistance policy for Moldova is comprised of two themes, which are industrial promotion and public services, along with healthcare and education.

Among the four recent JICA projects in the agricultural sector, two projects were provided in the form of trainings conducted in Japan. This report will highlight the other two grant aid projects which are being implemented in the Republic of Moldova (marked with * in the Table 5-1).

Table 5-1: Recent JICA Projects in Agricultural Sector of Moldova

Project	Scheme	Period
*The Food Security Project for Underprivileged Farmers	Grant aid	2012/4– 2012/10
*Project for Effective Use of Biomass Fuel	Grant aid	2013/6 – 2016/3
The farmer's welfare increase through cooperation, knowledge and access to markets	Training in Japan	2015/5 – 2015/11
Hygiene and Quality Management for Animal Source Foods	Training in Japan	2016/11 – 2016/12

Source: JICA Homepage

5.1.1 The Food Security Project for Underprivileged Farmers (formerly known as "2KR")

This project is well known by its previous name "2KR" which was created with the objectives of increasing food production and reducing poverty. The Japanese government began this grant aid in 2000. The grants from Japan were used for the procurement of agricultural machinery and equipment that was consequently sold in installments to private farmers in Moldova without interest, and with a repayment period of 4 years. Including the last round in 2012, the Japanese Government has released 9 grants to Moldova in total.

In terms of the project results, the project is said to have achieved great success in the country. In the year 2010, 10 years after the first grant aid release, it was reported that every single village of Moldova had heard of "The Japanese 2KR Project" and the project greatly contributed to improving relations between Japan and Moldova.

Compared to the Food Security Project for Underprivileged Farmers projects in other countries, which to some have been evaluated as a failure, the JICA report enumerated a few key success factors in Moldova as follows:[120]

(1) Implementation mechanism
- In Moldova, 2KR PIU was specially designed for implementation of this project. Being financially and logistically responsible for the implementation process, 2KR PIU was accountable to both the Moldovan and Japanese sides.

[120] https://www.jica.go.jp/topics/2010/pdf/20101221_01_02.pdf

- The efficiency and transparency of the implementation mechanism served to build trust between beneficiaries, resulting in a 100%repayment ratio for the procured equipment.

(2) Reinvestment to 2KR Project cycle
- The GoM decided to reinvest financial gains accumulated in Partnership Fund back into the 2KR Project cycle.
- The 2KR project stipulates the use of counterpart funds, accumulating and using the proceeds from the sale and the insurance handling fee of the procured machinery and equipment.

(3) Continuous dialogue with development partner community and civil society of Moldova
- Regular meetings were organized with representatives of agricultural producers in order to calibrate project policy to the current requirements of agricultural producers.

5.1.2 Project for Effective Use of Biomass Fuel in the Republic of Moldova

Before this grant aid project, "Implementation of Biomass Heating Project" was financed by Japanese Kusanone Program in 2008.This pilot project was initiated with the goal of promoting biomass as a source of energy in rural areas of Moldova. The use of biomass as source of thermal energy is considered one of the instruments to increase efficiency of agricultural farms by selling by-products from agricultural production and saving financial resources allocated for heating purposes for social buildings such as schools and kindergartens in rural settlements.

Through the pilot and the preparatory survey conducted in 2012 - 2013, the grant aid was approved. The "Project for Effective Use of Biomass Fuel in the Republic of Moldova" finally helped for the installation of pellet producers and boilers into 24 schools with aid amounting to JPY 1,154 million.

Although the installed facilities are being operated and maintained, at this moment, official evaluation of this grant aid project has not been undertaken. Official documents state that the results of the project will be evaluated 3 years after project termination.

5.2 Assistance Trends of Other Development Partners

5.2.1 EU

General Description

The EU has been supporting Moldova since 1994, based on the Partnership and Cooperation Agreement (PCA). Its delegation office is located in Chisinau and the projects are handled by EU Delegation.

As the policy background, the Eastern Partnership is the main policy framework for EU-Moldova relations. It represents the Eastern dimension of the European Neighborhood Policy and aims to bring the Republic of Moldova closer to the EU. The EU-Moldova Association Agreement, including DCFTA, was signed in this context.

EU policies are determined by the program document "The Single Support Framework (SSF)", which charts EU support to the country over the course of the next four years. SSF for Moldova in 2014-2017 involves two key programs, European Neighborhood Program for Agriculture and Rural Development (ENPARD) and Technical Cooperation Facility.

Project Areas

ENPARD sets the following targeted areas (1) through (3). The components closely related to agricultural sectors will be explained here:

1) Legal and strategic framework
   - MoAFI's capacity will be strengthened in implementing the harmonized legislation, evaluating (mid-term and ex-ante) the agriculture and rural development policy with accompanying SEA (Strategic Environmental Assessment) and preparing and implementing subsidy interventions in accordance with EU recognized best practices. More specifically, a monitoring methodology, which includes data collection procedures, will be introduced to MoAFI staff. Further assistance will also be provided to enable MoAFI to develop an integrated database system, which includes data flow between the land register, the farm register and the animal identification, registration and movement control.
   - As the nature of subsidy system currently in place is based on the principle of post-financing, there are no indicators set in the subsidy regulations. AIPA is being trained to effectively manage the subsidy program and continue with the progressive alignment of subsidy schemes according to EU policy and to ensure that the institutional development of AIPA is in line with European standards for accreditation of paying agencies.
   - SPS measures are critical in increasing competitiveness both for domestic and export markets. The recently conducted EU Food and Veterinary Office (FVO) missions have highlighted the need for the NFSA to step up in its efforts to provide state guarantees for the safety of products of animal origin. Among products of animal-origin, Moldova is already exporting honey and processed eggs to EU markets. Moldova also sees the export potential of fresh eggs and poultry in the neighboring market of Romania. In order to realize this, traceability has become a key issue. EUD expects that the issue for fresh eggs be addressed by June 2017. EU is requesting other development partners to conduct a feasibility study on animal byproduct disposal in order to enable the export of cattle meat from Moldova.
     The Twinning project[121] under ENPARD will assist the NFSA: (i) in drafting the necessary legislation from farm to fork, (ii) in reorganizing various NFSA departments and, (iii) in building staff capacity.
2) Promotion of economic development in rural areas
   - The ENPARD budget support program is contributing to the implementation of the national subsidy schemes. The objective of the subsidy schemes is to support investments related to the modernization of processing and storage of fruit and vegetables and multi-perennial plantations.
3) Creation and/or development of infrastructure
   - This priority area is not directly linked to the agricultural sector. The lifeline development and energy efficiency issues of rural areas are tackled here.

Implementation Scheme

ENPARD, with a total budget of EUR 64 million, targets projects of both agriculture and rural development. Under this scheme, EUR 64 million is not directly transferred to GoM and therefore not at its disposal. The amount EUR 64 million merely indicates the annual upper limit of budgetary support from EU to the GoM in Agriculture and Rural Development.

[121] Twinning isa unique form of technical assistance, which means the trainings for public officers by the trainer officials from EU member states. This method is particularly effective in policy assimilation.

In Moldova, ENPARD is currently supporting the grant project for remittance activity especially to rural areas and for road infrastructure investment. ENPARD money is repaid to the GoM when the relevant policies have been implemented.
However, Rural Development Strategy is not well developed in Moldova. As a result, MoAFI has not been able to fully utilize the amount of money allotted by EU under ENPARD, whereas Georgia has successfully attained it for three years in a row.

Co-financing Opportunity

Apart from direct management including Twinning, the EU allows national development agencies to implement projects which they bankroll. Currently, the Austrian Development Agency (ADA) and GIZ are implementing projects in Moldova, utilizing ENPARD budget. This is called indirect management with member state agencies. But according to the explanation provided by EU officers, eligibility is not limited to development partners in Europe, as long as it remains under the regional scope of EU strategy.

5.2.2 USAID/MCC

General Description

In support of the agricultural sector in Moldova, USAID completed the previous 5-year project "ACED" in March 2016. ACED project was the first co-financing project with MCC. The new 5-year project "High Value Agriculture Activity (HVAA)" commenced in November 2016 with a total budget of USD 21 million.

USAID's technical assistance particularly focuses on capacity development of the private sector. In the current project HVAA, the direct beneficiaries are defined as agricultural producers, producer groups, WUAs, industry associations, exporters, sales agents and business service providers. Through technical assistance executed by the contractors, USAID attempted to strengthen the foundation for sustainable development by direct knowledge transfer to the private sector and demonstrate the effects of its best practices. Such strong commitment to private actors in some selected value chains is a unique characteristic of USAID, and has not been observed in other Development Partner(DP)s' technical assistance projects, at least of those in Moldova. Other development partners usually find counterparts in public or semi-public organizations.

Related or not, USAID has another eminent feature, which is that its activities can reach outside the policy of the national GoM. In its former project (ACED), USAID invited private actors on both banks of the Dniester River to facilitate cross-bank cooperation on the private grounds, although the political situation is quite sensitive.

Project Areas

The former USAID project (ACED) focused on 4 key themes with the objective of transitioning to high value agriculture.

1) Market diversification
    - Key value chain (specific agro-product) is identified as the assistance target and enhanced through the project. Some of the activities are export promotion for income generation, domestic marketing for import substitution, and finding new markets. The foregoing project addressed table grapes and apples. A new study will likely be conducted on honey and berries.
    - During the last ACED project, new markets such as Bangladesh, Egypt, UAE and Mongolia were developed. A free trade agreement was signed with Egypt. USAID also found a potential market in India.
2) Post-harvest handling

- Post-harvest improvements such as cold chain and packaging were also subject to assistance. USAID integrated pre-cooling technology using SO2 for cold storage in the foregoing project.

3) Irrigation
   - USAID co-finances the rehabilitation of irrigation infrastructure with MCC. In order to achieve an effective project outcome, USAID also assists farmers associations, especially the WUA. Increasing the capacities of member-based groups (producer groups, WUAs and industry associations) works to serve their members in targeted value chains.
4) Agricultural education
   - Skill gap analysis will be performed to reform the curriculum of agriculture education which is currently based on the curriculum from the70's. USAID envisions PPPs linking the private sector to agriculture education by utilizing know-how from Italy.
   - Improvement of the enabling environment leading to increased investment and an improved workforce in key value chains

The ongoing project HVAA is setting the following objectives and key areas.

1) Expanding trade and strengthening linkages to domestic, regional and international markets for targeted value chains.
2) Improvement of productivity and post-harvest handling capacity and private sector capacity to comply with European and international standards in targeted value chains.
3) Capacity increases of member-based groups to serve their members in targeted value chains
4) Improvement of the enabling environment leading to increased investments and an improved workforce in key value chains

Implementation Scheme

Although it can be said that HVAA's main component is technical assistance provided by the consultant, in order to magnify the effect, HVAA has developed another financial scheme to support private actors.
In addition to the budget of USD 21 million for Technical Assistance (TA), USAID is preparing USD 5.7 million as the grant budget to support the innovation in agriculture and technology transfer. The fund is named "Fund for Innovation in Agriculture and Technology Transfer (FIATT)." This money is handled by the fund manager in the contractor of the TA consultants, Chemonics International, which has been directly appointed by USAID. This type of scheme is sometimes adopted under USAID in the countries with high corruption risk.

5.2.3 WB

General Description

WB is implementing MAC-P with a total budget of USD40 million from 2012 to 2019 (extended in 2016). In implementation of its projects, WB adopts variable assistance schemes in different priority areas.

Change History

MAC-P has gone through two Additional Financings since its launch in 2012. Among the current project components presented in the below table, components 1-4 are unchanged ones from the original project design in Appraisal Document as of 2012. Component 5: Compensatory Sales Support Grants was brought in place of "Contingencies" at the 1st Additional Financing in 2014, in response to the trade restrictions on Moldovan agro-food exports imposed by Russia in 2013-

2014. The 2nd Additional Financing of 2016 in the amount of USD 10 million was accompanied by the small restructuring of the project. The changes included (i) allocation of additional resources for scaling up the project's activities under Component 2: Enhancing Market Access Potential; and (ii) reallocation of US$4.2 million from Component 5: Compensatory Sales Support Grants to Component 1: Enhancing Food Safety Management. Also, the original project closing date of June 30, 2017 was extended by two years to June 30, 2019. The project's Results Framework was adjusted to reflect the revised project indicators and extended implementation time frame.

Project Components (after 2nd AF)

Table 5-2: MAC-P Components

Component 1.		**Enhancing food safety management:** The activities under this component aim at improving human, institutional and technical capacity of the country's food safety management system, as well as ensuring regulatory harmonization with European Union (EU) requirements on food safety.
	Sub-Component 1.1	**Regulatory and institutional Support:** On the regulatory side, the MAC-P supports harmonization of national legislation and regulations with EU standards. This activity includes inspection system reform from Soviet-style 100% certification to risk-based inspection and checking traceability to enable exports of poultry to the EU. On the institutional side, the activities include provision of trainings to governmental staffs involved in food safety management, and raising awareness about and technical understanding of the new food safety legislation and regulations among private sector entities.
	Sub-Component 1.2	**Technical enhancements for food safety management:** On the technical side, MAC-P supports investments aimed at ensuring the technical functionality of the NFSA. Also, MAC-P contributes to the strengthening of central laboratories and Border Inspection Points (BIPs).
Component 2.		**Enhancing market access potential:** The activities under this component aim at improving marketability and market integration of Moldova's high value, horticultural products, where the country has proven comparative advantages in the production of fresh fruits and vegetables.
	Sub-Component 2.1	**Business development support for productive partnerships:** Under this sub-component, MAC-P provides capacity building activities for primary horticultural producers and product/farmer associations to represent the interests of the fruit and vegetable industry of Moldova, through local consultants and, when necessary, international consulting.
	Sub-Component 2.2	**Investment Support for post-harvest technologies:** As Investment Support under this sub-component, MAC-P provides matching investment grants to emerging productive partnerships for the modernization of post-harvest technologies in the horticultural sector. In terms of eligibility, legal producer group must consist of at least 5 farmers. The conditions for a producer group to take a grant is that at first, 50% of the products sold must come from its constituent members, then 75%, and then finally 100%. In order to strengthen marketability, WB grants USD 350,000 for storage and packaging activities.

Component 3.		**Enhancing land productivity through sustainable land management:** The activities aim at mainstreaming sustainable land management (SLM) practices and technologies, and rehabilitation of anti-erosion shelterbelts.
	Sub-Component 3.1	**Capacity building for sustainable land management:** MAC-P supports the following specific activities with co-financing from GEF, (1) Methodological work on applied technical and economic options for farm-based interventions focused on SLM, (2) Awareness raising and training activities aimed at improving farmer land management skills and public policy response for SLM, (3) Strengthening grant beneficiary capacity to monitor economic and environmental benefits.
	Sub-Component 3.2	**Financial support for piloting sustainable land management:** MAC-P provides financial support to farmers through AIPA for piloting the adoption of SLM practices and technologies in the form of matching investment grants, with co-financing from IDA and GEF.
	Sub-Component 3.3	**Support for the Rehabilitation of Shelterbelts:** MAC-P supports investments in machinery for the creation of two mobile mechanized squads, carried out by the forestry enterprises of the State Forestry Agency (Moldsilva) in close cooperation with local communities, for the rehabilitation of anti-erosion shelterbelts.
Component 4.		**Project Management**
Component 5. (added at 1st AF)		**Compensatory Sales Support Grants:** MAC-P distributes compensations to apple, plums and grapes farmers affected by export restrictions, in order to avoid a collapse of the fruit growing sector.

Source: JICA Study Team, based on WB reports

5.2.4 FAO

General Description

FAO signed a new four-year Country Program Framework 2016 - 2019 with the GoM in December 2016. The estimated amount of the total budget is USD 9.75 million.

Under its organizational regulation and mandate, FAO does not provide any budgetary support to public institutions nor any financial assistance to private actors. FAO intervention employs the form of technical assistance by the consultants contracted with FAO.

Project description

FAO is implementing the following projects in line with each of the three governmental priorities under the Framework 2016 - 2019. The beneficiaries of support programs range from governmental institutions to local farmers.

(1) Governmental Priority 1: Increasing competitiveness of the agri-food sector
- Project for improving food safety legal framework and strengthening capacity of phytosanitary and animal disease control service
  - Helps MoAFI draft a package of legislative acts and secondary legislation on selected animal source food sub-sectors.
  - Prepares policy recommendations in the area of food safety for animal origin products for NFSA.

- Supports NFSA create operational manuals for detection of quarantine pests to enhance national phytosanitary control services.
- Revises national contingency plan for control of newly introduced animal diseases.
- Introduces to NFSA a GIS cloud-based information system as decision-making support tool for risk based prevention and control of African swine fever and other transboundary animal diseases.
- Supports NFSA to draft legislation for the enforcement of the legal framework on preparedness for transboundary animal diseases.

- Project for designing policy framework on internal and external market promotion of agri-food products
  - Supports MoAFI to prepare a draft program on the promotion of agri-food products both on internal and external markets.

- Project for improving relevant public sector institutions capacities to design and implement better policies and frameworks for reformation of education, research and extension system in agriculture.
  - Supports MoAFI and Ministry of Education to prepare a road map for reforming the agriculture and innovation systems in agriculture.

(2) Fostering sustainable agriculture and rural development

- Project for strengthening governmental capacity for formulation and operationalization of rural development policies in line with ENPARD Programme requirements
  - Assesses, recommends and revises a set of rural development policy documents drafted by MoAFI and MoE, including gender sensitive provisions.
  - Strengthens capacity of MoAFI, MoE and other stakeholders to facilitate the investment of remittances in productive activities in agriculture and rural areas.

- Project for enhancing governmental capacities in policy formulation of Integrated Pest Management Programme (IPM) and strengthening farmers' capacities in use of IPM methods for vegetables and berries produced in open fields and/or greenhouses
  - Supports NFSA to develop IPM.
  - Strengthens capacities of local institutions in promotion and adoption of modern crop and pest-management through trainings and established demonstration plots.
  - Creates at least 12 farmer field schools and improve their capacities in the implementation of innovative plant production practices through field trainings.

- Project for introducing new production technologies and guidelines for berry production for small holder farmers
  - Creates at least 5 demonstration plots on berry production.
  - Elaborates and disseminates guidelines on berry production and protection methods in corporation with MoAFI and the farmers association.

- Project for strengthening capacities of the NBS for conducting the next agricultural census and monitoring SDGs

- Disseminates best practices and adequate methodologies on conducting the agricultural census among NBS staff.

- Project for generating and disseminating knowledge on Empowering Smallholders and Family Farms for improving Rural Livelihood and Poverty Reduction
  - Conducts a country study related to smallholders and family farming.
  - Develops capacity and raise awareness in the form of a workshop for MoAFI and other relevant stakeholders.
  - Supports MoAFI to prepare an action plan on prioritized issues related to smallholders and family farms.

(3) Improving capacity for sustainable management of natural resources and disaster risk management

- Project for strengthening governance framework and capacities on conservation and improvement of animal and plant genetic resources and improving animal production technology
  - Supports MoAFI to draft the National Strategy and Action Plan for sustainable management of animal genetic resources.
  - Organizes at least 3 trainings / study tours for national professional staff and technicians on conservation and sustainable use of Plant Genetic Resource for Food and Agriculture (PGRFA).
  - Supports MoAFI to develop a National Program for PGRFA.
  - Organizes at least 3 trainings on modern methods in milk-quality analysis for farmers and technicians including youth and women from Artificial Insemination Centre (Maximovca Institute).
  - Helps to establish dairy performance recording system.

- Project for promoting innovative and good practices to reduce effects of climate change on agriculture
  - Organizes 10 training workshops for farmers including youth and women on climate-smart agricultural practices and technologies.
  - Helps to establish at least 10 demonstration plots using conservative agriculture technologies.
  - Assesses the anti-hail system and prepares recommendations for further action.

- Project for strengthening capacities of small-scale farmers in coping with drought and facilitating adoption of best practices and modern irrigation technologies
  - Helps to create at least 10 demonstration plots.
  - Organizes at least 20 training sessions and prepares a guideline on the adoption and implementation of best irrigation practices and technologies for farmers and extension services in local communities.

- Project for enhancing capacities of government and local authorities in pesticide waste management and diminishing the volume of obsolete pesticides in the country
  - Provides training materials and studies for government institutions and local authorities on sustainable management of obsolete pesticides.
  - Supports to transport and destroy 400 tons of obsolete pesticides from a contaminated deposit in Pascani village outside Moldova.

- Project for strengthening government capacities on forestry and degraded land restoration
    - Provides training materials and studies to government institutions on landscape restoration and sustainable forest management.

5.2.5 IFAD

General Description

IFAD started its activity in Moldova in 2000. By now, IFAD has created 7 projects, totaling USD196.8 million. 5 out of 7 projects have been completed, while 1 project is on-going, and 1 project concerning climate change and new technology has been just approved in Rome. The 7th project is expected to be operational from September 2017.

IFAD interventions usually take the form of financial assistance. Only a small portion of the total budget is dedicated for technical assistance. In case of the incoming 7th project, USD 0.5 million is used carefully for procurement of the consultants, while USD 18.2 million is budgeted in crediting sources. The consultants are hired to design the usage of the credits, especially what kind of technology to be promoted and invested using the USD 18.2 million.

In addition to financing farmers, IFAD can provide subsidies to the local communities for investment in infrastructure development. This is a community-based small infrastructure scheme.

- For instance, 1-2 km of pavement construction from the field to main road for improved transportation can be funded by this scheme.
- A recipient community should bear 15% of the total cost for the first application. When the community applies for the second time, they should bear 30% of the total cost. In the third instance, the community should bear 50% of the total cost which will constitute the last opportunity for them to apply to the scheme.

Another unique feature of IFAD intervention is a strong focus on rural areas. Although there is a movement to enlarge the geographic scope of assistance, the current program areas are defined as rural areas which exclude Chisinau and Balti, the top two cities of Moldova.

Project Area

IFAD had previously been focusing on horticulture, but it has diversified target areas in line with Moldovan priority as the agriculture sector continually changes.

(1) SME market oriented activities. Max. 150,000 dollars for 5 years with a 2-year grace period
(2) Youth entrepreneurs. Max. 15,000 dollars with 60% loan and 40% grant. As for the grant system: at first, 100% of the finance is given to the recipient as loan. After 3 years, if the given condition is fulfilled and the activity is admitted as continuous, 40% of the loan will be compensated by the grant.
(3) Micro business. Max. 10,000 dollars

Implementation Scheme

Especially among financial assistance schemes, IFAD provides low-interest loans to farmers or other agricultural actors through commercial banks. The IFAD loan scheme is carefully designed not to make a huge impact on the financial market, but also takes the development partners coordination into consideration.

The capital flow in an IFAD loan scheme is as below:

(1) IFAD Headquarters design the loan program. The end-user of the capital is defined by IFAD HQ at this stage: what kind of investments or activities of farmers should be financed by the loan.
(2) The grand agreement on loan conditions is approved between IFAD HQ and GoM. The loan conditions for GoM such as interest rate, loan period, and grace period are agreed at this stage. Although the official borrower is Ministry of Finance, management of day to day operations is delegated to MoAFI.
(3) The capital for the IFAD loan is then transferred to the account of IFAD PIU in Moldova.
(4) IFAD PIU calls for proposals from the commercial banks.
(5) Commercial banks, who are interested in dealing the IFAD loan, send proposals to IFAD PIU with the interest rate and the total amount. The interest rates offered by commercial banks are the sum of two figures. One is the basic loan rate controlled by the Central Bank of Moldova. The other is the bank commission rate, which covers the operation costs and margins of the commercial banks.
(6) Based on the proposals collected from commercial banks, IFAD PIU selects partner banks. In practice, this screening is not so strict, but when the interest rate offered by a bank exceeds the allowable range, the offer is rejected.
(7) Among selected partner banks, IFAD PIU coordinates the commission rate. Usually, the average of the proposed rates is used as the final rate. Thus, farmers applying to the IFAD loan program will take the same interest rate, no matter which partner bank they select. To note, loan period and grace period for farmers are predefined based on the target activities; for example, the loan period is 5 years for equipment and 7 years for orchards.
(8) Once the partner banks agree on the commission rate, a subsidy loan agreement is signed between MoF and banks. The subsidy agreement with MoF is done only once, and the ad-hoc agreement for the loan is delegated to IFAD PIU.
(9) Then, money is transferred from IFAD PIU account to each partner bank via State Treasury account in order to record the flow of the capital.
(10) Farmers apply the use of IFAD loan to partner banks and the banks judge eligibility. Partner banks decide the loan amount and the collateral requirement for each eligible applicant.
(11) At this stage, IFAD PIU controls partner banks by monitoring KPIs and periodically reports to IFAD HQ about the progress of disbursement.
(12) The basic loan rate differs by currency. At this time, the basic loan rate in MDL is 5.9%, EUR 5.4%, and USD 4.9% respectively. In accordance with the fluctuations in the basic loan rate, the interest rate is revised twice a year.
(13) The money paid back from the loan recipients is accumulated at the Credit Line Directorate[122] under MoF. GoM can reinvest this money in any project as long as it relates to Agriculture and Rural Development.

Legal Status of IFAD PIU

IFAD PIU is ranked as the statutory body under MoAFI. Although IFAD PIU is primarily founded as the consolidated project unit for IFAD program implementation in Moldova, its legal status does not eliminate the possibility for it to undertake programs of the other DPs.

Co-financing Opportunity

IFAD is open to co-financing with other development partners. In reality, IFAD is currently cooperating with the Danish International Development Agency (DANIDA) in the young and women entrepreneur support program. Another project co-funded with Global Environment Fund

[122] https://mobiasbanca.md/en/Credit-Line-Directorate

(GEF), equivalent to USD 5 million, is designed to enhance the tolerance to climate change, including land conservation efforts through no-till farming.

5.2.6 Summary

From the perspective of the assistance scheme and the beneficiaries, the rough features of each development partner are outlined in the table below:

EU support focuses on budgetary support and capacity development for public authority, while on the other hand, USAID places value on private sector development. The FAO only focuses on TA, while IFAD specializes in financial assistance for farmers and the local community.

Table 5-3: The Assistance Scope of Other DPs in the Ongoing Projects

	Financial Assistance		Technical Assistance	
	for Public	for Private	for Public	for Private
EU	✔		✔	
USAID/MCC		✔		✔
WB	✔	✔	✔	✔
FAO			✔	✔
IFAD		✔		

Source: JICA Survey Team

From the viewpoint of priority areas, the themes of each development partner can be described as follows (See Figure 5-1):

In order to avoid project duplication and create synergies among development partners, coordination meetings have been organized. The coordination meeting in agriculture is now held twice a year under the initiative of MoAFI. Another development partner coordination focusing on food safety is held under the initiative of NFSA. It is also held twice per year.

		EU	USAID/MCC	WB	FAO	IFAD
Support for Transition to HVC Production	Agricultural Technology Transfer			ACSA	MoAFI	Farmer
	Business Management Skill Transfer	ODIMM		ODIMM		
	Rehabilitation of Old Irrigation System		WUA			
	Finance for Farm-level Investment		Farmer	AIPA		Farmer
Support for Value Preservation	Preservation Technology Transfer		Farmer			
	Finance for PHH/ Cold Chain		Farmer			Local Community
Support for Sales Channel Development	Promotion of Moldovan Agri-products		Association, Exporter	Exporter	MoAFI	
	Facilitation of Producers Group		Farmer	Farmer		
	Finance for Sorting, Packing, Grading Line		Association			
Support for Enhancing Trust in Food Safety	Reorganization of the Relevant Institutions	NFSA		NFSA		
	Capacity Building of Inspectors	NFSA				
	Operational Improvement of NFSA	NFSA				
	Budgetary Support for Monitoring Facilities	NFSA		NFSA		

*Cells in bright orange show “On-going” projects, and cells in light orange show “Closed” projects.

Source: JICA Survey Team

Figure 5-1: Project Area Mapping of Development Partners

5.3 Evaluation of and Lessons Learned from WB project "MAC-P"

5.3.1 Overall Status and Evaluation

According to the latest Aide-Memoire, which is based on the implementation review and support visit conducted during 15th-24th June 2017, the overall rating of Moldova Agriculture and Competitiveness Project (MAC-P) is "Satisfactory". The project's implementation status achieved good evaluations across all the components presented in 5.2.3.

Table 5-4: Key Project Data of MAC-P

Effectiveness Date:	September 20, 2012	**Closing Date:**	June 30, 2019
Total IDA Credit/GEF/ SIDA Grant Amount:	US$ 46.54 million	**Total Disbursements:**	$ 30.75 million
PDO Rating	Satisfactory[123]	**Overall IP Rating**	Satisfactory

Source: World Bank

5.3.2 Status and Evaluation of Each Component/Sub-component

Table 5-5: Evaluation by Component

Component No.	Evaluation and Description
1. Enhancing food safety management	Implementation status of this component to date is evaluated as promising, and the progress is solid across both sub-components. Food safety actions for approximation to EU SPS requirements have been completed.
1.1 Regulatory and institutional support	All planned activities under this sub-component have been completed, and only ad-hoc requests are now being considered for financing. At the same time, thanks to the provision of substantial regulatory and institutional support to the NFSA from multiple other donors such as EU and GIZ, this area requires less of a financial effort from MACP.
1.2. Technical enhancements for food safety management	Progress on enhancing the technical functionality of the NFSA and its divisions is evaluated as considerable. More specifically, the key progress includes (1) Full completion of the construction works and operationalization of the country's network of four BIPs, (2) Enhancement of the central laboratory capacity, (3) Completion and operationalization of the NFSA building and (4) Support for provision of Information Systems to the NFSA.
2. Enhancing market access potential	The progress registered in the implementation of the component is evaluated as strong and it is expected to continue in the next two years of implementation with funding from the 2nd Additional Financing. As of 1st June 2017, increased sales (domestic and exports) of high value crops by targeted partnerships that receive investment support grants reached 25%, aiming 50% by the end of the project.

[123] Assign a value for each rating: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, and Highly Unsatisfactory = 1.

	2.1. Business development support for productive partnerships	The previous media campaigns to support the idea of cooperation for horticultural producers marked a great success. The lead of this activity is being handed over to MoAFI. The current focus of the sub-component on the quick launch of the selection of the consultancies for the development and support of producer groups, and WB team is reviewing TOR prepared by CAPMU.
	2.2. Investment Support for post-harvest technologies	MAC-P has made excellent progress in promoting the idea of cooperation amongst Moldovan farmers by supporting the creation of 32 producer groups. The productive alliance model has gained recognition and traction among local farmers. The 28 producer groups which received financing and have commenced operations have stored and processed more than 10,000 tons of produce through the post-harvesting infrastructure financed with the support of the project. As of 1st June 2017, capacity for post-harvest handling created in targeted productive partnerships reached 22,200 tons, aiming 30,000 by the end of the project.
3. Enhancing land productivity through sustainable land management		The progress to date in the implementation of the component is evaluated as substantial, followed by the two following successes. As of 1st June 2017, increased on-farm area benefitting from sustainable land management practices supported by the project reached 46,736 Ha, exceeding the original target of 10,000 by 30th June 2017. Also, increased area protected by robust anti-erosion shelterbelts rehabilitated under the project reached 56,706, while the original target was 50,000 by 30th June 2017.
	3.1. Capacity building for sustainable land management	The sub-component has supported a wide range of capacity building activities and events. The latest highlights include a series of field days throughout the country in the months of May-June, 2017, with the participation of hundreds of Moldovan farmers, on the topic of conservation agriculture.
	3.2. Financial support for piloting sustainable land management	From the beginning of the project, there were five rounds of grant calls organized and 186 applications were received. About 145 of them have been approved. The program beneficiaries have invested in 142 units of SLM equipment, purchasing: 34 shredders/mowers, 34 sprinkles, and 58 seeders, 16 combiners.
	3.3. Support for the Rehabilitation of Shelterbelts	The proposed activities under this sub-component are finished – from the project launch have been rehabilitated about 2,242 hectares - which is about more than 11 percent higher than what was planned.

Component 4. Project Management	Overall project management is rated as satisfactory. The CAPMU is positively evaluated as providing fiduciary support and cross-component coordination in a timely and efficient manner.
Component 5. Compensatory Sales Support Grants	The implementation of this component was successfully completed in 2016. Nearly US$7.0 million were provided as compensatory sales support grants to more than 6,000 eligible small farmers. (less than 15 hectares)

Source: World Bank

5.3.3 Lessons Learned from MAC-P

At the same time, in the Aide Memoire the WB enumerates some implementation/institutional issues that need to be addressed promptly in order to avoid any future negative impacts. Although some of the issues are specific to MAC-P components, especially the below two issues and recommendations seem to have broad utility and can be used as the lessons for future projects.

- The WB team observed the significant delays in contract award and management. When there is a need to address suppliers or contractors through official correspondence to ask for their compliance with the provision of the contracts, MoAFI and NFSA take too much processing time that is not acceptable. In order to reduce time span and secure implementation timeline, the WB and MoAFI decided to delegate sole signature responsibility to the Consolidated Agriculture Project Management Unit (CAPMU), while responsibilities for drafting and approving Technical Specifications, Terms of References, evaluating bids, making award decisions and approving deliverables should not be transferred.
- In reference to the emerging producer groups support activities, the WB recommends breaking down into smaller, more specialized and intensive packages to effect a more substantive outcome on the post-creation functionality and sustainability of producer groups. The WB admits the necessity of consultancy to support producer groups especially on the following three topics.

    1) Increasing quality of production
    2) Improving accounting and book keeping in line with national standards for cooperative entities
    3) Marketing and facilitation of sales

6. JICA's Assistance Scenario Suggested by the JICA Survey Team

6.1 Assistance Scope

Based on the discussions in the previous chapters, Chapter 6 suggests possible scenarios for JICA assistance. In "6.1 Assistance Scope", an outline of the agricultural sector and elements of the Moldovan agricultural policy are reviewed using the information of the previous chapters and drew out the points to be addressed in light of the Japanese assistance policy. Then, in "6.2 Assistance Scenario", three technical assistance projects are recommended.

Regarding Japanese assistance policy, the Japanese Government has set a high standard for basic policy of assistance towards sustainable economic development and poverty reduction. It reads as follows:
Stable growth of the Moldovan economy is ensured by the development of the agriculture and food industry, which are the main types of production in the country; as well as the growth of the non-agricultural sector observed in recent years, and the promotion of investments and exports that aim to reform the structure of the economy for being too dependent on remittances from those who work abroad. Moreover, providing assistance in education and social security spheres (medicine etc, which are now being reformed) contributes to improving the quality of life of the population, and poverty reduction.

Priority areas are (1) Industry promotion and (2) Improvement of public services in medicine and education. Under the (1) Industry promotion, it reads as follows:
The main goals are to effectively enhance the capacity of public institutions, and support the training of human resources in order to promote the investments and exports. Additionally, to provide support for agriculture, food industry, and the non-agricultural sector, taking into account the impact of DCFTA. Furthermore, Japan also assists the development and strengthening of small to medium-sized enterprises in order to promote growth and employment within various industries. Another objective is to study the possibility of dissemination and the use of Japanese technologies for development purposes assessing the spheres for assistance.

In line with the Japanese assistance policy, a possible assistance to agricultural development shall be examined in the context of industry promotion.

With limited arable land and a good number of fragmented farm lands, it is assumed to be difficult to compete with other countries in the export of cereals which require larger amounts of farm land for profitable production. On the other hand, since the supply of agricultural production surpasses the demand for domestic consumption, optimal land utilization should be considered with an economic point of view, keeping foreign markets in mind. The transition to HVCs is an important option which allows most of the farm land to harness the potential of agricultural products of Moldova, provided that food security is ensured by sound cultivation of cereals and other essential crops.

The agri-food industry as a whole accounts for a significant portion of the total industry workforce, however, the majority of small companies lack the horizontal and vertical coordination of supply chains which leads to discrepancies between the farm gate price and the consumer price and in turn results in low investment and lower quality. On the other hand, large-scale farmers prefer to continue to grow cereals instead of newly investing in HVC equipment.
Animal husbandry does not play a prominent role in the agricultural industry due to cheaper livestock imports, limited feed supply, longer production cycles when compared with cereals, and an inability to fulfill food safety requirements for exportation. Production is mostly concentrated

on the domestic market as the local production has not been able to meet demand. For a revitalization of the dairy sector, its supply chain should be reviewed and enhanced.

On the side of producers, the agricultural sector in Moldova is characterized by a huge number of new smallholder farmers working with less than 2.5 ha and with little agricultural management experience, who cultivate only about a third of the agricultural land. In total, there are over 2.25 million ha of agricultural land in Moldova. The area of agricultural land being worked is about 1.90 million ha, of which 60% is owned by incorporated farms and 40% by unincorporated family farms. In terms of economic growth, incorporated farms are vital as they employ over half of the country's farm lands on a commercial basis.

While 76% of the sown areas of small farms with areas up to 10 ha are accounted for by cereals and leguminous crops, they do not produce the necessary amounts of field crops; however, they do produce over 50% of total production of fruits and grapes in the country. It should be noted the maintenance of perennial plantations by small farms are not secure due to the aging of farmers and outward migration of the younger generations. Entrepreneurship is required, not only to maintain but also to modernize the farming system and enhance the quality of the products.

Considering that large scale farms should be self-managed in a market economy and smallholders with less than 2.5 ha should be taken care of under rural development or safety-net programs, target groups for HVC promotion in the context of industry promotion can be middle scale farmers and small farmers who already cultivate HVC. The constraints are, as discussed, limited access to finance, limited opportunities to update technical issues, and the lack of marketing. According to the field survey of the Study Team which collected data from 90 small farmers, only 12.8% of the total investment of 34,159,447 MDL in the last 5 years is grants and subsidies, which is not equitable to the support to the same kind of farmers based in the EU.[124] Modernization of farming and the enhancement of marketing can be said to be the key issues for support. Notably, food safety is always an impediment from access to the EU market and more importantly, the general health of the people.

Observing the government intervention, agriculture and rural development is regarded as one of the 8 solutions for economic growth and poverty reduction in the "National Development Strategy". Accordingly, the Moldovan government has implemented the National Agriculture and Rural Development Strategy with the three pillars of (1) Enhanced competitiveness through restructuring and modernization, (2) Sustainable management of natural resources, and (3) Improved conditions for living and working in agricultural and rural areas. HVC promotion falls under the the general objective: (1) Enhanced competitiveness through restructuring and modernization.

Specific objectives of the general objective (1) above are: (i) Modernization of agri-food chain to meet EU requirements on food safety and quality, (ii) Facilitate access to capital, inputs and output markets for farmers, and (iii) Reform education, scientific research and rural extension services in the agri-food sector, and creation of integrated agriculture information system

Therefore, modernization of farming and enhancement of marketing together with food safety for HVC promotion can be viewed as a priority assistance from the perspective of the agricultural sector and elements of the Moldovan agricultural policy which is in line with Japanese assistance policy. From economic development point of view, small to middle farmers who already cultivate or potentially cultivate HVC constitute a potential target group.

[124] According to the interview with EU farmer, 20% of farm investment is subsidized on average in EU.

6.2 Assistance Scenario

As the conclusion of the survey, three scenarios are squeezed out which covers the agricultural supply chain shown as in the Figure 6-1. Scenario A is to address modernization of the farming system pushing up the bottom of the supply chain. Scenario B is to address food safety that is one of the most important cross-cutting issues at the moment. Scenario C is to address enhancement of marketing pull and opening up of the supply chain from a consumer's point of view.

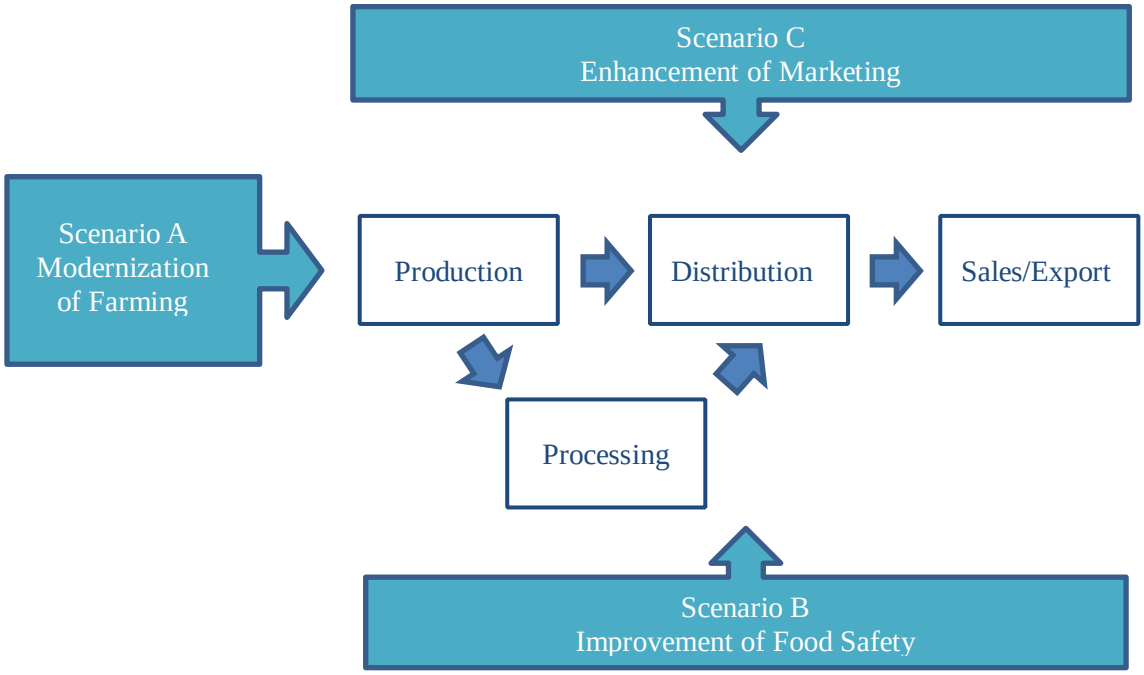


Figure 6-1: Correlation Diagram of Proposed Scenarios

Referring to the survey results and insights on applications of Japanese technologies, detailed project design is discussed. A methodology to shape the future project designs is illustrated in the diagram below.

Scenarios A, B, and C are shown in the boxes below which describe the Project Title, Background, Overall Goal, Project Purpose, Outputs and Activities. Scenario A is to enhance modernization of farming by training in Japan. Scenario B is to enhance food security by a technical assistance project focusing on field level monitoring. Scenario C is to enhance marketing by a technical assistance project linking marketing abroad and capacity development of producers in the country.

A-1. Country Specific Dialogue Program for Agri-food Product Promotion

Project Title	Country Specific Dialogue Program for agri-food products promotion in Moldova
Background	MoAFI in Moldova adopted a policy to enhance competitiveness of the agriculture sector by transitioning from traditional agricultural practice to modernized HVCs production such as F&V and restructuring value chain of agri-food products. In fact, economic profitability of F&V is around 5 times and 10 times higher than cereals, respectively. In the particular case of fruits, they count for around 40% of agricultural production value. Contrary to the economic value and profitability in the agriculture sector, sown areas of cereal crops in 2016 is 63% in arable land which is 72.9% of agricultural land[125]; meanwhile, the area of perennial crops in agricultural land is only 11.5% and sown areas of vegetables (including potatoes) are only 3% of arable land. Moreover, the sown areas of HVCs are decreasing every year. The reasons behind the decrease of sown areas of HVCs may be various, but one of the main causes is shrinkage of the market. Russia, Moldova's traditional export market, imposed a trade embargo for Moldovan agricultural products from 2013. Due to the effect of the embargo, Moldova has to diversify markets in and out of Moldova including EU countries. In order to diversify the market, a new strategy to improve competitiveness of agri-food products through promotion is required. Though the Moldovan government has prioritized plans and policies aimed at improving the competitiveness of the country's agriculture sector as part of the National Strategy on Agriculture and Rural Development for the period 2014 – 2020, there are various constraints such as budgetary limitations. It is necessary for decision makers in Moldova to identify the key issues among broad themes within the sector and to implement an effective solution in an efficient manner, utilizing assistance from development partners. Sixth Industrialization, One Village One Product (OVOP), restructuring of wholesale market and other agri-food promotion policies have been undertaken by the Japanese government. There have been many trials and errors since then along with lessons learnt. Challenges in the agriculture sector and experiences in agri-food product promotion in Japan will be capitalized on in improving competitiveness of agri-food items of Moldova. In order to share the experience of agri-food product promotion in Japan with Moldovan key actors in the agriculture sector, the country specific dialogue program for Sixth Industrialization has been proposed.
Overall Goal	Policy on agri-food products promotion is implemented and competitiveness in international market is improved
Project Purpose	Public investment strategy and plan and its implement on agri-food products promotion in Moldova is enhanced.
Outputs	1. Learn policy, strategy and relevant laws for promotion of agri-food products in Japan 2. Learn Agriculture and commerce cooperation, Sixth Industrialization, export oriented wholesale market, and other local agri-food products promotion activities in Hokkaido 3. Learn policy and practice of collaboration between local government and private sector in promotion of agri-food production. 4. Prepare a strategy and investment plan for promotion of agri-food products in Moldova
Activities	1-1. Conduct lecture on agri-food products promotion policy in Japan 1-2. Conduct lecture on organizational and institutional arrangement for agri-food products export promotion in Japan 2-1. Conduct lecture on short history of agriculture sector development policy, its achievements and challenges in Hokkaido 2-2. Conduct lecture on general situation and success stories of OVOP, Sixth Industrialization, wholesale market and other local agro-industry promotion activities in Hokkaido

[125] Please see "Table 2 3: Land Use in Moldova" on page 7 for difference between arable land and agricultural land.

	2-3. Field visit to observe OVOP, Sixth Industrialization and wholesale market, other local agro-industry promotion activities in Hokkaido and neighboring regions 4-1. Conduct lecture on policy on agri-food products promotion by Hokkaido government 4-2. Conduct lecture on collaboration for agri-food products promotion activities between Hokkaido government, private sector and other relevant actors 4-3. Visit Hokkaido government and learn institutional and organizational arrangement for promotion of agri-food products 5-1. Make draft strategy with investment plan for promotion of agri-food products in Moldova 5-2. Hold workshop for sharing draft strategy and collect comments and feedback from participants 5-3. Present the strategy for agri-food products promotion, and finalize it
Inputs	Japan training: 12 participants x 3 weeks for 3 times (years)

A-2. Country Specific Dialogue Program for Agriculture Modernization Policy for Enhancing Competitiveness

Project Title	Country Specific Dialogue Program for agriculture modernization policy for enhancing competitiveness
Background	MoAFI in Moldova adopted a policy to enhance competitiveness of agriculture sector by transitioning from traditional agricultural practice to modernized HVCs production such as F&V and restructuring the value chain of agro-food products. Lack of modernization or mechanization is one of the crucial bottlenecks for the HVCs' production such as farm machineries including irrigation equipment and postharvest management facilities such as pre-cooling and storing in appropriate temperature, sorting, grading, and packing. In cereal production, rate of machinery cost and manual operation cost in variable cost are around 60% and 2% respectively. It means that the cereal production highly depends on machinery in its operation. In F&V production, the rate of machinery cost and manual operation cost are both around 35%. In other words, F&V productions comparatively depend on manual operation, and modernization of the production process can contribute to reduction of labor costs. By modernizing HVCs production process, producers can increase scale of production, and increase profitability by reducing operation costs. Moreover, compared to cereal crops, postharvest management of HVCs is a significant determining factor for food loss rate, quality and safety. This obstacle for HVCs production and postharvest management can be also demonstrated by the availability of machineries. For example, field coverage of existing essential farm machineries for HVCs is around 60%. Moreover, 77% of tractors and 50-60% of essential attachments are older than their standard service life which is 10 years. Most of the farmers cultivate farmland by renting machineries or machinery services which are one of the limiting factors that keep farmers in a state of low productivity. Because of annual rainfall patterns, the optimum cultivated period is short and not so flexible in Moldova. In relation to rainfall patterns, irrigation coverages for fruit and vegetables is only about 15% and 10%, respectively. Though there is no statistical data on the number of postharvest management facilities, it is extremely limited. Achieving the targets set in the policy of the agriculture sector, investment on modernization of farm machineries including irrigation equipment for production and postharvest management facilities that improve productivity, quality and consequently profitability is inevitable. Though MoAFI has already been supporting HVCs producers through the policy of subsidies and donor funded projects, there is no specific policy on modernization that can guide MoAFI and relevant agencies into planning their project or activities for restructuring the value chain of agro-food items. Establishment and enhancement of special agency for data collection and processing in agriculture sector such as Agriculture Information Center (AIC) may enable MoAFI and relevant agencies to formulate their evidence based policy and plan; however, sufficient data has not yet been accumulated and well capitalized for the purpose of modernization of agriculture sector. Therefore, there is a significant need to establish an institution that can identify needs, extract essential machineries, equipment and facilities to realize high productivity, quality and safety of HVCs and finally to elaborate a concrete modernization policy for HVCs to maximize the impact of public investment. 2KR PIU which was originally established to serve 2KR scheme assisted by Government of Japan and sustain their project activities with the revolving fund and the fund provided by other donors (for example SDAM established for implementing MCC/USAID project disseminated irrigation equipment through 2KR PIU to facilitate use of rehabilitated irrigation infrastructures like pumps and channels) has a long history of experience in modernizing agricultural activities and developed strong network with farmers and partner agencies. Moreover, Steering Committee of 2KR has been functioning as policy level decision making and management since the beginning of 2KR scheme in Moldova. Restructuring the Steering Committee and

	2KR PIU from a project oriented institution to policy making and implementation institution, MoAFI will be able to make tangible an investment plan to realize high productivity, quality, safety and consequently competitiveness in HVCs in Moldova. This program aims to share experience of agricultural modernization policy and the implementation in Japan with relevant officials and staffs in 2KR Steering Committee and PIU so that MoAFI will be able to restructure 2KR Steering Committee and PIU to become an agency that can bear responsibility for modernization of agriculture sector.
Overall Goal	Sound modernization of agricultural sector and its implementation contributes to the competitive agriculture enhancement.
Project Purpose	Modernization planning and implementing capacity is enhanced based on the situation analysis and targeting an ideal situation.
Course objectives	1. Learn brief history of modernization policies, relevant laws and their impacts on agricultural production, postharvest management and processing in Japan 2. Learn mechanization plan and profitability assessment 3. Learn organizational and institutional arrangement for policy making and implementation of agricultural modernization 4. Prepare a plan to establish organizational and institutional arrangement for policy making and implementation of agricultural modernization
Activities	1-1. Conduct lecture on background, policy and relevant laws for modernization of agriculture in Japan 1-2. Conduct lecture on macro level trends of modernization in agricultural sector 1-3. Conduct lecture on case studies (F&V) of promotion of modernization policies 2-1. Conduct lecture on the methodology of mechanization plan 2-2. Conduct field survey to assess mechanization of individual farmers or enterprises 3-1. Conduct lecture on organizational and institutional arrangement for agricultural modernization in Japan (the roles of ministries, relevant agencies, local government and agricultural cooperative) 3-2. Conduct field visit to agricultural cooperative and local government to learn field level promotion of modernization 4-1. Make possible organizational arrangements and responsibilities of relevant organizations for promotion of agricultural modernization 4-2. Make outline of modernization policy and timeline of implementation in Moldova
Inputs	Japan training: 12 participants x 3 weeks for 3 times (years)

A-3. Country Specific Dialogue Program for Development of Livestock Sector in Moldova

Project Title	Country Specific Dialogue Program for development of livestock sector in Moldova
Background	MoAFI in Moldova adopted a policy to enhance competitiveness of agriculture sector by transforming from traditional agricultural practice to modernized high value agri-food production. The livestock sector did not manage the transition from a centrally planned to free market economy well. During Soviet times animal production was concentrated in large farms which were privatized after the animals were distributed to the local population. Many animals have been slaughtered in rural households as there wasn't sufficient fodder and shelter available. Especially the transfer of cows to private households has been difficult and the situation is still tenuous as it is not easy to raise 1 - 2 cows in the backyard. Today the animal production counts substantially – with the exception of poultry – fewer heads than in Soviet times. Cattle counted 1,112,000 heads in 1989 and in 2016, just 186,000 heads. Swine dropped from 2,045,000 to 453,000 heads; sheep and goats from 1,344,000 to 869,000. Only the headcount of poultry increased from 25.5 million to 45 million in 2016. A remarkable decline of milk and meat products in Moldova was caused by the dramatic transition from state own centrally managed industry to free market economy. Owners of animals are now small to medium scale farmers who do not have good access to finance, advanced technologies nor possess technical knowledge. In retrospect, during the Soviet era, Moldova had much higher potential to develop the livestock sector. In order to revive the livestock sector, MoAFI needs to study the present situation and identify the bottlenecks preventing the revival of the livestock sector. Analyzing the present situation, MoAFI will be able to elaborate a concrete strategy to solve the problems in the livestock sector, and learning from experience in sector development and promotion of animal products especially milk and meat from cattle which is one of major stock farm products in Moldova. In the Country Specific Dialogue Program, the participants will formulate strategy with a specific timeline and investment plan for enhancing meat and milk products promotion in Moldova.
Overall Goal	Value chain of milk and meat products is enhanced and productivity and profitability are improved
Project Purpose	Public services with investment plan for enhancing meat and milk products promotion in Moldova are improved.
Course Objective	1. Analyze the present situation and bottlenecks in livestock sector development, especially milk and meat products from cattle in Moldova 2. Learn policy, strategy and relevant laws for development of stock farm products in Japan, especially the case of Hokkaido 3. Identify the specific policy, strategy or technologies for enhancing milk and meat products in Japan that may applicable for Moldovan livestock sector 4. Prepare a strategy with specific timeline and investment plan for enhancing milk and meat products from cattle in Moldova
Activities	1-1. Study and review the present situation of livestock sector in Moldova, and address the major issues to be solved 2-1. Conduct lecture on policy, strategy and relevant laws for development of stock farm products in Japan 2-2. Conduct lecture on short history of livestock sector development policy, its achievements and lessons learnt in Hokkaido 2-3. Visit field of milk and meat production, processing, distribution and marketing in Hokkaido and neighboring regions 3-1. Make presentation on production, processing, distribution or marketing of milk and meat products in Hokkaido that learnt in the lectures and field visit 3-2. Make presentation on any aspects of milk and meat products that may be applicable in Moldova with concept of strategy 4-1. Produce draft strategy of milk and meat products development and promotion in Moldova, and present it for comments

	4-2. Produce strategy for milk and meat products with specific timeline and budget
Inputs	Japan training: 12 participants x 3 weeks for 3 times (years)

B. Project for Development of Monitoring and Traceability System on Food Supply Chain (Technical Assistance)

Project Title	Project for Capacity Development of NFSA in Monitoring and Traceability System on Food Supply Chain
Background	Russia has imposed a trade embargo on Moldovan agricultural products since2013. Due to the effect of the embargo, Moldova has had to diversify its export destinations which now target EU countries. In order to arrive at the EU market, quality improvement and food safety management system are key elements. Country assistance policy for Moldova by Japanese government describes that industrial promotion including agri-food sector and export promotion as a prioritized field of assistance. Effective human resource development and capacity building for public agencies are needed to achieve this middle term goal. All actors of the food supply chain recognize the importance of food safety management and the government is developing a food safety control system in line with EU standards and DCFTA technical requirements with support from donor agencies. Yet the lack of development and insufficient food safety management are some of the biggest barriers for export promotion. From the data on monitoring programs of NFSA, out of 567 samples tested in 2016, 4 samples failed on pesticide residues and 52 samples on nitrate residues. On the other hand, out of the total 41,211 investigations conducted by rayon and municipal PHCs on the nitrate contents and pesticide residues during 2010-2015, 1914 or 4.7% of investigation proved to be noncompliant. Although there is a difference in the failed sample ratio between NFSA's monitoring and that of the PHC, a noncompliant rate of about 5 to 10% is much higher than the Japanese monitoring result for imported food which counted0.14% or 140 legal violation cases out of 96,580 samples in 2014. Synergies in the data of NFSA and other agencies such as the MoH who is implementing monitoring programs is limited as they generally work independently. Review and integration of similar monitoring programs across the division and ministries is needed for efficient monitoring operation. According to *National Agriculture and Rural Development Strategy for the period of 2014-2020*, a lack of implementation of the full range of food safety standards and food quality standards was pointed out as one of the difficulties for development of agri-food sector in Moldova. *National Strategy on Food Safety for the Republic of Moldova for the Period 2017-2022* stressed the lack of human capacity and information technology IT system. There is currently no integrated IT system in relation to food safety management and controls in Moldova. Most records and data from territorial divisions are still in paper copy based. It is necessary to have an IT system for proper utilization of the large amounts of metadata for risk-based decision making. There are a maximum 1,422 staff of territorial, rayon/municipal food safety subdivisions in total including border check points and central body of the service in the country; however, there are many vacant positions due difficulties in finding skilled specialists for these positions. A lack of specialists of territorial food safety subdivision (local NFSA staff) is a crucial issue for implementation of planned annual monitoring. According to an interview with a local NFSA inspector, a huge amount of paper work for monitoring report and lack of specialists hampers the efficient operation of their activities. In order to reduce noncompliant cases of monitoring and possibilities of rejection cases in destination country, enhancement of capacity building of NFSA staff, organizational control system for monitoring and broad and seamless monitoring system are highly recommended. At the same time, from the perspective of efficiency and effectiveness of monitoring, development of an integrated information technology system is also a key component to enhancing food safety control from the business activity monitoring level to central decision making level.
Overall Goal	To enhance food safety system to remove obstructive factor for export promotion
Project Purpose	To improve food safety monitoring system based on results of periodical monitoring

	by introducing a digitized information system and capacity building of local inspectors under NFSA
Outputs	1. Revised work process flow and organizational structure as premises for installation of integrated food safety information system are introduced. 2. Integrated information system for food safety "e-ANSA" is developed and implemented. 3. Manual for operation of integrated information system is created. 4. NFSA's Monitoring and management skills to secure safety agricultural products / food stuffs are improved. 5. Evidence and risk-based decision-making system (Strengthening PDCA for monitoring system) is enhanced. 6. Reporting process speed of monitoring result from subdivision to central and work efficiency of local NFSA staff are improved.
Activities	1-1. Research current situation of monitoring activities and noncompliant cases in each territorial subdivision (including corrective action for noncompliant case) 1-2. Research implementation organizational structure of each food safety monitoring body including other ministries and institutions 1-3. Review organizational structure and work process of NFSA related to monitoring system in order to develop organizational capacity (effectiveness and efficiency) 2-1. Develop and implement integrated information system "e-ANSA" (Formulating data based monitoring system based on the result from Activity 1) 3-1. Prepare operation manual for integrated information system 4-1. Research current situation of training for local NFSA staff (External training, Internal training: On-the job training, Off-duty training) 4-2. Improve training program for local NFSA staff (Implementation of pilot training program for local NFSA inspectors) 4-3. Train new information system for all staff of the agency 4-4. Share Japanese knowledge and skill for improvement of national monitoring system for food safety (for local NFSA inspectors or for central NFSA staff) 5-1. Improve annual monitoring planning for risk-management action based on analysis of previous monitoring results 6-1. Monitor effectiveness of new reporting process based on the new integrated information system

C. Project for Export Promotion of Local Agri-products (Technical Assistance)

Project Title	Project for Export Promotion of Local Agri-products
Background	Ministry of Agriculture and Food Industries in Moldova adopted a policy to enhance competitiveness of agriculture sector by transitioning from traditional agricultural practice to modernized high value crops (HVCs) production such as fruits and vegetables (F&V) and restructuring the value chain of agro-food products, aiming to increase value added domestically. In fact, economic profitability of fruits and vegetables are around 5 times and 10 times higher than cereals, respectively. 61% of fruits and 86% of vegetables are produced by family managed farms or households that usually run small to medium scale farms (less than 50ha). Besides producing HVCs and processing domestically, another important factor to realize high profitability is the connection to high value markets, where end-users are prepared to pay more for quality food products. In conjunction with the Russian embargo and DCFTA, the EU market is currently regarded as the most important market. On the other hand, looking at the reality, the weak linkages between Moldovan producers and buyers in EU market is one of the most discouraging factors for small and medium producers who have started or are starting to invest on HVCs production. This weak linkage with the EU market is inherited from Moldovan traditional export structure, which had been largely dependent on the Russian market. The mission of building new business relationships with new markets, including EU, is assigned to the state agency under Ministry of Economy, Moldovan Investment and Export Promotion Organization (MIEPO). In National Strategy for Investment Attraction and Export Promotion 2016-2020, MIEPO is directed as the key public institution for export promotion. At activity level, MIEPO is currently publishing information of Moldovan major agri-products and suppliers, and supporting private attendants in international food fairs and exhibitions. While experience and knowledge of sales negotiation has been steadily accumulated at the attendants, the export opportunity is still very limited due to the lack of domestic process which encourages incremental improvement and sustainable growth. In other words, the beneficiaries of export promotion program remain merely some large enterprises or established associations. As often pointed out in the national paper and the WB report, in order to enlarge export opportunities to broader beneficiaries of the sector, the public assistance needs to enhance the organic linkage between the two public functions, export promotion and competitiveness building. Fortunately, MIEPO is expected to closely work with the newly introduced overseas outreach of MoEI, economic diplomats. This collaboration will improve MIEPO's capacity to collect necessary information for realizing export, by country, such as food safety standards to obey. From the perspective of competitiveness building, MIEPO does not have the sufficient dissemination system inside the country to broadly transmit its export know-how. In consideration of MIEPO's limited budget and human resources, the engagement of ODIMM is proposed. ODIMM is the state agency under the Ministry of Economy and Infrastructure, which has the mission of SME development and operates the Business Incubator Network. JICA had assisted the agency in developing NBEC, the center of its regional consultancy outreaches. While ODIMM already has a lot of experience to deal with agricultural enterprises, especially through subsidy application support, one of the next targets of the organization is to provide SMEs consultancy services and training courses designed as export support. In order to incubate promising Small and Medium enterprises in Moldova who deal the agri-products, including HVC farmers, the governmental coordination among

	MIEPO, Economic Diplomacy and ODIMM is desired with the help of Japanese know-how and experience.
Overall Goal	To enhance competitiveness of Small & Medium businesses for export as growth engine of the agriculture sector in the Republic of Moldova.
Project Purpose	Public consultancy for "Market-oriented agri-products" is institutionalized.
Outputs	1. Systematic collaboration methods between ODIMM and MIEPO are ensured. 2. MIEPO's capacity to promote Moldovan agri-products and to analyze the specific market demands is increased, utilizing economic diplomats abroad. 3. Internal capacity of ODIMM to achieve the export-readiness of SMEs is enhanced.
Activities	1-1. Set up the working group, consisted of MIEPO and ODIMM members. 1-2. Embed Periodical Liaison Meeting; Standardize communication method and develop a format to exchange date from both sides. 2-1. Test out Sales Support Activities in Selected Pilot Overseas Markets. 2-2. Define the Export Support Process in MIEPO' Operation Manuals. 3-1. Select Business Incubators (BI) [126] for Pilot Sites. 3-2. Analyze small and medium enterprises dealing agri-products in the area of selected BIs. 3-3. Develop an Operation Manual, based on the information on overseas market from MIEPO. 3-4. Provide technical supports to small and medium enterprises dealing agri-products by experts at BIs. 3-5. Monitor the practices of supported agri-producers, Identify the best practice, and Redefine the Operational Manual.

[126] Business Incubator is the center which provides a wide range of supports from settlements to trainings and business advisory for local entrepreneurs.