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Stratan, Alexandru and Moroz, Victor and Ignat, Anatolie

Institutul de Economie, Finanțe și Statistică. Chișinău, Republica Moldova, Institutul de Economie, Finanțe și Statistică. Chișinău, Republica Moldova, Institutul de Economie, Finanțe și Statistică. Chișinău, Republica Moldova

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# IMPACT OF ECONOMIES OF SCALE IN THE HORTICULTURAL SECTOR OF THE REPUBLIC OF MOLDOVA

STRATAN ALEXANDRU<sup>1</sup>, MOROZ VICTOR<sup>2</sup>, IGNAT ANATOLIE<sup>3</sup>

**Abstract.** *The major objective of the article is to provide an overview of the Moldovan High Value Agriculture (HVA) sector that can be useful to investors, producers, traders, donors and government officials alike, enabling concrete actions to be taken toward significantly increasing HVA exports. The article examines how the farm restructuring and land reform processes in Moldova have affected productivity and incomes in horticulture. To capture a comprehensive picture of the impacts of farm restructuring this study integrates analysis into the different quantitative and qualitative surveys during last ten years. The quantitative surveys cover the present situation mostly through questions that can be answered simply through multiple choices of yes/no responses or in a numerical form. The article integrates also the major findings from the Agricultural Census 2011. The qualitative surveys complement the quantitative research by focusing on the process of change involved in restructuring, the reasons for these changes and peoples' attitudes toward the changes. The major conclusion of this paper is that the HVA sector, which used to make a significant contribution to Moldova's economy has undergone a profound collapse which resulted from major structural changes, including the fragmentation of land, depopulation of rural areas, collapse of most irrigation schemes, and the rapid change in the demand of its traditional destination markets. Faced with this situation it would be unrealistic to expect a rapid recovery of the sector, even though a number of existing private sector initiative demonstrate the potential for profitable investment in a wide range of fresh and partly processed products.*

**Key words:** *Horticulture, structural changes, agricultural policies.*

## INTRODUCTION

In an era of rapid changes and increase of risk and uncertainty, agricultural policies and practices in developing states face a number of limitations that reveal their long term durability shortcomings and their ability to meet the range of objectives which they are expected to provide. The transformation process in most countries of Central and Eastern Europe (CEEC) focused on the restructuring of the organization of agricultural production in promoting the privatization of former agricultural production co-operatives and state farms. Production entities compatible with the market economic system emerged although in many cases the legal label was changed, only.

Moldova has been engaged in substantial export trade with its wine, fruit and vegetable products, and within former USSR, has enjoyed a good reputation as a supplier of these commodities. In addition to export of canned products, Moldova has traditionally exported fresh fruits and vegetables. Moldovan horticultural products are being displaced from their traditional FSU markets by other economies in the region that are fast developing their capacity in agricultural production and marketing. Production has steadily decreased throughout the decade. Furthermore, access to new European markets is very limited. Due to the inability to respond to changing market demands and due to uncompetitive production method in horticulture, Moldova is continuing its slide toward a subsistence rural economy. However, a number of local initiatives referring to development of horticultural production were launched during last few years.

## MATERIAL AND METHODS

Given the challenges the national economy has to face with, we highlight the following socio-humanistic research methods such as: conceptual approach, analysis of the impact of public policies in rural areas, including in agriculture, comparative analysis of the experience of Central and Eastern European countries, etc. There were also used quantitative research methods to evaluate the agricultural systems in the Republic of Moldova. The qualitative surveys complement the

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<sup>1</sup> Dr. hab., Stratan A., Institutul de Economie, Finanțe și Statistică. Chișinău, Republica Moldova

<sup>2</sup> Dr. Moroz V, Institutul de Economie, Finanțe și Statistică. Chișinău, Republica Moldova, email: [ymoroz27@gmail.com](mailto:ymoroz27@gmail.com)

<sup>3</sup> Ignat A. Institutul de Economie, Finanțe și Statistică. Chișinău, Republica Moldova

quantitative research by focusing on the process of change involved in restructuring, the reasons for these changes and peoples' attitudes toward the changes.

The purpose of this study is to observe the structural changes in agriculture and their effects on the social and economic development of the country. In this context, we have studied several studies, scientific papers and strategic documents related to High Value Agriculture (HVA) and structural transformations in rural areas [2, 3, 4, 6, 7, 8, 9]. Also studies where authors participated have been used as reference documents. Based on this fact, the current transformations in rural areas have been conceptualized in connection to migration and depopulation of rural areas of the Republic of Moldova.

The article highlights the existing agricultural systems, in order to show the causes of low agricultural productivity. Assumptions are based on the comparison and interpretation of calculated indicators for rural areas. The analysis refers mainly to economic and social problems, with a special attention to the impact of the economy of scales over the High Value agricultural production.

## RESULTS AND DISCUSSIONS

Moldova enjoys a favorable climate and good farmland, but has no major mineral deposits. As a result, the economy depends heavily on agriculture, featuring fruits, vegetables and wine. Moldova imports most of its supplies of oil, coal, and natural gas, largely from Russia.

Agriculture contributed with 12% of the country GDP in the year 2011. About 28% of the active population of the country was engaged in agriculture in 2011, and about 5% were employed in the food processing industry.

Horticulture, including primary production and agro-processing has a multiplier role in the national economy, creating demand and stimulating the creation of added value in other branches of the national economy, such as trade, construction and financial services. The share of horticulture in the total agricultural production amounted to about 33% in the year 2011. Production of the grapes - 14,4% and fruits - 4,8% of total agricultural production in 2011 are predominantly export oriented, while vegetables -7,8% and potatoes -5,8% are used mostly for local consumption (see figure 1).

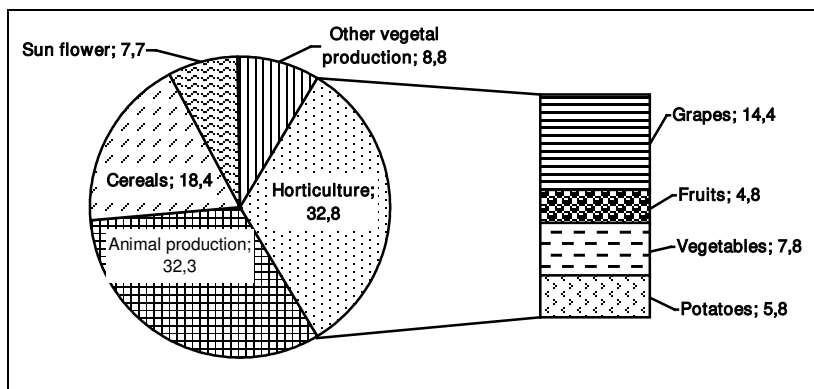


Figure 1. Structure of the agricultural production, 2011, %

According to the national land cadastre on January 1, 2011 most of private agricultural land (40.4%) is owned by limited liability companies. In the possession of peasant farms are about 33 percent of the land. About 13% of agricultural land are cultivated independently by private owners, while cooperatives and joint stock companies own 7.5% and 2.4% of private land, respectively (see figure 2).

According to preliminary data of the General Agricultural Census in 2011 were working 903 000 agricultural units, including 391,646 peasant farms, 232 agricultural cooperatives, 161 joint stock companies and 3624 limited liability companies.

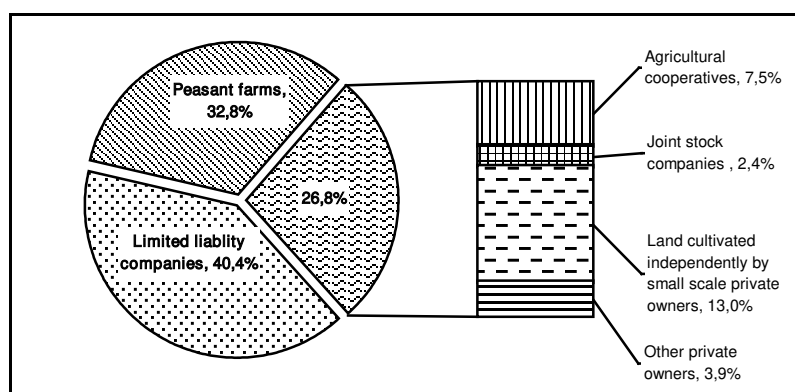


Figure 2. Structure of the private agricultural land according to the form of farms' organization, 2011, %

Average size of an agricultural holding is 2.2 ha, including agricultural holdings with legal entity - 247.9 ha, and those with physical entity - 0.8 ha.

According to the General Agricultural Census of 2011 lands of agricultural holdings are divided into 2.65 million plots. Each farm holds on average 2.9 plots of land. At national level the average size of parcels is 0.8 ha, including farms with legal entity - 25.8 ha, and those with physical entity - 0.4 ha. In many cases these parcels are located at a distance of 9-20 km from each other [1].

This fragmentation of agricultural land is largely a consequence of the imperfection of the legal framework and insufficient law enforcement. Thus, under the latest version of the Land Code, art.13 – the equivalent land share to be granted in kind in accordance with the land management project can be divided, depending to the situation at most within 3 plots of land (arable land, vineyards and orchards). However, within the framework of privatization process "Land" the equivalent shares of land in many cases were divided into 5-7 plots with the minimal size of the plot of about 4-5 ars.

Of the total number of 903 000 agricultural units registered within the General Agricultural Census of 2011, only 4800 (0.5% of the total) are farms with legal entity (limited liability companies, agricultural production cooperatives, joint stock companies, state enterprises, research institutes and agricultural schools, local councils / municipalities owning agricultural land, religious establishments, NGOs and other agricultural enterprises) and about 898 000 (99.5%) are agricultural units with physical entity (peasant farms, individual and family households, etc.). The corporate type of farms in particular such as Limited Liability Companies and Joint stock Companies in recent years have shown increasing trends of the number of households and respectively the reduction of the areas held by them as a result of adjustment to market conditions. Simultaneously, family peasant farms shows increasing trends of the number of households with areas larger than 5 hectares in recent years, keeping at the same level the number of households with 1-5 ha and reducing the number of households that have less than 1 ha of land (see table 1).

Table 1. The number of agricultural holdings, 2007-2011

Agricultural units	2007	2008	2009	2010	2011
Agricultural cooperatives	239	259	283	233	232
Joint stock companies	116	109	108	170	161
Limited liability companies	1342	1344	1513	2038	3624
Peasant farms (thousand)	390	386	381	400	392
<i>Including with area</i>					
Larger than 100 ha	186	209	203	276	559
From 50 up to 100 ha	105	113	143	524	780
From 10 up to 50 ha	746	904	1126	1794	2729
From 5 up to 10 ha	3307	4156	4320	3958	4175
From 1 up to 5 ha (thousands)	2405	216	224	241	240
Less than 1 ha (thousands)	147	165	152	146	144

Source: Elaborated by authors based on data from the National Land Cadastre [3]

Currently about 98% of the total number of peasant farms have areas less than 5 ha, including about 37% of them that have less than 1 ha, and 61% that holds areas from 1 to 5 ha. Together these agricultural units have worked about 42% of total agricultural land in Moldova in 2011.

Peasant farms have a significant share in total agricultural production. Together with population households they deliver essential quantities of agricultural products. Thus the major part of the production of corn, potatoes, vegetables, fruits and grapes are concentrated in the community of small-scale farmers (see table 2).

Table 2. Share of population households and peasant farms in the total volume of vegetal agricultural production, 2007-2011, %

Crops	2007	2008	2009	2010	2011
Winter wheat	23,6	29,7	33,0	28,7	28,3
Barley	26,3	26,8	30,5	36,0	37,7
Corn	91,3	83,8	89,9	84,5	80,9
Leguminous vegetables	53,9	56,9	51,4	58,9	69,5
Sun flower	33,4	31,7	33,2	30,2	31,9
Soya	32,9	26,0	31,3	22,3	21,6
Sugar beet	14,8	9,6	12,1	13,5	8,5
Tobacco	19,4	17,9	13,6	19,7	22,2
Potatoes	88,6	90,7	88,9	83,4	84,6
Field vegetables	80,2	78,9	84,5	83,9	84,0
Pumpkins	96,6	96,7	97,5	97,8	98,0
Fruits and berries	52,1	50,5	57,9	59,8	62,2
Grape	80,0	77,8	79,7	85,7	78,6

Source: elaborated by authors based on the Statistical Yearbook, 2012 [5]

The concept of the land reform was grounded on the assumption that the thriving smallholder rural economy based on small household farms, combined with rapid development of land markets will allow exit from farming of those individuals and households who did not see their future in farming. The resulting fragmented small agricultural farms have proved unviable in all, excepting those located in peri-urban areas. Moreover the small households who own the land have neither the financial and technical means to farm their land, in many cases were abandoned by the most part of the young people opting rather to migrate, either internally to larger urban areas or to seek a job abroad [8]. As a result the number of people employed in agriculture decreased from about 533 thou in 2004 to about 323 thou in 2011. The same trend is typical also for large agricultural enterprises (see figure 3).

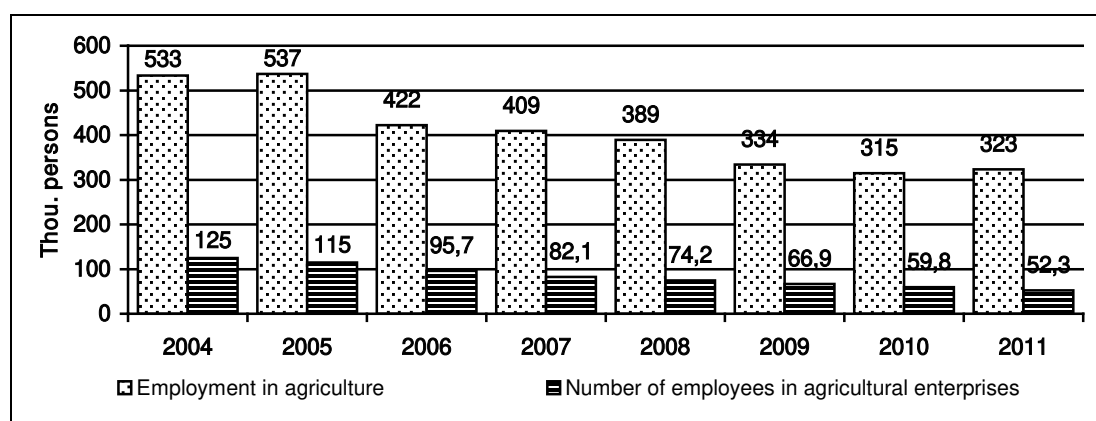


Figure 3. Employment in the agriculture of the Republic of Moldova, 2004-2011, thou. persons  
Source: Statistical Yearbook of the Republic of Moldova, 2012 [5]

The land reform process also caused an abrupt collapse of the majority of the former large irrigation schemes. Many of these became uneconomic due to the increase of the energy prices to the market level, and others collapsed due to the management problems which arose from the fragmentation of land, as institutional arrangements for the management of the irrigation schemes did not keep pace with the distribution and new ownership of land. To the extent that the fruit and vegetables production depended on irrigated water supply, this was a major factor in depressing horticultural productivity in the late 1990s.

During the post land privatization period there have been developments which have tended to correct these problems from the point of view of agricultural supply, even though the land markets remain non-transparent and ineffective. Substantial concentration of control over land has in fact occurred, typically based on extended lease-holdings taken on relatively large areas of land by the “leaders” who emerged from the land reform process, and other types of corporate farms established by one or more leaders or commercial investors into the agricultural sector. While this development has been effective in ensuring that the larger part of the arable area is cultivated, it has been less effective in restoring competent management and investment to the orchards and vineyards which require a longer term investment based process for which the present lease-holding-based arrangements are not well suited [8].

An alternative to individual farming in order to increase their bargaining power in relation to the processing industry is creating local associative structures such as marketing and production cooperatives.

The efficiency and competitiveness of the rural sector is dependent on a coherent approach regarding land tenure. Land fragmentation is an important factor affecting the Republic of Moldova as many other countries and its resolution through land consolidation would give to agricultural producers an incentive to invest in their farms and to remain in rural areas.

Taking into account the risk of land abandonment and depopulation, due to the high level of migration from rural areas, there are several opportunities for intervention in order to assure a sustainable development of the rural sector. Thus the demographic development can be influenced to a limited extent, while socio-economic factors and institutional frameworks can be addressed by appropriate policies.

The traditions of wine making, has a long history, Moldova being one of the oldest wine-producing countries known. Between the two World Wars vineyards were destroyed, production yielded and the previous practices and cultural developments were lost. It was only until the 1960s that wine-production became a viable activity again as demand in CIS increased significantly, and the practices (specifically the storage in caves) resumed [9].

Up until the 1980s, the increasing demand initiated the development of winery sector in Moldova, and it became the largest supplier of wine in the Soviet Union. Nowadays, Moldova’s wine sector continues to be one of the most significant agricultural sub-sectors in a predominantly agricultural economy. As an industry it accounts for about 10-11 percent of total exports on average for the period 2008-2011. About 6 percent of total agricultural land is used for production of grapes. Although figures are difficult to obtain, it is recognized that the wine industry provides employment to a significant number of rural households, with an estimated 70 thou of persons, predominantly smallholder farmers involved in the commercial cultivation of grapes, and a further 5,000 individuals involved in wine processing. The significant numbers of smallholders engaged in grape cultivation, as well as those who derive employment from working on vineyards means that the industry has potentially significant impact on poverty reduction

The total vineyard area has seen a significant decline from the 201 thou ha in 1990 to about 140 thou hectares in 2011. Technologies based on these previously distorted energy prices became, in many cases, economically unviable, which prompted a number of 30 companies, out of 174 of companies acting in this sector to purchase modern equipment for grape processing, wine storage and bottling, mainly from Western Europe. Despite this investment prior to the privatization process, capacity remained low with most enterprises using only 20-30 percent of their production capacity.

The majority of enterprises within the sector, immediately after the privatization, were characterized by obsolete primary wine making equipment often affecting the wine's quality. This was compounded by a slow enterprise restructuring process that came at high cost to both farmers and the economy in general. Many had problems of ownership, management and control, the results of which were a large accumulation of debt and lack of investment. This led to limited marketing opportunities for the farmer's grapes and low prices. The low prices inhibited the supply response, curbed revenues and prevented the critical reinvestment required for vineyard replanting.

Thus, in the period 2004-2008 only between 4,500 ha and 5,600 ha were planted annually, with a strong decline in 2009 due to marketing and financial difficulties.

The country's plan for the recovery and development of viticulture and wine processing for the years 2011 to 2020, foresees the replacement of 80,000 ha of old plantations, with 70,000 ha of new vineyards [9].

Wine sector restructuring program was designed by the Government of the Republic of Moldova and the European Investment Bank (EIB) in order to address structural vulnerabilities of the wine industry. The program will ensure that its investments in vineyards, wine processing and related industries are performed in order to advance the production of bottled wines classified: as Protected Designation of Origin (PDO), or Protected Geographical Indication (PGI) [6].

The potential for development of the Moldovan horticulture can be estimated by reference to its results obtained during the period of 1986 - 1990, when the total area of orchards was about 220 thousand hectares, including the fruit orchards - 150 000 hectares, and the global harvest - about 1.043 million tons.

In the 90s of the last century this sector went through a deep crisis due to the economic crisis that arose from the collapse of the USSR, including reduced demand for horticultural products in traditional markets, reorganization of the distribution channels, problems related to production means, and so on. By 1999 the volume of fruit production decreased to 136 thousand tons, while foundation of new plantations was practically stopped.

However, during the last decade some positive changes were manifested in this sector. Thus, as a result of stabilization of the fruit orchard area and increasing yields, the total production of fruits has increased and reached the volume of 378 000 tones in 2011, including 278 000 tones of seed fruit species, 84 thousand tons of stone fruit species, 14 thousand tons of nuts and 2300 tons of berry crops.

In case of fresh products, the adequate post-harvest infrastructure is required in order to supply continuously the market demands and maintain the products quality, especially those delivered to long distances. Additionally, the availability of cold storage capacity allows deliveries during off-season, when higher prices are recorded.

Expansion of cold storage capacity was a priority for Moldovan horticulture during the last 5-6 years. Thus, the functional capacity of cold storage chain has doubled in the period 2004 -2012, currently representing about 135 000 tones distributed in about 250 locations.

Refrigerators are used almost entirely for safekeeping (3-5 months) of apples and grapes. However, even for these products, only about 35% of production goes through the cold storage chain.

Vegetable production remains one of the main branches of the horticultural sector of the Republic of Moldova, aimed to ensure the population with fresh vegetables and the canning industry with raw material. Relatively favorable climatic conditions of our country, traditions and experience allows the cultivation of over 60 species of vegetable crops, obtaining high yields and an impressive benefit to most crops. This is confirmed by vegetable development indices registered in the period of 80-90s of the last century, when the annual global harvest of vegetables constituted 1200-1300 tons, including 700 thousand tons were processed by canneries and more than 250 thousand tons exported fresh.

Over the years the vegetable production has dropped considerably. According to statistical data it declined to 362 thousand tons in the year 2011. In particular, decreased the volume of vegetables production for processing (only 30 000 tones) and export (only 20 thousand tons). At

present, Moldova has a neutral balance in international trade with vegetables. The country is a net importer of fresh vegetables with a negative balance of about 15 000 tons and a net exporter of processed vegetables with a positive balance of about 12 000 tons [4].

The average yield of potatoes in Moldova is currently 10-12 tons per ha. However, the potential of potatoes production, with the proper investment in seed material, chemicals and fertilizers, irrigation and modern technology, it is possible to be increased up to 30-40 tons of per ha. Moldovan climate allows producing early potatoes ready for harvest in late May or early June that makes it possible to organize potatoes export in neighboring countries. In the Republic of Moldova the yearly potatoes is cultivated mostly in the Central zone of the country, while the later varieties are cultivated in the North part of the country. Despite of the increasing production of potatoes Republic of Moldova remains dependent on import of potatoes, mostly from Poland. The export of potatoes is limited also by the small size of private households and family farms specialized in potatoes production.

The branch of processed fruits and vegetables traditionally has an important place in horticulture, represented by 79 processing units, of which seven are of large capacity, while others are of medium and small capacity.

Processing capacity for fruits and vegetables at existing enterprises is estimated at 300 thousand tons of fruit and 120 thousand tons of vegetables. In 2011 have been collected and processed 136 000 tons of fruits and vegetables, including 108 000 tons of fruits and 28 thousand tons vegetables. This demonstrates the under utilization of the existing processing capacities.

The main products of the fruit and vegetables processing industry are concentrated apple juice and canned vegetables. At the same time, the production of traditional products of processing industry such as canned tomatoes and fruit jams is constantly decreasing due to continuing loss of competitiveness in export markets.

Moldova has a strong underlying comparative advantage as a producer of fresh and semi-processed fruits and vegetables for export. This potential is not being achieved at present and the prospects under existing conditions are that sector recovery and export growth will only occur slowly. By comparison with the wine sector, which is recognized as of key national importance by the authorities during last two decades, the fruit and vegetable sector only recently has got such a status and started to receive state support. However, by virtue of the small size of the operators in the sector, fruit and vegetables exports are particularly vulnerable to constraints stemming from excessive bureaucracy and an adverse trade facilitation environment. Specific actions in order to stimulate development of the High Value Agriculture are related to: creation of product sales centers, strengthening quality control, organizing regional wholesale markets assisting producers to sell their products, development of market infrastructure at central level: storage, transportation and information.

## CONCLUSIONS

The horticultural production sector still has a significant contribution to Moldova's economy. However it is undergoing a range of serious difficulties which resulted from major structural changes, including the fragmentation of land, depopulation of rural areas, the collapse of most large scale irrigation schemes, and the rapid change in the demand of its traditional destination markets. These sectors have to date attracted insufficient foreign investment interest, both because of the difficulties faced at a sector level and because of the wider unfriendly environment for inward investment. The existing enterprises are poorly equipped to develop new non-traditional markets and have little experience on the EU markets.

Faced with this situation it would be unrealistic to expect a rapid recovery of the sector, even though a number of small existing private sector initiatives demonstrate the potential for profitable investment in a wide range of fresh and partly processed products.

The wine sector has been able to attract more investments for modernization, mostly from Russian investors. This is due to the fact that the industry has a product which, with appropriate



investment can be readily marketed into the Russian market on a profitable basis, using the existing large scale production locations. By contrast the fruit and vegetable sector offers no comparable attractive areas for investment arising directly out of the privatization process. Most investment is in green-field locations and based on substantial product innovation compared to former export products. The fruit and vegetable sector is proving much more vulnerable to the adverse effects of the demanding bureaucratic requirements for export. This is largely a function of size. For the wineries the bureaucratic obstacles to export trade are a nuisance, but given the larger sizes of both the companies and of their average consignments, the wineries are able to overcome the bureaucratic obstacles. At the same time penetration of the new markets needs new approaches positioning Moldovan wines at higher price categories.

In the same time, for the fruit and vegetables production the whole range of new networks has to be created. While this has happened to a modest degree through pure private sector initiative, there has been little public or donor investment to accelerate the process. It is unlikely that the fruit and vegetable export sector will develop rapidly in the absence of accelerated development of the domestic market, as regular supplies on the domestic market should provide the launch-pad for development of export markets. The export strategy promotion should include also strengthening of regional trade with neighboring countries.

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