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Master Thesis

Analysis of Fruit and Vegetable Markets in the Republic of Moldova.

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Declaration

I declare that I worked on my Master Thesis Analysis of Fruit and Vegetable Markets in Republic of Moldova by myself and that I used only literature resources listed in references.

24.04.2013, Prague ……..

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Abstract

Republic of Moldova is one of the fifteen post Soviet countries. This small agrarian country is located in the Eastern Europe. Before being a part of USSR, Moldova was characterized as agricultural country and as a part o Soviet Union it became the main producer of agricultural products for the entire union. In 1991 country gained independence and started a period of economical transformation. Moldavian agriculture faced many problems especially in fruit and vegetable production, but due to fertile soil and favorable climate has a very high recovery potential. It is necessary to stratify the main market constraints and opportunities. The present thesis aims on detection of dynamics and trends of annual apple and onion prices through scientific search and direct market assessment in main agricultural districts Chisinau, Edinet, Soldanesti, Calarasi, Hincesti and Causeni. There were studied apple and onion production values in different parts of the country. The present study should be useful for agricultural producers especially for apple and onion producers through collected data about production and markets. Prognosis generated in the analytical part will make possible to calculate the price during next years by the farmers interested in increasing their production and price moderation. This thesis will be useful not only for apple and onion producers in Moldova, but also for producers in other fields in the country. For Moldavian farmers this research could also be interested due to direct observations, farmer's opinions and interviews. Making this study, the author wants to help to develop Moldavian agricultural sector especially market relations through provision of the most important information for farmers.

Key words: Moldova, agriculture, agricultural markets, market analysis, fruit, vegetable.

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Abbreviations:

ACED	Project Agricultural Competitiveness Economic Development
CIA	Central Intelligence Agency
CIS	Commonwealth of Independent States
CULS	Czech University of Life Sciences in Prague
CzDA	Czech Development Agency
EU	European Union
GDP	Gross domestic product
Ha	Hectares
HACCP	Hazard analysis and critical control points
HDI	Human development index
HoReCa	Hotels Restaurants Catering
ISO	International Standard organization
Kg	Kilograms
Km	Kilometers
MDL	Moldavian Leu
MIEPO	Moldovan Investment and Export Promotion Organization
OECD	Organization for Economic Co-operation and Development
UNDP	United Nations Development Fund
USAID	United States Agency International Development
USSR	Union of Soviet Socialist Republics
WB	World Bank

1. Introduction

Republic of Moldova is a small agrarian country located in Eastern Europe. As part of the Soviet Union, Moldova pursued an agro-food policy based on three main strands: collectivization and agro-industrial integration, controlled prices and rural industrialization. The country was the dominant actor in pursuing these policies and production was dominated by about one thousand agricultural enterprises, out of which, more than half were collective farms. Both the state and collective farms were engaged in activities other than farming such as processing and the provision of social services in rural areas. (Gorton and Dumitrasco, 2006).

Under this regime, Moldova became an important producer of wine and high quality fruit and vegetable products within the USSR. Fertile soils, a favorable climate, well-educated agricultural specialists and an abundance of low cost labour, ensured that agro-food products became Moldova's most important export (Berman, 1996).

Since Moldova gained independence in August 1991, its agricultural sector has been severely depressed. It has faced a series of shocks: a large cost-price squeeze; ethnic unrest; severe droughts and the economic disruption associated with the break-up of the USSR and continuing economic difficulties in its three main markets (Russia, Ukraine and Romania) (Berman, 1996).

According to Sutton's study, (2010) agriculture has traditionally been regarded as the main pillar of the Republic of Moldova's national economy, with agricultural output accounting for over 30% of its GDP in the last five years. The sector represents approximately 50% of Moldova's total exports, utilizing over 33% of the country's labor force.

Due to its fertile soils, Moldova has a big opportunity to revive its huge agricultural production, especially in fruit and vegetable production. It is only needed to indentify the main problems and opportunities of the production and its markets. Unfortunately, there is a very small number of authors, which paid attention to this problem and analyzed fruit and vegetable markets inside of the country and their problems. This could influence positively on the agricultural markets through the information about their development addressed to the fruit and vegetable producers, to make production and marketing processes more efficient.

This thesis has been elaborated to show the overall situation on the main agricultural markets of Republic of Moldova. Further it describes the possibilities, opportunities and problems of small and medium scale farmers. In this thesis six major fruit and vegetable markets located in

different parts of the country (Chisinau, Edinet, Soldanesti, Calarasi, Hincesti, Causeni) will be studied and the main objective is to analyze the prices of the production and to estimate the pricing process and to find solutions how to decrease prices and to increase the production.

The present thesis is organized as follows. The first part presents an analysis of agricultural production and fruit and vegetable markets in Republic of Moldova. This analysis was performed using scientific sources, citing authors and articles, describing the present topic.

The second part shows the results gained by the author of the thesis, on the basis of the studies which were done directly on the markets.

Results which were obtained on the markets were compared with the information given in the literature review and in the final part of the thesis there have been stated the conclusions and recommendations, which show if this comparison corresponds to the author's expectations and prognoses.

2. Literature review

2.1. Country profile

Republic of Moldova was one of the smallest countries of the former Soviet Union. The country became independent in 1991. According to population census, (2009), the population of Republic of Moldova is about 3,56 million people, which is represented by people of varied ethnic and religious composition and it is seen that the population is decreasing from year to year. Following the results of National Bureau of Statistics of Republic of Moldova review (2010) main ethnic group consists of Moldavian people (64.5 percent), the second group is represented by 13.8 percent of Ukrainians, then 13 percent of Russians and other nationalities (Gagauz, Bulgarians, Polish, etc.).

Moldova is one of the poorest countries in the Europe. According to the studies made by Cashin and McGrath, (2006) in the past Moldovan economy was largely dependent on agricultural exports to the former Soviet republics and subsequently import of raw materials, especially oil, gas, coal at very affordable prices, and after the collapse of the Soviet Union, Moldova felt a major crisis and a lot of problems, inclusive the civil conflict in Transnistria and occasional droughts.

2.1.1. Geography

The total area of Moldova is 33.700 square kilometers (National Encyclopedia, 1999). On the west side Moldova borders with Romania, on the north, east and south – with Ukraine. The capital city is Chisinau. Most of Moldova's territory is covered by hilly plains and cutted by many streams and rivers.

The Republic of Moldova belongs to the group of countries located in the Black Sea Basin. It maintains close mutually advantageous commercial ties with these countries.

Moldova's territory has a high degree of anthropogenic utilization of natural space. About 10% percent of the total territory is occupied by localities (human settlements): 4 municipies, 60 towns (urban space), 1600 villages administratively organized in 925 communes and separate villages (Ioniță, Munteanu, Beregoi, 2004).

According to review about Moldova made by Löwenhardt and Hill, (2009) while most of the country is hilly, elevations never exceed 430 m – the highest point being the Bălăneşti Hill. Moldova's hills are part of the Moldavian Plateau, which geologically originate from the Carpathian Mountains. Its subdivisions in Moldova include Dniester Hills (Northern Moldavian Hills and Dniester Ridge), Moldavian Plain (Middle Prut Valley and Bălți Steppe), and Central Moldavian Plateau. In the south, the country has a small flatland, the Budgeac Plain. The territory of Moldova eastern of the river Dniester is split between parts of the Podolian Plateau, and parts of the Eurasian Steppe.

2.1.2. Climate

Moldova's proximity to the Black Sea gives it a mild and sunny climate. Moldova's climate is moderately continental: the summers are warm and long, with temperatures averaging about 20°C, and the winters are relatively mild and dry, with January temperatures averaging -4°C. Annual rainfall, which ranges from around 600 mm in the north to 400 mm in the south, can vary greatly; long dry spells are not unusual. The heaviest rainfall occurs in early summer and again in October; heavy showers and thunderstorms are common. Because of the irregular terrain, heavy summer rains often cause erosion and river silting (Villarini, 2012)

In spite of the favorable climate, the country has, in recent years, experienced increasingly severe drought periods. The 2008 drought led to extensive crop losses (World Bank, 2010).

According to World Bank research, (2009) Moldova can be divided into three major agro-ecological zones based on temperature and precipitation. The three agro-ecological zones are the Northern forest steppe, the Central forest zone and the Southern steppe. Each of these zones will be impacted by climate change differently due to significant differences in topography, temperature, humidity and precipitation, as well as variations in production systems.

2.1.3. Soils

The climatic and geographical conditions determine the other natural characteristics like soils, vegetation and fauna. The soil in Moldova is rich and diverse, and constitutes of over 745 varieties of soils. Most of the territory is made up of chernozems, (around 75%), being followed by the brown and grey wood soils (11%), and the other 12% by alluvial soils that are often salted and marshy. (CTS, 2010). In Moldova the soils are the most important natural resource due to their richness and diversity. The economic value of a hectare of arable land is one of the highest

in Europe. Judging on their quality, the Moldavian soils can be compared with the richest soils in the world, like, for example, the soil from the Krasnodar region (Russian Federation) and California (USA).

According to Ursu, (2004) in the 100 cm layer Moldavian soils contain up to 7000 tons of humus per hectare. The entire soil layer contains, approximately: 1 billion tons of humus, 60 million tons of phosphor, 50 million tons of nitrogen, 700 million tons of potassium and important amounts of other essential elements. The use of soil resources in the Republic of Moldova is one of the most decisive factors in the national economics.

2.1.4. Environment

But despite the fertile soils, there are some very pressing environmental problems such as soil degradation, water pollution from municipal sewage and agrochemical run-off, and lack of sustainable manure management practices. In addition the amount of forest land in Moldova is insufficient for effective environmental protection and has been a major cause of a high level of soil erosion, landslides, water resource degradation, and drought intensification.

Natural landscape and biodiversity are limited and decreased because of severe impact of human activities. Moldova borders the Mediterranean biogeographic zone in the south, the rest of the country occupying an intermediate zone between the continental Eurasian steppe to the east (cold climate) and the European silvosteppe to the west (moderate climate). The spontaneous vegetation in the Republic of Moldova has been conserved on about 10% of the territory. Originally, there were two basic ecosystem types: steppes and forests. However, in many cases were distinguished the third ecosystem type: forest-steppe. The steppes have undergone big changes, their vegetation being practically destroyed. Their area decreased drastically during the 19th century, when vast areas were ploughed to cultivate cereal as their soils were fertile. Only some fragments have survived, e.g. the halophyte vegetation on some salty soil (0.35% of the territory) (Institute of Geography of the Academy of Sciences, 2011).

According to studies done by Kristiansen, Thompson and Taranu, (2011), intensive exploitation of natural resources in the last 40-50 years and imperfect ecological management of natural resources led to excessive pollution and the significant depreciation of productive natural fund and destructed flora and fauna.

The natural environment of Republic of Moldova suffers from the intensive use of chemicals in agriculture (including pesticides that have been banned in the EU). Soil and groundwater have been contaminated. According to the annual report of Ministry of Ecology, (2010) water quality

in major rivers (Dniester and Prut) is rated as "moderately polluted ", in the rivers Reut and Bic it is rated as “polluted” and most of the small rivers it falls into the category of "very polluted". The main problem related to the quality of surface water is presence of nitrates and ammonium.

Major concerns for the quality of the urban environment in The Republic of Moldova are air pollution, waste, noise and traffic congestion, increasing road traffic being the most important source of these problems.

2.1.5. Economic situation in the Republic of Moldova

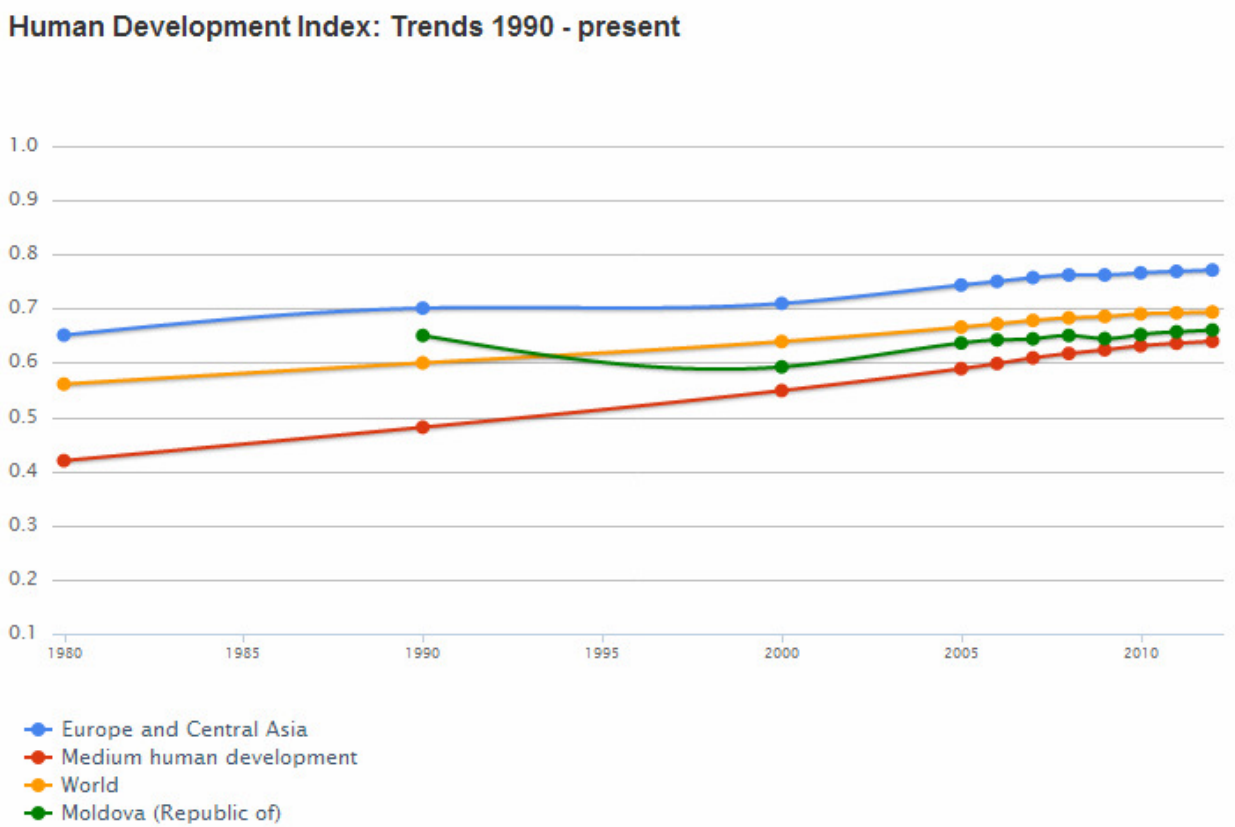
Despite the efforts made by the local authorities and international organizations, Republic of Moldova still remains one of the poorest countries in Europe. In the recent years there have been made many attempts to develop small business. This country has a favorable climate for intensive agriculture and for cultivation of some subtropical crops, especially vegetables, fruits, tobacco and wine grape. But that is not enough for a country that owns no significant mineral resources (Ministry of Foreign Affairs of Czech Republic, 2007). Most electric power, as well as the fuel is imported to Moldova. This small country is entirely dependent on Russia in energy issues and this has many times caused tensions and disputes over oil and natural gas prices. The consequence of these disputes resulted in a Russian ban in 2006 on the sale of Moldovan wine and agricultural products in Russia and also in doubling prices for oil and natural gas. The country's economy is, however, very sensitive on the prices of these commodities. The government has big expectation from the port in Giurgiulesti that could help the country to have easier access to the oil market and to gradually decrease the dependence. As a part of liberalization of the market in the ’90, Moldova introduced a new convertible currency, liberalized the prices, stopped giving preferential credits to the state companies and started the privatization process (Kielmas, 2011).

Because of the poor and unpromising economy, a big number of citizens had to leave the country looking for a better and more paid job. Nowadays more than a million Moldavians from the working age population are working abroad. The money transferred to the country by this group make up an important part of the GDP (approx 1 million dollars officially). According to World Bank, in 2009 one third of the country’s GDP was made of transfers from the Moldavians working abroad. Following the results of the research presented by (Prochinski, 2005), the inflow of remittances and other factors of socio-political characteristics (for example, allocation of funds for a populist action) against the state of the real economy affect the exchange rate of

Moldovan Leu (MDL) and inflationary trends. The economy also suffers from relatively high inflation and corruption (WarenTrade, 2009).

After the year 2000, the Republic of Moldova had an economic growth bigger than 6%, except the year 2006 when it consisted only 4% because of the crisis in the relationship with Russia, which banned the export of moldavian wines on the Russian market. In 2008 Moldova's GDP consisted of 6 billion dollars, and thus the GDP per capita was 1694 $ USD. In comparison in the neighbor country the GDP per capita was 12.200 USD. In 2011 the GDP grew to 12 billion dollars and the level of inflation was still very high and consisted 7,7%. The GDP is mainly formed by the service sector (63,6%), industry (20,3%) and agriculture (16,1%).In 2010 a major percentage of population was unemployed (7,8%) (National Bureau of Statistics of Republic of Moldova, 2008). Currently, on the base of Human Development Index Report, Moldova takest the 113rd place in the world among 187 evaluated countries (UNDP, 2013) and as it can be seen from figure 1 it has been inconsiderably growing in the last 10 years.

Figure 1. Human Development Index.



Source: National Human Development Report for Moldova, 2013

According to the study made by Spoor, (2012) the agricultural sector of Moldova is very significant in terms of the country's economy, exports, production and employment, the development of the sector is extremely important for economic growth and poverty reduction among the population. Poverty in rural areas in recent years has caused significant waves of population migration abroad and contributes to the weakening of the labor force of the Moldovan countryside and caused further economic losses in the agricultural sector and the deterioration of social indicators.

The average wage in Moldova in 2007 was only 150USD. According to estimations, approximately 25% of the working population works abroad. Therefore, the official unemployment rate in Moldova was only 2.3% in 2007 and reached to 7.8 in 2010 (National Bureau of Statistics of Republic of Moldova, 2011).

2.2. Agriculture

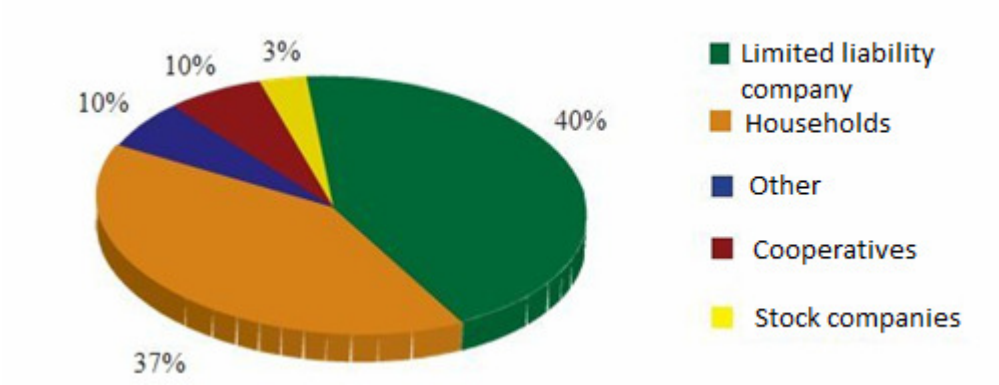
Agricultural sector of Republic of Moldova plays a big role in the national economy, and its contribution to the GDP in the last 10 years is about 30%. In 2010 agricultural production amounted about 16,410 million lei in current prices, and registered an increase to 31.9 percent. In the same year 40,6% of the population was working in this sector (Kushnir, 2011).

According to National Bureau of Statistics of Republic of Moldova (2011) the total area of agricultural land due the date of 01.01.2012 amounted to 2,506,200 ha or 74 percent of Moldova's total area, including arable land - 1,821,700 ha and perennial plantings - 302 800 ha.

ACSA, (2008) mentioned that about 75 percent of the total area of agricultural land is the “black soil”.

Following the research made by Kutuzov and Haskins, (2003) about 40 percent of the total agricultural lands belong to private companies, 37 percent - households and farmers, 10 percent - other forms of property, 10 percent - cooperatives and 3.0% to joint stock companies.

Figure 2. Structure of agricultural land ownership in Republic of Moldova.



Source: MoldovaGate, Agriculture of Republic of Moldova, 2011.

According to the current legislation (Law 198-XV, 2003), foreign investors can rent agricultural land for a period up to 30 years, what is widely used by investors from Germany, Bulgaria and other countries.

Agrarian economy of Moldova has four major advantages, which are generally recognized (ACED, 2012). Firstly, due to geographical location and favorable climate, in Moldova can be grown early fruits and vegetables, providing a significant advantage of the country.

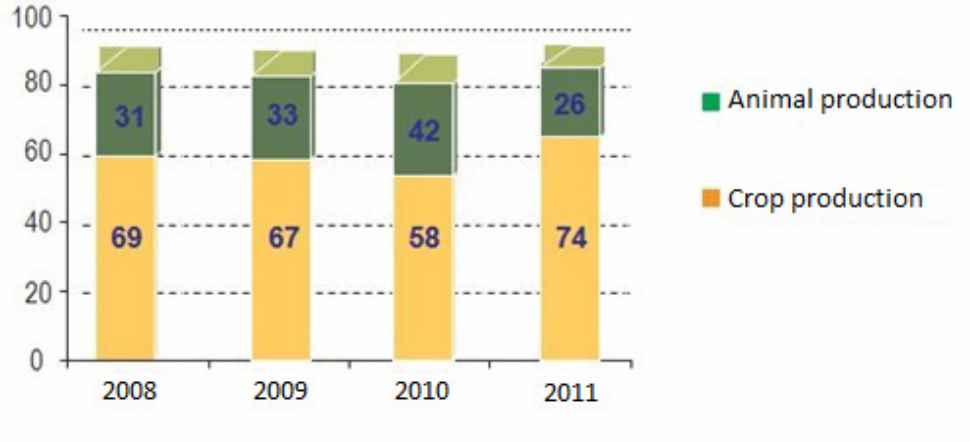
Secondly, Moldova has land, which is rich in humus and sufficient resources.

Thirdly, the population of Moldova has accumulated a rich experience and knowledge in areas such as the growth of fruit and vegetables, tobacco, grapes and wine.

Fourthly, according to the calculations of MIEPO, (2010) the scientific research institutions of the country have accumulated rich knowledge and experience to help in agriculture developing.

Moldavian agricultural production structure can be classified as a relatively stable one. Generally, 70 percent – occupies the crop production and 30 percent - animal production. In 2008, as a result of livestock decreasing after the drought in summer 2007, there were registered some deviations in plant and animal production, thus registering 74 percent, and 26 percent (World Bank, 2009).

Figure 3 - Agricultural production structure.



Source: World Bank, 2009

According to conclusion in research made by Stioca and Brinza, (2010), the crop production of the country is represented mainly by fruit and vegetable production and occupies about 85% of the whole production. Overall Moldova has very good conditions for fruit and vegetable production.

2.3. Fruit and vegetable production in Republic of Moldova

Farming in Moldova is one of the main branches of income and export of fresh and processed fruits and vegetables (Brezianu, 2000). Following the study of Murtu, Sachdeva and Robertson, (1999) in Moldova there are over 100 varieties of fruits and vegetables grown. Climatic conditions, with some exceptions, allow to obtain high yields and benefits in crop production activity in the region. Traditions of cultivation, and the importance of vegetables in nutrition, their export (fresh and processed) highlights growing of fruits and vegetables as one of the most important branches of the national economy.

According to Spoor, (2012) in the past, Moldova was one of the largest producers and processors of fruits in the former Soviet Union, with most of the production exported to other Soviet republics. Fruit and vegetable production volumes hovered around two million tons. The collapse of the old system in the early 1990s brought with it the disruption of the existing state-controlled distribution chains and the rapid shrinking of fruit and vegetable production and processing.

During the transition to a market economy, agricultural production in the region has decreased. Fruit and vegetable sector of the Republic of Moldova needed modernization and support.

Specific tasks to achieve strategic objectives in the fruit and vegetable production were elaborated by the Ministry of Agriculture and Food Industry of Moldova, (2011):

- optimization and extention of fruit and vegetable growing areas;
- reviewing of the structure of production volumes and directions of recovery of fruits and vegetables, in terms of traditional farming systems;
- Increasing of the productivity of fruits and vegetables by the implementation of new varieties with potential biological productivity and adaptation to weather conditions, resistant to diseases and pests;
- expanding of production of seedlings in trays and increasing of their production volume to a level of up to 75 percent of seedlings needs in agricultural production;
- rational and efficient use of existing greenhouses;
- development of fruit and vegetable irrigation systems and providing financial assistance from the state, directly or indirectly subsidizing the consumption of electricity used to pump water;
- Increasing of the collection and sale of fruit and vegetable production to specialized regional markets;
- rational use of land in the floodplains of rivers Dnestr, Prut and Raut for growing fruits and vegetables, creation of micro and specialized centers of agricultural production;
- stimulation of local and foreign investments, especially interested in growing fruits and vegetables on protected land and in the research and development branches;
- rehabilitation of irrigation systems in area over 126 500 hectares.

National Bureau of Statistics, (2012) informed that agricultural production in all regions increased by 10.6%. Also, increase of agricultural production was determined by the growth of animal production by 11.0%.

Proposed strategic objectives provide an increase of economic efficiency of fruit and vegetable production and lead to social effects. Although increased productivity and modernization of fruit and vegetable cultivation, technologies will obviously reduce labor costs and will create new jobs.

2.3.1. Fruit production

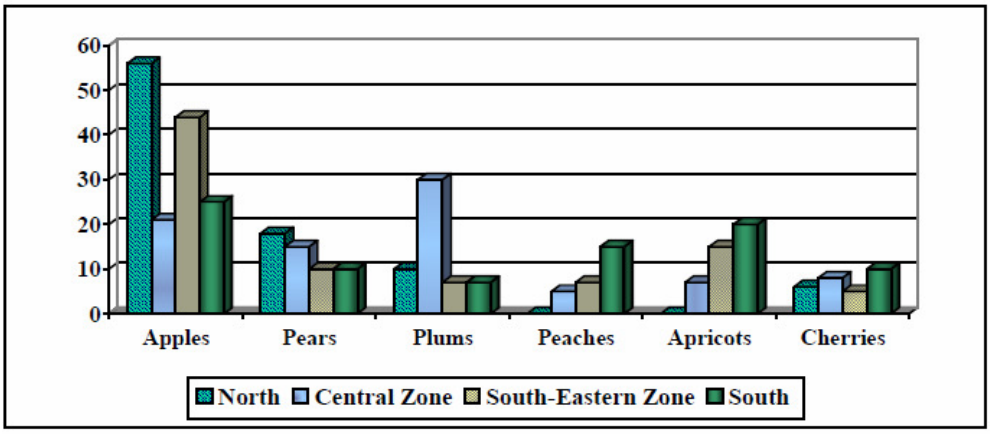
In the report presented by Corobov, (2009) the total area occupied by horticultural plantations in the country is about 114 000 hectares and production of fresh fruit is estimated at approx. 400-430 thousand tons. In comparison with period 1985-1990 the surfaces decreased by 40% and overall fruit production had a decrease of 60%. Currently, annually there is a growth by 4-5 thousand hectares of fruit surface and of global production by 15-20 thousand tons. Increasing production is explained by more efficient exploitation of existing plantations and also by planting of superintensive orchards that provides productions of up to 40 tons per hectare.

According to data from Ministry of Agriculture and Food Industry, (2011) the highest share in the increase of fruit production have plantations of: apple (about 65-75%), plum (10-15%) and peaches (5-10%). The most important investments were observed in apple production in the northern region, and in plum production in the central and southern regions. In the structure of fruit production in Moldova and in existing assortment of species, the most important part takes apple production, which consists 78-80% of the total fruit production in the country, the second importand production is plum production, which takes 12-13% of the total production, further are peaches with 3-4%, 2% of cherries, 1% of pears, and 0.7% of strawberries and berries. Fruit production structure is represented mainly by fresh fruit.

Statistically, the consumption of fruits and berries in Moldova is about 40 kg / year / person. For comparison, the European and CIS countries fresh fruit consumption per capita per year is: in Turkmenia 23 kg / capita / year (minimum) and 183 kg / capita / year in Italy (maximum) (National Bureau of Statistics, 2011).

On the base of CNFA report, (2005) Moldova produces 17 types of fruits and berries, with registered varieties of apples, pears, plums, peaches, apricots, and cherries being the most widely produced for fresh consumption and processing.

Figure 4. Fruit Distribution by Geographic Zones



Source: CNFA, 2005

In the present thesis the author presents the state and trends on the fruit market of Republic of Moldova on the example of the most important fruit production part – apple production.

As stated by the Ministry of Agriculture and Food Industry of Moldova, (2010) the apple production plays a crucial role in the agricultural sector recovery in the country.

The rebound of the Moldovan apple sector began in 2000, driven by increased demand from regional markets, mainly the Russian Federation, whose imports grew annually by an average of 20% during the last decade, rapidly increasing from 200,000 tons in 2000 to 1.2 million tons (worth about $1.7 billion at wholesale prices) in 2010. Currently Moldova produces about 350 thousand tons of apples. The main destination for Moldovan apples is the fresh export market (180 thousand tons goes to the Russian Federation), followed by processing (90 thousand tons, or 26%) and then the local fresh fruit market (80 thousand tons, or 23%) (USAID, 2011).

According to the country report of CNFA, (2005) Moldova has 57 registered apple varieties, which are divided into 3 groups, according to harvest, maturity and consumption period: summer, autumn and winter.

According to report made by AllMoldova, (2012) the predominant channel in the Moldovan apple sector involves the production of apples in traditional, low-density orchards (fewer than 1,250 trees/ha), followed by exports by the grower or a local trader/exporter to Russia during the harvest season, or immediately following harvest, without passing through the cold chain (apples are packed directly in the field). These apples are usually sold through local truck markets to

small wholesalers who distribute the fruit to the entire European part of Russia, with the final consumer buying the fruit on the street or in an open market.

In the conclusion of the report made by Fala, (2010) the number of farmers planting modern high-density orchards (with more than 1,250 trees/ha) is increasing every year. The Soviet Union left behind a well-educated cadre of agronomists that are comfortable working in the traditional orchards. Intensive apple orchards were introduced in the Republic of Moldova just recently (M9 rootstock in 1998, and two-year *knip-baum* seedlings in 2006) and there is only limited use of the specific practices and techniques which are necessary to achieve maximum productivity from this production system. These techniques include: chemical and mechanical thinning, planting, pruning, branch binding, plant nutrition and irrigation.

Some apple growers started to use chemical thinning in intensive apple orchards only recently, and mainly on the smaller orchards. Chemical thinners with active ingredients such as BA (6-Benziladenine), NAD, NAA, and 2-chloroethylphosphonic acid (ethephon), are the ones most frequently used by Moldovan apple growers (Stiopca, 2013). The interest in, and the number of, apple growers implementing this technique is increasing each year. However, the wide adoption of this technique is limited by the lack of experience and the unavailability of support from local national consultants.

Apple production in Moldova is a multi-century tradition in many private households, passed down from generation to generation.

2.3.2. Vegetable production

Vegetable production is one of the main branches of the Moldavian agriculture. This is dued to the traditions of growing vegetables, their importance in nutrition as well as their export. It also provides raw materials for the food industry and contributes to the exporting activity of the country.

More than 40 varieties of vegetables are cultivated and the climatic conditions, with small exceptions, allow to obtain high yields (USAID, 2011).

In the transition to the market economy, the vegetable production faced a substantial decrease. The general vegetable production decreased 4 times,and constisted 475,2 thousand tones in 2006, as a result of decreasing of the cultivated surfaces to 42.4 thousand hectares and the decrease of average production. Also there have been important changes in the utilisation of the vegetables. The aquisition and processing volumes by the local plants, as well as delivery on the traditional markets have decreased considerably, and consist 8-10 percent and respectively 4-5 percent from

the global production, but in the mean time the volumes that went to the internal market in fresh state, increased (World Bank, 2009).

As Botnari, (2010) stated, in the early 90's the production of vegetables in the public sector of the country was about 1.2 million tonnes, of which about 240-260 tonnes were exported as fresh production and about 450-500 tons in the form of various processed goods. For the processing of such a large number of vegetables 23 large factories were built.

Besides being used for personal consumption, vegetables normally contribute largely to increase farmers' income. Vegetables allow to smallholders to obtain an income with relatively small investments.

Out of the total production of 396.700 tones of the vegetable sector for the year 2011, approximately 80% (316.500 tones) are produced by the households and respectively 20% by Limited liability companies, stock companies, cooperatives and other commercial entities. The territory used for vegetable production consisted 45,4 thousand hectares in 2009, out of which 16.7% were cultivated with tomatoes, 14,1% with onion, 9,7% green beans, 9% cabbage, 7,7% cucumbers and 6,6% zuchinni (White, Belschi, 2011).

In the present thesis the particularities of vegetable production on the basis of dynamics of onion production will be described.

Onion is a frequently used crop in human nutrition, and it is consumed all year round. In a research presented by Stiopca, Brinza, (2010) the economical and nutritional advantages of onions are determined by:

- Their high nutritional value, containing albumins 14-15%, carbohydrates over 10%, minerals, vitamins A, C, etc.;
- Contains several antibiotic substances (phytoncides) with bactericidal and laxative effect. The onion juice, with a high containt of essential oils, has an important effect against artherosclerosis, and because it is a diuretic, enhances renal activity;
- It is used in spicing diferent fresh and canned foods from vegetables, meat or fish;
- It is used as a raw product in the pharmaceutical industry;
- When advanced technologiesare used, onion is a profitable crop.

In the Republic of Moldova, the onion is directly sown on the field, as chieves and only partly as seedlings.

The onion (Allium cepa L.) is an indispensable nutrient for the human being, both for fresh consumption and as a condiment. It is a wonderful raw material for preparing canned vegetables for

the food industry, for example: ragouts, stews, marinades and canned meat products. The onion is used in big amount in cooking. It can be sliced and dehydratated, can be converted into flour.

The onion is widely used due to its taste, nutritional and healing characteristics. According to medical norms, each Moldavian citizen should consume 164 kg of vegetables, out of which 8-12 kg should be onions. Fresh onion enhances appetite, improves secretion of gastric juices, contributes to a better asimilation of nutrients. The nutrient importance of the onion resides in the fact that it contains a big amount of biologically active substances, which enforce human health. The onion has also well pronounced phytoncide properties. Grace to this fact it is used from ancient times in healing different diseases: arteriosclerosis, asthenic rheumatism, rachitism, obesity, inflammatory diseases, also helps wound healing and hair growth. Onion contains cca 83-87% of water, 15% of dry substance, carbohydrates, inclusing 8-10% sugars (glucose and fructose). The sweet sorts of onion contain 4-7% of sugars. The embryos and the bulb disc contain a high quantity of essential oils 25-34 mg per 100 g of raw material. Onion is an important source of vitamins: vitamin C – 25 mg %, vitamin B_2 -6, vitamin 61 - 0,04, vitamin A – 0,05 mg% and minerals: Na – 130 mg %, K- 34, Fe – 45, P – 20, and thus has a total energetic value of 51 calories per 100 g of raw material. The minerals are essential for the bones, for the haematopoietic activity, also contributing to formation of alkaline environment in the blood and lymph (Mcdaniel, 2007).

As ACSA (2010) informed, the area of vegetable plantations anually sown with onion in Moldova consists of about 6,5-7,5 thousands hectars, and the aproximate harvest is around 75-85 thousand tones.

The variety of onion sorts and hybrids, at the moment, fully completes the consumers' demands: early sorts, with big bulbs, uniform size, colour, with strong peel and rich, white pulp and with pleasant taste, not so hot, are at high request. The consumers are also interested in resistent sorts, both as chieves and bulbs destinated to consumption.

The onion bulbs are very resistent during transportation and good storage capacity and can be deposited during the entire winter, and some sorts can even make it to the new harvest.

The onion is cultivated for it's bulbs, which can be harvested after reaching maturity. In Moldova onion is being cultivated in all regions by direct, field sow, as well as chieves and partially seedlings (The National Onion Association, 2010).

2.4. Fruit and Vegetable market in Republic of Moldova.

2.4.1. Structure

According to the sectoral study made by USAID, (2011), the market structure for fruit and vegetables in Moldova includes 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 buys directly from the open air and wholesale markets as well as directly from growers and retailers. Besides those commercial channels a large portion of rural households consume and preserve their production for their own consumption or informal exchange with their neighbors.

On the basis of the ACED, (2011) report we can divide the market structure into groups described below:

(i) Producers

It is still common in Moldova for growers to consume and preserve the vegetables that they have grown, limiting the need for expenditures. It is also common for family members and friends to gift or trade produce with each other. Moldovan vegetable production consists mainly of open-field vegetables harvested from June to September/October. These vegetables are consumed locally, sold to processors, as well as exported. Greenhouse vegetables can be harvested starting in May and run through November. Greenhouse vegetables land area approximates 550 hectares which produces around 54 thousand tons of vegetables. A rough estimate of the total number of vegetable producers is 13,500 when open field vegetable producers and greenhouse producers are taken into account together (CIA, 2012).

According to Botu and Papachatzis study, (2012) fruit production is fragmented, but not as much as vegetable farming. It is estimated that there are 500 apple producers (small and large) who are taking lead positions in the apple production business. The estimate of the number of stone fruit producers, consisting of mainly plums, peaches, apricots and cherries, total 663 with 89% being smaller than 50 hectares. As for gender, women are very present in production, but less present as one goes up the value chain, except for as accountants and book-keepers where they dominate. More women than men harvest apples, grapes, and tomatoes. In the apple value chain, women work at all steps of production. In orchards they dominate in pruning and harvesting. The places where they are less present are integrated pest management, spraying, operating tractors, machinery and truck driving.

(ii) Importers

Importers that bring products to the wholesale market are typically individuals with their own liquid capital, who see an opportunity (for example a missing product or high prices), travel to conclude a contract, and then hire a broker services firm which does the wire transfer and brings the product to the market. The broker service fee is $250-400 per truck and between the broker's fee and the VAT and other taxes, a typical cost will be 10-15,000 MDL ($850 - $1300) per truck. The major importing brokering firms are PAVIRAMUS, TAIEX-PRIM and POLITRANS.

Another category of importers are Turkish companies, typically acting out of the wholesale market, which also deliver to other wholesale, retail, and supermarkets. They trade a large amount of tomatoes, lemons, mandarins, clementines, seedless grapes, apples, peppers, aubergines, cucumbers, pomelos, pomegranates, cashews, and raisins. As for gender, women are infrequently working as importers (Agravista, 2008).

(iii) Wholesale traders

Following the study presented by AgraVista, (2009) almost all commercial growers are connected to a certain list of wholesale traders (also called middlemen) who buy commodities from the grower and then trade them in the wholesale markets. In the market, one can meet many sellers competing against each other with similar commodities with price fluctuations in every possible direction. This is mainly due to the limited shelf-life (perishability) of produce, the lack of refrigeration facilities, and the daily arrivals of competing products. A wholesaler usually has his own means of transportation, a mini-truck or several of them. He is the person who negotiates the purchase price with the grower and travels to the growers "gate" to pick up and pay for the different commodities. The wholesaler cannot control the quality of production from the grower, and if the quality is different than what is requested, re-negotiates the price before acceptance. Once the product is received and there is exchange of money, the transaction is final. Often growers bring their products to the wholesale market, especially vegetable producers. What usually happens is that they create competition for the commercial wholesalers because they usually sell their produce at lower prices just to "get rid of it" due to time constraints, their lack of market intelligence, and the imminent need to get back to the farm to do other tasks. Wholesalers generally believe that growers are bad traders due to their tendency to drive prices down.

(iv) Wholesale markets

There are four permanent wholesale markets in Moldova: three in Chisinau and one in Balti.

The open air wholesale markets are privately run businesses that offer a place for traders with trucks or mini-buses or other transportation means to trade their goods. The wholesale markets generally offer basic infrastructure necessities such as: toilets, tap water, canteens and bars, limited security services, storage and cooling rooms (ACED, 2011).

(v) Retail Open Air markets

In Chisinau, there are nine permanent open air retail food markets in operation located in different sectors of the city with the biggest being the Piata Centrala (Chisinau Central Market) in the downtown area. These open air markets are the main location where the majority of the people buy products. Within the rayons (regions) the regional open air markets are in full operation. In every regional center there is at least one functional open air market. Collectively, there are over 100 retail open air markets spread throughout the country.

According to Lerman, Csaki, Moroz, (1998) the main Moldavian open air markets are located in Chisinau, Edinet, Soldanesti, Calarasi Hincesti and Causeni and represent central, southern and northern regions of the country. These open air markets are very competitive and many times similar products are offered by multiple vendors driving prices downward. In the high season, the production from local farmers has the same characteristics (size, color, cosmetic appeal, freshness) and appears all at once at these markets. As farmers use relatively simple technologies, all produce a limited range of products that are harvested at the same time, flooding the market. One solution is to expand the range of products produced locally, and the other is to extend the production and harvesting season.

In contrast, during the winter months (December - March) there are more imports and a more noticeable differentiation of products.

The Chisinau Central Market is the cheapest in the country, followed by Hincesti and Calarasi markets. This is because markets are large and located in central region of the country; sellers have more competition with each other. Since they have the most foot traffic, retailers there can make more money based on volumes than in the other markets. Main northern region markets located in Edinet and Soldanesti are represented by the cheapest apple production.

In the southern Causeni region market is characterized by the strong and cheap onion production. Markets in rural areas generally work one day per week and sell everything (clothes, shoes, electronics, etc.,) especially agricultural products (fruits and vegetables). In the rural areas there are limited agricultural products' sales as most people have their own fruit trees around their houses. They might buy peppers, onions, potatoes, cabbage, and tomatoes if they live in the town and don't have land. In some cases the prices in southern and northern regions are higher due to

the fact that there is less competition than amongst vendors in the central region (mainly in Chisinau). The prices in Edinet and Soldanesti could be more or less high. Similar to Edinet and Soldanesti, but not as large, in Causeni there is a daily retail market, however no wholesale market. The Causeni market sells all kinds of consumer products all year round. In the off season, production is sourced from the Chisinau wholesale market, but in season it is sourced locally. Traders from Chisinau supply the market there and go on to trade with Romania.

Due to delays at the border and political-economic interests, the trade of production between Transnistria and the rest of Moldova is difficult (Fala, 2010).

In the open air markets there were not any distinguishable niche products such as "fair trade" noted and no real representation of any collective organic offerings. Even though it isn't officially allowed, often along the streets of these open air markets individuals are selling their own local produce in very small quantities. Women are often retailers in the open air markets. Furthermore, an estimated 70-80% of fresh fruit and vegetable production purchases are made my women in Moldova, so they comprise the majority of consumers present at the markets. This is also true in supermarkets (described more below), but the traditional roles are less defined as it is a less traditional format (OECD, 2012).

(vi) Supermarkets

Although, basing on studies made by Sorochan, (2008) a small but growing factor in the overall fresh produce market, modern supermarkets face stiff competition from one another. Some of the major supermarket chains in Moldova are Fourchette, Green Hills, N1, Fidesco, Metro Cash & Carry, IMC Market, Piatiorochka, Unimarket Discounter and Linella. Generally there seems to be a lack of emphasis and overall commitment to the fresh produce aisles in terms of allocation of space and strategic location within the supermarkets. While 10-20% of the Moldovan population buys at least a portion of their fruits and vegetables in supermarkets, fresh production accounts for only 2-5% of the vending space.

Competition in the domestic supermarket channel is quite different than the traditional open markets. This requires consistent volumes to meet delivery windows, proper labeling, packaging, sanitary inspections, and requires invoices. This is the channel where competition from imports is the strongest and quality becomes a little more important in order to compete effectively. In supermarkets, the overall cosmetic appearance of the domestic product must be equal to the import's and this cannot be at the expense of products costing more at retail as consumers perceive the traditional markets as a more economical option.

Often supermarkets purchase produce from the wholesale open air market where there are no invoices provided (particularly when there is a shortage of an item that is usually provided by a longer term contract with a grower). In order to sell produce to a formal trade outlet such as a supermarket, the supermarket would like for them to provide a fiscal invoice and they may not want, or be capable of doing this (Huseynov, 2010).

2.4.2. Price formation

Fluctuating consumer prices of fresh fruit and vegetables are reflecting many factors, which are too often unknown or understood by the public. However, they should always be seen by consumers in perspective of a series of factors. Knowledge, education and experience are needed steps to enable consumers to make qualified purchasing decisions and to value fresh production accordingly. Consumers are used to have a large diversity of fresh production available all year round. However, a number of factors affecting either offer or demand might interfere and affect the price of fresh production at retail level. Price variations might consequently astonish shoppers as they are not familiar with the price formation of fresh production. Consumer surveys confirm that without the needed knowledge and experience they are wondering about the swings in retail prices, which they finally struggle to put into perspective (Murtu, Sachdeva, Robertson, 1999).

According to review presented by ACED, (2011) the price of fresh fruits and vegetables is influenced by many factors: variety, size, packaging, brand, organoleptic quality or the maturity of the product (ready to eat, etc.), demand for specific growing practices such as organic or fair trade, promotion activities, etc. All these elements are influencing the price. Furthermore, logistical constraints or the place of purchase (supermarket, hard-discount, and grocery store) also exert an influence on the final price.

2.4.3. Market demands

The traditional open market is the primary consumer source for fresh produce and it imposes its standard approach of quality evaluation to the whole production market. The general principle is that all production can be sold on the market if the price is correct. If local fresh fruits or vegetables are small, not uniform, have different maturity or are even partially spoiled, they can still be sold at a reduced price. There will always be a price that equates to the offering irrespective of defects as long as the production is edible.

Supermarkets are not as price competitive as the traditional markets due to incremental costs and the need to include VAT in the final price. In order to avoid further pricing differentials from the open market, they do not typically raise the quality standards which would imply even higher prices. For fresh products in supermarkets the main requirement is that production is somewhat fresh and not spoiled. In effect, the strategy is to check a box, instead of attract customers with high quality products. Contrary to the low bar set by the local standard (of not being spoiled), imported fruits and vegetables generally have higher quality standards for both the traditional markets and supermarkets. The majority of imported fruits and vegetables have more uniform size and no major visual defects. Initially this quality standard differentiation was not consumer driven, however, over time importers brought fruits and vegetables with higher quality standards and now this is what is expected by consumers when purchasing imported products.

While in most markets, HoReCa quality requirements are higher than for price sensitive consumers, in Moldova they do not differ from what can be found in traditional markets and supermarkets. In other words, HoReCa simply consumes what is available on the market based on the "value" which is in essence the price to quality relationship (Morari, 2010)

2.4.4. Market constraints and opportunities

According to World Bank research, (2010) the main impediments in the stagnation of the fresh and processed fruit and vegetables' market consists in the absence of specialized traders as well as retail traders and processing companies, who would be willing to collect, by direct contacts with the farmers, the fruits and vegetables either for commerce, export, short term storage or processing. The products from the fruit and vegetable production are sold both on internal market as well as on the foreign ones in fresh and processed forms. Largely, the products that are meant to export should be managed by specialized companies which own their own packing houses or rent from bigger commercial producers.

The domestic market is extremely price sensitive and consumers have limited buying power. Food safety is sometimes sacrificed in order to move product quickly when the market price is good, compromising sufficient elapsed time from agrochemical application to harvest and then sale. Often supermarkets purchase domestic and imported products through distributors who facilitate and consolidate paperwork and invoices.

Moldova is in the process of bringing its inspection and export procedures into compliance with EU quality requirements for fresh fruits and vegetables, which will be in force starting in 2013 (OECD, 2012).

Moldovan producers need to better understand the importance of food safety requirements for all crops to expand domestic consumption and better position crops for select export markets. The fragmentation of the grower community must overcome with the consolidation of crops and introduction of new varieties to better meet the needs of retailers. Requirements for better penetrating the supermarket distribution channel include consistent volumes, product visual appeal and conformity, frequency of delivery (fueled by better cold chain management), packaging, labeling, certification, and proper fiscal invoicing (Kaser, 1999).

3. Objectives

3.1. Main Objective

The main objective of the thesis is to analyze apple and onion markets as especially focused on monthly prices development and trends on the main agricultural markets of Republic of Moldova, located in southern, northern and central regions of the country.

3.2. Specific Objectives

The main objective of the thesis will be accomplished through the specific objectives:

- Detailed study of six major regional agricultural markets in the Republic of Moldova.
- Analysis of the seasonal occurrence of apples and fruits on local agricultural markets.
- Analysis of monthly minimum and maximum prices of apples and onion on agricultural markets.
- Determine key factors that affect price growth during a specified time period.

4. Methodology

4.1. Studied area

The present research took place in southern, northern and central regions of Republic of Moldova (see Figure 5), which are described below. The study follows the information approach by the National Development Agency (ACSA), acting in agriculture and development sector. For example, the National Development Agency is involved in monitoring the supply chain of fruit and vegetable production prices in whole republic and it is one of the most valuable development organization. According to studies made by ACSA, (2008) Moldavian fruit and vegetable market is divided into three geographical regions. From each region had been selected the most important agricultural markets with the high importance in the national agriculture and food production. These agricultural markets accurately show us prices of agricultural commodities, problems and opportunity differences in the different geographical parts of the country. The fruit and vegetable market research is oriented to set the direct contact with farmers on the chosen markets for better understanding the price formation and their main problems on the market. On the basis of the research presented by Gobija, (2012) selected markets from districts Chisinau, Calarasi, Hincesti, Edinet, Soldanesti and Causeni represent the biggest part of the Moldavian agriculture and fruit and vegetable markets.

Figure 5 – Regional division of the Republic of Moldova.

Source: Expresul, 2009

4.1.1. Central region

The central region is represented by Chisinau, Calarasi and Hincesti districts, in which are located the biggest markets in the region.

(i) Chisinau

The biggest and the most important market is located in the capital city Chisinau (see Figure 6).

Figure 6 – Chisinau district

Source: Expresul, 2009

Central market is located in the center of the city and occupies the place about two hectares. Fruit and vegetable market occupies more than 65% of the whole market. The present market is the most crowded place in Chisinau. This famous place was formerly situated from the side of the main street, from where the market starts today. The main market of the country provides a possibility to find fresh vegetables and all kind of fruits during all the year here.

Historically, on the market are present all types of market participants:

Producers and farmers are coming with their own products from villages with hope of selling it at the central market. Importers are taking part on the market with the cheapest production or during the extra seasons. Wholesalers and wholesale markets are usually represented by small kiosks and deposits on the land about 0.7 hectares. This segment of the market is presented here for the selling the production, bought in the different parts of the country or for searching new clients. Chisinau Central market is the biggest business activity in the city. According to the

report made by World Bank, (2009) the total amount of the daily monetary operations is about 19 million Moldavian Lei ($2 million). However, the total amount is bigger than 750 million per year. The majority of sales are provided unofficial, without the bill, with cash and without taxes.

According to the population census (2011), in Chisinau district live 800 000 people, and more than 80 000 people visit the central market daily. Officially, on Mondays market is closed, but on the practice, there is no day when the market is closed. Nowadays, every day from 7 a.m. to 6 p.m. Chisinau Central market is opened for people.

(ii) Hincesti

The second largest market in the central part of Moldova is located in Hincesti district (see Figure 7). Hincesti district is located only in 36 km from the capital city. Due to the location Hincesti market receives fresh fruit and vegetable production from the whole country with the smallest extra charge. The market is situated in the center of city Hincesti and occupies about 1 hectare. Following the study made by Graur (2008), more than 70% of the market is represented by fruit and vegetable production. According to the population census, (2013) Hincesti district population is 110000 people and the market is used as a central business point not only for the whole district, but also for the nearest Romanian district. Romanian wholesalers and retailers are present here as well.

Figure 7 – Hincesti district.

Source: Expresul, 2009

Officially Hincesti market is closed on Mondays, but the most profitable days are on Thursday and Saturday from 7 a.m. till 2 p.m.

(iii) Calarasi

Third central region market is situated in the district Calarasi (see Figure 8). The market is located in the center of the Calarasi city as well. Calarasi district plays a big role in the apple and wine grape production. Due to this factor, fruit production on the market is represented by the cheapest prices on these products. More than 80% of the Calarasi market is represented by the local producers and farmers (Diacon, 2010). The population of Calarasi district is 78000 people (Population census, 2013). The biggest part of the market is occupied by the local producers and small scale farmers.

Figure 8 – Calarasi district.

Source: Expresul, 2009

4.1.2. Northern region

The northern region is represented by Edinet and Soldanesti districts, where are located the biggest markets of the region.

(i) Edinet

In the northern region the most important agricultural market is located in Edinet district (see Figure 9). Edinet district is the main representative of the agriculture in the northern region of Moldova. According to the National Bureau of statistics, Edinet is the largest district in the

northern region of the country (933 km^2) and has the population around 83000 people. Statistically, the most important days on the Edinet market are on Thursday and Saturday, when the market is visited by more than 10000 people. District's location plays a big role in the market development. Market is located in the vicinity from the Ukrainian border and a big number of Ukrainian traders come to the Edinet market for the cheaper and more qualitative products, especially for apples, onions and cherry.

Figure 9 – Edinet district

Source: Expresul, 2009

(ii) Soldanesti

The second largest market in the northern region of Moldova is located in Soldanesti district. Soldanesti district populated by 43300 people and the total area is about 598 km^2 (National Encyclopedia, 2008). The district is located in the Dniestr River basin, at a distance of 110 km. Being a beginning agricultural district, the main efforts are focused on supporting and developing priority directions of agriculture. The market is mainly represented by retailers and small scale farmers and is not attractive for wholesalers. Due to the price differences and location, a bigger part of the population prefers to buy products for consumption or for the resale from the neighbor Transnistria.

Figure 10 – Soldanesti district.

Source: Expresul, 2009

4.1.3. Southern region

The southern region is represented by Causeni district, where the biggest market of this region is located.

(i) Causeni

The southern part of the country's agriculture is represented by Causeni district. As of 1 January 2011, its population was 92,300 (Population census, 2013). According to the National Bureau of statistics, (2011) Causeni district is the biggest in the southern part of Moldova and its area is about 1,163 km^2.

Figure 11 – Causeni district

Source: Expresul, 2009

The market is located in the center of city Causeni and represents the most important business forum for fruit and vegetable producers and wholesalers from the whole country and Ukraine. Causeni district is the larger producer of grapes, peaches and onion. For the better production availability, Causeni market in opened every day from 7 a.m. till 3 p.m.

4.2. Timeframe

For data collection and results evaluation were dedicated three months during the holidays (July – September 2012). Theoretical preparation for master thesis and data collection started in the beginning of year 2011 and included the elaboration of the questionnaire for the most accurate data collecting. Selection of the most important regions and markets was done during March 2011. First visit of selected regions and markets took place in March 2012 and general notes and observations were partial done at the same time. The introduction of the questionnaire method started at the beginning of July and finished at the end of September 2012.

Due to difficulties related to the transport in Moldova, for each market were allocated 2 days for farmers questioning and interviewing and situation analysis directly being on the market. The collected information was carefully processed and analyzed in November.

4.3. Data and data sources

In case of elaboration of the present thesis were used two types of data collection. Taking into account, that nobody before did a similar study, the present research mainly focuses on the interviewing of apple and onion producers and sellers (small and medium scale farmers). Questioning method was implemented for the most accurate identification of the situation on the markets and its demands and opportunities. The target group was selected according to its market orientation and production directly on the market.

As secondary data sources were used scientific articles, reviews and statistical databases. To estimate dummy variables of the monthly prices in this study were used monthly market reports from 2009 to 2012 from the Agency for Rural Development (ACSA).

For the better understanding of the market structure were performed consultations with information and marketing coordinator from the ACSA's headquarter Dr. A. Fala.

4.4. Data collection methods

For more accurate information several data collection methods were used. Structured questionnaires, interviews with target group and direct observations were used as primary data collection method and led to a better market understanding. Questioning method made possible to collect and analyze data and information. During the research period in Moldova there were no disappointments and misunderstandings in the course of data collection process.

4.5. Structured questionnaire

For the primary data collection for the present research author used structured questionnaires. Questionnaires represent the most suitable and the most efficient method to collect the most accurate data which is needed for market and farmers understanding. This method is widely used in the world and recommended by Leung, (2009) in his study.

Information and practice about elaborating the questionnaire design and structure was obtained during years of master studies in Czech University of Life Sciences and from master thesis supervisor's consultations. From each studied agricultural market were collected 20 questionnaires, so the total number of respondents was 120.

Questionnaires for apple and onion producers consisted from 18 questions which reflected the situation on the studied markets and producer's market relation. 40% of questions were closed, other 60% were opened. Questions were structural and consistent for better understanding.

The present questionnaire was designed according to three main objectives: the first part describes the main information about apple and onion producers, the second part presents producer's market relation, their problems and opportunities, and the last, third part shows the actual situation with price formation and actual monthly prices. Questionnaires were elaborated in Russian and English languages.

4.6 Data analysis

Collected data from all 120 questionnaires was analyzed and introduced into Microsoft Office Excel, and afterwards there were elaborated diagrams, graphs and tables for the result monitoring.

For the better visibility of the price dynamics on the chosen agricultural markets were used statistical reports from the Agency for Rural Development (ACSA), introduced in Microsoft Office Excel and then analyzed in regression model.

4.6.1. Regression Analysis of Apple and Onion Markets

The method of regression analysis was used for processing of acquired data related to monthly prices of apples and onion from local agricultural markets of Moldova in the range of forty-eight months (2009-2012). The main purpose has been achieved by regression model, based on the regression function. Index of determination R^2 was calculated to determine the direction of the curve.

$$b_0 = \frac{\sum y_i \sum x_i - \sum x_i y_i \sum x_i}{n\sum x_i^2 - \left(\sum x_i\right)^2}, b_1 = \frac{n\sum x_i y_i - \sum y_i \sum x_i}{n\sum x_i^2 - \left(\sum x_i\right)^2} \qquad \textbf{(4.1)}$$

For detailed seasonal analysis of apples and onion monthly prices changes and trends (based on months, quarters and also years), author chose regression analysis with inclusion of *dummy variables*.

According to the methodological consecution individual years were considered as independent variables and dummy were considered as explanatory variables, represented the seasonal structure of the apples and onion monthly prices (value of *0* or *1*).

In order to verify explanatory power of the model and to estimate apples and onion prices in subsequent months, quarters and years, the regression function for seasonal apples and onion prices was used:

$$Y=B_0+B_1*Month+B_2*QT_1+B_3*QT_2-B_4*QT_3+B_5*QT_4+B_6*T_1+B_7*T_2+B_8*T_3+B_9*T_4 \quad \textbf{(4.2)}$$

Where:

Y……= apple/onion price;

B_0……..= coefficient for the intercept;

B_{1-9}…....= coefficient for the slope;

QT_{1-4}….= quarters;

T_{1-4}……= current year.

5. Results and Discussion

5.1. Descriptive part

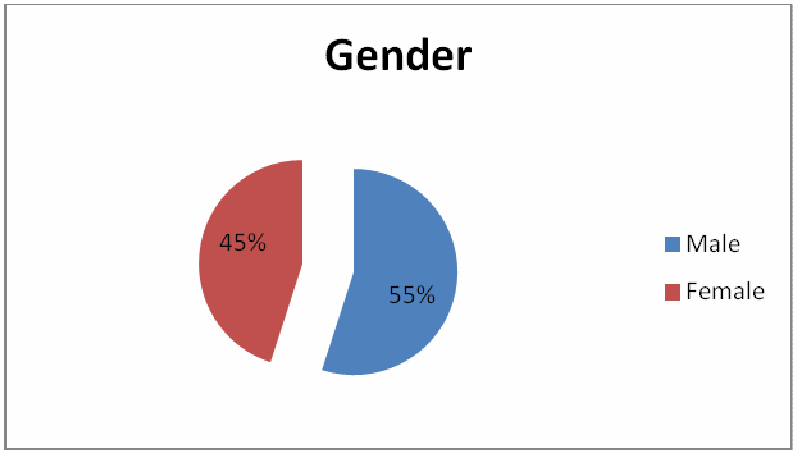
During the research in Moldova were gained 120 filled questionnaires from apple and onion producers. Obtained results are described below.

Gender

The percentage of gender distribution of respondents is represented by 55% of male and 45% of female apple and onion producers (see Figure 12).

Due to need of transport and introduction of new technologies, number of women working in fruit and vegetable production sector is decreasing.

Figure 12 – Gender distribution of respondents.

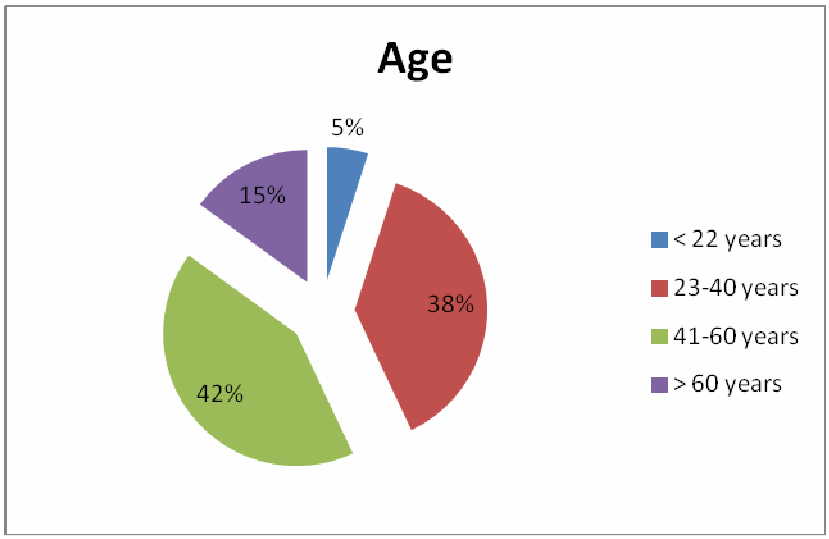


Age

Average age of agricultural producers was calculated as 44.7 years. Results are reflected in percentage age distribution of respondents on six agricultural markets Chisinau, Edinet, Soldanesti, Calarasi, Hincesti and Causeni (see Figure 13).

Majority of producers, 42% belong to middle-aged group from 41 to 60 years. The second active group from 23 to 40 years represents 38%. The retired group of respondents over 60 years is represented by 15%. The youngest group of producers till 22 years has 5%, and represents the lowest contribution.

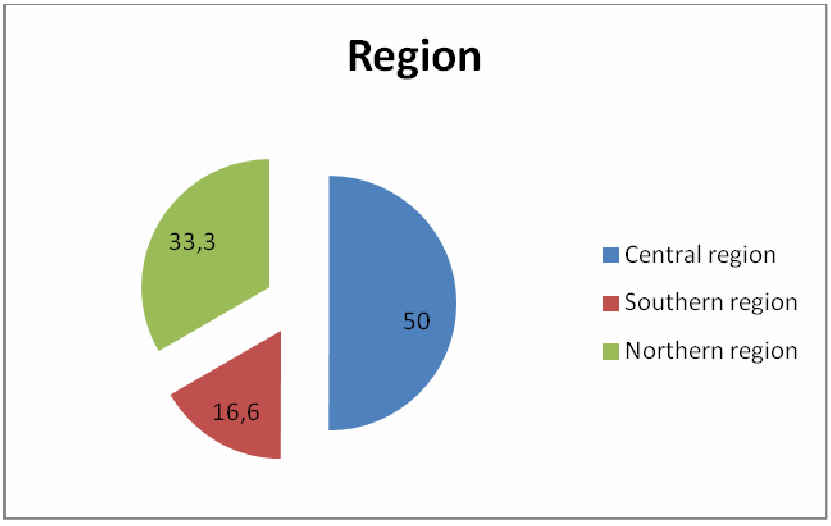
Figure 13 – Age of respondents.



Region

The regional division is reflected in percentage below. Due to the size and location of the central region of the country, 50% of respondents were interviewed in this region. Then 33.3% of respondents were interviewed on the main markets of northern region which is oriented mainly on apple production. And finally, the last, southern region of Moldova is represented by 16.6% of interviewed respondents which are mainly oriented on vegetable production.

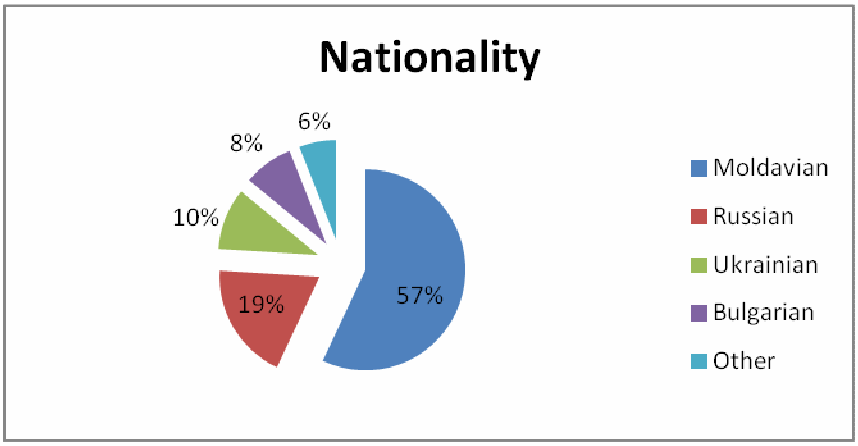
Figure 14 – Regional division of respondents



Nationality

The main group of 57% of respondents is represented by Moldavian nationality (see Figure 15), followed by 19% of Russian nationality. Ukrainian group takes 10% and Bulgarian 8% of the total number of respondents. Last 6% belong to small national communities (Polish, Czech, Tatar etc.).

Figure 15 – Nationality of respondents.

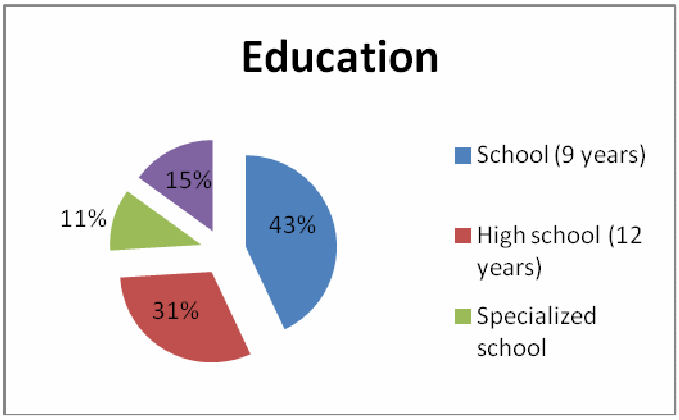


Education

Republic of Moldova is represented by a very high level of literacy. Everyone has access to at least school education in rural area. Higher level education is accessible in cities, especially in the capital city. The education level of the agricultural producers in the chosen districts is described in the Figure 16.

First of all, a biggest group of 43% of respondents has middle school education, achieved mainly in rural areas, followed by 31% of respondents with high school education, available only in the cities. Two last groups are represented by 11% of specialized education and 15% of university education, available only in the capital city or abroad.

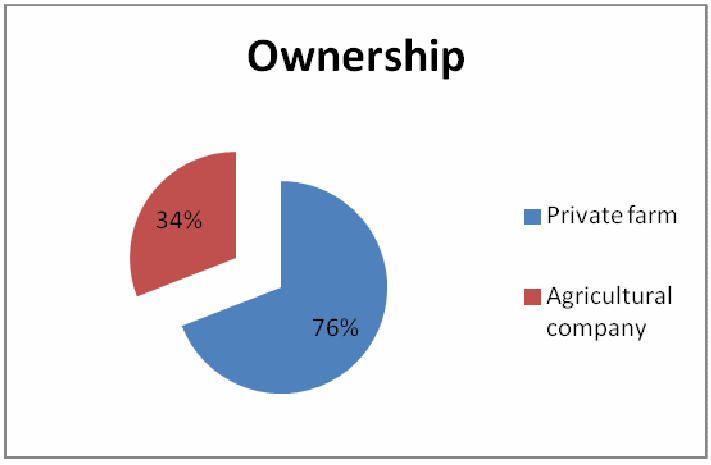
Figure 16 – Education level of respondents.



Ownership

Majority of respondents belongs to private farmers group and consists of 76% of all interviewed farmers. Only 34% is represented by agricultural companies, limited liability companies and joint-stock companies. Because it is much more profitable to produce apple and onion on your own land, than to work for the salary for a company.

Figure 17 – ownership distribution.



Cooperatives

According to CNFA, (2010) agricultural cooperatives are characterized as a fast growing niche which is sustained and subsidized by the government and developed countries. Every year the total number of farmers registered in cooperatives is increasing.

During the present research, it was calculated that 42% of the total number of apple producers are members of regional cooperatives. Other 58% are still private farmers, but some of them are

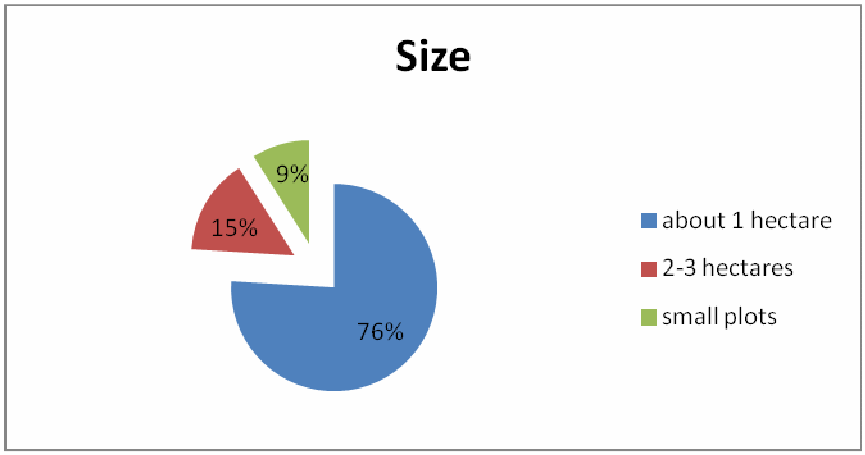
thinking about the cooperative membership. Situation with onion producers is different: only 15% of onion producers joined cooperatives. Because of the small size of the land or low level of production, they do not have reason to join and to pay fees. But some of them still think about joining cooperatives to increase their yields and maybe to rent bigger parcels of land.

According to the farmer's opinions which were discussed during interviews, it is possible to state that in next two years the number of cooperative members will increase by 10-15%.

Size of the land

From the total number interviewed apple producers 76% of them indicated that the size of their plots is about 1 hectare, followed by 15% of farmers which have about 2-3 hectares, and the smallest group of 9% of farmers produces apple at small plots near their houses (see Figure 18). So high number of big plots is characterized by the low rental price in Moldavian countryside.

Figure 18 – apple production land size.



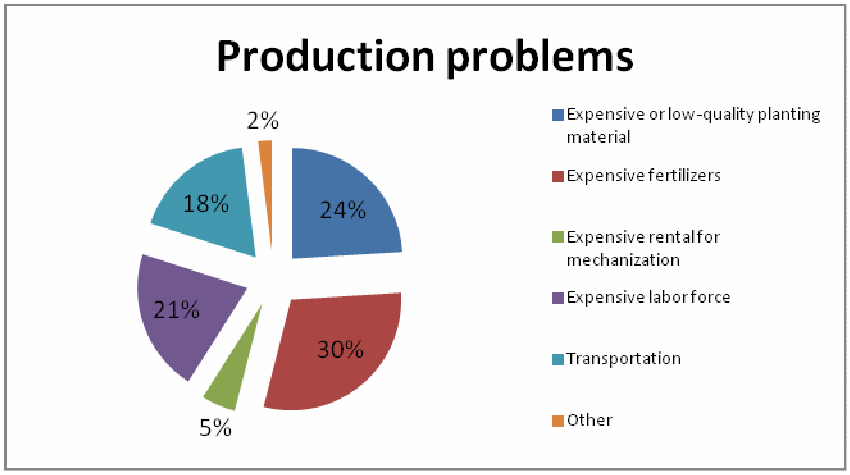
Questioned onion producers indicated that their parcels are smaller than in the case with apples. Due to low demand on onion on the local markets for the majority of farmers it is enough to produce onion on the small plots near their houses (0.01-0.1 ha). Only 10% of onion producers have good market relations on the Central Chisinau Market and are able to trade with wholesale markets use in their production bigger size of the land.

Almost every third Moldavian citizen owns at least several acres, but not everyone effectively uses it.

Main problems in apple and onion production

According to the farmer's answers, the main problems in apple and onion production consists in taking care of these products, expensive fertilizers and chemistry (30%), followed by the difficulties with in buying qualitative and cheap planting material. A quite big problem for farmers is labor force which is difficult to find in the countryside due to urbanization and migration abroad. Lack or high costs of transport and mechanization represents a changing spending, due to changing fuel prices.

Figure 19 – Main problems in agricultural sector in the chosen regions.



Market access

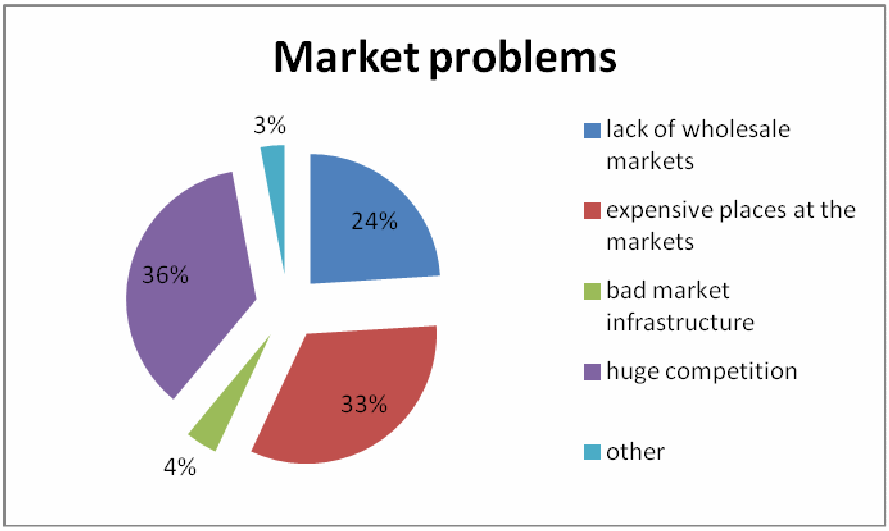
The bigger part of interviewed farmers was able to sell their production only on the local markets. Due to the transportation costs farmers prefer to attend nearest markets or to sell their production to retailers for a bit smaller price. Only some farmers (16%) preferred to sell apples and onion on the Central Market Chisinau or to Wholesaler Markets. For selling agricultural production on other markets which are located far away is needed to do investments in transportation, accommodation and certification (certification needed for transportation). This factor pays off only in the big differences of the price on markets.

Main problems on the local market

The main problem faced by the farmers on the markets is represented by high competition. This is characterized by a high number of farmers and sellers of apple and onion on the markets. Price can be discussed and will lead that one who will set the lowest price for the better product.

Expensive rental for places on the markets play a very big role in market accessibility and not everyone can invest only for the place.

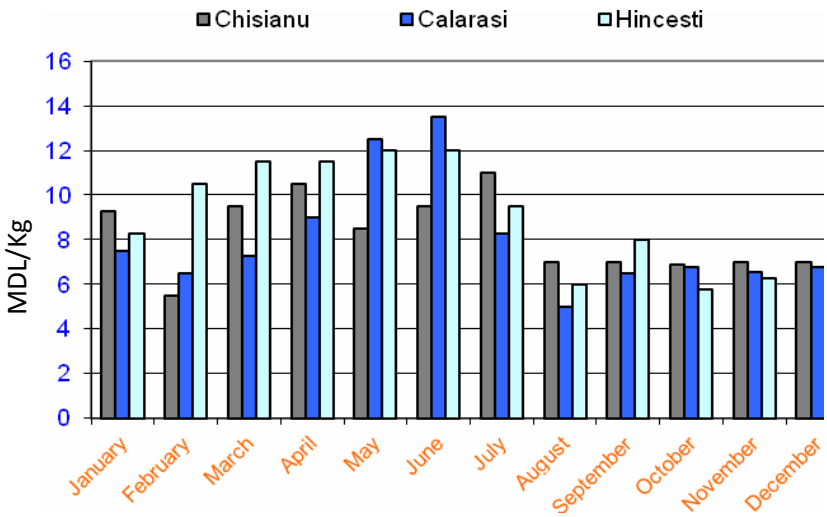
Figure 20 – Main problems on the local agricultural markets.



Apples' monthly prices in 2012 on the regional markets

During last year and questioned period on the main Moldavian agricultural markets were observed price changes which are dependent from the seasonality, availability and region of market. Onwards are presented apple price dynamics during year 2012 gained from the questioned farmers.

Figure 21 – Apple price in the Central region



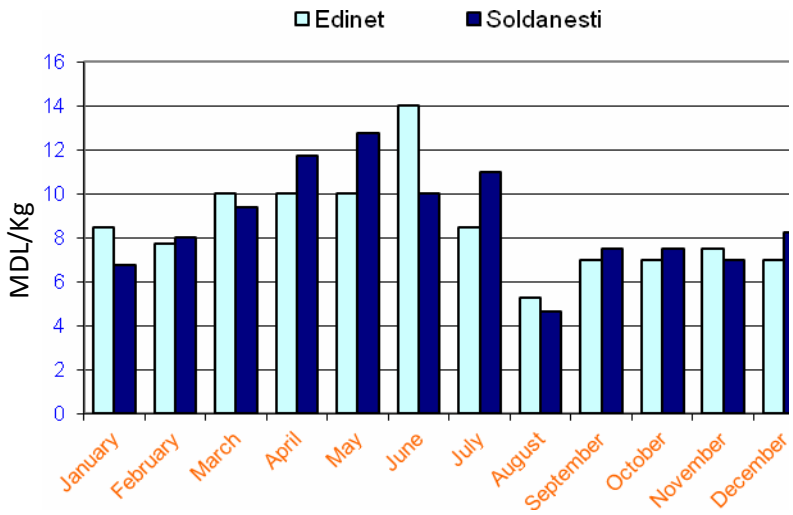
Source: Author's compilation, 2012

According to the Figures 21, 22 and 23, the lowest price on apples was observed in the central region, especially on Chisinau Central Market. Following the results of the study made by White, Belsky, (2011) this phenomenon is explained by a high competition and market size. Northern region of Moldova is the main region of apple production, but the prices are higher than in the Southern region. This fact is easily explained by the production process costs. In the Northern region apple production is more professional and is represented by the drip irrigation systems which are more expensive than classical irrigation in the Southern region. From the personal experience the author affirms that apples from the northern region are bigger and more tasty than from the southern region. Price difference between Chisinau, Calarasi and Hincesti markets is explained by transportation costs from the capital city or other regions where apple production is more developed.

On all analyzed markets the highest apple price was observed in period from April till July 2012. This jump of price was explained by respondents as period when stocks of apples on storages are almost sailed, but the production will be available to consumers only in August-September. Price growing in this period is due to deficit of apples and lack of specialized storages. After the harvesting in all regions price starts growing the end of the year. Price formation is mainly affected by the quality of production and exports to Russia (Stratan, 2012).

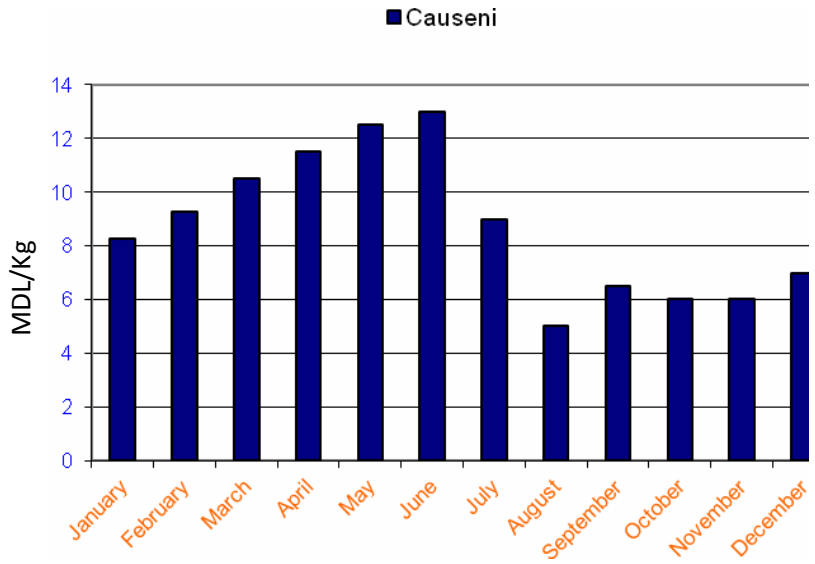
Fresh apples are affected to high fluctuations in prices. Typically, prices of fresh apples in Moldova are changing every 2-3 days.

Figure 22 – Apple price in the Northern region



Source: Author's compilation, 2012

Figure 23 – Apple price in the Southern region



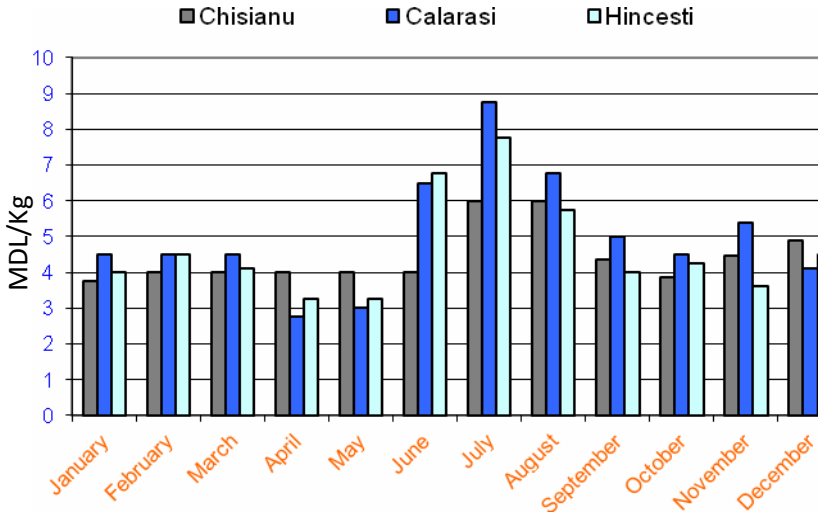
Source: Author's compilation, 2012

It is also important to remember that Moldova is a big producer of apple. Prices are largely determined by local demands, especially in high season. It often happens that small local producers who cannot dictate terms and do not have access immediate information about market prices, or who cannot properly assess their real costs, offer goods at very low prices to retailers or wholesalers. Because of this, big companies often have to adjust their prices in line with the prices of small producers who have set artificially low price, due to their own inefficiency. In such circumstances, the wholesalers can often get extremely high margins ranging up to 100%, while the usual margin in the wholesale business is 20 - 30%.

Onion monthly prices in 2012 on the regional markets

Gained results about onion price during the questioned year are described below. Onion has a good resistance to transportation, good storage capacity and can be stored during the whole winter. Some varieties - even till the new harvest. Especially it relates to the local varieties named Halțedon and imported hybrids Daytona F1, Candy F1 and Universo F1. However, storage capacity is limited in time and in the beginning of June until mid-July there has been observed a price increase on the background of decreasing of stocks of harvest from 2011 and the later emergence of onions planted in the same year (2012).

Figure 24 – Onion price in the Central region

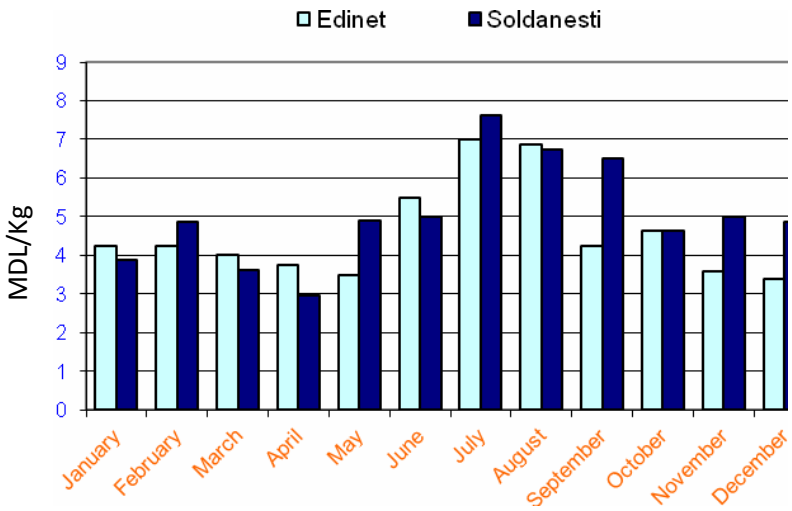


Source: Author's compilation, 2012

Price of onion in June-July on Calarasi market (5-7 MDL / kg) in comparison with Chisinau and Hînceşti market prices (4-6 MDL / kg) is higher due to low specialization of producers in this district, cultivation of onion and distance (50-60 km) from the retailers of early onion (see Figure 24). The first onion harvest in 2012 appeared in the south region of Moldova in June. During this period there is noticeable depletion of stocks of onion from the previous year. Producers from the south region (their production is by 10-12 days earlier in comparison to the central region and by 14-21 days in comparison to the north region) use this advantage to start selling their production at wholesale price about 5-6 MDL/kg and about 6-7 MDL/kg on the market. Important plantations of onions in the southern region are located in Cahul, Ceadîr Lunga Căuşeni and Stefan Voda.

The price of onion on the Edinet market is increasing in the period from June to July, till new local harvest of onion or from the southern region. Prices on Şoldăneşi and Soroca market were always higher by 1-2.5 MDL/kg in comparison to Balti and Edineț markets due to lack of specialization of farmers and lower level onion supply transported to other markets in the country (see Figure 25).

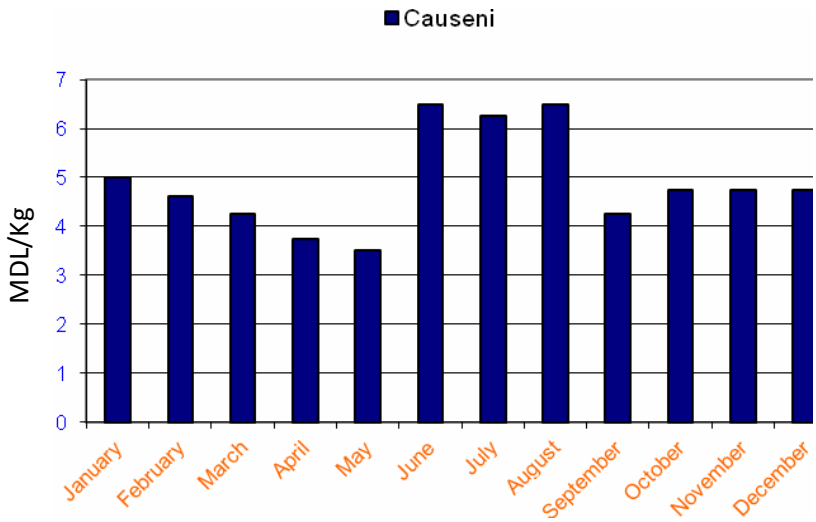
Figure 25 – Onion price in the Northern region



Source: Author's compilation, 2012

The price of onion on the Causeni market is characterized by relative stability, it varies between 3.5-4 MDL/kg and slowly increases till 4-5.5 MDL/kg in December-January (see Figure 26).

Figure 26 – Onion price in the Southern region



Source: Author's compilation, 2012

Causeni market has a specific feature: this market is famous and very important for retailers from Romania and Ukraine. Due this factor, the price remains relatively traditional during season. As

seen in Figures 24, 25 and 26, prices differ in each area of the country. This is caused by different transportation costs, different manufacturers and market demands.

Prices of onion begin to increase since May and are maximal in mid-June - beginning of July. During the period when appears new yield in the southern region, markets return to the stable prices of the season (3-4 MDL /kg).

During the purchase of onions for processing (August -September) and storage (10-30 of October) wholesale price may drop to 2-3 MDL/kg. Price in these periods is influenced by big quantities of onion on the market due to the fact that not all farmers have warehouses for keeping big quantities of onions and later to sell it at better prices.

In conclusion, we can report that onion is widely used in food, being sold on the markets of Moldova all over the year. For producers would be better to turn to wholesale market with bigger quantities of onion during the season when the price increases. But it is necessary to have storage facilities and to take into account possible weight loss.

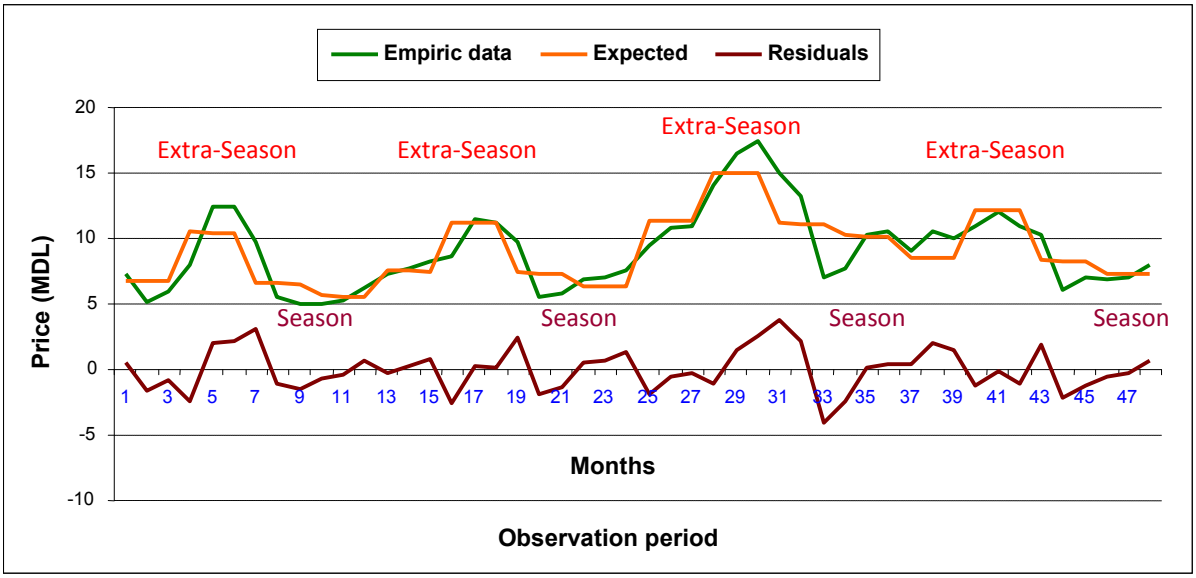
5.2. Analytical part

Before applying the statistical analysis, the average monthly price of apples and onion in the country was determined. For calculation it was necessary to use data about the minimum and maximum prices of apples and onion on 6 major markets for the most accurate estimation of the average monthly price of apples during 4 years.

5.2.1. Method of Regression Analysis of Apple Markets

As it is presented in Figure 27 the market price of apples varies depending on the period of time. We can determine two periods, which are directly related to changes in the price of apples. This is so-called period of Extra-Season, which last from February, when prices are rising slowly up and continues until mid-May. During this period the average price of apples in the country is 11 - 14 MDL. Period, which is called the Season, lasts from August to November, when the average price of apples in the country is 5-7 MDL. Onwards, it should be emphasized that Figure 27 shows the relative changes in the dynamics of price growth in 2011 which was related to drought and low yields when the average price of apples in Extra-Season period was 15-22 MDL.

Figure 27 - Empirical and seasonally adjusted data on apple prices over 2009-2012



Source: Author's calculations, 2013

The data related to monthly prices of apples was statistically analyzed using regression model with dummy variables (see Annex 7), because this model is the most suitable for the analysis of seasonal price of apples during months, quarters, years.

The trend of apple prices development during 48 months (2009-2012) was analyzed. For explanatory variables were used: (i) $months_{1-12}$, (ii) $quarters_{1-4}$, (iii) $years_{1-4}$.

The regression function was determined for description of apple prices development on local agricultural markets:

Apple price = ***B0+B1*Month+B2*QT1+B3*QT2-B4*QT3+B5*QT4+B6*T1+B7*T2+B8*T3+B9*T4***

During the statistical analysis was defined the Index of determination R^2 = 0,83, thus our statistical model on the basis of its functions will be able to identify 83% of the changes in monthly prices of apples.

Figure 27 shows how real (empirical monthly prices) monthly prices of apples were compared with expected prices (expected monthly prices) of apples. It should be noted that during two

years 2009-2010, monthly prices of apples had relatively the same trend, but it has been drastically changed in 2011 due to the draught in the country, and then a slow decrease in prices in 2012 was observed. But despite this reality our model provides a relatively high percentage of the monthly assumptions of apple price.

For seasonal forecasting of changes in prices of apples in the Republic of Moldova, it is necessary to introduce the data into regression equation and therefore it will be possible to make theoretical forecasts (see Annex 7) of changes in expected price of apples on the market in a given month. As example, empiric prices of apples in February, April, August and November in 2012 were compared with the theoretical forecasts (expected prices) of prices:

Expected apple price in February 2012 = 9,5348 – 0,038***38**-2,2047****1***+1,5683****0,0001***-2,1826****0,0001***-3,0375****0,0001***-0,4716****0,0001***+0,7368****0,0001***+5,0089****0,0001***+2,6111****1*** = **8,49 MDL/Kg**

Real (empiric) price = **10,5 MDL/Kg**

Expected apple price in April 2012 = 9,5348 – 0,038***40**-2,2047****0,0001***+1,5683****1***-2,1826****0,0001***-3,0375****0,0001***-0,4716****0,0001***+0,7368****0,0001***+5,0089****0,0001***+2,6111****1*** = **12,18 MDL/Kg**

Real (empiric) price = **11 MDL/Kg**

Expected apple price in August 2012 = 9,5348 – 0,038***44**-2,2047****0,0001***+1,5683****0,0001***-2,1826****1***-3,0375****0,0001***-0,4716****0,0001***+0,7368****0,0001***+5,0089****0,0001***+2,6111****1*** = **8,28 MDL/Kg**

Real (empiric) price = **6,12 MDL/Kg**

Expected apple price in November 2012 = 9,5348 – 0,038***47**-2,2047****0,0001***+1,5683****0,0001***-2,1826****0,0001***-3,0375****1***-0,4716****0,0001***+0,7368****0,0001***+5,0089****0,0001***+2,6111****1*** = **7,31 MDL/Kg**

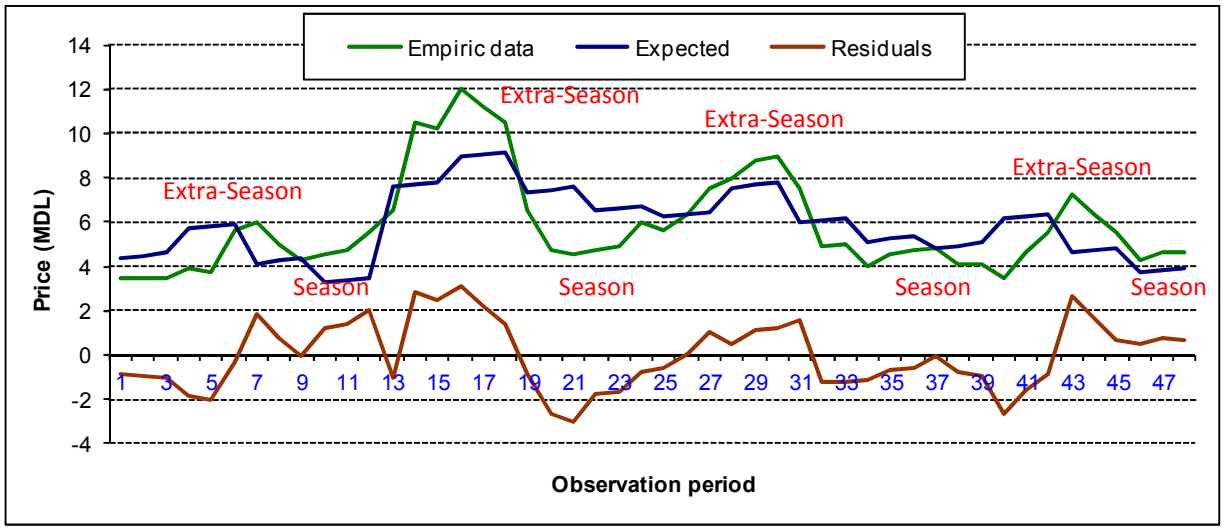
Real (empiric) price = **7 MDL/Kg**

Using this statistical forecast, apple producers in Moldova will understand the seasonal dynamics of prices on the markets with the ability to determine the theoretical (expected price) price of apples in a particular month. Very important information for farmers is also a precise definition of the statistical analysis of the period in which prices start growing (Extra-Season period), and in which period prices are decreasing (Season period).

5.2.2. Method of Regression Analysis of Onion Markets

The onion price on the main Moldavian markets is vaulting. Moldova's agriculture is strongly dependent on seasonality. There is a small number of greenhouses in the country, but they particularly don't affect the price formation. As in the case with apples, onion production has two main periods: Season and Extra Season. Season period is form August to November and if onion harvesting is delayed, it continues growing and becomes unsuitable for storage. This period is represented by onion prices about 3,5-4,5 MDL/kg. The second Extra-Season lasts from March till July and is characterized by significant price growth (see Figure 28) and consists 7-12 MDL/kg.

Figure 28 - Empirical and seasonally adjusted data on onion prices over 2009-2012



Source: Author's calculations, 2013

The trend of development of onion prices during 48 months (2009-2012) was analyzed. For explanatory variables were used: (i) months$_{1-12}$, (ii) quarters$_{1-4}$, (iii) years$_{1-4}$.

The regression function was determined for description of onion prices development on local agricultural markets:

Onion price = *B0+B1*Month+B2*QT1+B3*QT2-B4*QT3+B5*QT4+B6*T1+B7*T2+B8*T3+B9*T4*

During the statistical analysis the Index of determination R^2 = 0.70 was defined, thus our statistical model on the basis of its functions will be able to identify 70% of the changes in monthly prices of onion.

In Figure 28 it is illustrated the comparison of real monthly prices (empirical) and expected monthly prices of onion.

According to monthly price of onion, we can claim that in 2009 seasonal changes of price were not as significant as in 2010-2011. Significant changes of prices during 2010 and 2011 are explained by draughts and production deficit. The low price during the season is due to availability of the local product on the market, but in extra-season a biggest part of stocks is exported to Russia and Ukraine and the onion shortage is filled by imported onion from Poland and Egypt (due to transportation and custom costs price grows).

Despite this reality our model provides a relatively high percentage of the monthly assumptions of onion price.

For seasonal forecasting of changes in prices of onion in the Republic of Moldova, it is necessary to introduce the data into regression equation and therefore it will be possible to make theoretical forecasts (see Annex 10) of changes in expected price of onion on the market in a given month. To avoid misunderstandings, as in the case with apples, empiric prices of onion in February, April, August and November in 2012 were compared with the theoretical forecasts (expected prices):

Expected onion price in February 2012 = 2,482 + 0,11***38**+2,5931****1***+3,5991****0,0001***+ 1,6939****0,0001***+0.5013****0,0001***-0,8160****0,0001***+1,0791****0,0001***-1.6144****0,0001***-4,3147****1*** = **4,94 MDL/Kg**

Real (empiric) price = **4,125 MDL/Kg**

Expected onion price in April 2012 = 2,482 + 0,11***40**+2,5931****0,0001***+3,5991****1***+ 1,6939****0,0001***+0.5013****0,0001***-0,8160****0,0001***+1,0791****0,0001***-1.6144****0,0001***-4,3147****1*** = **3.16 MDL/Kg**

Real (empiric) price = **3.45 MDL/Kg**

Expected onion price in August 2012 = 2,482 + 0,11***44**+2,5931****0,0001***+3,5991****0,0001***+ 1,6939****0,0001***+0.5013****0,0001***-0,8160****0,0001***+1,0791****0,0001***-1.6144****0,0001***-4,3147****1*** = **6,008 MDL/Kg**

Real (empiric) price = **6,375 MDL/Kg**

Expected onion price in November 2012 = 2,482 + 0,11***47**+2,5931****0,0001***+3,5991****0,0001***+ 1,6939****0,0001***+0.5013****0,0001***-0,8160****0,0001***+1,0791****0,0001***-1.6144****0,0001***-4,3147****1***= **3,33 MDL/Kg**

Real (empiric) price = **4.625 MDL/Kg**

The present analysis makes possible forecasting the prices for moldavian farmers via determination of the theoretical (expected) price of onion in a particular month.

The most important part of these analyses is the determination of beginning of seasonal and extra-seasonal price growths.

6. Conclusions and Recommendations

6.1. Conclusions

According to the results of the present study it is possible to make several conclusions:

Apple and onion production play a crucial role in the agriculture of Republic of Moldova. Apple production is mainly concentrated in the northern region of the country. Onion production is located all over Moldova, but the most intensive is still in the southern region. These products can be found on each agricultural market of the country, but quality, size and price will be different. For small and medium scale producers is more profitable to sell their products on the local markets, but for bigger companies and cooperative it is much better to access Chisinau Central Market and wholesale Chisinau markets.

After elaborating the present thesis, situation on fruit and vegetable markets of Moldova becomes clear. The cheapest onions with better quality are available in the southern part of Moldova, and better quality apples with favorable prices are located in the Southern region. On the Central Chisinau market there is possible to buy apples and onion from every region of the country, but it is important to recognize the quality and its origin.

In the last four years on the Moldavian market, apple and onion production demonstrated a significant increase in consumption. This is due to a slight decrease of imports and a small increase in the volume of local production.

Through the fast developing drip irrigation for apple and fertilizers for onion, Moldova has a big opportunity to become again a bigger agricultural producer for CIS countries. The greater part of apple and onion production is exported from Moldova to Russia, Ukraine, Kazakhstan and Belarus. Nowadays new market relations are starting to develop with EU countries, but it is necessary to fulfill norms and restrictions. Due to that factor, agriculture of Republic of Moldova is widely supported by EU grants and developing projects.

6.2. Recommendations

In order to diminish the negative influence of the above mentioned problems of fruit and vegetable production, it is necessary to implement several short and long term specific measures:

- Introduction of new variety of breeds (with early and late harvest), in order to increase the selling and harvest season by selecting the sorts with early harvest, followed by those in season and the ones with late harvest;
- Encouraging of the wide use of standardized and certified seeds and improved cultivation practices;
- Application of intensive technologies, that are in accordance with the conservation of the environment, that could lead to improving of quality, quantity and selling capacity of the fruits and vegetables;
- Increase of availability and access to improved and appropriate techniques for harvesting, washing, sorting, cooling, storage, transport, preservation, management and packing of the products;
- Improvement of offered information to the producers about the optimum levels of harvesting the vegetables in according to the kind of usage and the target market (distance and preferences) of the product;
- Spreading of usage of maturity indices which will help farmers to insure seasonal qualities of the product (for example color, taste, flavor and look) and will offer guide for the consumers about the available qualities and will help in planning of multiple harvests;
- Introduction of standards and general improvement of fruit and vegetable production, according to the view of the consumer, to the health and security aspects and to EU, EuroFresh, GlobalCAP, ISO, HACCP standards;
- Integration and further improvement of the marketing system (sorting, packing, cooling, transport and other marketing activities) in order to offer products on internal and external markets, including further introduction of field packing systems, field cooling, cooling transport, packing sections, mechanized management, paleting systems, improvement of containers, loading and unloading technologies and control programs, for example distance monitoring and satellite connection (integrated logistic);
- Development and consolidation of the trademarks of local fruit and vegetable products;

- To stimulate, by offering specialized technical assistance, the organization of farmers' marketing business cooperatives, organization or producers' marketing groups, commercially active;
- Organizing retail marketplaces (fairs for farmers and rural collecting centers, or other facilities in order to prevent eventual losses of production and to increase the added value). In this context it could be optimal that they would be founded by the state, that would invest preventively in the respective infrastructure and thus creating optimal work background, - process, followed by the privatization of respective markets through tenders with the participation of several private agents, future co-owners;
- Development of stronger and more productive relationships between farmers, wholesale and retail and sellers, market operators and exporters;
- Organization of preventive processing at farmers' associations.

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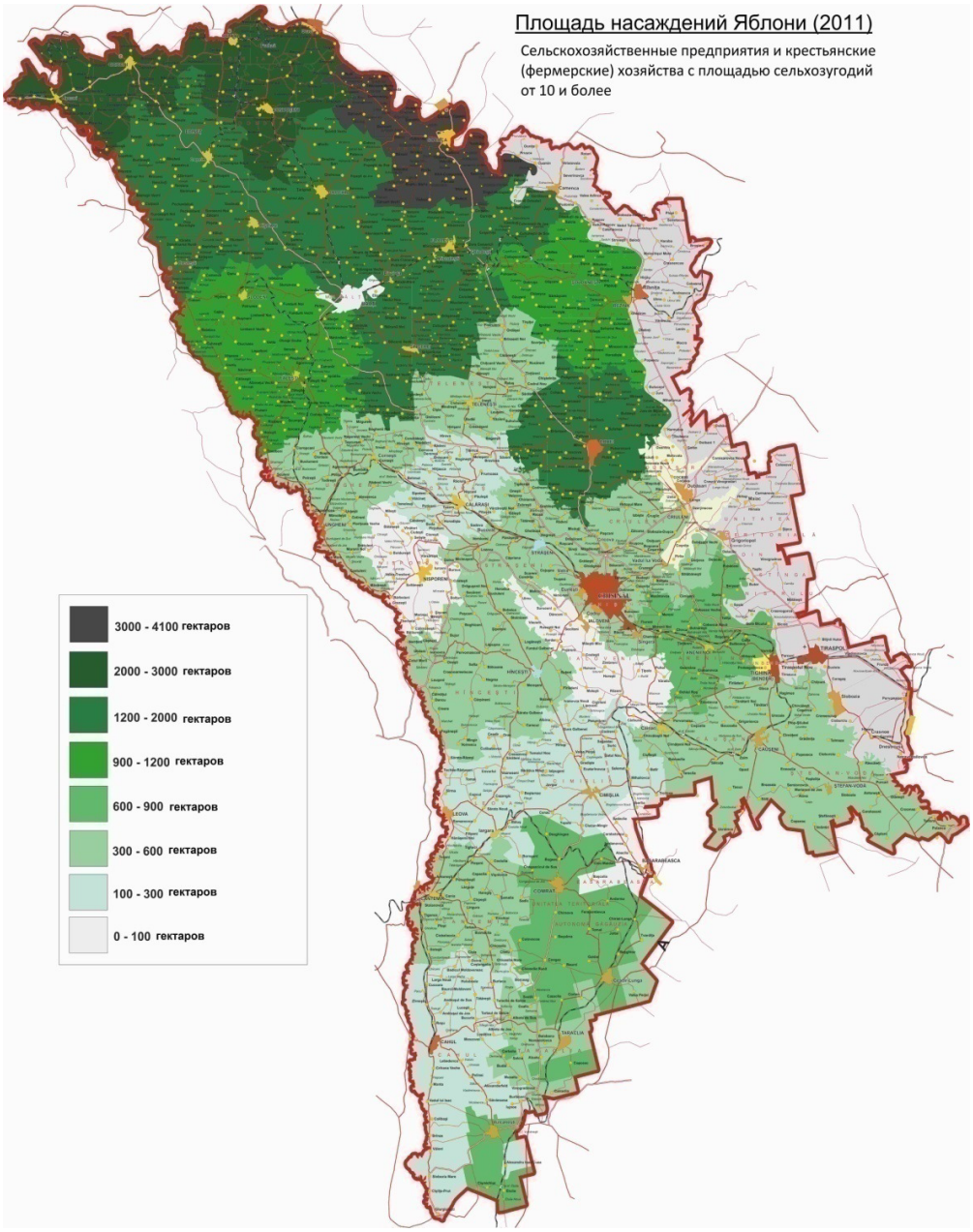
Annex 1. Areas occupied by vegetables, potatoes and melons in the years 2003-2012, thousand ha

Specification	Areas in hectares, cultures in years									
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Field vegetables	50,2	62,2	54,3	41,6	36,4	36,7	42,40	37,70	39,8	45,4
cabbage	5,9	8,4	5,6	3,8	3,6	3,3	3,90	2,80	4,30	4,1
cucumbers	3,5	5,1	5,3	3,7	2,8	2,9	3,60	2,90	3,20	3,5
tomatos	12,3	12,1	10,7	8,0	7,3	6,1	8,00	6,10	7,00	7,6
red beet	2,4	2,5	2,1	1,5	1,3	1,3	1,60	1,20	1,40	1,5
carrots	3,4	3,9	3,1	2,0	1,8	1,7	2,30	1,90	2,20	2,4
onion	11,3	11,8	10,5	7,5	5,7	6,3	6,70	5,40	5,60	6,4
garlic	1,0	5,1	3,9	2,9	1,9	2,0	2,00	2,10	2,30	2,6
garden peas	1,2	1,5	2,5	2,5	2,1	2,7	2,80	4,10	3,40	4,4
other vegetables	9,2	11,8	10,6	9,7	9,9	10,4	11,5	11,2	10,60	12,9
including: pumpkin	1,8	2,3	2,0	2,5	2,9	2,4	3,10	2,50	2,60	3,0
zucchini	2,3	1,6	1,3	1,4	1,2	1,2	1,30	1,30	1,30	1,5
Sweet pepper	2,5	3,7	3,3	2,7	2,7	3,2	3,60	2,70	2,40	3,0
aubergine	1,1	1,5	1,3	0,8	0,6	0,7	0,80	0,70	0,60	0,8
bell pepper	0,3	0,7	0,6	0,3	0,4	0,8	0,70	0,50	0,50	0,6
herbs	0,8	1,2	1,2	0,9	1,1	1,2	1,30	1,50	1,30	1,6
other	0,4	0,8	0,9	1,1	1,0	0,7	1,30	2,00	2,05	2,4
2. Potato	65,3	42,7	45,0	38,5	34,6	35,9	34,40	35,40	31,20	42,0
3. Pumpkins	7,1	6,9	6,1	8,3	6,7	5,4	8,80	7,00	8,90	8,0
Veg.+Potato+Pump.	122,6	111,8	105,4	88,4	77,7	78,0	85,6	80,10	79,9	95,4

Source:The National Bureau of Statistics (2012).

Annex 2. Apple Production in Moldova.



Source: MIEPO 2011.

Annex 3. Causeni Market.

Source: Authors archive, 2012

Annex 4. Chisinau Central Market.

Source: Authors archive, 2012

Annex 5. Edinet Market.

Source: Authors archive, 2012

Annex 6. Dummy variables and seasonal analysis of apple monthly prices 2009-2012

			QT I	QT II	QT III	QT IV	T I	T II	T III	T IV
	Price	MONTHS	Months I-III	Months IV-VI	Months VII-IX	Months X-XII	Year I	Year II	Year III	Year IV
January	**7,35**	1	1	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001
February	**5,12**	2	1	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001
March	**6**	3	1	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001
April	**8**	4	0,0001	1	0,0001	0,0001	1	0,0001	0,0001	0,0001
May	**12,5**	5	0,0001	1	0,0001	0,0001	1	0,0001	0,0001	0,0001
June	**12,5**	6	0,0001	1	0,0001	0,0001	1	0,0001	0,0001	0,0001
July	**9,75**	7	0,0001	0,0001	1	0,0001	1	0,0001	0,0001	0,0001
August	**5,5**	8	0,0001	0,0001	1	0,0001	1	0,0001	0,0001	0,0001
September	**5**	9	0,0001	0,0001	1	0,0001	1	0,0001	0,0001	0,0001
October	**5**	10	0,0001	0,0001	0,0001	1	1	0,0001	0,0001	0,0001

November	**5,25**	11	0,0001	0,0001	0,0001	1	1	0,0001	0,0001	0,0001
December	**6,25**	12	0,0001	0,0001	0,0001	1	1	0,0001	0,0001	0,0001
January	**7,25**	13	1	0,0001	0,0001	0,0001	0,0001	1	0,0001	0,0001
February	**7,75**	14	1	0,0001	0,0001	0,0001	0,0001	1	0,0001	0,0001
March	**8,25**	15	1	0,0001	0,0001	0,0001	0,0001	1	0,0001	0,0001
April	**8,62**	16	0,0001	1	0,0001	0,0001	0,0001	1	0,0001	0,0001
May	**11,5**	17	0,0001	1	0,0001	0,0001	0,0001	1	0,0001	0,0001
June	**11,25**	18	0,0001	1	0,0001	0,0001	0,0001	1	0,0001	0,0001
July	**9,75**	19	0,0001	0,0001	1	0,0001	0,0001	1	0,0001	0,0001
August	**5,5**	20	0,0001	0,0001	1	0,0001	0,0001	1	0,0001	0,0001
September	**5,87**	21	0,0001	0,0001	1	0,0001	0,0001	1	0,0001	0,0001
October	**6,87**	22	0,0001	0,0001	0,0001	1	0,0001	1	0,0001	0,0001
November	**7**	23	0,0001	0,0001	0,0001	1	0,0001	1	0,0001	0,0001
December	**7,62**	24	0,0001	0,0001	0,0001	1	0,0001	1	0,0001	0,0001
January	**9,5**	25	1	0,0001	0,0001	0,0001	0,0001	0,0001	1	0,0001
February	**10,75**	26	1	0,0001	0,0001	0,0001	0,0001	0,0001	1	0,0001
March	**11**	27	1	0,0001	0,0001	0,0001	0,0001	0,0001	1	0,0001
April	**14**	28	0,0001	1	0,0001	0,0001	0,0001	0,0001	1	0,0001
May	**16,5**	29	0,0001	1	0,0001	0,0001	0,0001	0,0001	1	0,0001
June	**17,5**	30	0,0001	1	0,0001	0,0001	0,0001	0,0001	1	0,0001
July	**15**	31	0,0001	0,0001	1	0,0001	0,0001	0,0001	1	0,0001
August	**13,25**	32	0,0001	0,0001	1	0,0001	0,0001	0,0001	1	0,0001
September	**7**	33	0,0001	0,0001	1	0,0001	0,0001	0,0001	1	0,0001
October	**7,75**	34	0,0001	0,0001	0,0001	1	0,0001	0,0001	1	0,0001
November	**10,25**	35	0,0001	0,0001	0,0001	1	0,0001	0,0001	1	0,0001
December	**10,5**	36	0,0001	0,0001	0,0001	1	0,0001	0,0001	1	0,0001
January	**9**	37	1	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1
February	**10,5**	38	1	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1
March	**10**	39	1	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1
April	**11**	40	0,0001	1	0,0001	0,0001	0,0001	0,0001	0,0001	1
May	**12**	41	0,0001	1	0,0001	0,0001	0,0001	0,0001	0,0001	1
June	**11**	42	0,0001	1	0,0001	0,0001	0,0001	0,0001	0,0001	1
July	**10,25**	43	0,0001	0,0001	1	0,0001	0,0001	0,0001	0,0001	1

August	**6,12**	44	0,0001	0,0001	1	0,0001	0,0001	0,0001	0,0001	1
September	**7**	45	0,0001	0,0001	1	0,0001	0,0001	0,0001	0,0001	1
October	**6,87**	46	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001	1
November	**7**	47	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001	1
December	**8**	48	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001	1

Source: Author's calculations 2012

Annex 7. Regression statistics of apple prices analysis

Regression Statistics	
Multiple R	0,838072904
The value of reliability R	0,702366193
The set value of reliability R	0,631873975
Standard Error	1,847413481
Observations	48

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regrassion	9	306,0505417	34,00562	9,963741	1,18601E-07
Residual	38	129,6915896	3,412937		
Total	47	435,7421313			

Parameter	*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	9,534864183	7657460,665	1,25E-06	0,999	-15501709,69	15501729	-1,6E+07	15501729
MONTHS	-0,038125	0,32657965	-0,11674	0,907	-0,69925096	0,623001	-0,69925	0,623001
Months I-III	-2,204734083	8890962,836	-2,5E-07	1	-17998816,11	17998812	-1,8E+07	17998812
Months IV-VI	1,568351559	8890962,836	1,76E-07	1	-17998812,34	17998815	-1,8E+07	17998815
Months VII-IX	-2,182648541	8890962,836	-2,5E-07	1	-17998816,09	17998812	-1,8E+07	17998812

Months X-XII	-3,037525696	8890962,836	-3,4E-07	1	-17998816,94	17998811	-1,8E+07	17998811
Year I	-0,471642273	7794418,763	-6,1E-08	1	-15778976,88	15778976	-1,6E+07	15778976
Year II	0,736811906	7794418,763	9,45E-08	1	-15778975,67	15778977	-1,6E+07	15778977
Year III	5,008905782	7794418,763	6,43E-07	0,999	-15778971,4	15778981	-1,6E+07	15778981
Year IV	2,611166008	7794418,763	3,35E-07	1	-15778973,79	15778979	-1,6E+07	15778979

Source: Author's calculations 2012

Annex 8. Expected and empirical apple prices 2009-2012

Observation(Months)	*Empiric data*	*Expected*	*Residuals*
1	7,35	6,820833333	0,529166667
2	5,12	6,782708333	-1,662708333
3	6	6,744583333	-0,744583333
4	8	10,47916667	-2,479166667
5	12,5	10,44104167	2,058958333
6	12,5	10,40291667	2,097083333
7	9,75	6,614166667	3,135833333
8	5,5	6,576041667	-1,076041667
9	5	6,537916667	-1,537916667
10	5	5,645	-0,645
11	5,25	5,606875	-0,356875
12	6,25	5,56875	0,68125
13	7,25	7,571666667	-0,321666667
14	7,75	7,533541667	0,216458333
15	8,25	7,495416667	0,754583333
16	8,62	11,23	-2,61
17	11,5	11,191875	0,308125
18	11,25	11,15375	0,09625
19	9,75	7,365	2,385

20	5,5	7,326875	-1,826875
21	5,87	7,28875	-1,41875
22	6,87	6,395833333	0,474166667
23	7	6,357708333	0,642291667
24	7,62	6,319583333	1,300416667
25	9,5	11,38583333	-1,885833333
26	10,75	11,34770833	-0,597708333
27	11	11,30958333	-0,309583333
28	14	15,04416667	-1,044166667
29	16,5	15,00604167	1,493958333
30	17,5	14,96791667	2,532083333
31	15	11,17916667	3,820833333
32	13,25	11,14104167	2,108958333
33	7	11,10291667	-4,102916667
34	7,75	10,21	-2,46
35	10,25	10,171875	0,078125
36	10,5	10,13375	0,36625
37	9	8,530833333	0,469166667
38	10,5	8,492708333	2,007291667
39	10	8,454583333	1,545416667
40	11	12,18916667	-1,189166667
41	12	12,15104167	-0,151041667
42	11	12,11291667	-1,112916667
43	10,25	8,324166667	1,925833333
44	6,12	8,286041667	-2,166041667
45	7	8,247916667	-1,247916667
46	6,87	7,355	-0,485
47	7	7,316875	-0,316875
48	8	7,27875	0,72125

Source: Author’s calculations 2012

Annex 9. Dummy variables and seasonal analysis of onion monthly prices 2009-2012

			QT I	QT II	QT III	QT IV	T I	T II	T III	T IV
	Price	MONTHS	Months I-III	Months IV-VI	Months VII-IX	Months X-XII	Year I	Year II	Year III	Year IV
January	**3,5**	1	1	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001
February	**3,5**	2	1	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001
March	**3,5**	3	1	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001
April	**3,87**	4	0,0001	1	0,0001	0,0001	1	0,0001	0,0001	0,0001
May	**3,75**	5	0,0001	1	0,0001	0,0001	1	0,0001	0,0001	0,0001
June	**5,62**	6	0,0001	1	0,0001	0,0001	1	0,0001	0,0001	0,0001
July	**6**	7	0,0001	0,0001	1	0,0001	1	0,0001	0,0001	0,0001
August	**5**	8	0,0001	0,0001	1	0,0001	1	0,0001	0,0001	0,0001
September	**4,25**	9	0,0001	0,0001	1	0,0001	1	0,0001	0,0001	0,0001
October	**4,5**	10	0,0001	0,0001	0,0001	1	1	0,0001	0,0001	0,0001
November	**4,75**	11	0,0001	0,0001	0,0001	1	1	0,0001	0,0001	0,0001
December	**5,5**	12	0,0001	0,0001	0,0001	1	1	0,0001	0,0001	0,0001
January	**6,5**	13	1	0,0001	0,0001	0,0001	0,0001	1	0,0001	0,0001
February	**10,5**	14	1	0,0001	0,0001	0,0001	0,0001	1	0,0001	0,0001
March	**10,25**	15	1	0,0001	0,0001	0,0001	0,0001	1	0,0001	0,0001
April	**12**	16	0,0001	1	0,0001	0,0001	0,0001	1	0,0001	0,0001
May	**11,25**	17	0,0001	1	0,0001	0,0001	0,0001	1	0,0001	0,0001
June	**10,5**	18	0,0001	1	0,0001	0,0001	0,0001	1	0,0001	0,0001
July	**6,5**	19	0,0001	0,0001	1	0,0001	0,0001	1	0,0001	0,0001
August	**4,75**	20	0,0001	0,0001	1	0,0001	0,0001	1	0,0001	0,0001
September	**4,5**	21	0,0001	0,0001	1	0,0001	0,0001	1	0,0001	0,0001
October	**4,75**	22	0,0001	0,0001	0,0001	1	0,0001	1	0,0001	0,0001
November	**4,87**	23	0,0001	0,0001	0,0001	1	0,0001	1	0,0001	0,0001
December	**5,95**	24	0,0001	0,0001	0,0001	1	0,0001	1	0,0001	0,0001
January	**5,65**	25	1	0,0001	0,0001	0,0001	0,0001	0,0001	1	0,0001
February	**6,37**	26	1	0,0001	0,0001	0,0001	0,0001	0,0001	1	0,0001
March	**7,5**	27	1	0,0001	0,0001	0,0001	0,0001	0,0001	1	0,0001
April	**8**	28	0,0001	1	0,0001	0,0001	0,0001	0,0001	1	0,0001

May	**8,75**	29	0,0001	1	0,0001	0,0001	0,0001	0,0001	1	0,0001
June	**9**	30	0,0001	1	0,0001	0,0001	0,0001	0,0001	1	0,0001
July	**7,5**	31	0,0001	0,0001	1	0,0001	0,0001	0,0001	1	0,0001
August	**4,87**	32	0,0001	0,0001	1	0,0001	0,0001	0,0001	1	0,0001
September	**4,95**	33	0,0001	0,0001	1	0,0001	0,0001	0,0001	1	0,0001
October	**4**	34	0,0001	0,0001	0,0001	1	0,0001	0,0001	1	0,0001
November	**4,5**	35	0,0001	0,0001	0,0001	1	0,0001	0,0001	1	0,0001
December	**4,75**	36	0,0001	0,0001	0,0001	1	0,0001	0,0001	1	0,0001
January	**4,8**	37	1	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1
February	**4,12**	38	1	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1
March	**4,12**	39	1	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1
April	**3,45**	40	0,0001	1	0,0001	0,0001	0,0001	0,0001	0,0001	1
May	**4,65**	41	0,0001	1	0,0001	0,0001	0,0001	0,0001	0,0001	1
June	**5,5**	42	0,0001	1	0,0001	0,0001	0,0001	0,0001	0,0001	1
July	**7,25**	43	0,0001	0,0001	1	0,0001	0,0001	0,0001	0,0001	1
August	**6,37**	44	0,0001	0,0001	1	0,0001	0,0001	0,0001	0,0001	1
September	**5,5**	45	0,0001	0,0001	1	0,0001	0,0001	0,0001	0,0001	1
October	**4,25**	46	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001	1
November	**4,62**	47	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001	1
December	**4,65**	48	0,0001	0,0001	0,0001	1	0,0001	0,0001	0,0001	1

Source: Author's calculations 2012

Annex 10. Regression statistics of onion prices analysis

Regression Statistics	
Multiple R	0,706654549
The value of reliability R	0,499360652
The set value of reliability R	0,380788175
Standard Error	1,72655314
Observations	48

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regrassion	9	112,9881333	12,55423704	4,211438	0,000780475
Residual	38	113,2774583	2,980985746		
Total	47	226,2655917			

Parameter	*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Loir 95,0%*	*Upper 95,0%*
Intercept	2,482351808	7156499,016	3,46867E-07	1	-14487572,8	144875	-1,4E+07	14487578
MONTHS	0,11	0,305214358	0,360402442	0,720	-0,50787418	0,7278	-0,50787	0,727874
Months I-III	2,593177213	8309303,772	3,12081E-07	1	-16821304,0	168213	-1,7E+07	16821309
Months IV-VI	3,59911114	8309303,772	4,33142E-07	1	-16821303,0	168213	-1,7E+07	16821310
Months VII-IX	1,693920621	8309303,772	2,03858E-07	1	-16821304,9	168213	-1,7E+07	16821308
Months X-XII	0,501301359	8309303,772	6,03301E-08	1	-16821306,1	168213	-1,7E+07	16821307
Year I	-0,816040119	7284497,127	-1,12024E-07	1	-14746694,	147466	-1,5E+07	14746693
Year II	1,0791494	7284497,127	1,48143E-07	1	-14746692,9	147466	-1,5E+07	14746695
Year III	-1,614453293	7284497,127	-2,21629E-07	1	-14746695,6	147466	-1,5E+07	14746692
Year IV	-4,31472332	7284497,127	-5,92316E-07	1	-14746698,3	147466	-1,5E+07	14746690

Source: Author's calculations 2012

Annex 11. Expected and empirical onion prices 2009-2012

Observation (Months)	*Empiric data*	*Expected*	*Residuals*
1	3,5	4,369583333	-0,86958
2	3,5	4,479583333	-0,97958
3	3,5	4,589583333	-1,08958
4	3,87	5,705416667	-1,83542
5	3,75	5,815416667	-2,06542

6	5,62	5,925416667	-0,30542
7	6	4,130416667	1,869583
8	5	4,240416667	0,759583
9	4,25	4,350416667	-0,10042
10	4,5	3,267916667	1,232083
11	4,75	3,377916667	1,372083
12	5,5	3,487916667	2,012083
13	6,5	7,584583333	-1,08458
14	10,5	7,694583333	2,805417
15	10,25	7,804583333	2,445417
16	12	8,920416667	3,079583
17	11,25	9,030416667	2,219583
18	10,5	9,140416667	1,359583
19	6,5	7,345416667	-0,84542
20	4,75	7,455416667	-2,70542
21	4,5	7,565416667	-3,06542
22	4,75	6,482916667	-1,73292
23	4,87	6,592916667	-1,72292
24	5,95	6,702916667	-0,75292
25	5,65	6,21125	-0,56125
26	6,37	6,32125	0,04875
27	7,5	6,43125	1,06875
28	8	7,547083333	0,452917
29	8,75	7,657083333	1,092917
30	9	7,767083333	1,232917
31	7,5	5,972083333	1,527917
32	4,87	6,082083333	-1,21208
33	4,95	6,192083333	-1,24208
34	4	5,109583333	-1,10958

35	4,5	5,219583333	-0,71958
36	4,75	5,329583333	-0,57958
37	4,8	4,83125	-0,03125
38	4,12	4,94125	-0,82125
39	4,12	5,05125	-0,93125
40	3,45	6,167083333	-2,71708
41	4,65	6,277083333	-1,62708
42	5,5	6,387083333	-0,88708
43	7,25	4,592083333	2,657917
44	6,37	4,702083333	1,667917
45	5,5	4,812083333	0,687917
46	4,25	3,729583333	0,520417
47	4,62	3,839583333	0,780417
48	4,65	3,949583333	0,700417

Source: Author's calculations 2012

Annex 12. Translated questionnaire in English language.

Questionnaire

We are grateful for your time, effort, willingness and answers, which would help us to complete the research of local agricultural markets in the Republic of Moldova. The results of this research will be part of the master thesis submitted to the Czech University of Life Sciences, Prague, at the Faculty of Tropical Agriculture.

1) What gender are you?

2) What is Your age?

- **< 22**
- **23-40**
- **41-60**
- **>60**

3) In what region do you live?

4) What is your nationality?

5) What is your level of education?

6) Are you a private farmer or do you work on a state company?

7) Are you a member of an agricultural cooperative?

8) What is the size of your lot where you grow fruits (apples) and vegetables (onion) (field, backyard)?

9) What main problems are you facing during apple/onion cultivation?

a) expensive or non-qualitative seeding material

b) expensive fertilizers

c) expensive rent for the mechanization (tractor, plowing)

d) expensive or lack of manpower

e) transport of ready production from the fields to the markets

f) other

10) Are you taking your production only to the local market from your region or you are going to other markets as well. If you take it to other markets, what regions do you prefer?

11)What amount of fruit (apple) production or vegetables (onion) production do you sell on local (Moldavian)market per month? (tons/kg).

12) What are the decisive factors that influence on the creation of price for your production?

a) information about real prices on the market

b) price of seeding material

c) price of fertilizers

d) price of manpower

e) price of transport

f) other

13) In what time period do you sell your production (apples/onion) on the local market?

Season (please fill in the months) _____

Out of season (please fill in the months) _____

14) What is the minimum price of your products during the entire season and out-of-season? (kg.MDL)?

	Onion	Apples		Onion	Apples
January			July		
February			August		
March			September		
April			October		
May			November		

June		December	

5) What is the maximum price of your products during the season and out-of-season (kg/MDL)?

	Onion	Apples		Onion	Apples
January			July		
February			August		
March			September		
April			October		
May			November		
June			December		

16) What influenced the growth of prices on the market where you sell your products during all year round (during season and out of season) (drought, frosts, national holidays)? Please fill in what concretely influenced the prices of your production (apples/onion) in each month.

January		July	
February		August	
March		September	
April		October	
May		November	
June		December	

17) What general problems do you indentify in selling fruits (apples) and vegetables (onion) on the local (Moldavian) markets?

a) the lack of wholesale markets

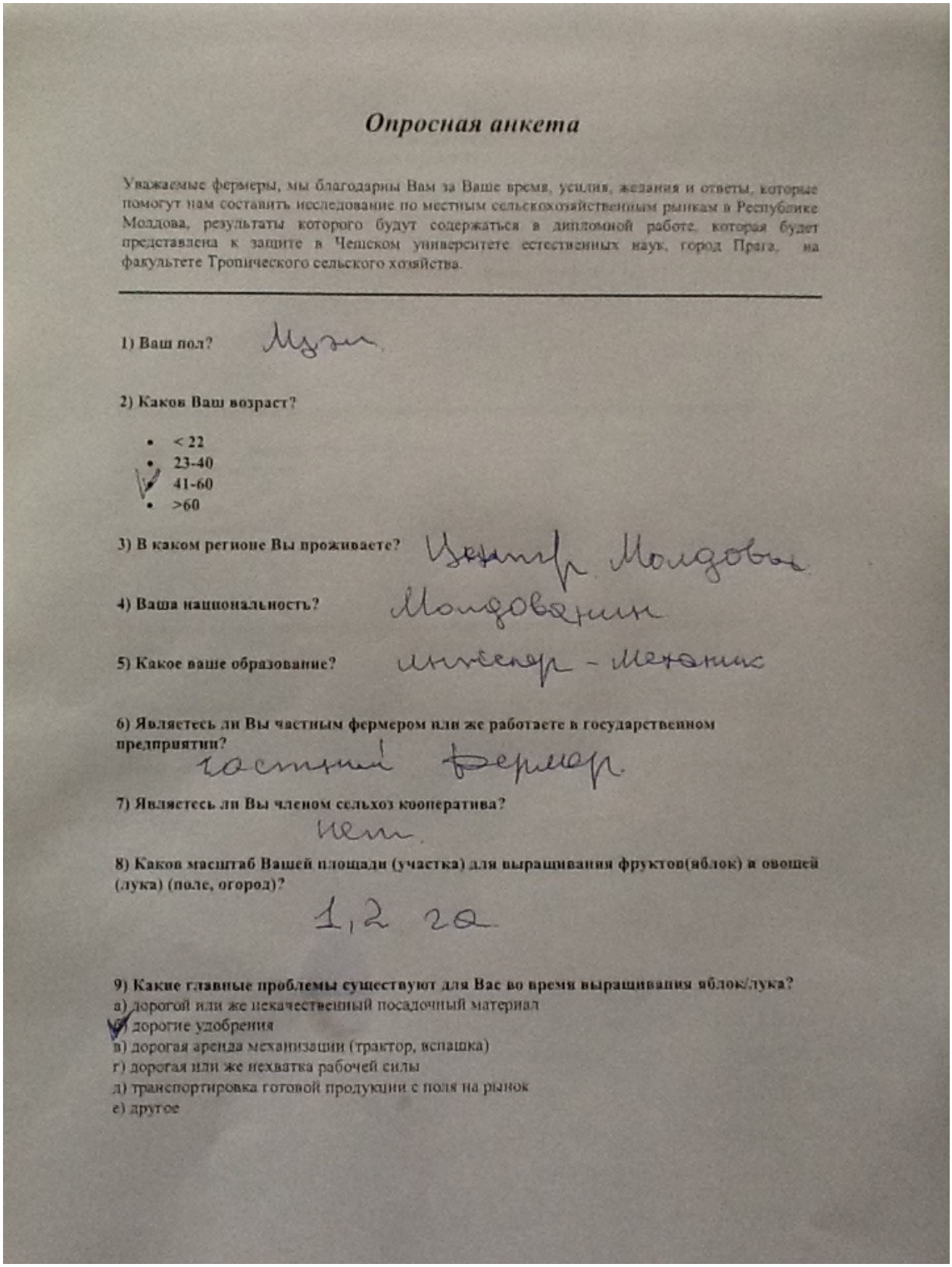
b) expensive rent for places in the markets

c) bad infrastructure of the markets

d) big competition

e) other

Annex 13. Filled Questionnaire.



Опросная анкета

Уважаемые фермеры, мы благодарны Вам за Ваше время, усилия, желания и ответы, которые помогут нам составить исследование по местным сельскохозяйственным рынкам в Республике Молдова, результаты которого будут содержаться в дипломной работе, которая будет представлена к защите в Чешском университете естественных наук, город Прага, на факультете Тропического сельского хозяйства.

---

1) Ваш пол? Мужчина

2) Каков Ваш возраст?

- < 22
- 23-40
- ✓ 41-60
- >60

3) В каком регионе Вы проживаете? Центр Молдовы

4) Ваша национальность? Молдованин

5) Какое ваше образование? инженер - механик

6) Являетесь ли Вы частным фермером или же работаете в государственном предприятии?
частный фермер

7) Являетесь ли Вы членом сельхоз кооператива?
нет

8) Каков масштаб Вашей площади (участка) для выращивания фруктов(яблок) и овощей (лука) (поле, огород)?
1,2 га

9) Какие главные проблемы существуют для Вас во время выращивания яблок/лука?
а) дорогой или же некачественный посадочный материал
✓ б) дорогие удобрения
в) дорогая аренда механизации (трактор, вспашка)
г) дорогая или же нехватка рабочей силы
д) транспортировка готовой продукции с поля на рынок
е) другое

10) Вы поставляете свою продукцию только на рынок, находящийся в Вашем регионе или же и на другие региональные рынки. Если и на другие, то в каких регионах данные рынки находятся?

Только в своём регионе

11) Какой объём продукции фруктов(яблок) и овощей (лука) Вы продаёте на местном (молдавском) рынке в месяц? (тонн/кг)

точно не считал

12) Какие решающие факторы играют роль в ценообразовании вашей продукции?

а) информация о реальных ценах на рынках
б) посадочный материал
в) удобрения
г) рабочая сила
д) транспортировка
е) другое

13) В какой период времени Вы продаёте свою продукцию (яблоки/лук) на местном рынке?

Сезон (напишите какие месяца) Сентябрь, Октябрь

Межсезонье (напишите какие месяца) Март, Апрель

14) Какова минимальная цена вашей продукции в течении всего сезона и межсезонья (в кг/Мдл)?

	Лук	Яблоки		Лук	Яблоки
Январь		5 лей	Июль		8 лей
Февраль		5 лей	Август		5 лей
Март		4 лей	Сентябрь		4 лей
Апрель		4 лей	Октябрь		3 лей
Май		3 лей	Ноябрь		5 лей
Июнь		7 лей	Декабрь		4 лей

15) Какова максимальная цена вашей продукции в течении всего сезона и межсезонья (в кг/Мдл)?

	Лук	Яблоки		Лук	Яблоки
Январь		13 лей	Июль		15 лей
Февраль		6 лей	Август		10 лей
Март		15 лей	Сентябрь		11 лей
Апрель		14 лей	Октябрь		10 лей
Май		12 лей	Ноябрь		10 лей
Июнь		12 лей	Декабрь		10 лей

16) Что повлияло (засуха, заморзки, национальные праздники итд.) на тенденцию роста цен на рынке, где вы продаёте свою продукцию в течении всего года (в сезон и межсезонье)? Напишите, что в конкретном месяце повлияло на рост цен (яблоки/лук).

Январь		Июль	Град
Февраль		Август	
Март		Сентябрь	
Апрель		Октябрь	
Май	Засуха	Ноябрь	
Июнь	Засуха	Декабрь	

17) Какие общие проблемы имеются с продажей фруктов(яблок) и овощей (лука) на местных (молдавских) рынках?

а) отсутствие оптовых рынков
б) ✓ дорогие места на рынках
в) плохая инфраструктура рынков
г) ✓ большая конкуренция
д) другое

18) Ваши дополнительные коментарии, рекомендации и отзывы

Из-за отсутствие нормального планирования рынка в Молдове отношение покупателя сильно зависимой цены на нашу продукцию, также и этому мы имеем большие потери, дорогой стоит переработка

Большое Вам спасибо за Ваше сотрудничество !