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Access to agricultural market information by rural women:

a case study of Telenesti district in Central region of

The Republic of Moldova

Master's thesis

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MASTER'S THESIS TOPIC

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Thesis title: **Access to agricultural market information by rural women: a case study of Telenesti district in Central region of the Republic of Moldova**

Objectives of thesis: The Republic of Moldova is the poorest country in Europe and more than half of a population lives in rural areas of the country. The economic reform of transition to market economy has led to the poor social and economy conditions as well as a numerous of unemployed private land holders appeared in the country. More than half of agricultural sector contains women with low earning and potential productivity. They are also limited in a decision-making, service provision and their access to agricultural market information is insufficient. The availability of market information significantly affects livelihood and agricultural market conditions. The main objective of the diploma thesis is to analyze the significance of the access to agricultural market information by rural women in the Republic of Moldova and its impact to women's role in Moldavian agriculture.

Methodology: 1. The thesis is based on primary data collection in Telenesti district in Central region of the Republic of Moldova through transect walks, interviews and discussions with local women farmers involved in the process of agricultural production and management of family farms. The survey will enable to identify the current situation, difficulties and opportunities of women farmers in access to agricultural information (the main agricultural products and modern technologies for their cultivation, potential trading partners, market prices, etc.) for improving their decision-making and streamlining agricultural production.
2. Secondary data collection will be done through available literature sources and mainly from scientific database of Thomson Reuters Web of Science, ScienceDirect, Scopus etc.
3. The collected data will be categorized, statistically processed by descriptive statistical tools and then interpreted.

The proposed extent of the thesis: 55 p.

Keywords: Agriculture, market information, rural women, Telenesti district, Moldova

Recommended information sources:

1. Farnworth CR, Ragasa C. 2008. Gender in Agricultural Sourcebook: Gender and Agricultural Market. World Bank. Food and Agricultural Organization. International Fund for Agricultural Development. 175-199 p.
2. Grigsby M., Espanol E., Brien J. 2012. The Influence of Farm Size on Gendered Involvement in Crop Cultivation and Decision-making Responsibility of Moldovan Farmers. Missouri Columbia. Eastern European Countryside. 27-44 p.
3. Sarbu O. 2013. Scientific Papers Series Management: Particularities of Employments in Rural Areas of the Republic of Moldova. Chisinau. State Agrarian University of Moldova. 361-370 p.
4. Shepherd AW. 1997. Market Information Services. Theory and Practice. Rome. FAO's Agricultural Services Bulletin. 125 p.

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Declaration

I hereby declare that I worked on my Master's thesis Access to agricultural market information by rural women: a case study of Telenesti district in Central region of the Republic of Moldova by myself and that I used only literature resources listed in references.

Prague 20th April, 2016

.....

Bc. Anna Kupková

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Abstract

Access to agricultural market information by rural women: a case study of Telenesti district in Central region of the Republic of Moldova

This thesis was focused mainly on the significance of access to agricultural market information by rural women and its impact to women's agricultural productivity. Thesis also identified women's role in agriculture, and analyzed accessibility, sources and utilization of agricultural market information. Research was conducted in Telenesti district in Central region of the Republic of Moldova, specifically in three selected communes Cazanesti, Brinzenii and Chitcani Vechi. A linear regression model was used to estimate relationship between annual agricultural production quantity expressed in money (MDL) and number of men within household, number of women within household, size of owned agricultural land and agricultural information usage by rural women. Number of women in household and agricultural market information by rural women did not have real impact to annual agricultural production quantity expressed in money. Agricultural market information were easily accessible for rural women in Telenesti district, and usage of agricultural market information was highly popular.

Keywords: Agriculture, Market information, Rural women, Telenesti district, Moldova

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List of the contractions used in thesis

ACSA	National Agency for Rural Development
AMIS	Agricultural market information services
CAMIB	Central Agricultural Marketing Information Bureau
CBS-AXA	Central Director for Sociology and Marketing
CIS	Commonwealth of Independent States
CSO	Civil society organization
ČNB	Czech National Bank
CZK	Czech Crown
DCFTA	Deep and Comprehensive Free Trade Area
EU	European Union
EUR	Euro
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistics division
GDP	Gross domestic product
HDI	Human development index
IFAD	International Fund for Agricultural Development
ILO	International Labour Organization
IOM	International Organization for Migration
JISB	Joint Information and Services Bureaus
MDG	Millenium Development Goal
MDL	Moldovan Leu
NGO	Non-governmental organization
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Square Method
PPP	Purchasing power parity

SOFA	State of food and agriculture
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	Children's Rights and Emergency Relief Organization
US	United States
WB	WB
WEE	Women's Economic Empowerment

1 Introduction

The Republic of Moldova is the poorest country in the Europe, and more than half of population lives in rural area (Welter *et al.*, 2006). The economic reform of transition to market economy two decades ago has led to large scale changes in economic, social, and agricultural field. Unfortunately, these changes has led to poor social and economic conditions as well as numerous of unemployed private land holders appeared in the country (Sarbu, 2013). In consequence, Moldova has a high rate of labour migration and women's role in agriculture has become essential (Grisby *et al.*, 2012).

Agriculture plays an important role in economical growth and poverty reduction in countries suffering from poverty. Rural women represent the crucial resource in agriculture and rural economy of developing countries through their roles of farmers, workers, and entrepreneurs. However, compared to men, women are confronted with lots of disadvantages, for instance lower mobility, lesser access to market information, and minor access to productive resources. More than half of agricultural sector is represented by women with low earning, and large productivity potential (Farworth and Ragasa, 2008).

Within the country is agriculture important mainly in terms of employment, rural livelihoods, food security, rural growth and exports (WB, 2010). Rural women in Moldova suffer from limited access to information and services, are less paid than men, and under-represented in the decision-making process at the regional or local level (UNICEF, 2012).

Jerome and Theresa (2009) state that the availability of market information significantly effects livelihood and agricultural conditions, and information is an important source for development. Benefits of the access to agricultural market information are represented mainly by the planning of the production in line with market demand, scheduling of harvests at the most profitable times, making decision about market choosing, awareness about market prices etc. It could also help farmers to improve their profits and profitably move their products from a surplus to a deficit market. Based on these facts, developing countries are

establishing Market Information Services. Unfortunately, these services suffer by lack of accessibility, sustainability and utilization (Shepherd, 1997).

First part of this thesis introduces agricultural conditions in the Republic of Moldova, women's role in agriculture, and significance of agricultural market information.

The main aim of this thesis is to analyze the significance of the access to agricultural market information by rural women in Telenesti district of the Republic of Moldova, and its impact to women's agricultural productivity. The linear regression model is used to estimate relationship between annual agricultural production quantity expressed in money, number of men and women within household, size of owned agricultural land, and agricultural market information usage by rural women.

Particular aims analyze several facts in Telenesti district: (i) women's role in agriculture, (ii) accessibility of agricultural market information, (iii) sources of agricultural market information, and (iv) utilization of agricultural market information.

Methodological part describes studied area, three communes in Telenesti district Cazanesti, Brinzenii and Chitcani Vechi in the central region of Moldova, where the research was conducted. This part also describes and explains used research methods.

Results of the thesis show empirical information acquired during elaboration of this thesis. Agricultural production, women's role in agriculture, accessibility of agricultural market information, sources of agricultural market information, and utilization of agricultural market information are described there.

Discussion chapter compares results of this thesis with already ascertained information in other studies and suggests procedures that might be useful for further analysis.

2 Literature Review

2.1 Facts about the Republic of Moldova

2.1.1 Geography

The Republic of Moldova is a middle income country (WB, 2015) located in the central part of Europe in the north eastern Balkans. The country has total area of 33,843.5 km² (without Transnistria)¹ (Republic of Moldova, 2011). The country borders with Ukraine on the North, East and South (the length of the boundaries is 939 km) and with Romania on the West (the length of the boundaries is 450 km) (Republic of Moldova, 2011). It is divided into 32 districts, 3 municipalities (the capital Chisinau, Balti, Bender), 1 autonomous territorial unit (Gagauzia)² and 1 territorial unit (Transnistria)³ (National Bureau of Statistics, 2012).

Moldova belongs to the group of countries situated in the Black Sea Basin. However, the Black Sea lies behind its border and it is not accessed. The northwest and southeast relief of the country is composed of low hills (average elevation is 145 m above the sea) with numerous rivers. As a result, water erosion caused by the rivers is creating numbers of valleys and gorges. The central part is occupied by Codrii Woods which represents the most elevated topographical region with the maximum altitude 429.5 m at Hill Balanesti (Republic of Moldova, 2011). Forests cover only 12% of land area (UN, 2016).

The soil in the country is mostly fertile. There are several sorts of it. The three-fourth of area is composed of chernozem (black earth). Gray soil represents about

¹ Data are sometimes demonstrated without Transnistria. Because of current geopolitical situation is not possible to determinate whether the Transnistria is a part of Moldova or not (Dočekalová, 2011).

² Gagauzia is a relatively young autonomous territorial unit situated in the southern part of the country. The Gagauz are a Christian-Orthodox Turk people. Their leaders argue that the Republic of Moldova is as much their homeland as that of Romanian-speaking Moldovans. After several conflicts during 80's and 90's of 20th century, an agreement of Autonomy Statute for Gagauzia was reached in 1995. This deal has brought the area around the Gagauz capital Comrat back under the control of the central government (Neukirch, 2002).

³ Transnistria is de facto partially recognized state in Moldova established in 90s of 20th century. It is represented by the same attributes as a state, but it is not accepted internationally. The number of population is approximately 550 thousand consists mostly of Russians, then Ukrainians and Moldovans. The total area is 4, 163 km² (Dočekalová, 2011).

11% of the country 's land area, and floodplain, alluvial, meadow soils occupy around 12% of the Moldovan land area (Republic of Moldova, 2011).

Moldova has a temperate continental climate characterized by short mild winters, long warm summers and a high level of variability across the country. Annual mean temperature ranges from 8°C to 10°C and annual precipitation ranges from 500mm to 625mm (WB, 2010). In spite of moderate climatic conditions, Moldova has suffered from frequent draughts, hail storms, frosts and floods. For instance, in the last two decades Moldova has registered draughts almost every year, and it caused yield decrease⁴ (FAO, 2013). According to WB's study in 2007 a rural population of 1.2 million people was affected by drought (OECD, 2013).

2.1.2 Demography

Population density of the country per sq km is 102.3 (including Transnistria) (UN, 2016). The National Bureau of Statistics (2016) states that number of total population on January 1st 2015 was 3.555 million (including Transnistria) of which 42.4% constitutes the urban population and 57.6% the rural population. Population by sex was distributed as 51.9% of women and 48.1 % of men.

Moldovan/Romanian inhabitants constitute 78% of total population. The main minority groups are Ukrainians (8.4%), Russians (5.9%), Gagauzians (4.4%), and Bulgarians (1.9%). These minorities are concentrated in specific regions of the country (Kosienkowski and Schreiber, 2014).

According to United Nations (2016) average annual population growth rate⁵ was -0.8%⁶ (including Transnistria) between the years 2010 and 2015. The most common is population in a productive age (63%). Life expectancy at birth reached between the years 2010 and 2015 72.8 females and 64.9 males (including Transnistria). Sex ratio (number of males per 100 females in population) was 90.0

⁴ Years of draught season: 1990, 1992, 1994, 1996, 1999, 2000, 2001, 2003, 2007, 2012 (Serviciul Hidrometeorologic de Stat, 2008) For instance, 2007 and 2012 were losos up to 70% of major crops (OECD, 2013).

⁵ Population growth rate is the increase in a country's population during a period time, expressed as a percentage of the population at the start of that period. It reflects the number of births and deaths during a period and the number of people migrating to and from a country (WB, 2001).

⁶ -0.7 % in urban areas, -0.8% in rural areas (UN, 2016)

in 2014 (UN, 2016). GINI index⁷ in 2013 reached 28.5 (when 0 means perfect equality and 100 represents perfect inequality) (WB, 2016). UNDP (2015) states that Moldova is in medium human development group with HDI 0.618 in 2014.

2.1.3 Economic background

The Republic of Moldova is the poorest country in the Europe⁸, and more than half of a population lives in the rural area. The economic reform of transition to market economy three decades ago has led to the poor social and economy conditions as well as a numerous of unemployed private landholders appeared in the country (Welter *et al.*, 2006). This period was also marked by large scale changes in economic, social and agricultural field. The disintegration of the Soviet Union has caused the refusal of centralized system of economic, and social managing and the principles of social and economic system organization appeared in the country. These facts have led to a massive economic recession in the 90s of the last century accompanied by an essential degradation of the society. During this period were also made some structural, institutional, legal, behavioral changes aiming to the new economic mechanism based on market relations, competition and efficiency. Unfortunately, these changes experienced several failures and the global economy and financial crisis rapidly impacted the Moldavian economy. As a consequence, Moldova has a high rate of unemployed and labour migration (Sarbu, 2013). During this crisis (1990 – 1999) the GDP decreased almost by three times (Republic of Moldova, 2011).

Since 2000 the economy has risen. During the years 2000-2005 the GDP in real terms increased with 43%, and poverty rate⁹ decreased with 41.3% (Republic of Moldova, 2011). However, the current economy situation within the country has changed during a few years. Moldova experienced the highest cumulative GDP growth which was unfortunately volatile because of climatic and global economic conditions. GDP grew by 7.1% in 2010 and 6.4% in 2011. In 2012, GDP decreased

⁷ Gini index measures extend to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution (WB, 2016).

⁸ According to the International Monetary Fund's (2014) regional poverty line (US\$ 5/day (PPP)) 55% of population was poor in 2011.

⁹ Poverty rate is a ratio of the number of people who fall below the poverty line and the total population (OECD, 2010).

by 0.7% because of draught which was explained above, and Eurozone crisis. In 2013, GDP rapidly increased by 9.4% which was caused by a record harvest (WB, 2015). Actual information about the country demonstrates that in 2014 growth of GDP was reduced thanks to weak economic activity of major economic partners and Russian trade restrictions (WB, 2015). According to WB's database (2016) the GDP per capita reached US\$ 1,137 in 2013 and US\$ 1,190 in 2014. GDP per capita PPP reached US\$ 4,735.5 in 2014 (WB, 2016) which is twice higher than in 2005 (US\$ 2, 869) (International organization for migration, 2008).

The current situation of the GDP during the year 2015 represented the decrease by 3.7% because of bad harvest (agriculture decreased by 17.4% and the internal demand was weak due to low remittances) (WB, 2015).

Since 2013 Moldova has been a member of partnership with European Union Deep and Comprehensive Free Trade Area (DCFTA). This deal opens extraordinary opportunities for the country from the perspective of access of domestic goods and services to the market, and supports deep structural changes required to increase the competitiveness of national economy (Government of Republic of Moldova: Ministry of Economy, 2016). However, as a "punishment" for pro-European policy was the Russian embargo on wine, meat, fruits and vegetable (Calus, 2014). Nevertheless, the Russian Federation is still the major trading partner of the country. According to United Nation's data the highest percentage of exports in 2013 was aimed to Russia (23%), then to Romania (16.9%) and Italy (7.6%) (UN, 2016). In spite of increasing of export to EU countries, Moldovan economy is still affected by older problems, such as the country's non-transparent banking system (the banking system depends heavily on funding from Russian banks) and the systemic corruption (Calus, 2014; International Monetary Fund, 2014). This fact could be demonstrated on the Exports ^x Imports balance which was US\$ 3064.1 million in 2013 (UN, 2016).

Moroz and Ignat (2015) highlighted in their study the rapid change of sector contribution in the country. WB's data (2016) shows that employment in sectors in 2013 contributed 28.8% in agriculture, 17.7% in industry and 53.5% in services. Agriculture and industry share of GDP have been falling from 56% in 1995 to about 13.8% in 2013 (National Bureau of Statistics, 2014).

2.1.3.1 Labour migration

The centre of process of emigration started in 1991 when Moldova re-claims its independence. Due to this declaration the country gave citizens opportunity to move relatively free across state borders (International organization for migration, 2008). The main causes of migration were economic crisis, decline of production, inflation, growing unemployment, reduction of social sphere, continuous delays of salary payment etc. (Mosneaga, 2007). In 2005, the labour migration became the major component of Moldovan emigration (more than 400, 000 people left the country). However, IOM's survey shows that this type of migration is temporary and only 14% of emigrants planning to settle abroad for a long term, and 52% of labour emigrants engage in seasonal work. Also, after the revolution were men more affected by unemployment than women because many industrial plants and factories (where men labour was essential) have been disappeared. Women gained better access to job opportunities developed in service sector (International organization for migration, 2008). Based on this fact, CBS-AXA's report from 2005 confirmed that 60% of those living abroad are male (Mosneaga, 2007). According to Migration Policy Institute (2015) 64% of labour migrants are men who mostly head to Russia and other CIS countries to work in construction, and women often seek work in Italy in the care and service sector.

Furthermore, National Bureau of Statistics (2016) states that the number of men from rural areas who are working or looking for a work abroad is still rapidly higher than female's one in Moldova. In 2014, 159,400 rural men, and only 85,800 rural women, were working abroad or looking for a job there.

However, the National Strategy on Gender Equality in the Republic of Moldova for the years 2009-2015 states that the number of female labour migrants significantly increased as compared to the previous periods. These changes are caused by limited possibilities in the labour market such as influenced with lack of services for women with small children, aged-based employment discrimination against women, persistence of professional segregation and discrepancy in remuneration between women and men, and reduced level of female entrepreneurship, especially in rural areas (National Strategy on Gender Equality in the Republic of Moldova, 2008). In addition, a large percentage of migrants are in

prime reproductive age and actively involved in the labour force, thus emigration causes loss of human capital and reproductive potential (Yanovich, 2015).

Consequently, the Moldovan emigrants often seek to improve well-being of their family and leave it behind (Yanovich, 2015). In addition, UNICEF's report (2012) claims that the number of children left behind is higher than 100, 000, and in 2011 one out of five children in Moldova had a parent living abroad.

Actually, Moldovan government began to try to minimize negative effects and risks associated with mass emigration. International organizations and national institutions started to work together on the development and implementation of policies in order to decrease negative impact of emigration. Owing to, the National Strategy in the migration and asylum domain (2011-2020), and the Action Plan for 2011-2015 regarding the implementation of the Strategy were approved (Migration Policy Centre, 2013).

2.1.4 Agriculture

The agriculture plays an important role in a growth and poverty reduction in countries suffering by poverty (SOFA Team and Doss, 2011). According to Akers's analysis (2010) the potential role of agriculture as an engine for economic development has been recognized and GDP growth generated in agriculture can be particularly effective in increasing incomes for the poor.

In the case of Moldova, the economy relies considerably on its agriculture sector (European Commission, 2013). Within the country is agriculture important mainly in terms of employment, rural livelihoods, food security, rural growth, and exports (WB, 2010). WB's data (2015) states that in 2013 the employment in agriculture reached 28.8% (one quarter is directly employed by agri-enterprises, and other 75% of the agricultural force is classified as self-employment (European Commission, 2013). Agricultural sector shared 14.6% of total GDP in 2012 (in combination with the agro-processing is this share goes up to around 36% of the GDP) (WB, 2015).

The total area of agricultural land is 24,620 km² (FAO, 2015) (26% is under a public form of ownership, and 73.8% is under a private form of ownership

(European Commission, 2013)), and rural population is consist of 1,045,685 women, and 1,002,209 men (National Bureau of Statistics, 2015).

Agricultural land accounts for around 75% of total land area (European Commission, 2013). The land use is mostly composed of arable land for annual crop production (55.1%) which is situated especially in the northern districts of the country, then forest (11.9%), permanent meadows and pastures (10.7%), permanent crops (9.1%) and other land (13.2%) (WB, 2010; FAO, 2015). After the land reform caused by the privatization in 1990s, the structure of agricultural land use has changed. A large share of land remains as small individual plots. The average landholding is 1.4ha (European Commission, 2013).

2.1.4.1 Agricultural market

Historically Moldova has been focused on agricultural specialization thanks to its favourable climate conditions and a high quality soils, particularly in the production of high value crops like fruits and vegetables. However, the current situation shows relatively low productivity of agricultural products (Moroz and Ignat, 2015). WB (2010) states that one of the essential influences is the weather conditions change which has been described above already. This underperformance can be attributed to a complex set of factors from which are for instance the poor quality public services in areas like agricultural education, extension, research, and market information systems. According to Moroz and Ignat study (2015) the great problem of the country is also the low competitiveness of the agricultural sector which is caused mainly by two reasons: (i) lack of horizontal and vertical coordination of supply chain, (ii) agrochemicals products, seeds and fuel are all imported.

Agricultural export accounts for an essential part of total exports. The most imported products are wine, spirit, and fresh and processed fruits and vegetables. These products shares 40% of total exports (European Commission, 2013). The top exported commodities in 2013 were wheat (312,357 tonnes), sunflower seed (275,091 tonnes), apples (194,286 tonnes) and maize (132,995 tonnes). Other products were barley and wine, rapeseed, sunflower oil and grapes (FAOSTAT,

2016). The main trading partners are Russian Federation and western CIS countries. More than one-third of agricultural exports direct there (FAO, 2011).

Consequently, the Republic of Moldova formulated the main objectives to support competitiveness of the agricultural sector. It is based on modernization of agri-food chain in order to meet EU requirements on food safety and quality, facilitation the access to capital, inputs and output markets for farmers, reform of education, scientific research and rural extension services in agri-food sector, and creation of integrated agriculture information system (Moroz and Ignat, 2015).

2.1.4.2 Agricultural production

The agricultural production of the country is driven mainly by households (National Bureau of Statistics, 2015). According to Moroz and Ignat (2015) small farmers generate a limited surplus of high value-added crops such as cereals, oilseeds and sugar beet. However, National Bureau of Statistics (2015) also states that during the last two years the production of agricultural enterprises decreased approximately by 10%, and it is almost on the same level as a household's production. Finally, small farmers produce high value-added crops on one hand, and large scale agricultural companies produce low value-added crops on the other hand. This specialization has been driven by a number of negative factors as a low production cost of these crops (Moroz and Ignat, 2015).

Table 1 explains the agricultural crop production of whole agricultural sectors across the years 2007 – 2014. Plant production contributes over two thirds of the overall value of agricultural production, for instance in 2014 was the yield of sugar beet 498.8 q/ha, fodder roots 205.7 q/ha, cabbage 147.0 q/ha, and pumpkins 138.4 q/ha (European Commission, 2013). It is clearly visible that in the year 2007 and 2012 the production rapidly decreased due to draught season (National Bureau of Statistics, 2015) (see Appendix 1).

Table 2 shows the annual agricultural production per capita in kilograms. The largest number of production in 2014 is represented by cereals, than eggs, milk, and sugar beet. In 2012 when the country was affected by drought the production per capita did not decrease but on the contrary increase (National Bureau of Statistics, 2015). According to WB (2010) the major annual grown crops are maize, wheat,

sunflower and barley. The main perennial crops are vineyards and fruit trees. Contemporary, plant crops are represented by sugar beet, fodder roots, cabbage, pumpkins and field vegetables (National Bureau of Statistics, 2015). In addition, viticulture, horticulture and other specialized farmer activities as a sunflower seed or tobacco production are particularly important. Grapes and milk are agricultural products of the highest value, and grapes are also most important crop value in Moldova (European Commission, 2013).

Table 2 Annual production of main agricultural products per capita in Moldova (kilograms) (National Bureau of Statistics, 2015)

Product	2007	2008	2009	2010	2011	2012	2013	2014
Cereals (in weight after processing)	252	888	610	680	702	339	753	822
Sunflower seeds	44	104	80	107	120	83	142	154
Sugar beet (industrial)	171	269	95	235	165	165	284	381
Potatoes	56	76	73	79	99	51	67	75
Vegetables	62	105	86	96	102	65	82	92
Fruits and berries	78	104	86	91	106	107	118	140
Meat (in slaughter weight)	30	22	25	31	33	33	34	32
Milk	169	152	161	166	157	147	148	148
Eggs, pcs.	197	158	180	202	198	175	181	175

2.2 Women's role in agriculture

According to Das (2000) rural women are essential in agriculture due to several factors:

- (i) Women play historical roles in agricultural development.
- (ii) Rural women are mothers and home managers.
- (iii) Rural women are decision makers at home and are included in other activities such as agriculture.
- (iv) Rural women are productive factors in agriculture and rural industries.
- (v) Rural women are effective members of the society and they participate in rural development.

Historically, the division of farming roles has often had gender character: most farm work is done by men, while women do most of the work inside the house, domestic work, childcare, farm administration and some manual farm labour

(Seuneka and Bock, 2015). Hansen et al. (2015) state that in the traditional society men use their physical strength in food production, and women care about the food processing, and their role in society do not provide them economic independence. In conclude, men usually derive their identities from farming, in contrast, women's identities are mostly connected to their role as farmer's wife (Seuneka and Bock, 2015).

Nowadays, women represent the crucial resource in agriculture and rural economy of developing countries through their roles of farmers, workers and entrepreneurs (Farworth and Ragasa, 2008). On average, women comprise 43% of the agricultural labour force in developing countries (FAO, 2016). The modernization of agriculture involved women in a large scale farming process (Seuneka and Bock, 2015). Their activities usually involve producing agricultural crops, tending animals, processing and preparing food, working for wages in agricultural or rural enterprises, collecting fuel and water, engaging in trade and marketing etc. However, compared to men, women face to a lot of disadvantages, for example lower mobility, lesser access to market information and minor access to productive resources. Women are usually excluded from more lucrative and profitable markets (Farworth and Ragasa, 2008). Women's participation in rural markets shows much diversity at the regional level. Nevertheless, women are overrepresented in unpaid and seasonal and part-time work (SOFA team and Doss, 2011). On the other hand, Invande *et al.* (2015) suggest in their study about changes of roles in agriculture in Nigeria that during the last periods appear an increase of involvement women in joint decision making in all agricultural activities. The research states: *"The era of when the women alone controlled and took major decisions in all food related issues while the men alone took major decisions in cash crop related issues is over."* (121p.).

Abedi *et al.* (2011) suggest in their research paper that rural women in developing countries are producing about 80% of agricultural products, however their activities are not considered economical and they are simply removed from agriculture and rural development programmes. Furthermore, in 2009 was organized in Rome by FAO, IFAD and ILO discussion at a technical workshop on gender and rural employment. After several rich discussions were suggested

following conclusions that gender inequalities in rural employment exist everywhere on the economic level, but exhibit different patterns according to social, cultural, religious and economic factors. Furthermore, gender patterns of rural employment change over the time and differ across countries (FAO, 2011). Therefore, the policy interventions could help to close the gender gap in agriculture and rural markets. Several strategies and plans how to improve gender equality have been already generated. For instance, Millenium Development Goals focused on gender equality: MDG3 “*Promote gender equality and empower women*” (FAO, 2011), others which are participating on the process of improvement are Sustainable Development Goals, FAO, Global Agriculture and Food Security Program, The US Agency for International Development, The European Commission, The United Nations, The WB, The UN Women etc. (Boto and Moglan, 2015). The priorities for reform also include the elimination of discrimination against women in access to agricultural resources, education, and extension and financial services (FAO, 2011).

2.2.1 Gender and agriculture in the Republic of Moldova

First of all it is necessary to define the meaning of gender. According to FAO (2004) gender are “the relations between men and women, both perceptual and material. Gender is not determined biologically, as a result of sexual characteristics of either women or men, but it is constructed socially”.¹⁰

In the total population of the country 51.9% are women, and 48.1% are men. Other demographic indicators demonstrates that central part of the country is less affected by ageing process (average ageing coefficient is up to 16%) as well as the male and female mortality is particularly similar (12.1% female and 14.6% male), and the lowest life expectancy among women is same as among men. The largest gender gap is in the North part of the country (UN, 2014).

¹⁰ The World Health Organization (2016) suggests that gender represents social constructed characteristics of women and men such as norms, roles and relationships of and between groups of women and men. People in general appropriate norms and behaviour how they should interact with others on the same or opposite sex within households, communities and work places.

Generally, women's role in agricultural is crucial in Moldova. Women are actively concerned in the process of food production and marketing. However, they suffer from the lack of technological and scientific information (Okwu and Umoru, 2009). They also suffer from limited access to information and services, are less paid than men¹¹, and under-represented in the decision-making process at the regional or local level (UNICEF, 2012). The limitation is represented by lack of services for women with small children, age-based employment discrimination against women, reduced level of female entrepreneurship, especially in rural areas etc. (National Strategy on Gender Equality in the Republic of Moldova, 2008). Despite the fact that women make up 36% of the total agricultural holders in the country they manage only 19% of the land covered by agricultural holdings. For instance, in the Central Region only about 20% of the agricultural worker who are not members of the holdings are women (National Bureau of Statistics, 2014).

Figure 1 demonstrates the differences between crop production of male headed and female headed holdings in Moldova. The largest difference is evident when female and men headed industrial crop production. Women produce industrial crop on the 18% of the arable land, while men produce industrial crop on the 26% of the arable land. Moreover, female headed holdings are a bit more involved in producing vegetable (National Bureau of Statistics, 2014) (see Appendix 2). In contrast, Campos *et al.* (2016) argue that the numerous studies on gender differentials in agricultural productivity suggest that women achieving lower yields than men. For instance, the studies available for Sub-Saharan Africa demonstrates a gender gap ranging widely from 4% to 40%, the majority claims around 20-30%.

2.3 Agricultural market information

Generally, market information provides comprehensive and analytical information, for instance explaining market situation determinants, price formation from farm to consumer, interactions with regional or international markets as well as commercial information on market trends, individual contacts with commercial potential partners, transaction opportunities etc. It also offers technical information such as weather forecasts, and also works as policy supporter through policy and food-security monitoring (David-Benz *et al.*, 2011).

¹¹ Women's salary constitutes 76.4% of the man's average salary (UNICEF, 2012).

Specifically, agricultural market information provides knowledge to farmers such as the planning of the production process in line with market demand, scheduling of harvest at the most profitable times, decision making on markets choosing, awareness about market prices etc. (Shepherd, 1997). It also helps to improve knowledge about fertilizing, cultivars, pesticides and technologies (Akar, 2010). Oladele (2006) divided agricultural information into two groups, technical and business information. Technical information is related with cropping practices and with activities as agro-environment analysis, land preparation, nursery, irrigation and fertilization, crop protection, harvesting, post harvest handling and product processing. Whereas, business information is related with economical aspect of agricultural sector, involving capital, finance and market information.

Umali-Deininger (1996) describes two applicable types of disembodied agricultural information: (i) general, no excludable information (market information or cropping patterns), which tends to be a public goods, (ii) excludable information (fertilizer recommendations for a specific field or farm operation), which tends to be toll goods.

Table 3 shows the information needs of farmers in Oluyole local government area of Oyo State, Nigeria. The total number of respondents is 70 when 44.3% of them perceive marketing information in most essential frequency, 51.4% in essential frequency, and only 4.3% in less essential frequency. The most requested agricultural information is: (i) Information about rural development programmes and subsidies, 95.7% of farmers seen it in most essential frequency and nobody of them in less essential frequency, (ii) General agricultural news, the most essential frequency has percentage of 87.1% farmers, and (iii) Information about input prices and availability, the most essential for 54.3% farmers, and essential for 45.7% farmers (Adeboye *et al.*, 2012) (see Appendix 3).

2.4 Accessibility of agricultural market information

The availability of market information¹² significantly effects livelihood and agricultural conditions (Jerome and Theresa, 2009). Access to agricultural market

¹² For instance in Nampula Province of Mozambique 66% of the households received price information, and in Manica province 59% of the households, in 2002 (Mabota *et al.*, 2003).

information is crucial for participating in agricultural market (Mabota *et al.*, 2003; Magesa *et al.*, 2014). Skilled participants benefit more in agricultural market chain (Magesa *et al.*, 2014), and accessibility of agricultural market information could also help farmers to improve their profits and to move produce profitably from a surplus to a deficit market (Shepherd, 1997).

Due to lack of market information rural farmers negotiate on prices of their produce bases on the information provided by traders, and it significantly reduces the bargaining power of rural farmers (Magesa *et al.*, 2014). Based on these facts, developing countries are establishing Market Information Services. Unfortunately, these services suffer from the lack of access, sustainability, utilization (Shepherd, 1997), and tend to be expensive (Shepherd, 1997; Akar, 2010).

Generally, in developing countries are majority of agricultural market information services included in public sector. Public provision has limitations of cost and if users require more than basic information they should be required to pay. For example, in Colombia is market information transmitted to Bogota by satellite and a detail bulletin is prepared by noon of the same day. This is available, at a price, to traders and anyone else who wishes to pay for it (Shepherd, 1997). In Mozambique were the operational costs in 2002, including staff salaries, communication and transport, US\$ 130, 000 (Mabota *et al.*, 2003). However, paying for information is very unsustainable way of solution. Thus, the vast majority of Market Information Services are run as free public services. Market Information is seen as a public good, for instance something like roads or clean water (Shepherd, 1997).

Oladela (2006) perceives the problem of information access due to the language barrier. Therefore, it is important to demolish the language barrier to broaden information access into multilingual¹³. For instance, in Mozambique rural population receive the information about prices and other market attainments via radio programs using local languages (Mabota *et al.*, 2003).

¹³ Nowadays, by a combining information-retrieval with language barrier was developed the Multilingual Information Access System providing a way for monolingual users to gain access to information in other languages by using their own native language. The technique has been already used in Japan, Vietnam, Thailand, China and Indonesia with the attendant transformation of the agriculture and improvement in the economy (Oladele, 2006).

It is also known that men have better access to agricultural market information services than women despite a high need for information among rural women was proved. For instance, in Nigeria are the staffs of market information services composed mainly of men who prefer helping to male farmers. In Malawi the agricultural extension workers, who visit rural areas and inform farmers about new technologies, usually communicate with men farmers, not women farmers (Okwu and Umoru, 2009).

2.5 Sources of agricultural market information

The sources of agricultural market information are usually provided by family, farmer community (Okwu and Umoru, 2009; Akar, 2010), mass media, such as newspapers, radio broadcasts, television, fax, e-mail, and paper copy distribution, or extension agents¹⁴ as well as by local organizations and developing projects (Okwu and Umoru, 2009).

Nowadays, information and communication technologies become highly popular in developing countries (Akar, 2010). Consequently, the main source of agricultural market information is represented by agricultural market information services (AMIS). Interest and investment in AMIS in low- and middle income countries has rapidly increased (Staatz *et al.*, 2011). An appropriate agricultural market information service (AMIS) can improve market performance by facilitating transparency, competitiveness, efficiency, and the welfare of farmers (Shepherd, 1997). Shepherd (1997, 2p.) define AMIS by following: *“a service, usually operated by the public sector, which involves the collection on a regular basis of information on prices, and in some cases quantities supplied, of widely consumed agricultural products, from wholesale markets, rural assembly and retail markets, as appropriate, and dissemination of this information on a regular basis through various means to farmers, traders, government officials, policymakers and others.”* Boone and Kurtz (2007) define market information system as a planned computer-based system designed to provide managers with continuous flow of information relevant to their specific decisions and areas of responsibility.

¹⁴ Mabota *et al.* (2003) prove in their study that people who benefited from extension services were more likely to have access to information.

Staatz *et al.* (2011) define the Agricultural Market Information System (AMIS) as an organization or a group of organizations that: (i) collects data on market conditions, (ii) processes and analyses the data to transform it into market information, and (iii) disseminates market information products to different stakeholders using one or more channels. The AMIS may be based in public sector, private sector, farmer and trader organizations, or NGOs. According to Oladele (2006) is agricultural information providing and using by government as a policy makers, experts as researches and knowledge sources, extension workers as farmer's consultants, industrial sectors and businessmen as the suppliers of production factors, financial institutions and investors as source of capital, business practitioners and distributors as market mediators, and farmer groups, farmer cooperatives or individual farmers as agricultural produce producers. Staatz *et al.* (2011) also suggest that AMIS stakeholders involve farmers, traders, government policy analysts and makers, development organizations, input providers, banks, AMIS personnel, and researchers.

For instance, in Eastern Africa three different models of market information services in agricultural sector have been designed and implemented: (i) a national market information service that provides a regular overview of the countrywide market status targeting Government, national traders, and food security agencies, (ii) a localized market information service that aims to meet the concretized need of small-scale farmers and traders at the district, (iii) a regional market information service that aims to support the needs of the formal and informal traders involved with cross border trade of high volume staple commodities (Ferris and Robbins, 2006). For instance, in Mozambique, in Nampula Province was the local system developed by the partnership between the private and public sector where some NGOs participate in the coordination of information from and to producer association, and also provide a financial support (Mabota *et al.*, 2003). Piciotto and Anderson (1997) state that combination of public and private sectors is suitable for providing information associated with toll goods. Whereas private sector is generally best in providing information associated with market goods, and cooperative and voluntary organizations are usually best in providing information

about the management of common pool goods, with low excludability and high rivalry.

2.6 Utilization of agricultural market information

The role of information is significant in any society, community or organization and it is also important in all stages of life. It is very useful in rational decision making and it can represent a helpful tool for rural development (Jerome and Theresa, 2009). According to Ansari and Sunetha (2014, p. 1455) research “*information asymmetry at farm level in India has been recognized as a one of the main reasons for low agricultural productivity and production efficiency*”. Sulaiman *et al.* (2015) states that the differences between the markets in Syria, (Lattakia province) are influenced by several factors. One of them is on-going information asymmetry.

Better information can lead to better spatial and temporal arbitrage of existing production due to the reduction of search costs (Stigler, 1961). And also, more informed decision making by farmers, traders, processors, and consumers can lead to better allocation of resources over time through the adjustment of production and consumption to respond more closely to consumer’s effective demands and to the opportunity costs of the resources included in the production of those goods (Staatz *et al.*, 2011).

Staatz *et al.* (2011) divided, according to Henderson *et al.* (1983), utilization of agricultural market information services into three grounds:

- (i) A more equitable distribution of bargaining power within the food system which include the movement of market from position of monopoly or oligopoly to a more competitive outcome
- (ii) Improvement of market efficiency from better private decision making
- (iii) Improvement of design and implementation of government programs, and of technology development in term of informing public policies and providing the information to implement public programs.

Particular examples of utilization of agricultural market information from scientific literature:

- (i) In Maharesta province of India usage of agricultural market information system helped farmers to improve crop quality, and change agricultural practices. However, the effect was very small (Fafchamps and Minten, 2011).
- (ii) In Lattakia region of Syria was proved that functional AMIS is important for the improvement of the position of farmers in the markets, and helps them in decision making and smoothing income volatilities (Sulaiman *et al.*, 2015).

2.7 Agricultural market information services in the Republic of Moldova

The agricultural sector in the Republic of Moldova is not supported enough by proper information services. Based on this fact, the “business decisions” are usually taken by small farmers in hazardous way, and local level market information is mediated by oral communication (Kandakov and Havrland, 2012).

However, AMIS is operating in Moldavian agricultural sector composed of small and medium-scale farmers in the poorest rural areas as well as large agricultural entrepreneurs and companies. The system is an effective tool for elimination of information asymmetry and is a functional system in the field of consultancy in rural areas of the Republic of Moldova. It is also used for analyses of Moldavian commodity markets and supports decision making process via providing useful information (Kandakov and Havrland, 2012).

The system is composed of three modules and links among them: (i) Product D-base, (ii) Producer’s D-base, and (iii) Market Research D-base. The online information flow was developed and launched on the market of consultancy, and support rural primary producers, and also the agricultural and food commodity traders. AMIS also works as facilitator in the field of offer and demand of agricultural products and inputs (Kandakov and Havrland, 2012).

In Moldova following agricultural market information services provided by several agencies has been established:

- (i) **Women's Economic Empowerment through Increasing Employability Program (WEE)** was implemented by UN Women in partnership with the Ministry of Labour, Social Protection and Family, and the Ministry of Economy of the Republic of Moldova, with the financial support from the Government of Sweden (UN Women, 2013). WEE Program representation is based on six major issues caused women's economic inequality, whereas one of them is access to information and services. UN Women (2013) suggests that women's economic empowerment on local level should be improved by following: (i) to increase access to information and resources for women, (ii) to improve quality of services (through JISBs), (iii) to increase the role of CSOs, (iv) to establish monitoring and evaluating system. Consequently, one of the projects represents increase of access to quality information and services at the rural level. UN Women WEE Program provided financial support in the establishment of "Joint Information and Services Bureaus" (JISBs) (UN Women, 2013). It is based on the concept of "one-stop-shop" or "one window" approach. JISBs operate in numerous Moldovan districts where one of them is Telenesti. The beneficiaries are mostly composed of women in rural areas (UN, 2010). The provided service within JISBs is also non-governmental provider ACSA (UN Women, 2013).
- (ii) **Central Agricultural Market Information Bureau (CAMIB)** was established in 1999 as a Moldovan NGO. CAMIB has no affiliates but closely cooperates with other business services providers all over Moldova which provide marketing information. One of its two missions is to provide domestic food operators within information and marketing services fundamental to create and maintain market transparency (CAMIB, 2003)
- (iii) **Agency for rural development (ACSA)**, established in 2001, is the executive unit which provides rural extension services in Moldova, financed by the Government of Moldova and WB. ACSA manages a network of 35 service providers/regional advisory centers and 350 local advisory centers. The services are related to modern growing technologies, procuring inputs and marketing agricultural products, development of non-agricultural businesses, agricultural

ecology and community development. They are accompanied by wide range of information materials such as manuals, brochures, posters, leaflets etc. The advisory, information and training services are available to over 60% of rural population in the country. Beneficiaries are agricultural producers, rural entrepreneurs, village inhabitants as well as processing companies, enterprises for collecting and storing agricultural products, financial institutions, state organizations etc. (ACSA, 2016).

.In 2006 has ACSA cooperated with the Czech Republic, and implemented development project “Support to the Rural Development - Improvements of Management Qualifications and Advisory Capacities“. The basic idea of the project was to create an information system which would be easily accessible for users anywhere in Moldova as well as simple, reliable, and would provide bilateral or multilateral communication. Databases of two separate systems have been crated: (i) information system of agricultural and food products aiming to map agricultural and food products, their characteristics, and potential for domestic market and export, and (ii) information system of agricultural and food producers offers information about characteristics of their business portfolio, and their future possibilities for pro-export-oriented production. Finally, the complete conception of information system AMIS was created as a connection of two databases (see Figure 2).

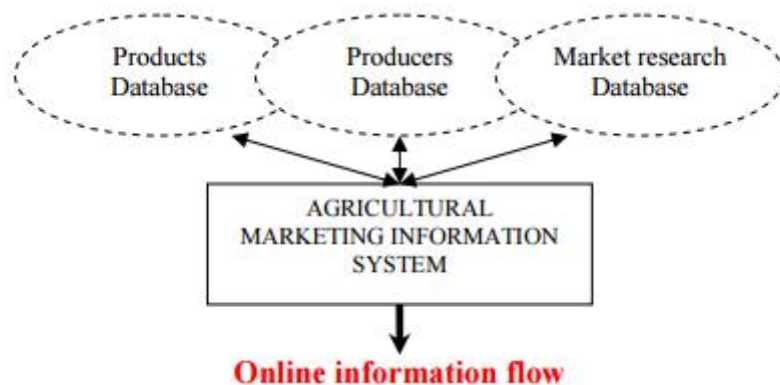


Figure 2 Final conception of AMIS (Kandakov and Havrland, 2007)

3 Aims of the Thesis

The main aim of the thesis is to analyze the significance of the access to agricultural market information by rural women in Telenesti district of the Republic of Moldova, and its impact to women's agricultural productivity.

Theoretical literature suggested that:

- Increasing of access to agricultural market information by rural women causes increase of agricultural production, and their income (Shailaja and Reddy, 2003; Fabiyi *et al.*, 2007).
- Increasing of agricultural information usage causes increase of agricultural productivity (Stigler, 1961; Ansari and Sunetha, 2014; Sulaiman *et al.*, 2015).
- Increasing number of persons in household causes increase of agricultural production of household expressed by money (FAO, 1995; Abedi *et al.*, 2011).

Particular aims of the thesis were defined as:

- Identify women's role in agriculture in Telenesti district
- Analyze accessibility of agricultural market information in Telenesti district
- Analyze sources of agricultural market information in Telenesti district
- Analyze utilization of agricultural market information on rural women in Telenesti district

4 Methodology

4.1 Studied area

Research was conducted in Telenesti district situated in the north-western edge of the central part of Moldova, 90 km to the north of the capital Chisinau (Council District Telenesti, 2015). During the research three selected communes were visited: Brinzenii, Cazanesti, and Chitcanii Vechi.

Telenesti district has a total area of 849 km² covered by woods, hills and plains. District has 1 town, 23 villages and 30 communes. The total population is 72,900 residents from which 64,100 are living in rural area (National Bureau of Statistics MD, 2015). The proportion of men and women is almost equal. The main economy sector is agriculture (Council District Telenesti, 2016). According to National Bureau of Statistics (2016) in 2014 there were 610 ha of sown area: 561 ha for industrial crops, 46 ha for forage crops, and 3 ha for potatoes, vegetables, and water melons.

In 2014 total expenditures of legal entities for information technologies in the district reached 2,165.5 MDL¹⁵ (National Bureau of Statistics, 2016). ACSA (2016) states that there are ten local advisory centers situated in Telenesti district (see Appendix 4).

The first selected commune Brinzenii is situated in the northwest, 75 km from the capital. It has approximately 943 inhabitants from which 46% are male, and 53% are female. It is composed of two villages: Brinzenii Vechi and Brinzenii Noi (Council District Telenesti, 2016).

The total population of Cazanesti commune is 3,262 inhabitants with similar proportion of men and women. It is composed of three villages: Cazanesti, Vadul-Leca and Vadul-Leca Nou (Council District Telenesti, 2016).

Chitcanii Vechi is commune with 2,398 inhabitants from which 50% are men, and 49% are women. It is composed of two villages: Chitcanii Noi and Chitcanii Vechi (Council District Telenesti, 2016).

¹⁵ 1 MDL = 1.2103 CZK, 0.045 EUR, 0.0507 \$US (ČNB, 2016)

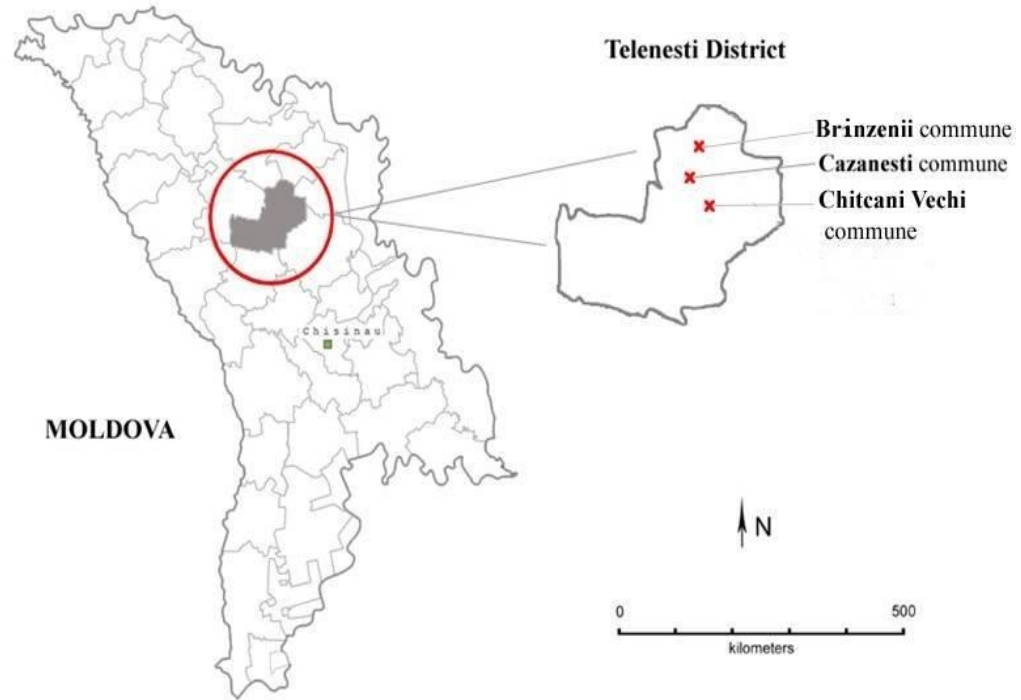


Figure 4 Selected communes in Telenesti district (Author, 2016)

4.2 Timeframe

Total time determinate for research preparation and data collection was five months since May 2015 till September 2015. Theoretical preparation for data collection in central region of the Republic of Moldova started in May 2015. Research design was prepared in June 2015 when was also selected the most suitable area as well as specific communes. Composition of questionnaire was accomplished in July 2015, and August 2015. Pilot testing, data collection, observations, transect walks, and visit of ACSA advisory centers occurred from 17th September till 26th September 2015.

During the first day of the research was analyzed the questionnaire with local women farmer, and modified according to her recommendations. Process of data collection, and discussions with local rural women lasted one week. The final phase of the research consisted of field walks, observations, and visits of ACSA advisory centers.

4.3 Research design

Selection of studied area was chosen according to recommendation and previous experiences with agricultural information services in Telenesti district of master's thesis supervisor Ing. Alexander Kandakov, Ph.D. Mr. Kandakov has publicized several studies about information systems in the Republic of Moldova as well as cooperated on several projects aiming the same topic. As mentioned, above 10 local advisory centers providing agricultural market information are situated in Telenesti district, thus there was a high probability that rural women were experienced with agricultural market information. In addition, research aiming rural labour migration "Survey on rural migration from the Republic of Moldova" was conducted in Telenesti district (2013). Based on its results, the labour migration is frequent solution to poor economic situation among rural people in Telenesti district. 87% of local respondents thought that rural migration has negative repercussions on agriculture (Zichová, 2013). Furthermore, based on literature review 64% of labour migrants are men (Migration Policy Institute, 2015), and National Bureau of Statistics (2016) states that the number of men from rural areas who working or looking for a work abroad is still rapidly higher than female's one in Moldova. Finally, all these mentioned facts indicated Telenesti district very suitable for data collection with the expectations that rural women had often been left behind to administer their households on their own.

4.4 Sample size

Research was conducted only with rural women above 18 years old in selected area who owned agricultural land and were experienced with agricultural activities. The sample size was chosen by willing women farmers in the selected area. There were used several sampling methods for selections of respondents: (i) simple random sampling base on the random selection in the concrete area, (ii) snow ball sampling based on the social network of local population when women farmers provide the contacts on others (Kothari, 2004).

The total number of respondents was 45. This amount was specified as the minimum of respondents for the research, and simultaneously appropriate due to

deep character of data collection methods. Moreover, a high probability of conformity in case of higher number of respondents also predominated.

All age categories of adult rural women were interviewed. Women farmers were mainly between 36-45 years old, and 46-55 years old. The lowest number of respondents was in age group below 25 years old – only one respondent (see Table 4).

All 45 interviewed rural women owned agricultural land. That condition also influenced the sample size. Rural women had to be experienced with agricultural activities, and produced crops because of measurement of agricultural production of household expressed by money (essential for analytical part of the research).

Table 4. Age distribution of rural women

Age Group	Total
< 25	1
26-35	7
36-45	16
46-55	15
56 <	6

4.5 Data and data sources

During the elaboration of this thesis two types of data were collected and applied: (i) primary data, and (ii) secondary data.

Primary data were gathered during author’s personal visit in the Republic of Moldova mainly through interviews with local rural women. Responses were endorsed by observations and transect walks in studied area. Complementary data were gained from visits of ACSA advisory centers in studied area (see Appendix 11).

Secondary data and information sources were as well used to precisely describe current situation in the Republic of Moldova, and brought as accurate results as

possible by careful reviewing of available literature articles such as monographs, academic journals, and also reviewing of documents and statistical and other databases.

4.6 Data collection methods

During the research several data collection methods were used. Selected data such as questionnaire, interviews, observations, and transect walks were applied in order to gain accurate and useful information.

4.7 Pilot testing

Questionnaire was firstly revised after consultation with master thesis' supervisor, and finally with one local woman from Cazanesti village. Small modification of questionnaire was realized during the first day of the research. This testing was important because of elimination of potential errors. It was also helpful to check its comprehensibility.

4.8 Structured questionnaire

Structured questionnaire was chosen as the main instrument to collect data. It was considered the most effective research instrument due to short time available for collecting information about respondents, and limited number of translators.

Questionnaire was composed of 20 questions. It included sections as demographic information about respondents, agricultural background, agricultural productions, experiences with agricultural market information, sources of agricultural market information, utilization of agricultural market information, and women's role in agriculture (see Appendix 5).

The questionnaire was semi-structured using open-ending and close-ending questions. It has represented the descriptive part of the research, and was able in both English and Romanian language (see Appendices 5 and 6).

The questionnaire data collection was supplemented by personal (face-to-face) interviews and discussions with local female farmers. The local translator was used in all cases because of language barrier and author of this thesis was present to explain potential incomprehension.

4.9 Data analyses

Gained data from 45 filled questionnaires were transcribed into Microsoft Office Excel, categorised and subsequently prepared for further analyses. Particular aims were analyzed through figures in MS Excel.

The analysis was conducted with SW Gretl¹⁶ using Ordinary Least Square method (OLS) for one equation linear regression model (LRM). A cross-sectional data collected among 45 female farmers were applied in this model.

4.9.1 Linear regression model

LRM is used for modelling the relationship between dependent (explained) variable y and explanatory variables x . OLS method is parameter estimation technique used for experimental and observational data (Hančlová, 2012).

In this thesis LRM was used to estimate relationship between agricultural production of household expressed by money, and number of men and women in every household, agricultural information usage, and size of agricultural land. Agricultural production of household was expressed by money due to numerous types of cultivated crops.

Finally, the model application was made by using coefficients of elasticity. Elasticity calculation expressed the relative effect of explanatory variables (number of men in household, number of women in household, agricultural information usage, size of agricultural land) on explained variable (annual agricultural production quantity within one household expressed in money) in percentage.

¹⁶ SW Gretl is a cross-platform software package for econometric analysis, written in the C programming language (GRETL, 2016).

4.9.1.1 Economic and econometric model

Endogenous (dependent) variable

y_1 Annual agricultural production quantity within one household expressed in money (MDL)

Exogenous (independent) variables

x_0 Unit vector

x_1 Number of men within household

x_2 Number of women within household

x_3 Agricultural information usage

x_4 Size of owned agricultural land (ha)

Abbreviation

Abbreviation was used due to better orientation in SW Gretl calculations.

Table 5. Variables abbreviation

Variable	Abbreviation
y_1	Production
x_0	UV
x_1	Men
x_2	Women
x_3	AMIS_USG
x_4	Agr_land

Assumptions

- Increase of number of men within household causes increase of agricultural production of household expressed by money.
- Increase of number of women within household causes increase of agricultural production of household expressed by money.

- Increase of agricultural information usage causes increase of agricultural production of household expressed by money.
- Increase of size of agricultural land causes increase of agricultural production of household expressed by money.

Economic model

Production_t = (Men; Woment; AMIS_USG_t; Agr_land_t)

$$y_{1t} = f(x_{1t}, x_{2t}, x_{3t}, x_{4t})$$

Econometric model

$$y_{1t} = \gamma_{0x0t} + \gamma_{1x1t} + \gamma_{2x2t} + \gamma_{3x3t} + \gamma_{4x4t} + \mathbf{ut}$$

5 Results

5.1 Descriptive part

5.1.1 Social indicators

5.1.1.1 Age

Respondents were categorized into 5 groups (see Figure 5), and only rural women above 18 years old were interviewed.

The majority of women were between 36-45 years old, and 46-55 years old. Almost the same number of respondents had the group of age between 26-35 years, and above 56 years old. Only 1 woman was younger than 25 years (see Figure 5).

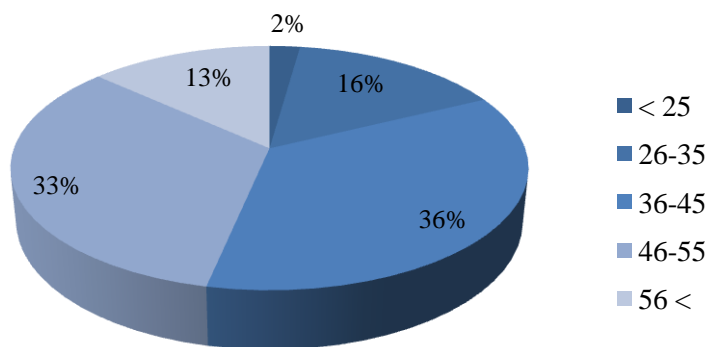


Figure 5. Age distribution of rural women

5.1.1.2 Marital status

Marital status of female farmers was divided into 4 groups (see Figure 6). Analysis of women's marital social situation was important due to influence on their role in agriculture, and general analysis of local society.

The majority of rural women were married. 6 respondents were widows, and only 1 respondent was single (see Figure 6). Married women were involved in all age groups while widows were involved only in age groups of 46-55 years, and above 56 years. Based on these facts and general observations the studied area represented typical rural society.

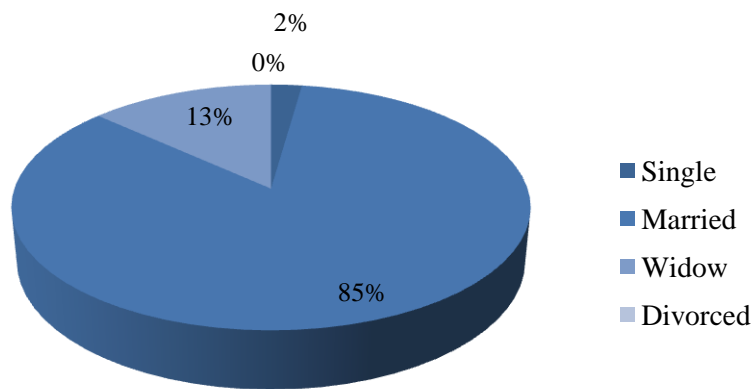


Figure 6. Marital status of rural women

5.1.1. Distribution of men and women within household

The average distribution of men within household was 2 men within one household while the average distribution of women within household was 2.7 women within one household. In consequence, an average household was composed of 2 men and 3 women (see Appendix 9).

5.1.2 Agricultural background

5.1.2.1 Agricultural land

As was mentioned above, all 45 respondent's households owned agricultural land which was essential for choosing of respondents.

The average size of agricultural land was 5 ha. The smallest size was 0.5 ha, and the largest size was 31 ha (see Appendix 9).

5.1.2.2 Fertilizing

43 rural women used fertilizing on their agricultural lands, and only 2 of them did not use fertilizers on their agricultural lands (see Figure 7). They use both organic and chemical fertilizing.

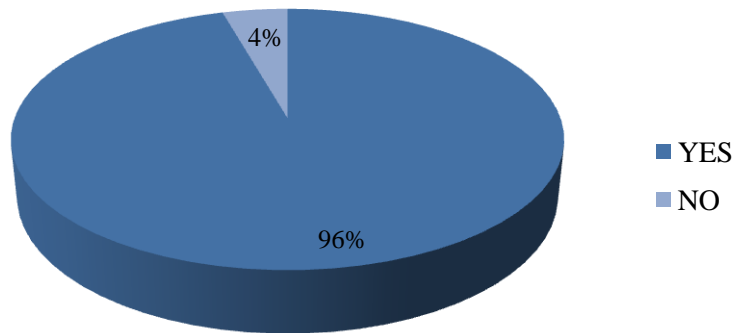


Figure 7. Fertilizing usage

5.1.2.3 Agricultural technology

Rural women were asked about the kinds of agricultural technology they used. 29 of them answered that they used drip irrigation, 2 respondents answered that they used depuration, and other 2 respondents used tractors. The rest of 28% respondents did not answer the question (see Figure 8).

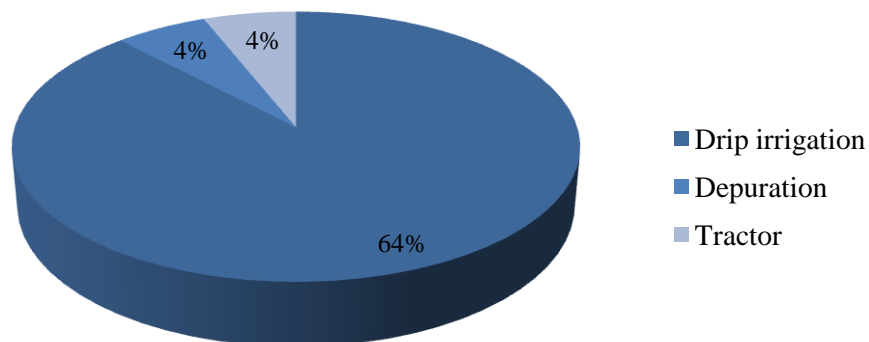


Figure 8. Agricultural technology used by rural women

5.1.3 Agricultural production of rural women's households

This part of the research was divided into 2 groups: (i) cultivated crops which were represented by general crop cultivation within households, (ii) crop production (kg/year) which was represented by cultivated crops within households and sold at market place.

The annual average production quantity within one household expressed in money was 149,256 MDL. The highest annual production quantity within one household expressed in money was 587,694 MDL, and the lowest one was 45,897 MDL (see Appendix 9).

5.1.3.1 Cultivated crops

Cultivated crops were characterized by all crops which women cultivated at their agricultural land, but it did not need to be sold at market place. The question was significant for general information about popular cultivated crops in studied area, and also due to comparison of cultivated crops and crop production sold at market place.

The major cultivated crops of women's households were represented by maize, then by sunflower seeds, and by peppers. Other predominant crops were wheat, black currants, and grapevine. Some of the rural women also cultivated tomatoes, apples, barley, water melons, potatoes, lucerne, walnuts, and raspberries (see Table 4).

Table 6. Cultivated crops of women's households

Crop	Number of rural women
Apples	5
Barley	4
Black currants	10
Grapevine (<i>Moldova</i>)	10
Lucerne	2
Maize	43
Peppers	23
Potatoes	2
Raspberries	2
Sunflower seeds	30
Tomatoes	6

Walnuts	2
Water melons	2
Wheat	14

5.1.3.2 Crop Production

The total amount of production of 45 women's households per a year 2015 was following: the major cultivated crop was maize with production capacity of 307.5 tonnes, interviewed women also cultivated 66.9 tonnes of wheat, 60.4 tonnes of peppers, 40.2 tonnes of sunflower seeds, 38.4 tonnes of grapevine, 15.6 tonnes of black currants, 11.2 tonnes of tomatoes, 10 tonnes of water melons, 2.4 tonnes of jost, 2 tonnes of raspberries, 1.2 tonnes of gooseberries, and 1 tonne of potatoes (see Table 7).

Table 7. Total quantity of crop production of women's households in 2015 (kg/year)

Crop	kg/year
Apples	18,000
Black currants	15,600
Gooseberries	1,200
Grapevine (<i>Moldova</i>)	38,400
Jost	2,400
Lucerne	2,000
Maize	307,500
Peppers	60,405
Potatoes	1,000
Raspberries	2,000
Sunflower seeds	40,200
Tomatoes	11,200
Water melons	10,000
Wheat	66,900

To compare both tables (Table 6 and Table 7) the major crop both cultivated and sold at market place was maize. Other common crop represented sunflower seeds which were on the second place in cultivation, but on the fourth place in crop production sold at market place. Others crops were almost on the same position in cultivating and producing. However, some crops appeared in the group of crop production, but not in the group of crop cultivation, concretely gooseberries and

jost. On the other hand, walnuts were only crops which were cultivated, but not sold at a market place.

Table 8 shows the average crop production of women's households in kg per a year 2015. The highest average production was represented by maize, then by water melons, wheat, grapevine, apples etc. The lowest average production was represented by potatoes, raspberries, and gooseberries.

Table 8. Average quantity of crop production of women's households in 2015 (kg/year)

Crop	Kg/year
Apples	3,600
Black currants	1,560
Gooseberries	1,200
Grapevine (Moldova)	3,840
Jost	2,400
Lucerne	1,000
Maize	7,151
Peppers	2,626
Potatoes	500
Raspberries	1,000
Sunflower seeds	1,340
Tomatoes	1,867
Water melons	5,000
Wheat	4,779

5.1.4 Women's role in agriculture

5.1.4.1 Contribution of rural women in agricultural sector

Distribution of interviewed women in agricultural sector was an important question. Sector contribution has changed in the country as well as women farmers struggle with low income in agricultural sector. During the interviews some woman said that she works as a teacher because of better income conditions, and helps to her husband in agriculture afterwards. Some other women had her husband abroad, and catered the land by themselves.

Figure 9 shows that 21 respondents were not engaged in agricultural sector while 18 respondents worked in agriculture. It followed that more than half of rural women did not have agriculture as only income (see Figure 9).

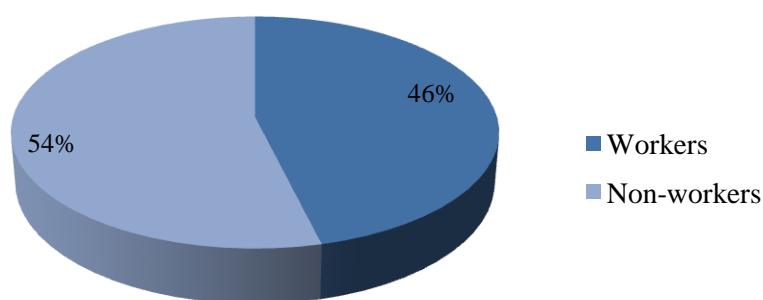


Figure 9. Contribution of rural women in agricultural sector

From the perspective of age distribution of rural women engaged in agricultural sector was obvious that rural women in age group below 25 years old, and 26-36 years old did not work in agricultural sector. Women in age group 36-45 years old worked in agricultural sector “fifty fifty” while majority of women in age group 46-55 years old were engaged in agricultural sector. Only 2 women in age group above 56 years old had agriculture as a main income (see Table 9).

Table 9. Age distribution of rural women worked in agricultural sector

Age Group	Workers	Non-workers
< 25	0	1
26-35	0	7
36-45	8	8
46-55	10	5
56 <	2	4

5.1.4.2 Experiences of rural women with agricultural market

41 rural women were actively in touch with agricultural market, and only 5 respondents were not keeping in touch (see Figure 10). Most of them usually sold agricultural crop products, and all of them visited market Chisinau as retailers.

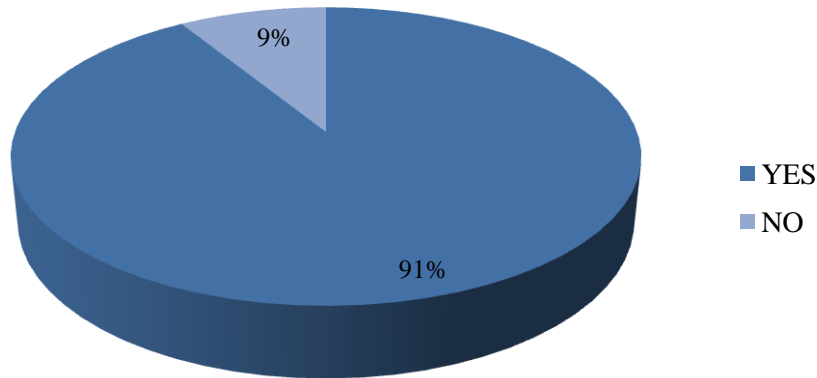


Figure 10. Experiences of rural women with agricultural market

5.1.4.3 Participation of rural women on decision making

The rural women were asked if they thought that men should make final decisions. 27 of them stated that men should not decide, and 18 of them stated that men should decide (see Figure 10).

However, the all 45 rural women answered that they participate in decision making within their livelihood. Based on the observations and interviews, rural women felt equal with their husbands. Some of them said that women should to decide within household and men should to work. One woman also said that the role of women was strengthened in the society thanks to modernization, and better access to media.

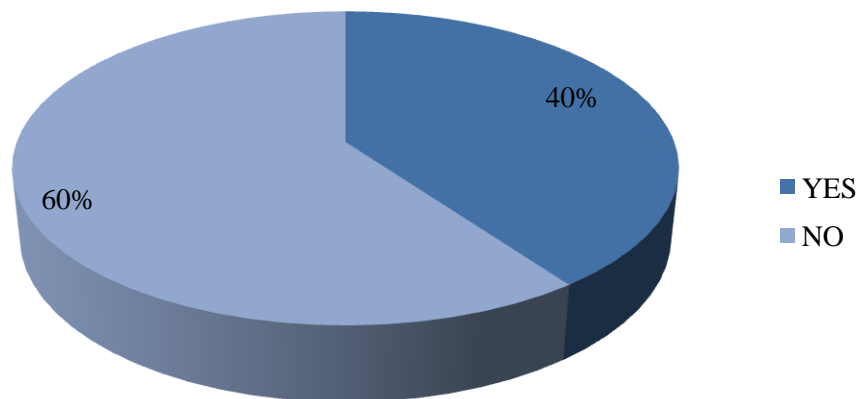


Figure 11. Women's opinion on decision making

5.1.4.4 Women's experiences with agricultural activities

Table 10 illustrates women's experiences with agricultural activities. The important fact for this thesis was that agricultural activity with the highest frequency of experience was getting agricultural information as well as selling harvested crops. Other significance activities were weeding, and also harvesting. The least common experienced activities were tillage, and fertilizing.

Table 10. Women's experiences with agricultural activities

Activity	
Fertilizing	6 (13%)
Getting agricultural information	39 (87%)
Harvesting	29 (64%)
Selling of harvested crops	39 (87%)
Tillage	8 (18%)
Weeding	31 (69%)

5.1.4.5 Gender character of agricultural activities

Table 11 shows the gender character of agricultural activities from the perspective of rural women. Women were asked which agricultural activity was according to their opinion typical for men and for women, eventually which activity had neutral character. The crucial results were observed in the case of typical female agricultural activities. 67% of rural women perceived getting agricultural market information as the most typical female's agricultural activity. Other typical activities were weeding and selling of harvested products. The most typical male's agricultural activity was according to women's opinion fertilizing, tillage and harvesting.

Table 11. Women's opinion on gender character of agricultural activities

Agricultural activity	Male	Female	Neutral
Weeding	10 (22%)	23 (51%)	10 (22%)
Tillage	39 (87%)	4 (9%)	2 (4%)
Harvesting	18 (40%)	20 (44%)	7 (16%)
Fertilizing	39 (87%)	4 (9%)	2 (4%)
Getting agricultural market information	8 (18%)	30 (67%)	7 (16%)
Selling of harvested products	14 (31%)	22 (49%)	9 (20%)

5.1.5 Accessibility of agricultural market information

100% of interviewed women (45 respondents) had access to information about agricultural market.

Based on the observations rural women had possibilities to obtain agricultural market information in several ways: (i) access to the internet which was accessible at least at public institutions such as schools, kindergartens, and libraries, and (ii) ACSA advisory centres which were in every visited commune. Rural women had

opportunities to study brochures and documents about market as well as to ask local trained people about possible sources of information.

5.1.6 Sources of agricultural market information

The major source of agricultural market information was consultancy agency. Consultancy agency was in this area aforementioned ACSA consultancy agency, and its advisory centres. Other important sources were represented by internet and media, and by family members and neighbours. 29 women used as a source of agricultural information also farmer community, and 4 of them used some other sources such as information gained directly at market place. No respondent stated as a source of agricultural information the Ministry of Agriculture (see Table 12).

Table 12. Sources of agricultural market information

Source of information	
Consultancy Agency (AMIS)	39 (87%)
Farmer community	29 (64%)
Ministry of Agriculture	0
Family members, Neighbors	33 (73%)
Internet, Media	35 (78%)
Others	4 (9%)

5.1.7 Utilization of agricultural market information

100% of interviewed rural women (all 45 respondents) thought that agricultural market information is useful.

Kinds of agricultural market information were categorized into 5 groups according to previous studies of scientific articles. The most common kinds of agricultural market information were chosen (see Figure 11).

Figure 11 shows that the most popular agricultural market information is information about market prices, and information connected with choosing the market. 35 respondents used information about planning of production, and 31 respondents used information about agricultural technology. The least frequent kind

of agricultural market information was information about scheduling of harvests; only 22 respondents used this kind of information.

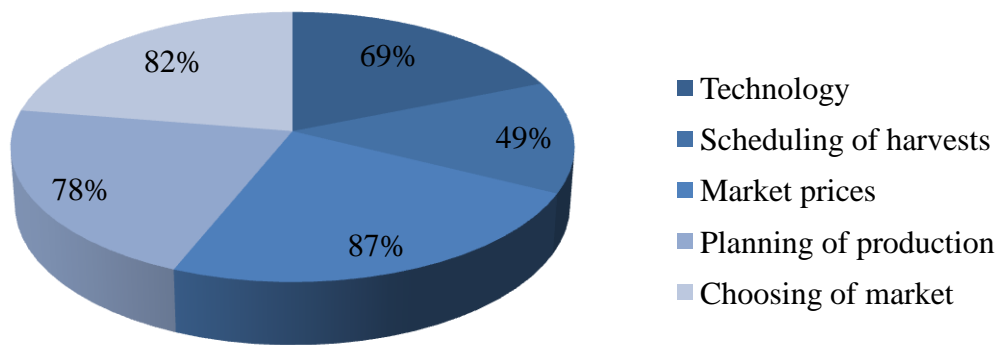


Figure 12. Kinds of agricultural market information used by rural women

Rural women were asked about the way they find agricultural market information useful. The majority of them stated that agricultural market information help them to gain higher profit because they are able to sell their products for higher prices.

Women also said that agricultural market information help them to choose the most appropriate market place because they have information about actual market prices and market requirements.

Significant number of women claimed that agricultural market information helps them with realization of production. They are able to better specify amount of production.

5.2 Analytical part

Analytical part of the thesis estimated the relationships of number of male and female within household, size of agricultural land, and agricultural market

information usage to annual agricultural production quantity within one household expressed in money. The relationships between variables represented the main aim of the thesis. The main aim of the thesis is to analyze the significance of the access to agricultural market information by rural women in Telenesti district of the Republic of Moldova, and its impact to women's agricultural productivity.

The currency unit used for calculation was represented by thousand MDL. The agricultural production quantity was expressed in money due to a large differentiation of cultivated crops in each household. The annual agricultural quantity production expressed in money was calculated based on the average market price for a year 2015.¹⁷ The market price was calculated for the market Chisinau (Piata Chisinau)¹⁸, and it was used retail price for seller (see Appendix 7).

For the calculation of relationships was used linear regression model using ordinary least square method. Several feature's of model's results obtained from SW Gretl are mentioned in this chapter. Table with data and outputs from SW Gretl are presented in the Appendix 9 and Appendix 10.

Firstly, declarations of variables, assumptions, economic and econometric model were defined (see the chapter Methodology). Then, variables were tested for multicollinearity. Multicollinearity tested relationship between two explanatory variables in one equation. The dependence among variables could not be strong (>0.8). The correlation matrix was created which showed no significant multicollinearity between explanatory variables (see Appendix 8). Finally, parameters were estimated in SW Gretl by using OLS method (see Appendix 9).

Several types of verifications were also made: (i) statistical verification stated that the coefficient of determination was defined as 0.919370 which means that explained variable is explained by model from 92%, and model is highly suitable, (ii) econometric verification stated there was no autocorrelation in model. Therefore, there is not high dependency between random errors, (iii) also test for

¹⁷ Due to respondents' time limitation it was not possible to get information about crop production per each month. For this reason were respondents inquired about crop production per a year, and then was calculated average market price for a year 2015.

¹⁸ The Republic of Moldova has 10 regional markets.

normality of residual stated that there is normal distribution of random variables (see Appendix 10).

Actually, the model outputs showed that just two of all four independent variables were statistically significant. Only the size of agricultural land and number of men within one household had real impact on annual agricultural production quantity within household expressed in money.

The assumption, defining that increasing number of men in household increases the annual agricultural production quantity within one household expressed in money, was confirmed. This independent variable had a positive effect on dependent variable. Specifically, if the number of men in one household increases by 1 unit, the annual agricultural production quantity within one household expressed in money increases by 23,745 MDL.

Even though, the assumption that increasing the number of women within one household increases the annual agricultural production quantity within one household expressed in money was confirmed. However, this independent variable was statistically insignificant which means that there was not real impact to the annual agricultural production quantity within one household expressed in money.

Unfortunately, the same case was represented by the explanatory variable agricultural market information usage. The assumption, defining that increasing of agricultural market information usage increases the annual agricultural production quantity within one household expressed in money, was confirmed. Nevertheless, this explanatory variable was also statistically insignificant which means that there was no real impact to the annual agricultural production quantity within one household expressed in money.

Furthermore, the assumption that increasing of size of agricultural land increases the annual agricultural production quantity within one household expressed by money was confirmed. Specifically, If the size of agricultural land increases by 1 ha, the annual agricultural production quantity within one household expressed in money increases by 14,135 MDL.

The number of men within household had coefficient of elasticity 0.31464. It means that if the number of men within household increases by 1% the annual agricultural production quantity within one household expressed in money increases by 0.32%. The number of women within household had coefficient of elasticity 0.04568. It means that if the number of women increases by 1% the annual agricultural production quantity within one household expressed in money increases by 0.05%. The agricultural market information usage had a coefficient of elasticity 0.12954. It means that if the agricultural market information usage increases by 1% the annual agricultural production quantity within one household expressed in money increases by 0.13%. The last exogenous variable the size of agricultural land had coefficient of determination 0.47458. It means that if the size of agricultural land increases by 1% the annual agricultural production quantity within one household expressed in money increases by 0.48%.

Finally, it exposed that the size of agricultural land and the number of men within household had the highest effect on the annual agricultural production quantity within one household expressed in money. Unfortunately, the number of women within household and agricultural market information usage has not proved real impact on the annual agricultural production quantity within household expressed in money.

6 Discussion

National Bureau of Statistics (2015) states that in 2014 were the highest production of agricultural crops per capita in Moldova represented by cereals, sunflower seeds, sugar beet, and fruits and berries. According to several databases (WB, 2010; National Bureau of Statistics, 2015) the major grown crops in general are maize, wheat, sunflower seeds, barley, sugar beet, fodder roots, cabbage, pumpkins and field vegetable. To compare, empirical results of this thesis show that the highest production of agricultural crops and also the major grown crops by rural women's households in Telenesti district are represented by maize (96%), sunflower seeds (67%), peppers (51%) and grapevine (22%).

In general, women comprise on average 43% of the agricultural labour force in developing countries (FAO, 2016). This thesis shows that 46% of rural women are directly employed in agricultural sector, and source of their income is contributed only from agriculture. Several studies (Moroz and Ignat, 2015; WB, 2016) claim that sector contribution has rapidly changed, and service sector became predominant. Thesis claims that younger group of rural women (below 25, and 26-36 years old) did not engaged in agricultural sector, and worked primary in services while women from 36 to 55 years old worked mainly in agricultural sector.

According to empirical results of this thesis 91% of rural women have experiences with agricultural market especially with selling harvested crops what was claimed by 87% of them. Selling of harvested crops is also the most often experienced agricultural activity among rural women. However, just 49% of them though that it represents typical female agricultural activity. Several sources (Farworth and Ragasa, 2008; Okwu and Umoru 2009; SOFA team and Doss, 2011) states that participation on the market is typical female agricultural activity. Furthermore, SOFA team and Doss (2011) highlight that women's participation in rural markets shows at the regional level much more diversity. However, Farworth and Ragasa (2008) argue that rural women are usually excluded from more lucrative and profitable markets which is one of women's disadvantage compared with men.

According to Das (2000) rural women are essential in agriculture due to their roles of decision makers within their households. What is more, Invande *et al.*

(2015) prove in their study that during the last periods in Nigeria some increase of involvement women in joint decision making appeared in all agricultural activities. Empirical results of this thesis show that all interviewed women participate in decision making within their households, and only 40% of them think that men should decide. On the other hand, UNICEF (2012) argues that women in Moldova are under-represented in decision-making process at the regional or local level.

Based on several studies, the major female agricultural activities are defined as following: producing agricultural crops (Das, 2000; Farworth and Ragasa, 2008; Abedi *et al.*, 2011), tending animals (Farworth and Ragas, 2008), processing and preparing food (Farworth and Ragasa, 2008; Okwu and Umoru, 2009; Hansen *et al.*, 2015), working for wages in agricultural or rural enterprises (Farworth and Ragasa, 2008; Seuneka and Bock, 2015), collecting fuel and water (Farworth and Ragasa, 2008), and engaging in trade and marketing (Farworth and Ragasa, 2008; Okwu and Umoru 2009; SOFA team and Doss, 2011). According to empirical results of this thesis rural women are experienced mainly with several agricultural activities: getting of agricultural information (87%), selling of harvested crops (87%), weeding (69%), and harvesting (64%). However, according to their opinion the most typical female agricultural activities are several: getting agricultural information (67%), weeding (51%), and selling harvested crops (49%).

Several studies (Shepherd, 1997; Oladela 2006; Okwu and Umoru 2009) highlighted the lack of access to agricultural market information in developing countries. In addition, Okwu and Umoru (2009) state that men have better access to agricultural market information than women. However, empirical results of this thesis argue that rural women in Telenesti district had one hundred per cent access to agricultural market information.

Staatz *et al.* (2011) claims that interest and investment in AMIS increased rapidly in middle income countries. Furthermore, Okwu and Umoru (2009) proved that the main source of agricultural market information is provided by AMIS. Some studies (Okwu and Umoru, 2009; Akar, 2010) specify other sources as family, farmer community, mass media, and extension agents. Based on results presented in this thesis, 87% of rural women use as a main source of agricultural market information consultancy agencies which are included in agricultural market information

services. Other sources of agricultural market information of rural women presented in this thesis were internet and media (78%), family and neighbours (78%), and farmer community (64%).

On the whole, Jerome and Theresa (2009) point out the significance and utility of information in any society, community or organization. What is more, results of this thesis state that 100% of rural women thought that agricultural market information are useful and the majority of them perceive it as essential. In contrast, according to Adeboye *et al.* (2012) only 44.3% farmers from Oluyole area of Nigeria consider agricultural market information essential. They prefer more information about rural development programmes or general agricultural news. Fafchamps and Minten (2011) also argue that in Maharesta province of India was the effect of agricultural market information usage very small.

Moreover, in comparison, this thesis claims that 87% of rural women actively used information about market prices. This information is used in the higher frequency in comparison with other. But only 54.3% of Nigerian farmers from Oluyole area perceive it as an essential.

This thesis also states that 82% of rural women used agricultural market information for choosing of the most suitable market place. The majority of them said that their decision making is influenced mainly by agricultural market information about market prices and market's requirements. Several studies (Jerome and Theresa, 2009; Staatz *et al.*, 2011; Sulaiman *et al.*, 2015) claim that agricultural market information is a helpful instrument to make good decision for farmers.

Other empirical results of this thesis state that 78% of rural women used agricultural market information for planning of production. The majority of them also said that it helps them with realization of production, and they are able to better specify amount of production in line with market demand.

Akar (2010) claims that agricultural market information helps to improve farmer's knowledge about fertilizing, cultivates and technologies. 69% of our respondents quoted that they used agricultural market information due to improvement of agricultural technology. The majority of them also said that they use drop irrigation thanks to their awareness. Fafchamps and Minten (2011) indicate

that agricultural market information helps to Indian farmers change agricultural practices, too.

Campos *et al.* (2016) states that numerous studies on gender differentials in agricultural productivity suggest that women are achieving lower yields than men. Empirical results of this thesis show that men played an important role in agricultural productivity within household while women did not have real impact on agricultural productivity within household. However, several studies (FAO, 1995; Abedi *et al.*, 2011) argue that increasing of women within household causes increase of agricultural production.

Based on this thesis, the majority rural women state that agricultural market information helps them gain higher profit because they are able to sell their products for a good price. Several studies (Shailaja and Reddy, 2003; Fabiyi *et al.*, 2007) highlight that increasing of access to agricultural market information by rural women causes increase of agricultural production, and their income. Several studies (Stigler, 1961; Ansari and Sunetha, 2014; Sulaiman *et al.*, 2015) also point out that increasing of agricultural information usage causes increase of agricultural productivity. The results of this thesis also confirm the assumption that increasing the number of women within household increases the annual agricultural production quantity expressed by money. Nevertheless, the relation between number of women within household and annual agricultural production quantity expressed in money did not confirm because it did not show as statistically significant.

This thesis implies that rural women and agricultural information usage did not affect the annual agricultural production within household expressed in money in expected degree. The major influence seems to be men's domain. Therefore, it is recommended to focus further studies on socio-cultural context of access to agricultural market information and women's role in agriculture.

Despite the fact that the questions in questionnaire were formulated simply and clearly it could lead to misinterpretation from the side of respondents. Therefore, the respondents did not have to understand questions properly. Author's personal presence at data collection and personal interviews could not eliminate every

potential misunderstanding. Despite appropriate work of the interpreter, language barrier remains significant limitation.

The local environment and cultural differences could be a cause of research limitation as well as time limitation of rural women. Also the sample size aimed only on specific area of the district. We should definitely not omit possibility of mutual influencing of responded women that could also influence data significance. The model chosen for data processing is a simplified real model, and therefore does not provide fully relevant information. Of course, not all explanatory variables could have been covered within chosen econometric model. All these facts could influence research accuracy and subsequent conclusions.

Despite being aware of stated limitations could be claimed that in several aspects the conducted research did not confirm the original expectations of the thesis which were formulated based on available literature sources. On the other hand, some of empirical results partly issued mentioned thesis in literature review. That indicates that the particular theme has not been fully exhausted. More extensive and detailed research could show other interesting findings about the role of rural women in area selected for this thesis same as many others.

7 Conclusion

The main aim of this thesis was to analyze rural women's role in agriculture and significance of their access to agricultural market information in Telenesti district of the Republic of Moldova, and its impact to women's agricultural productivity. The linear regression model was used to estimate relationship between annual agricultural production quantity expressed in money, number of men and women within household, size of owned agricultural land, and agricultural market information usage by rural women. This thesis analyzed if factors such as number of men and women within household, size of owned agricultural land, and agricultural market information usage, have an impact on annual agricultural production quantity expressed in money.

Despite expectations based on literature review women's access to information in Telenesti district is good. Each of 45 responded women claimed that they obtain and use agriculture market information to improve household profits. Moreover, most of respondents considered obtaining that information typical female activity in agriculture. Favoured source of agriculture market information are consultancy agencies, internet and other media. Women often participate in decision making process. Author's personal observation and interviews indicates that women in visited communes are not subordinated to men, although division of labour between men and women is apparent.

Results of conducted research confirmed literature-based expectations only partially. The number of women within household and agricultural market information usage did not show significant impact on annual agricultural production quantity expressed in money. Nevertheless, point of agriculture market information cannot be reduced on several examined explanatory variables. Presented thesis could above all be an inspiration to focus further studies on this important and complex subject.

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Appendix 1: Table 1. Yield per hectare of agricultural crops in Moldova

Table 1. Yield per hectare of agricultural crops in Moldova (quintals) (National Bureau of Statistics, 2015)

Product	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cereals and leguminous crops – total	25.2	10.1	31.7	23.2	26.7	28.1	13.4	28.2	31.2
<i>Wheat (winter and spring)</i>	23.2	13.2	31.2	21.0	22.9	26.0	15.8	27,6	31.7
<i>Barley (winter and spring)</i>	18.5	9.5	27.2	17.1	16.3	18.8	12.9	21,1	22.9
<i>Grain maize</i>	29.1	8.6	34.9	28.9	34.5	32.5	12.3	31,0	33.5
Leguminous crops	16.3	4.0	13.6	8.8	10.7	11.6	6.8	13,4	14.2
Sunflower	13.3	6.9	16.5	12.7	15.3	15.6	10.0	18,3	17.7
Soy	14.8	10.2	19.8	11.2	19.0	13.7	8.5	16,6	20.7
Rapeseed (winter and spring)	10.8	9.6	18.9	12.3	9.6	13.0	11.7	16,6	23.3
Sugar beet (industrial)	283.2	192.8	390.9	170.9	319.6	237.3	191.5	355,6	498.8
Tobacco	14.0	12.4	14.6	17.6	17.7	14.2	12.2	14,8	16.3
Potatoes	109.6	56.8	86.9	92.7	102.1	119.0	74.8	100,7	117.7
Field vegetables	112.6	59.3	94.4	85.8	89,2	101.4	69.7	84,8	98.0
Cabbage (different)	165.0	95.3	143.4	123.8	134.9	156.1	98.5	121,2	147.8
Cucumber	105.6	55.2	71.7	78.4	74.0	99.5	82.1	88,4	102.1
Tomato	129.4	75.6	119.3	124.6	98.1	142.4	99.8	93,6	106.6
Dry onion	90.6	45.8	85.8	68.3	90.4	87.6	64.6	87,7	100.0
Green peas	34.7	8.9	33.6	18.7	27.0	21.2	27.8	34,0	38.9
Pumpkins	145.5	64.8	122.4	124.7	136.7	143.0	79.2	99,9	138.4
Melons and gourds	106.2	59.5	80.9	88.1	103.5	108.0	74.8	74,1	66.9
Fodder roots	112.4	76.6	143.7	137.7	181.6	191.1	76.4	192,2	205.7

Appendix 2: Figure 1. Arable land by main crops in both sexes headed holdings in Moldova

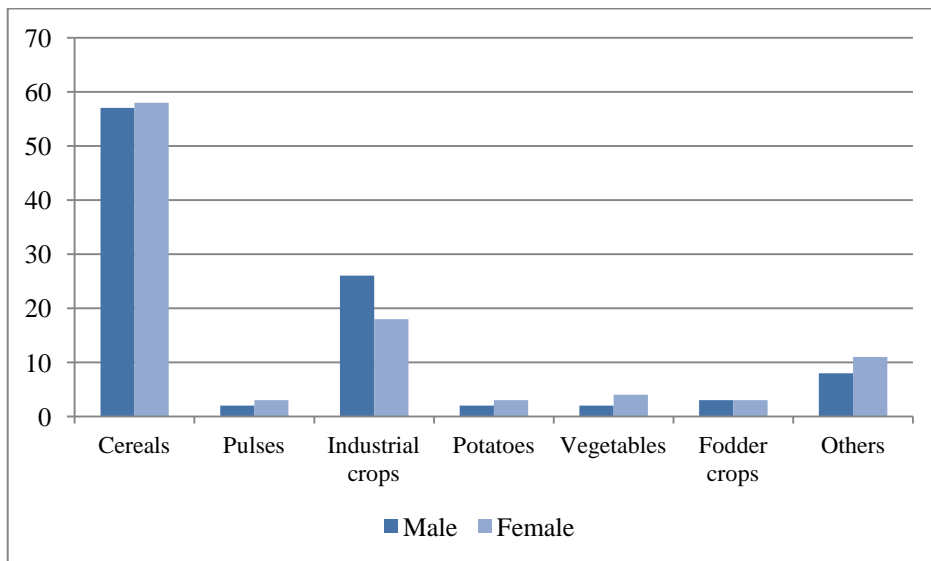


Figure 1. Arable land (%), by main crops in both sexes headed holdings in Moldova (ha) (National Bureau of Statistics, 2014)

Appendix 3: Table 3 Information needs of farmers in Moldova

Table 3. Information needs of farmers, Oluyole, Oyo State, Nigeria (Adeboye *et al.*, 2012)

Variable	Most essential frequency (%)	Essential frequency (%)	Less essential frequency (%)
Marketing information	44.3	51.4	4.3
Accounting and payment	17.1	11.4	71.4
Input prices and availability	54.3	45.7	0.0
Soil testing and soil sampling information	0.0	2.9	97.1
Dairying and marketing of milk and milk products	18.6	7.1	74.3
Early warning and management of diseases and pest	50.0	42.9	7.1
Farm business and management information	10.0	12.9	77.1
Crop insurance information	2.9	7.1	90.0
General agricultural news	87.1	12.9	0.0
Post-harvest technology	30	54.3	15.7
Latest packages of practices	18.6	4.3	77.1
Weather forecasting	24.3	74.3	1.4
Question-and-answer services	11.4	4.3	84.3
Information about rural development programmes and subsidies	95.7	4.3	0.0
Facilitating access to land records/online registration	10.0	12.9	77.1

Appendix 4: ACSA regional and local advisory centres



Figure 3. ACSA regional and local advisory centres (ACSA, 2016)

Appendix 5: English version of questionnaire

Questionnaire

1. Age

- < 25 36 – 45 56 <
 26 – 35 46 – 55

2. Marital status

- Single Widow
 Married Divorced

3. How many men and women are living in your household?

Number of women: Number of men:

4. Do you own an agricultural land?

- Yes No

5. If yes, what is your farm size? (ha)

6. Do you work in agricultural sector?

- Yes No

7. What kind of agricultural products do you have?

8. How big is your production capacity sold at market place? (Kg/year 2015)

Product	Kg	Year 2015
.....
.....
.....
.....

9. Do you use agricultural technology? What kind?

10. Do you use fertilizing?

Yes No

11. Do you get in touch with market?

Yes No

12. Do you have any access to information about market?

Yes No

13. Where do you get information?

Consultancy Agency Farmer community
 Ministry of Agriculture Family members,
 Neighbours Internet, Media Others:

14. Do you think that the agricultural market information is useful?

Yes No

15. If yes, in which way?

16. What kind of agricultural market information do you use?

Technology Scheduling of harvests Market prices
 Planning of production Choosing of market
 Other:

17. Do you participate in decision making in your livelihood?

Yes No

18. Do you think that men should decide?

Yes No

19. What kind of agricultural activity are you experienced with?

- Weeding Harvesting Getting agricultural market information
- Tillage Fertilizing Selling of harvested products

20. According to your opinion, what agricultural activity is typical for men and for women?

	Male	Female	Neutral
Weeding			
Tillage			
Harvesting			
Fertilizing			
Getting agricultural market information			
Selling of harvested products			

Appendix 6: Romanian version of questionnaire

Chestionar

1. Vîrsta

- < 25 36 – 45 56 <
 26 – 35 46 – 55

2. Starea civilă

- Necăsătorită Văduvă
 Căsătorită Divorțată

3. Câți bărbați și femei locuiesc în familie?

Numărul femeilor: Numărul bărbaților:

4. Aveți propriul teren agricol?

- Da Nu

5. Dacă aveți, care este suprafața terenului agricol? (ha)

6. Dacă nu aveți, lucrați în sectorul agrar?

- Da Nu

7. Ce fel de produse agricole cultivați?

8. Cît de mare este capacitatea de producție dumnevoastră? (Kg/an 2015)

Produs	Kg	an 2015
.....
.....
.....
.....
.....
.....

9. Utilizați tehnologii agricole? Ce fel de tehnologii agricole?

10. Utilizați fertilizanți?

- Da Nu

11. Realizați producția agricolă pe piață (personal)?

- Da Nu

12. Dispuneți de acces de informație despre piețe?

- Da Nu

13. De unde obțineți informația?

- Agenție de consultanță Comunitate de fermieri
 Ministerul Agriculturii Membrii familiei, Vecini
 Internet, Media Alte surse:

14. Credeți că informația despre piața agricolă este utilă?

- Da Nu

15. Dacă da, atunci explicați de ce?

16. Ce fel de informație agricolă utilizați?

- Tehnologie Metode de recoltare Prețuri de piață
 Planificarea producției Selectarea pieței Alte:

17. Participați la luarea deciziilor în familia dumnevoastră?

- Da Nu

18. Credeți că bărbații ar trebui să decidă?

- Da Nu

19. În ce fel de activități sunteți antrenată?

- Prășit Recoltare
 Dobândirea informației despre piețe agricole
 Lucrarea solului Fertilizarea
 Realizarea producției agricole recoltate

20. După opinia dumnevoastră, ce activitate este tipică pentru bărbați și pentru femei?

	Bărbat	Femeie	Neutral
Prășit			
Lucrarea solului			
Recoltare			
Fertilizare			
Dobândirea informației despre piețe agricole			
Realizarea producției agricole recoltate			

Appendix 7: Average market price of crops per a year 2015¹⁹ (in MDL)²⁰

Crop	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	Average
Apples	13	15	x	20	14	26	25	15	9	9	9	15	15.45
Black currants	x	x	x	x	x	x	35	20	15	x	x	x	23.33
Gooseberries	x	x	x	x	x	x	35	x	x	x	x	x	35
Grapevine (Moldova)	19	30	x	x	x	x	x	8	9	10	20	x	16
Maize	3	3.5	4	4	4	4	4	4.5	4	4.5	4.5	4.5	4.04
Peppers	30	40	40	45	40	35	12	8	8	13	35	40	28.83
Potatoes	6	7	7	7	6	12	7	7	8	12	13	9	8.42
Raspberries	x	x	x	x	x	x	35	x	35	x	x	x	35
Sunflower seeds	10	12	15	12	10	11	10	10	15	17	17	15	12.83
Tomatoes	34	36	35	40	30	24	10	6	9	16	24	25	24.08
Walnuts	35	x	x	x	x	x	x	x	x	x	x	x	35
Water melon	x	x	x	x	x	x	19	2	3.5	x	3.5	x	7
Wheat	3	3.5	4	4	4	4	4	4.5	4	4	4.5	4.5	4

¹⁹ Source of market prices for each month was from ACSA, 2016.

²⁰ 1 MDL = 1.2103 CZK, 0.045 EUR, 0.0507 \$US (ČNB, 2016)

Appendix 8: Correlation matrix for testing Multicollinearity from SW Gretl

Correlation coefficients, using the observations 1 - 45

5% critical value (two-tailed) = 0.2940 for n = 45

Production	Men	Women	AMIS_SG	Agr_land	
1.0000	0.5843	0.6972	0.3851	0.9133	Production
	1.0000	0.3831	0.2799	0.3419	Men
		1.0000	-0.0661	0.7128	Women
			1.0000	0.3355	AMIS_USG
				1.0000	Agr_land

Appendix 9: Data table for parameter's estimation in SW Gretl

Production	UV	Men	Women	AMIS_USG	Agr_land
490.569	1	2	7	5	31
77.175	1	1	3	1	2
84.747	1	1	1	4	5
200.252	1	2	1	3	6.6
232.703	1	1	2	5	12
98.111	1	3	1	5	2
268.023	1	5	2	5	5.3
128.975	1	2	2	4	2
587.694	1	8	7	5	25
102.632	1	2	1	5	3
113.289	1	4	1	4	1.25
225.264	1	1	2	5	12
134.836	1	1	1	5	3.2
210.665	1	2	1	4	6.6
99.715	1	2	3	3	3.5
151.004	1	1	1	5	4
36.188	1	2	1	5	3
223.25	1	2	5	4	11
89.1	1	2	3	3	3.5
133.058	1	2	2	4	2
102.485	1	1	1	4	5
282.633	1	2	3	3	11
54.525	1	1	2	2	1
58.101	1	2	2	3	1
106.176	1	2	2	3	1.5
133.022	1	2	2	4	2
119.987	1	4	1	4	1.25
47.729	1	2	1	4	0.5
84.179	1	1	1	4	3
104.021	1	1	1	4	5
323.809	1	2	5	4	13
45.897	1	1	2	4	1
119.756	1	1	2	4	3
123.523	1	1	2	4	3
101.641	1	2	3	4	2
66.356	1	2	1	4	2
98.331	1	2	3	4	2
81.816	1	1	4	4	3
274.791	1	5	4	5	5.3
150.656	1	1	1	5	4

108.937	1	2	2	3	1.5
137.489	1	1	1	5	3.2
59.247	1	1	3	1	1.15
185.861	1	2	3	4	5
58.307	1	1	3	1	1.15

**Appendix 10: Outputs from SW Gretl using Ordinary least square method
for Linear regression model**

Model 1: OLS, using observations 1-45				
Dependent variable: Production				
	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>
const	5.30833	25.0755	0.2117	0.83342
men	23.7449	4.20044	5.6530	<0.00001 ***
women	3.00805	5.64409	0.5330	0.59701
AMIS_USG	4.97161	5.85054	0.8498	0.40051
Agr_land	14.1353	1.41366	9.9990	<0.00001 ***
Mean dependent var		S.D. dependent var		
	149.2561			110.1267
Sum squared resid		S.E. of regression		
	43026.58			32.79732
R-squared		Adjusted R-squared		
	0.919370			0.911306
F(4, 40)		P-value(F)		2.62e-21
	114.0226			
Log-likelihood		Akaike criterion		
	218.2677			446.5355
Schwarz criterion		Hannan-Quinn		
	455.5688			449.9030
White's test for heteroskedasticity -				
Null hypothesis: heteroskedasticity not present				
Test statistic: LM = 17.3215				
with p-value = P(Chi-square(14) > 17.3215) = 0.239449				
Test for normality of residual -				
Null hypothesis: error is normally distributed				
Test statistic: Chi-square(2) = 0.613252				
with p-value = 0.735926				

Appendix 11: Photos from the research with description



Photo 1. ACSA advisory centre in Cazanesti



Photo 2. Interviews with rural women in ACSA advisory centre in Cazanesti



Photo 3. Interviews with rural women in ACSA advisory centre in Brinzenii



Photo 4. Transect walk – vineyards



Photo 5. Transect walk – field walk

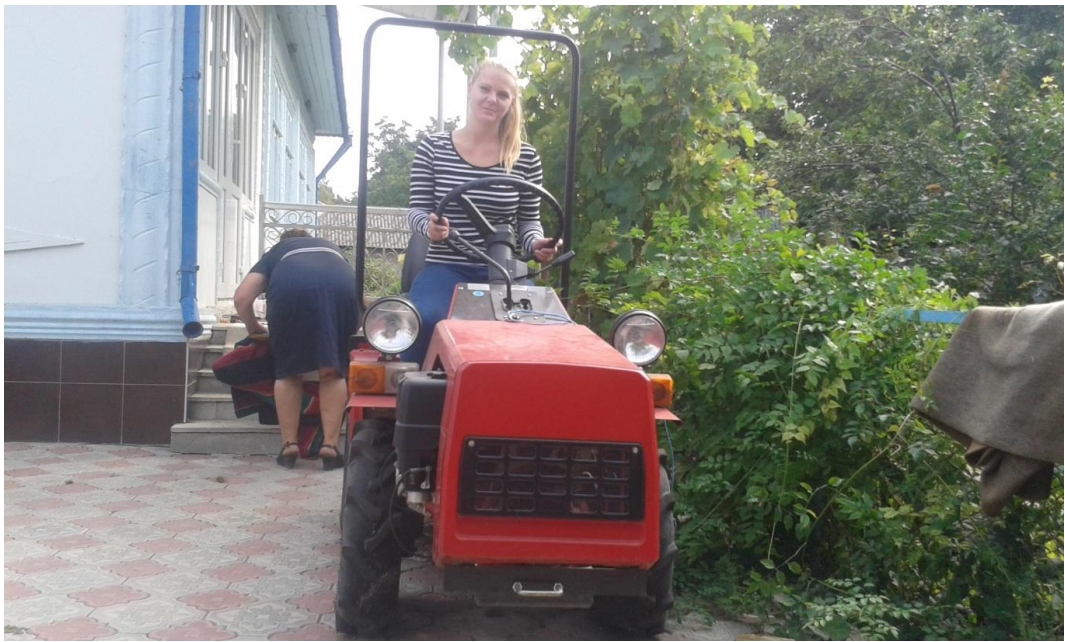


Photo 6. Transect walk – agricultural technology