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The impact of remittances on food security status of households of university students: the evidence from the Republic of Moldova

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Declaration

I hereby declare that I have done this thesis entitled The impact of remittances on food security status of households of university students: the evidence from the Republic of Moldova independently, all texts in this thesis are original, and all the sources have been quoted and acknowledged by means of complete references and according to Citation rules of the FTA.

In Prague 15.5.2020

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Tereza Šiftová

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Abstract

Despite that remittances represent an important financial resource for rural households with the potential to relieve credit constraints, the empirical evidence regarding the effect of remittances on the food security status is limited in European countries. In Moldova, the annual fee for higher education occupies up to 70 % of annual average disposable income, therefore we assume that the attendance of university by students can affect the consumption patterns of their family and may lead to a greater dependence on their own production or remittances. Therefore, the thesis aims to identify the level of food insecurity among households of university students and to analyse the factors affecting food security status. The survey was conducted in September 2018 among 103 households of university students. The Household Food Insecurity Access Scale (HFIAS) as an indicator was used for analysis. In total, 47 % respondents suffer from a certain level of food insecurity. More than 14.5 % of households were classified as mildly food insecure, 15.5% as moderately food insecure and 16.5 % as severe food insecure. In order to find determinants of the level of food insecurity of household of university students, an ordered and binary probit regression model was used. Results revealed that with a higher monthly household's income experienced a lower level of food insecurity, but those household, receiving food from migrant members experience higher level of food insecurity.

Key words: migration, nutrition, youth, Moldova, remittances

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List of the abbreviations used in the thesis

AIPA	Agency of Interventions and Payments in Agriculture
CIS	Commonwealth of Independent States
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross domestic product
HFIAP	Household Food Insecurity Access Prevalence
HFIAS	Household Food Insecurity Access Scale
HH	Household head
MAFI	Ministry of Agriculture and Food Industry
MRA	Material Reserves Agency
NELM	New Economics of Labor Migration
NBS	National Bureau of Statistics of the Republic of Moldova
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
USAID	United States Agency for International Development
USD	United States Dollar
VIF	Variance inflation factor
WHO	World Health Organization

1. Introduction

Migration has become a strategy to improve the living standards in Moldova. Over the past twenty years, the economy of Moldova has become dependent on the inflow of remittances (The World Bank 2016a). The research follows the New Economics of Labor Migration (NELM) framework introduced by Stark (Stark 1980; Stark & Bloom 1985; Stark & Levhari 1982). The NELM literature distinguishes between three ways through which migration affect household decisions. Firstly, the inflow of remittances relaxing capital or liquidity constraints and this may increase the expenditure and consumption of nutritious food (Karamba et al. 2011). Secondly, migration may lower household food consumption requirements, but at the same time may imply a loss of labour available for working on the farm available for food production (Maharjan et al. 2013). Thirdly, remittances may indirectly improve food security by enabling the household to invest in crop production or to non-agricultural activities (Böhme 2015; McCarthy et al. 2009).

Ensuring food security at the national level is a crucial policy for each state. The central role of food security plays agriculture. In the Republic of Moldova, the agricultural sector is essential for the national economy, especially for the of employment, export, and rural development (The World Bank 2015). However, the development of the agricultural sector is stagnant due to the lack of investments and innovations (Bulgari 2015).

Accessibility of the higher education in Moldova have change the household consumption patterns. Due to the high costs of higher education, the families of students mostly have to decrease they daily expenditures which might affect the food security status of the household (Cainarean et al. 2011).

2. Literature Review

2.1. Economic overview in Moldova

The Republic of Moldova is a small country with a lower-middle-income economy. During the 1990s, Moldova went through the economic transition from centrally planned to a market-oriented economy. Currently, it is considered the poorest country in Europe. The GDP per capita reached 2,724 current USD in 2018 (The World Bank 2020a).

Moldova is one of the largest recipients of remittances in the world. Remittance account for a 16 % (2018) of GDP. GDP of agriculture represents 10 % (2018), which is one of the highest levels in Europe after Albania (18.4 % of GDP in 2018) and Ukraine (10.1 % of GDP in 2018). Services occupy 53.7 % (2018) and industry 22.6 % (2018) of GDP (The World Bank 2020b). Services occupy the highest share of employment, 51 % in 2019. The employment of the agriculture sector accounts for 31.8 % (2019) and industry 17.2 % (2019) (UNSD 2020).

2.2. Agricultural sector in Moldova

Agriculture is a crucial sector of Moldova's economy. It has a significant impact on employment, exports, food security, and rural development (The World Bank 2010a). Despite the size and importance of agriculture's contribution to the economy, currently, agriculture is considered an unstable sector due to the slow and uneven growth. The highest poverty rate is also registered in this sector, up to 31 % of the country's poor population (The World Bank 2016b). Due to the lack of innovative resources, technologies, government support, and skilled workers, agriculture is currently considered a stagnant sector (Bulgari 2015).

Another challenge, the agricultural sector has been facing is migration. Migrants and their family members reduce investment in agricultural equipment or new technologies, and parts of their land are leased (Bolganschi 2011) or abandoned and left as fallow (Leah 2016).

2.2.1. Climate and agricultural areas

Moldova is one of the most fertile countries in Europe due to the fertile soils and mild continental climate. Fertile chernozem covers almost 75 % of agricultural land.

The climate is moderate intra-continental, characterized by short, mild winters and long warm summers. Average annual temperatures range from 8° C in the north up to 10° C in the southeast. The frequency of precipitation increases from the southeast to the northwest area.

The average rainfall ranges from less than 500 mm up to more than 625 mm. The wettest season of the year is the first half of summer. At the end of summer prevails drought season combined with high temperatures.

Based on the temperatures and precipitation Moldova can be divided into three agrarian zones: northern, central, and southern.

The northern region is suitable for planting sugar beet, corn, peas, soybeans, wheat, and barley. The climate is also suitable for growing forage and cattle grazing. The central part is suitable for growing permanent crops like fruit trees and vineyards. In the southern region prevail higher temperatures and low precipitation. This climate is suitable for growing tobacco, cereals, and grapes (The World Bank 2010a).

2.2.2. Structure of agricultural farms

Land reform in the 1990s and subsequent developments have resulted in a duality of the agricultural structure. On the one hand, there are a small number of large corporate farms, and on the other hand, many small, fragmented family farms (Hartvigsen et al. 2012; Hartvigsen 2013; Ignat & Moroz 2013). Medium-sized family farms, which are the typical agricultural structure for most Western European countries, are almost absent in Moldova (Hartvigsen et al. 2012; Hartvigsen 2013).

Around 903 000 farms are registered in Moldova. Only 0.5 % of farms are registered as legal entities (limited liability company, joint-stock company, cooperatives, state-owned enterprises, research institutes and agricultural schools, agricultural land municipalities, religious institutions, NGOs and other agrarian holdings). The remaining 99.5 % are non-legal family farms, which include peasant farms and land plots (Ignat & Moroz 2013).

The structure of agricultural holdings is divided according to ownership into state farms and private farms. Private farms are further divided according to their legal form into limited liability companies, joint-stock companies, and agricultural cooperatives. These farms were established after 1991 by reorganizing or disorganization of former state (Sovkhoz) and collective (kolkhoz) farms into several smaller farms. Although legally considered as new farms, the way they operate has not changed significantly (The World Bank 2006). Private farms usually use the land leased from their associates. State farms persist, but their operations are oriented to highly specialized areas, which are seed and livestock selection, experimental stations, education, and research (Lerman & Cimpoieş 2006). Today's farms specialize in the

production of low value-added crops (cereals, oilseeds, sugar beet) due to the availability of agricultural machinery, allowing rapid cultivation of large areas. (Moroz et al. 2015).

The second group is the family farms. Mostly family members are working here and employ other workers as needed. These farms are further subdivided into small household plots and slightly larger peasant farms (The World Bank 2006). They mainly use their land, on which they create a limited surplus of crops with high added value (fruits, nuts, grapes, vegetables, potatoes) (Moroz et al. 2015).

Agricultural land covers 2 500 000 hectares in Moldova. Currently, about 74 % of agricultural land is private ownership. The remaining 26 % is considered as a public property. The average size of the land is 0.8 hectares, while the average land size of legal entities is 25.8 hectares and for family farms 0.4 hectares. The overall average farm size is 2.2 hectares. The average size of legal entities is 247.9 hectares, and 0.8 ha for family farms (Ignat & Moroz 2013).

2.2.3. Agricultural production

The structure of agricultural production has changed since the restructuring. During the first half of the 1990s production fell by 35 %, in the second half of the 1990s production fell by 20 %. The decrease was caused mainly by decreased productivity. The extent of the agricultural area has not changed significantly. Agricultural production depends on imports of mineral fertilizers, pesticides, mineral and vitamin nutritional supplements, veterinary medicines, and fuels.

Essential products of the agricultural sector are fruits, vegetables, tobacco, grapes, sunflowers, winter wheat, corn, and livestock production (The World Bank 2004). Moldova has a lack of mixed farms with livestock and crop production (Millns 2013).

2.2.3.1. Livestock production

The considerable decline of meat production and livestock production was in the 1990s (see Table 1). The decrease was mainly due to the elimination of breeding animals in large farms during the transformation of the agricultural sector. Although livestock farming in family farms has increased by 50 %, it has fallen by up to 90 % in large farms (Coser 2012). This sector is weakened due to the small number of large farms and the lack of grazing areas (The World Bank 2016b).

Table 1. Number of livestock in 1000 pieces

Livestock	1991*	1994	1999	2004	2009	2014	2019
Cattle	1,061	816	469	373	217	188	144
Pigs	1,850	1,015	860	446	283	420	397
Sheep	1,245	1,346	1,026	817	761	713	613
Goats	37	74	95	121	103	135	155
Poultry	13,164	2,593	1,557	1,499	3,191	3,475	3,623

Source: NBS of the Republic of Moldova (2020); own processing
*including Transnistria

Between 1991 and 2003, the number of dairy cows decreased, bringing total milk production decreased from 1.5 million tonnes to 600,000 tonnes (Gorton et al. 2006). In 2010, 97 % of milk production came from small farmers. Most of them are households with a maximum of five cows that are milked by hand. In Moldova is only 49 farms with more than 50 dairy cows (Millns 2013).

2.2.3.2. Crop production

The main crops are cereals such as wheat, barley, and corn, followed by potatoes and vegetables. Other important crops are sunflower, sugar beet, grape, and fruit.

Recently, crop production has decreased as a result of minimizing the use of mineral and organic fertilizers and obsolete technologies. The production volume of cereals and sugar beet fell by up to one third; fruit, vegetables, grape, and tobacco fell by up to 50 %.

The production area of wheat, corn, sunflower, and potatoes has increased. These crops do not require high input investment and guarantee a profit on the market (Bolganschi 2011; Coser 2012). The extent of land in which tobacco and vegetables are grown is decreasing due to the lack of the necessary financial resources (The World Bank 2004; Bolganschi 2011; Coser 2012).

2.3. Migration in Moldova

Lee's (1966) theory of migration distinguishes factors influencing reason for migration. These factors are separated into two groups push and pull factors. Push factors represent the supply side in the emigration area. Pull factors refer to the demand side in the immigration area.

According to this theory, migration exists only if the push factors create enough desire to emigrate and pull factors form the demand for immigration (Corry 1996).

Push factors drive people to migrate from their country of origin due to economic, political, or environmental conditions (Simpson 2017). The main push factors in Moldova are lack of job opportunities, living standards and poverty (Mosneaga 2012).

Pull factors relate to the destination country of migration. It can be described as various reasons which attract individuals or groups to leave their homes, for example, better working and living conditions (Simpson 2017). Pull factors in Moldova are guided by the social factors like recommendation by a person they asked for advice, guaranteed job, good working condition or social contacts (Mosneaga 2012).

Since 2000, in Moldova has been a significant growth of the emigration of Moldovans looking for work abroad (IBP, Inc. 2009). To date, three waves of mass migration are identified in Moldova. The first mass migration was economically motivated and had a commercial character based on the purchase of goods from abroad and sale on the Moldovan market. The introduction of a visa regime, along with more complicated customs controls and equalization of prices in the post-communist states, made this type of migration less profitable for an individual migrant. Therefore, commercial migration was gradually replaced by labor migration. The second wave of mass migration from Moldova was caused by the financial and economic crisis in the Russian Federation in 1998. This mass migration occurred as a response to acute poverty and continued until 2007. The last current Moldovan emigration wave responses to the opportunities in the foreign labor market (The World Bank 2010b).

According to The World Bank (2010b), in Moldova, there are three types of international migration. The first type is a short-term migration, mainly to countries of Commonwealth of Independent States (CIS). The second type is a long-term migration, mostly to the European Union (EU) countries. The third type is a long-term legal migration to the United States and Canada.

The level of education plays a role in the emigration destination country. Emigrants with higher education tend to migrate to European countries. Per contra, less educated emigrants more likely to choose CIS countries (Sârbu & Cimpoieș 2018). The top destination countries of emigration are The Russian Federation, Ukraine, Italy, Romania, the United States, Israel, Spain, Germany, Portugal, and Uzbekistan (Ratha et al. 2016).

The number of emigrants was more than 24 % of the population in 2013 (Ratha et al. 2016). Sârbu & Cimpoieș (2018) pointed out that labor migrants represent 11.2 % of total Moldova's active population. A comparison of the previous years shows that the number is still increasing. Between the years 2010 and 2013, the number of emigrants increased from 770.3 thousand to 859.4 thousand (Ratha et al. 2011; Ratha et al. 2016). Around 63 % of the emigrants are from rural areas with an average age of 35-36 years (Sârbu & Cimpoieș 2018).

Increasing the emigration of the economic active population has affected the labor market by reducing the unemployment rate and the labor supply as well. Therefore, the wage level has risen; however, without an improvement in labor productivity. Thus, the economy suffers from inflation pressures (Stratana & Chistruga 2012).

2.4. Remittance in Moldova

Stark and Bloom (1985) reported that migration could be a part of a household strategy to overcome market failures and diversify the source of income in the form of remittances. Remittances sent by migrants have a direct impact on recipients in the receiving area by increasing the family budget (Taylor 1999).

Remittances can be seen as a source of investment capital that can be used for entrepreneurial activities, education or to facilitate the migration of others/remaining household members (De Haas 2009). However, in Moldova, the significant part of remittances is used to meet daily needs and the rest to buy houses and lands (Stratana & Chistruga 2012). The economic environment that stimulates migration also restricts the potential investment of remittances and thus limit the contribution to the local production in receiving areas. The reason is poor infrastructure and public services, which are crucial for development (Taylor 1999).

In the countries where the government revenues are mostly from taxes on imports, the rapid income increase occurs as the remittance inflows grow. Increasing government revenue can help to finance social expenditures and thus decrease the government's fiscal burden. However, the dependency on the remittance is not sustainable in the long term due to the external shocks like a financial crisis, which may decrease remittance inflow.

In Moldova the massive inflow of remittance started after the financial and economic crisis in 1998 (see Figure 1) (Stratana & Chistruga 2012). The increasing growth of remittances is visible until 2008. The international financial crisis caused a decrease in 2009 (Sârbu & Cimpoieș 2018).

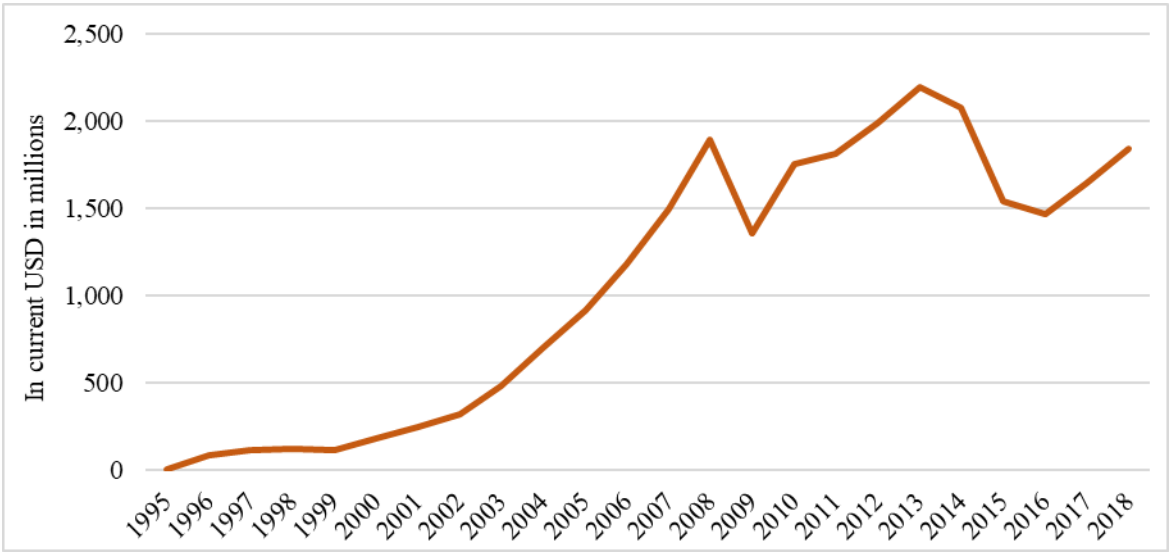

Figure 1. Remittance inflow in Moldova

Source: The World Bank (2020b); own processing

The highest share of remittances is originated in Russia. In 2016 the sum accounted for 546 million USD. However, the tendency is decreasing compared to previous years. The amount fell by half from 1,173 million USD in 2012. Remittance transferred from Italy accounts for around 192 million USD (in 2016). The amount has not changed significantly over the years. A significant increase in remittance transfer occurred from Israel. Between the years 2012 and 2016, the amount raised from 82 million USD up to 163 million USD (Sârbu & Cimpoieș 2018).

Remittance sent by migrants working abroad has increased household disposable income (Stratana & Chistruga 2012). The growth of additional income typically supports the increase of the marginal propensity to invest (Halton 2019). However, in Moldova, the higher share of received remittances keep high growth of consumption rate, and the marginal propensity to invest does not increase (Stratana & Chistruga 2012). Only 5 % - 15 % of remittances are invested. 10 % - 20 % is savings, and the majority, 60 % - 90 %, are used to cover daily expenses (Sârbu & Cimpoieș 2018). High reliance on the remittance decreases the marginal inclination to invest (Stratana & Chistruga 2012).

2.5. Food security concept

The concept of food security was developed in the mid-1970s, during the global food crisis, as a result of a discussion of international food problems. The food security definition was adopted in the 1974 World Food Summit. This definition has changed over years. The

development of the definition reflects the change of food security perception as an international and national responsibility (FAO 2003). The complex definition was adopted at the World Food Summit 1996 (FAO 1996):

"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meets their dietary needs and food preferences for an active and healthy life."

The last redefinition was in The State of Food Insecurity 2001 by adding social access to food besides the physical and economic (FAO 2002). The definition is:

"Food security a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."

The food security definition identifies four main dimensions. These dimensions are physical **availability** of food, economic, physical, and social **access** to food, food **utilization**, and **stability** of the other three aspects over time.

Food insecurity is caused by many factors ranging from political issues, civil and war conflicts, macroeconomic disequilibrium, trade disruption, climate variation, gender inequality, poverty, inadequate education, and health conditions. All factors are related to insufficient access to food by individuals and households due to poverty, and insufficient national food availability (Smith et al. 2001).

The primary distinguish of food insecurity is chronic and transitory. Among these two groups also belong to seasonal food insecurity. However, the time frame for the transition and chronic food security has not been specified explicitly (Jones et al. 2013). FAO (1997) describe the difference between them as a time dimension of the problem, short-term or persistent. Further differentiation refers to the extent of food insecurity, whether it is a national (macro) or individual (micro) problem.

Devereux (2006) additionally divide food insecurity as a severity dimension and time dimension. The chronic food insecurity is divided as "moderate chronic food insecurity" which can be a chronic hunger, and "severe chronic food insecurity" which occurs with a high infant and crude mortality rate. Transitory food insecurity is "moderate transitory food insecurity" for example, seasonality and "severe transitory food insecurity" as a result of the emergency.

2.5.1. Effect of migration and remittances

Migration and remittance might influence food security via many different channels. As such, migration has the potential to change nutritional habits through experience with different diets and health practices from the destination country of immigration. Migrants also can gain new experience, knowledge, and skill, which can improve productive activities and thus increase income and food security. Another factor is the reduction in the number of household members. It means decreasing food consumption per household. However, a missing person has a negative consequence in the loss of labor. Especially long-term migration reduces labor endowment, which influences income generation and food production. Migration also affects the quality of childcare and its food security in the case a mother must migrate for work or must take responsibilities of another household member who migrate, for example, husband (Zezza et al. 2011). For many households, migration is a strategy to improve their food security status (Regmi et al. 2016).

The direct impact of migration is remittances. The additional household income can positively influence food security. Remittance facilitates access to health services, sanitation facilities, and nutrition (Zezza et al. 2011). Money transfers help overcome economic access to food in the case of financial risk and thus stabilize the household food consumption (Atuoye et al. 2017). Remittances as funds using to purchase food are an essential factor for improving the situation, especially for families with a high level of food insecurity in rural areas (Regmi et al. 2016). After food consumption, remittances are widely invested in child education and cover their health service fees (Lacroix 2011). However, the overall impact of using remittances may be affected by a household head who controls income. The gender of the household head can change the dynamics of income distribution. Nutrition can also be affected indirectly via remittances. Additional income may eliminate liquidity and insurance constraints and as the consequent affect production and investment decisions (Zezza et al. 2011).

2.6. Food security in Republic of Moldova

2.6.1. Institutional and policy framework

The welfare of the country reflexes the food security status despite the external environmental factors and world economic situation. Food security at the national level

signifies the population has access to food of guaranteed quality and necessary quantity to ensure a healthy life and eliminate unexpected deficiency in a short time.

Moldova does not have strategies, laws, or doctrines, ensuring food security approved by the government. Food security is included as a part of the National Strategy (Perciun & Oleiniuc 2019). In the agenda of Moldova's food security is involved many agencies and ministries which are responsible for the formulation and implementation of the policies related to food security. The weakness is limited interaction, planning and cooperation among institutions. The awareness of food security complexity is insufficient as food safety, health care, and sustainable farming practice are not considered as an essential part of the food security agenda.

The central institution responsible for the development, coordination, and implementation of the policy for ensuring efficient strategic management of food resources is the Ministry of Agriculture and Food Industry (MAFI). To prevent disequilibrium and lack of foodstuff and consequent food insecurity, MAFI controls the national agricultural market. The Agency of Interventions and Payments in Agriculture (AIPA) is responsible for the allocation of the subsidy funds and it is a crucial institution of MAFI to execute the agricultural policy. Other institutions involved in the food security policy are National Food Safety Agency, Ministry of Economy, Ministry of Labor, Social Protection and Family, Ministry of Health and Ministry of Environment and its Agency Apele Moldovei.

The state food reserve is governed by the Material Reserves Agency (MRA). MRA is a distinct government body in charge of national strategic reserves, besides food reserves also military and humanitarian supplies, fuels, and other reserves. MRA also manages accumulation, storage, maintenance, and release of the reserves. In comparison with the OECD countries where most of the food stock storage private sector, the current management of Moldova´s strategic reserves remind a legacy of Soviet times. Moldova´s state food reserves are food products: sunflower oil, pasta, canned meat, coffee, tea, sugar, and agricultural product: wheat (The World Bank 2015).

The challenges of Moldova's food security are the increase and maintain the ability of the country to meet the national food demand via domestic production, food products import, and export of products with a competitive advantage. Equally, the reduction of growing inequalities and enlargement of poverty due to the weak institutional support and food

emergency management system, insufficient purchase power, and unemployment (Stratan et al. 2011).

2.6.2. Food availability

Food availability refers to the source and quantity of safe and nutritious food, and distribution systems on a national and international level. Food availability is entirely dependent on the agricultural sector (Sassi 2017). Food production is affected by factors like land-use system and ownership, crop and livestock management, harvesting, and climatic conditions as well (FAO 1997). Source of food is domestic production, which is household production and commercial farm, imports and food aid, and stocks (Sassi 2017). The distribution system involves all activities which occur after harvest, like processing, storage, transportation, packaging, and marketing (FAO 1997).

Food availability on a national level in Moldova is not a significant challenge; however, the weakness can be instability of the food production caused by climatic shocks (floods and droughts) and lack of precautions. Domestic production covers a large part of population needs, and it is supported by the import (The World Bank 2015), especially for the products which cannot be produced efficiently in Moldova (Stratan et al. 2011). Moldova exports wine, fruits, and cereals and import dairy products and meat. Also, a vegetable is imported due to the seasonal production, which cannot cover consumption for the whole year (The World Bank 2015).

2.6.3. Food access

Food access consists of affordability (economic access), allocation (physical access), and preferences (social access) (Gregory at al. 2005).

Economic access describes the resources to acquire enough food of appropriate quality and nutrition (Sassi 2017). The critical factor is the ability of the household to generate sources to obtain enough food for all members. According to FAO (2019) and Ghonkrokta (2017), poverty is the root cause of the inability to access available food. Food affordability depends on employment, wage level, and prices. For subsidence producers, the crucial factor is the availability of productive assets and non-market transfers.

The importance of food physical access is the allocation that the food is available everywhere to everyone. Well-developed market infrastructure, transport, and storage are

crucial, which is affected by the political situation, legal environment, and cultural and religious restrictions

The new element, social access, consider the aspects influencing the intake of nutrient-rich food, an amount of consumed food, and dietary diversity. These aspects are affected by political affiliation, religion or ethnicity (Sassi 2017).

Access to food in Moldova is different in rural and urban areas. Urban households are wholly dependent on the purchasing power and the food product price. Rural households mainly rely on their own production. Agricultural activities are a source of income and food for rural households. However, the importance of its production has been decreasing in the past years, from approximately 45 % in 2006 to 30 % in 2013. It is caused by market orientation and specialization of the farmers and leaving agriculture by the rural population. The rural households have become more dependent on the purchased food, which has replaced their own production. The share of purchased food products increased by 15 % between the years 2006 and 2013. Both purchases from individuals and household stock remain on 10 % of the total source of food. The change of rural household access to food also reflexes the increasing number of supermarkets and their expansion in rural areas. The food offered in supermarkets usually combines local and imported products.

The food price in the Moldova increase is slow and stable, however, with high seasonal volatility, especially for vegetables and fruit. Lower price volatilities are for meat and dairy products and very low for bread products. During the harvest season, the prices are lowest, and in the off-season the prices are higher for some imported products (The World Bank 2015).

2.6.4. Food utilization

Utilization interprets food safety, social value, and nutritional value (Gregory at al. 2005). Utilization underlines the importance of the diet quality based on health status, and also the allocation of food among household members to meet their physiological requirements (Jones et al. 2013; Ghonkrokta 2017). To achieve food safety, the access to potable water and the household knowledge of food processing, storage techniques, adequate sanitation are fundamental factors (Sassi 2017).

The increase of the income improves dietary variety. In both in rural and urban areas of Moldova, households with higher income level have tendency to consume more daily calories.

Mainly animal products like meat, fish, fruit and vegetable (see Figure 2.), dairy products and eggs. On the other hand, the consumption of fats, oils and staples has decreased.

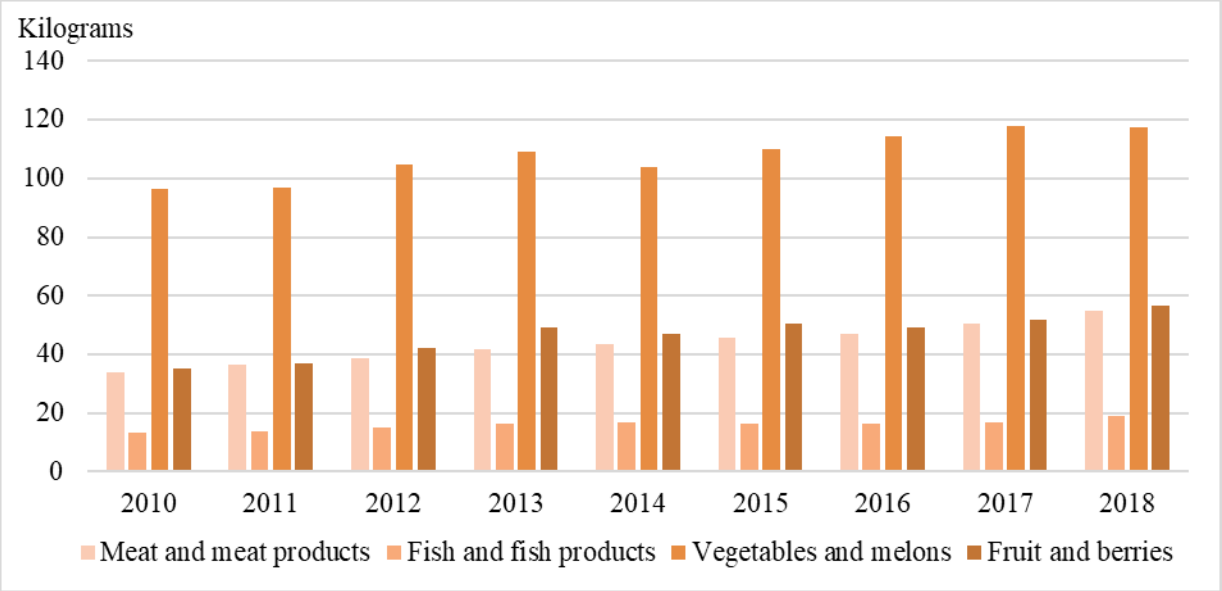

Figure 2. Annual average consumption per capita

Source: NBS of the Republic of Moldova (2020); own processing

The difference between rural and urban areas is mainly in water quality, hygienic, sanitation, and access to health care, which is worse in rural areas. The current food security framework still does not ensure proper control of food products sold within the country. Public control of food safety is better reachable in urban areas. In rural areas, the control is done by households through reliance on their production (The World Bank 2015).

2.6.5. Food stability

Food security definition calls the fourth dimension, stability, by the term "at all times". It specifies the stability of the three previous dimensions, which are availability, access, and utilization. Over time, food security status may change. It can be seasonally or as a result of an unexpected situation, for example, regional conflict, death of a household member, or natural disaster (Jones et al. 2013). Thus, food security needs to ensure now and, in the future (Sassi 2017).

The stability of food availability in rural areas is affected by weather volatility. The volatility affects agricultural sector development and the food security of rural households. Prices of food products are lower and more unstable compare to the world's agrarian price. Due to the low prices of food products and dependency on remittances, the farmers and agricultural workers

represent the most endangered part of the population. Utilization is more unstable in the rural areas compared to the urban areas due to the dependency on their own production, purchase or food exchange, access to potable water, hygienic situation, and food security control (The World Bank 2015).

2.6.6. Food insecurity

The recommended daily intake per person is 2,100 kcal (WHO et al. 2004). In Moldova, the average daily consumption per person is approximately 2,400 Kcal (in 2013) (The World Bank 2015). According to the amount of energy consumption, Moldova is food secure at the national level (Stratan et al. 2011). However, the number of people with insufficient consumption of food energy is disquieting. Around 21 % of households do not meet the recommended level of calories, and 9 % of households reported a severe deficit of consumed calories, larger than 300 kcal (The World Bank 2015). In comparison with neighbouring countries, Ukraine, and Romania, the consumption level of dairy products, meat, and vegetables is lower in the Republic of Moldova (Stratan et al. 2011).

Food security variance among urban and rural populations is generally significant due to the own production of rural households. The contrast between urban and rural household food security has changed over the years in Moldova. The difference in a food energy deficit, which determines the households that consume less than the recommended amount of calories per day per capita in rural and urban populations, was evident in 2007. The rate for rural households was 28.7 and for urban households 46.8 %. Until 2013 the prevalence has changed, and the difference was minimal; for both rural and urban households, the rate was approximately 21 %. The same occurs with rates of high food energy deficiency, that identifies a more severe food deficit of households with at least 300 kcal per day per capita. Between the years 2007 and 2013, the rate decreased from 17.7 % to 8.3 % for rural households, and the urban household from 32.3 % to 8.0 %. The lower improvement of rural households has been caused by the economic situation and adverse climatic events that affected incomes, and it has led to migration to urban areas or abroad. The most vulnerable part of the population is families dependent on jobs related to agriculture. The problems are especially food price volatility, inconsistent incomes, dependency on remittances, and own production of food (The World Bank 2015).

2.7. University students and household food security in Moldova

The share of enrolled students at universities has increased since 2000. The increase caused two factors. The first factor is the enrolment based on the fees that made the opportunity to higher education more accessible to the students. The second factors are migration and remittances. The annual fee for higher education occupies up to 70 % of annual average disposable income. However, only 40 % of the population reach more than the average income. Almost 70 % of students pay the tuition fees, for the remaining of students the education is financed from the state budget. Increased household income by remittances made higher education more affordable for many families (Cainarean et al. 2011). Stratan et al. (2013) confirm that remittances cover education expenses apart from the daily expenditures.

We assume the increase in expenditures due to the attendance of university by students can affect the consumption patterns of the household, especially food expenditures. The consumption patterns of the household might lead to a higher dependency on their own production or remittances. There is no scientific evidence focused on the impact of remittances on the household food security status of university students.

3. Aims of the Thesis

The main objective of the thesis was to determine the effects of remittances on the food security status of households of university students in the Republic of Moldova

3.1. Specific objectives

The main objective of the thesis was accomplished via specific objectives:

(I) The first specific objective was to describe the food security status of households of university students in Moldova

(II) The second specific objective was to analyse the factors influencing the food security status of households of university students

(III) The last specific objective was to analyse the possible effect of remittances on the food security status of households of university students

3.2. Research questions

I. Do the recipients of remittances have a better food security status in Moldova?

II. What factors influence the food security level of households of university students in Moldova?

4. Methodology

4.1. Data source

For the purpose of the thesis, the primary and secondary data was used. The secondary data provided the better understanding of the situation before the collecting of the primary data.

4.1.1. Secondary data

The secondary data was searched via databases like Web of Science, ScienceDirect, FAO, The World Bank, National Bureau of Statistics (NBS) of the Republic of Moldova, and web searcher Google Scholar. The key words like migration, food security, nutrition, youth, Moldova, remittances were used to obtain the information.

4.1.2. Primary data

During the primary data collection, several methods was used: structured questionnaire, interview and observation.

Structure questionnaire

The primary data was collected via a structured questionnaire. The pilot study was done in July 2018 in the region central region of the Republic of Moldova in the district Strășeni and Calarași. The questionnaire was elaborated in English and then translated to Russian. Firstly, two questionnaires were elaborated. Due to the similarity of the questions in both questionnaires some of the questions were omitted by the respondents. The questionnaires were modified, and one questionnaire was elaborated. The questionnaire contained six parts:

I. **Household characteristics:** gender, age, status, level of education, citizenship and region of the household head, and the size of household

II. **Agricultural production:** information about the land ownership, crop and animal production

III. **Source of income:** level of income and its source

IV. **Migration and remittances:** number of migrants and its gender, age, education and country of destination, frequency of receiving remittance, king of remittances (food, money, farm inputs, cloth, others), receiving remittances via bank account

V. **Household food insecurity and water quality:** source of water, using of filters, investment to filter system, quality of the drinking water, Household Food Insecurity Access Scale, food and drink availability during the year

VI. **Food consumption:** frequency consumption and source of consumed food divided into the groups, money spend for food, lack of food and portable water and its cause in the past 12 months.

The total number of the questions was 45.

The questionnaire survey was accomplished on September and October 2018 among the students of The State Agrarian University of Moldova (SAUM). The questionnaires were completed by the household heads. The total number of surveyed respondents was 103.

Interview

The semi-structured interview focused on the food security of the households with students attending university was carried out in district Străşeni and Calarași in Central region. The total number of interviewed persons was 5 (3 students, 2 parents). The interviews were accomplished with the assist of the translator. The questions of the interview with parents were related to the change in food consumption patterns, and household expenditures after their children started to attend the university. Interview with students was focused on their food consumption patterns, preferences of the homemade food or attending the university canteen.

Observation

Observation contributed detailed and realistic awareness of the situation in the Republic of Moldova. The formal observation of the surroundings was undertaken in the districts Străşeni and Calarași.

4.2. Target area

The research area covered North, Central and South region of Moldova. The pilot study took place in Central region, Calarași and Străşeni district (Figure 3).

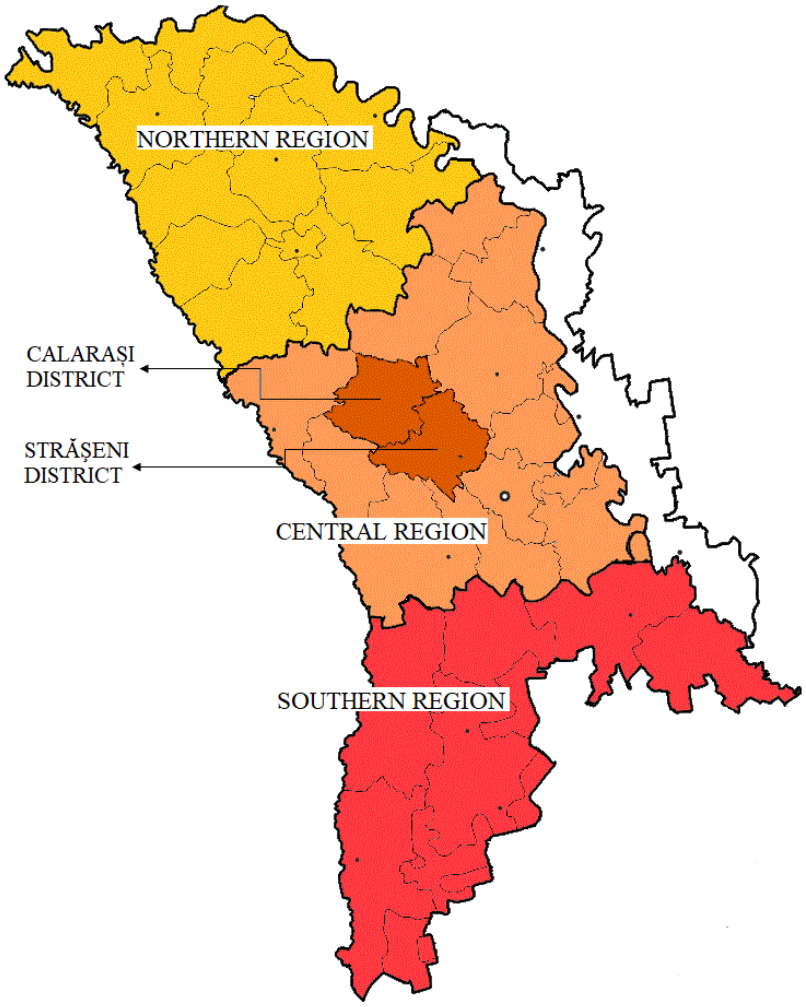

Figure 3. Description of study area

Source: Own processing 2020

North region

The Northern region has 11 districts (Briceni, Ocnita, Donduseni, Edinet, Rișcani, Drochia, Soroca, Glodeni, Falesti, Floresti, Singerei) and one municipality (Balti). The North region is the most developed area regarding the animal and crop production benefiting from the favourable climatic conditions and fertile soils. The region is suitable for pastures and livestock production but also for growing of cash and staple crops such as maize, wheat, sunflower, soybean, barley, sugar beet, potatoes and apples (Möllers et al. 2016; The World Bank, CIAT 2016).

The total population of the Northern region is 979,690 (2018) around 36 % of the population is from the urban areas and 64 % from rural areas (NBS 2020).

In 2004 the number of absent populations was 86,035, out of them 3,322 was absent more than 5 years. Majority of them was absent less than one year 52,706 (NBS 2004). No recent migration data are available in the territorial aspect.

Central region

In the central region is placed the capital Chisinau. It is the most populated region in the Moldova with the total population 1,877,652 (2018). More than 51 % of the population are from the urban areas. Around 45 % of the total population live in the Chisinau municipality. Central region has 13 districts: Soldanești, Rezina, Telenesti, Orhei, Ungheni, Calarași, Nisporeni, Strășeni, Criuleni, Dubasari, Anenii Noi, Ialoveni, Hincești (NBS 2020). Households in the central region profit from the presence of large markets located in the district and in the capital city Chisinau (Möllers et al. 2016; The World Bank, CIAT 2016).

In central region the share of the absent population is highest. The total number of absent populations in 2004 was more than 105,000, out of them more than 27,000 habitants was from Chisinau Municipality. Population absent less than one year was almost 48,000, and more than five years was 5,900 habitants (NBS 2004).

In the capital, Chisinau The State Agrarian University of Moldova is situated. Currently, over 4,000 students from all regions of Moldova attend the university (USAM 2019)

South region

The southern region is the smallest region in Moldova. It has 8 districts: Leova, Cimislia, Causeni, Stefan Voda, Basarabeasca, Taraclia, Cahul, Cantemir; and one municipality Comrat. The south part of Moldova is situated Autonomous Territorial Unit Gagauzia. The Southern region (a mix of hills and plains) is exposed to a dry climate condition affecting crop production and due to higher temperatures and low rainfall, South region is less suitable for agricultural production compared to other regions (Möllers et al. 2016; The World Bank, CIAT 2016).

The total population is 528,352 whereas almost 74 % are from the rural areas. The population of Gagauzia is 161,845 (NBS 2020). In Southern region migration reached more than 53,000 of the population in 2004. Around 11,000 habitants were absent less than one year and almost 3,000 habitants were absent more than 5 years. In Gagauzia the total number of absent populations was 1,.900, out of them 11,100 habitants were absent less than one year and less than 500 habitants was absent longer than five years (NBS 2004).

4.3. Target group

To select a target group, purposive sampling method was used. The target group were students of The State Agrarian University of Moldova living in Republic of Moldova in one of the regions, north, central or south. Four classes were randomly selected. The respondents were selected based on the following criteria:

I. One respondent per household (usually household head)

II. With Moldovan citizenship

III. Speaks Russian

4.4. Data analysis

4.4.1. Dependent variables

Household Food Insecurity Access Scale (HFIAS)

The United States Agency for International Development (USAID) Food and Nutrition Technical Assistance Household Food Insecurity Access Scale (HFIAS) indicator was used to determine household food access. The indicator comprises nine questions and consists of the three domains representing the household food insecurity (access) experience within the past 30 days. The first domain is focused on anxiety and uncertainty about the household food supply. The second domain concentrate on insufficient food quality and the third domain represent insufficient food quantity (Coates et al. 2007), Each answer was coded before setting up the final score. The answers were coded as follows: never = 0, rarely = 1, sometimes = 2, often = 3. The maximum score per household was 27 The household experience with the food insecurity (access) is higher, with the increasing score of HFIAS and vice versa, lesser food insecurity (access) was with the lower score (Coates et al. 2007). The HFIAS indicator included following set of questions (Table 2):

Table 2. Questions of HFIAS indicator

Question no.	Questions	Abbreviation
Domain I: Anxiety and uncertainty about the household food supply		
Q1	In the past four weeks, did you worry that your household would not have enough food?	Worried
Domain II: Insufficient quality (including variety and preference of the type of food)		
Q2	In the past four weeks, were you or any household member not able to eat the kinds of food you preferred because of lack of resources?	Preferred food
Q3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	Limited variety
Q4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because a lack of resources to obtain other types of food?	Not want
Domain III: Insufficient food intake and its physical consequences		
Q5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	Smaller meals
Q6	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	Fewer meals
Q7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	No food
Q8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	Sleep hungry
Q9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	Whole day

Source: Coates et al. (2007)

The household food insecurity (access) prevalence (HFIAP) is a categorical indicator of household food insecurity. The HFIAP indicator divide households into four grades of household food insecurity (access): (i) food secure, (ii) mildly food insecure, (iii) moderately food insecure, and (iv) severely food insecure (Coates et al. 2003).

For each household, the HFIAP category was calculated by assigning the code based on the category (never, rarely, sometimes, often) in which it belongs (see Table 3).

Table 3. HFIAP categories

	Frequency			
	Never (0)	**Rarely (1)**	**Sometimes (2)**	**Often (3)**
Q1				
Q2				
Q3				
Q4				
Q5				
Q6				
Q7				
Q8				
Q9				

Food Secure	Mildly food insecure	Moderately food insecure	Severely food insecure

Food Secure: household members classified as food secure did not experience any conditions of inadequate food access or reported worrying or being anxious about the household's food supply (first domain), but only rarely.

Mildly food insecure: household members do not suffer from the conditions of the third domain. It means mildly food insecure households do not reduce food intake nor experience running out of food, going to bed hungry, or not eating for a whole day and night. However, they do worry about not having enough food (first domain) sometimes or often, and/or are affected by conditions of the second domain: eats less preferred foods (rarely, sometimes, or often), and/or rarely limits their food variety and eats food that they do not like eating.

Moderately food insecure: household members partly have experience with the second and third domain. Households do not run out of food, go to bed hungry, or not eat for 24 hours, but they do have the experience to reduce quality and diversity of diet often and/or cuts back on the size and frequency of meals sometimes or rarely.

Severely food insecure: households have experience with the third domain. Household members often have to cut down meal size and frequency, run out of food entirely, gone to bed hungry, or not eaten for a whole day and night.

HFIAS has shown acceptable validity and applicability in different cultural backgrounds.

Numerous validations around the world have offered encouraging results as to the reliability of the HFIAS. For example, validations conducted in Latin America and sub-Saharan

Africa (Melgar-Quinonez et al. 2006, Knueppel et al. 2010) have found that the instrument demonstrated reliability and validity in the local contexts in which it was deployed. Similar studies have rarely been conducted in Europe as well as the issue of food security in developed countries, at a household level, is rather neglected in the scientific literature (except Poczta-Wajda (2019) focusing on food security of small-scale farmers in Poland).

The Months of Adequate Household Food Provisioning

The household respondents were asked there have been months in the past 12 months when their family did not have enough food (products) to meet their family's needs.

4.4.2. χ2 test, Fisher exact and Mann-Whietney U test

The χ^2 test (Pearson 1900) and Fisher exact (Fisher 1922) test were used for categorical or binary dependent variables. The independence χ^2 test was applied to determine whether variables are independent of each other or whether there is a pattern of dependence between them. When the expected frequency was lower than five Fisher exact test was used.

To determine if there is a difference between two independent groups when the dependent variable is ordinal and the independent variable is categorical, the Mann- Whitney test was used. However, there are several assumptions which should be fulfilled (Laerd Statistics 2018).

Assumption 1: The dependent variable should be measured at the ordinal or continuous level. Examples of ordinal variables include Likert items or ranking. As the dependent variable (questions of HFIAS) was measured at ordinal level (0=never, 1=rarely, 2=sometimes, 4=always), and therefore the assumption was fulfilled.

Assumption 2: Independent variable should consist of two categorical (for example, male/female, yes/no, employed/unemployed), independent groups. Our independent variables (receiving often remittance (yes/no) and receiving often food (yes/no) fulfilled the assumption.

Assumption 3: Independence of observations, which means that there is no relationship between the observations in each group or between the groups themselves. There must be different participants in each group, with no participant being in more than one group, which is fulfilled.

Assumption 4: A Mann-Whitney U test can be used when variables are not normally distributed. The assumption of normality was tested by Shapiro-Wilk (Shapiro & Wilk 1965). The test results revealed that the data was not normally distributed.

4.4.3. Ordered probit model

The ordered binary probit was run to determine characteristics influencing the food security level by using the HFIAP indicator. The detailed description of the independent variables is included in chapter 4.4.8. In the results part, marginal effects are presented.

The ordered probit model was applied in the following form:

$$Y_{ik} = \beta_1 X_i + \varepsilon_i \qquad (1)$$

where X_i represents a set of all explanatory variables presented in Table 4, β_1 is a vector of estimated parameters, and ε_i is an error term. Y_{ik} is an ordered dependent variable where y=0 when the households were food secure, y=1 when households were mildly food insecure, y=2 when the households were moderately food insecure, and y=3 when households were severally food insecure.

4.4.4. Binary probit model

Simple binary probit was run to determine characteristics influencing if the households did not have enough food (products) to meet their family's needs in the past 12 months.

The binary probit model in the following form was used:

$$Y_{ik} = \beta_1 X_i + \varepsilon_i \qquad (2)$$

where Xi represents a set of all explanatory variables presented in Table 4, β_1 is a vector of estimated parameters, and ε_i is an error term. Y_{ik} is a dependent variable denoting if the households did not have enough food (products) to meet their family's needs in the past 12 months (if yes =1).

4.4.5. Multicollinearity

Due to a large number of independent explanatory variables included in the empirical model, multicollinearity is a potential issue. The presence of multicollinearity in the regression model was tested using a variance inflation factor (VIF). The collinearity can influence the standard errors but does not bias parameter estimates. Besides, the model becomes sensitive to changes in the model structure or the sample size (Greene 2003).

Several recommendations regarding the value of VIF and level of tolerance have been proposed. The value of 10 as the maximum level of VIF and a value of 0.10 has been most recommended as the minimum level of tolerance (Kleinbaum et al. 2013). When the presence

of multicollinearity among variables cannot be rejected, exclusion of independent variable from the model, ridge regression or weighted least squares can be applied (Stata undated).

VIF was estimated using the formula stated below:

$$VIF_k = \frac{1}{1 - R_k^2}$$

where R_k^2 is the R^2-value obtained by regressing the k^{th} predictor on the other specified explanatory variables. The Variance inflation factor is calculated for *each of the k predictors* included in a multiple regression model.

4.4.6. Heteroscedasticity

For the ordered probit model, the test of heteroscedasticity was adopted. The purpose of using the test of heteroscedasticity is the problem with the biased and inconsistent parameters or incorrect standard errors that the heteroscedasticity can cause.

4.4.7. Endogeneity

Empirical model specifications may suffer from an endogeneity due to the presence of omitted variables, sample selection bias, measurement error and reverse causation (Carter Hill et al. 2008; Greene 2003; Wooldridge 2002). Households receiving remittances may be basically different from households that do not receive them which refer to a *selection bias*. For example, households with remittances may likely be a previously poor household where a member migrated abroad to solve this situation. *Reverse causality* occurs when the food insecurity of households influences the migrant to remit to improve the status of households. Moreover, households receiving remittances may be characterized by unobservable characteristics that could influence both remittance receipt and the food security level which refers to *omitted variables*. The result would either be overestimated or underestimated. If remittances are sent to wealthy households, which are not facing to a challenge of food security, then the result might be overestimated, but if remittance is sent to compensate high level of food insecurity the result may be underestimated. An instrumental variable (IV) method is usually applied to adequately address endogeneity. However, in the setting of our thesis this strategy is quite problematic. The information about host country of the migrant is available only for those households having a household member working abroad. Using such a restricted sample does not allow estimating the relationship between remittances and food security for all individuals. Furthermore, using such a reduced sample (as only 48 % respondents received

remittances), does not provide the analysis of an adequate sample size needed to consistently analyse the model (Matano & Ramos 2018). The effect of endogeneity will be further described in the discussion part.

4.4.8. Independent variables

Dependent and independent variables (Table 4) are selected based on the previous studies conducted in Malawi (Kangmennaang et al. 2017), Ghana (Atuoye et al. 2017), Nepal (Pandey 2019; Pandey & Bardsley 2019), Ethiopia (Regassa & Stoecker 2012; Kisi et al. 2018; Cholo et al. 2019), Kenya (Kimani-Murage et al. 2014), Namibia (Pendleton et al. 2014), South Africa (Cock et al. 2013) and Sub-Saharan Africa (Sulemana et al. 2019).

Treatment variables

A number of studies affirm the effect of *remittances* on the food security of households by diversification of the income source (Kangmennaang et al. 2017; Atuoye et al. 2017; Pandey 2019; Cholo et al. 2019; Sulemana, et al, 2019). However, the extent of the impact depends on other factors. Atuoye et al. (2017) pointed out remittance might mitigate severe symptoms of food insecurity in the case of a high level of poverty; however, it cannot reach food security completely. In the short term, the contribution of remittances may ensure food security. However, due to the missing household member in the long term, the self-production of food might be neglected and thus affect food security negatively (Pandey 2019). Additionally, the frequency of receiving remittances is important for food security. Households receive remittance often are likely to be more food secure (Sulemana et al. 2019).

Table 4. Variables included in the model

	Description of variable	Mean/frequency
Dependent variables		
HFIAP	HFIAP score (food secure=0, mildly food insecure=1, moderately food insecure=2, severely food insecure=3)	Food secure = 53 % Mildly FI = 15 % Moderately FI = 16 % Severely FI = 17 %
Months	Household members experienced lack of food in 2017 (yes=1, no=0)	0.21
Treatment variables		
Remittances	Frequency of received remittances in 2017 (never=0, rarely=1, sometimes=2, often=3, very often=4)	Never = 48 % Rarely = 4 % Sometimes = 20 % Often =20 % Very often =8 %
Food remittances	Frequency of received food remittances in 2017 (never=0, rarely=1, sometimes=2, often=3, very often=4)	Never = 65 % Rarely = 11 % Sometimes = 11 % Often =11 % Very often =2 %
Control variables		
Gender of HH head	Gender of household head (female/both=1, male=0)	0.42
Household size	Number of household members (continues)	3.75
Crop production	Respondents are growing staple or cash crops (yes=1, no=0)	0.78
Animal production	Respondents are breeding animals on their farm (yes=1, no=0)	0.61
North region	Household is situated in North region (yes=1, no=0)	0.22
South region	Household is situated in South region (yes=1, no=0)	0.16
Central region *(reference)*	Household is situated in Central region (yes=1, no=0)	0.59
Income 1	Monthly average household income less than 3,000 LEI* (yes=1, no=0)	0.31
Income 2	Monthly average household income between 3,000-6,000 LEI* (yes=1, no=0)	0.49
Income 3 *(reference)*	Monthly average household income more than 6,000 LEI* (yes=1, no=0)	0.20

*Currency exchange rate in 2018, 1 USD = 17 LEI

Control variables

Gender as a control variable was used in several studies by Cock et al. (2013), Atuoye et al. (2017), and Kisi et al. (2018.), Cholo et al. (2019) Household food security might be affected by gender, as it reflexes the socio-economic status. Female as a household head increase the probability of household head food insecurity (Cock et al. 2013).

Linkages between *household size* and food security was confirmed by Atuoye et al. (2017), Kimani-Murage et al. (2014), Cock et al. (2013). Large family size means more people

to feed. Furthermore, the number of household members reduces income per head; thus, the expenditure and consumption per head are lower (Aidoo et al. 2013).

The *region* of the household and its diverse environmental conditions affecting agriculture or socioeconomic conditions like a level of poverty, migration rate, and remittance receipt might influence the level of food security (Atuoye et al. 2017) In our study, we divided Moldova into three regions Northern, Central and Southern region, where each part has specific economic, agricultural, and climatic condition and different migration patterns.

According to Kimani-Murage et al. (2014), the *level of income* influences the level of food security of the household. With a higher level of household income, the probability of being food secured increases. In our study we divided the income level based on the minimum income per month 2,610 Lei (less than 3,000 Lei) (Vlas 2018), and average household income per month (6,000 Lei) (NBS 2020).

4.4.9. Data processing

At first, the data set was translated, coded, and categorized for further analysis. Secondly, the data set was upload into the statistical program Stata 16 and afterward have been cleaned. One questionnaire was omitted due to the missing value. The final number of the analysed data set was 102. Both descriptive and inferential statistics were used.

5. Results

5.1. Descriptive statistic

Farm production

On average, households own farmland located on area of three hectares, typically distributed in three plots which consistent. More than 78 % of respondents was planting staple or cash crop on their farm. The majority of arable land was devoted to the wheat and maize cultivation, followed by table grapes, alfa alfa, vegetable (such as potatoes, tomatoes, onions, cabbage, cucumbers, peppers or carrots), sunflower, legumes, fruit and nuts (berries, apples, plums, sweet and sour cherries, pears, peaches, apricots and walnuts). More than 61 % of respondents were involved in poultry, pigs, sheep, goat, livestock, or horse breeding.

Economic situation

Figure 4 shows the distribution of the total monthly income of the households. Households with income less than 3,000 Lei (which correspondent to 177 USD) per month account in total 31 %, and households with income between 3,000 Lei and 6,000 Lei (which correspondent to 353 USD) are 43 %. Households that reach the level of income more than 6,000 Lei accounts for 26 %.

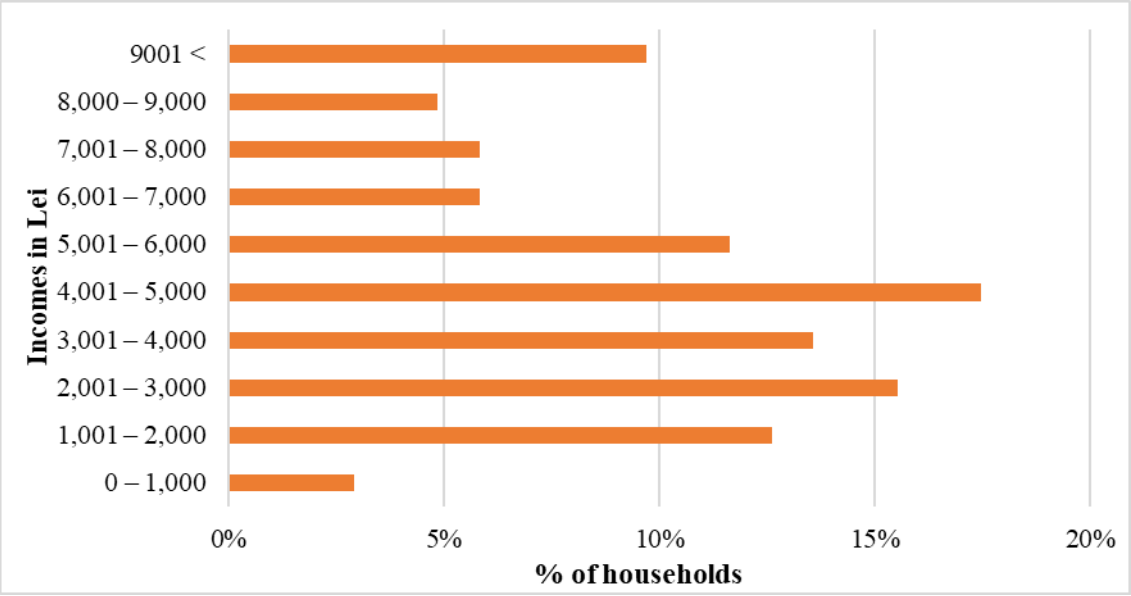

Figure 4. Average household monthly income- distribution

Migration patterns

Based on our survey, the migrant's country of destination is mostly Russia, Italy, Romania, and Ukraine.

The majority of the households have no experience with receiving food remittances (65 %). The share of households with no experience of receiving money remittances is lower (48 %) (Figure 5). The frequency of receiving money remittances is higher than food remittances. Households receiving money remittances often and very often account for 28 %. The percentage of households receiving food remittances often and very often is lower, in total account 13 %.

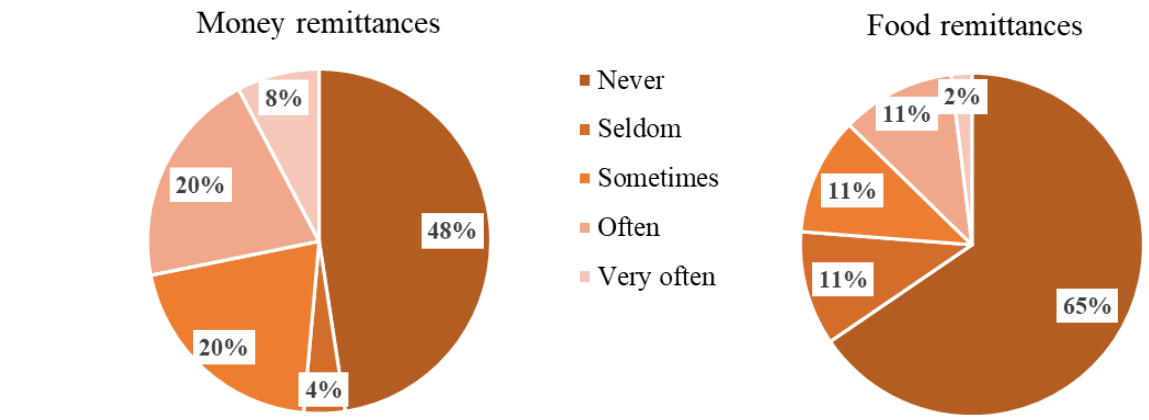

Figure 5. Frequency of receiving remittances

Consumption behaviour and food security

The majority of the surveyed households eat three times (47 %) or four times (37 %) per day (see Figure 6). The number of households eating two times (8 %) or five times (6 %) per day is approximately the same. Only 1 % of respondents eat once per day. Households eating six times per day show the same result.

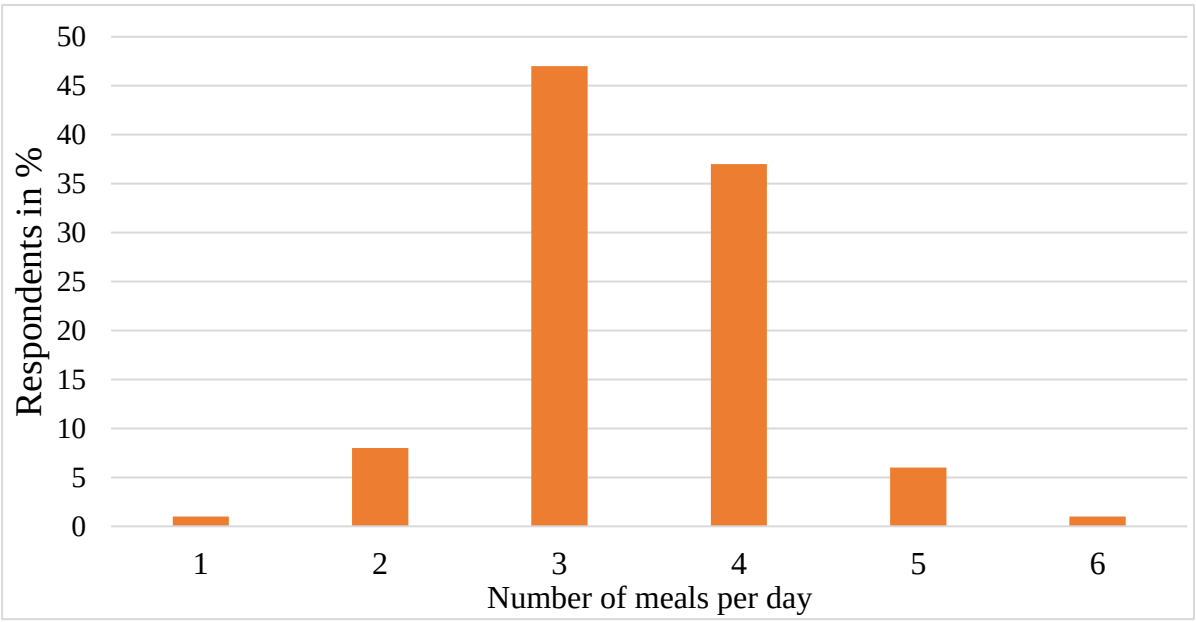

Figure 6. Number of meals consumed per day

Most of the respondents stated all members of the household satisfy their hunger when they eat (86 %), 14 % of households have problems to satisfy the hunger of all family members. The overwhelming majority of the respondents do not feel a lack of energy regarding insufficient food intake (82 %), Almost 15 % of the household rarely feel a lack of energy due to insufficient food intake, 2 % of respondents sometimes and 2 % of respondents often. 21 %

of households of university students have experienced lack of food during the past 12 months. Months, when households most suffer from lack of food, are November, December, and January

The results show the most daily consumed foodstuffs are carbo (58 %), vegetable (49 %), fruit (48 %), sugar (48 %), and spicy (55 %) (see Figure 7). Dairy products and meat daily consume around 32 % of the respondents. Legumes consume daily 20 % of the respondents, 21 % three times per week, 20 % once a week, and 13 % of respondents stated they do not eat legumes at all. Oils consume 35 % daily of the respondents, 17 % two times per week and 13 % three times per week.

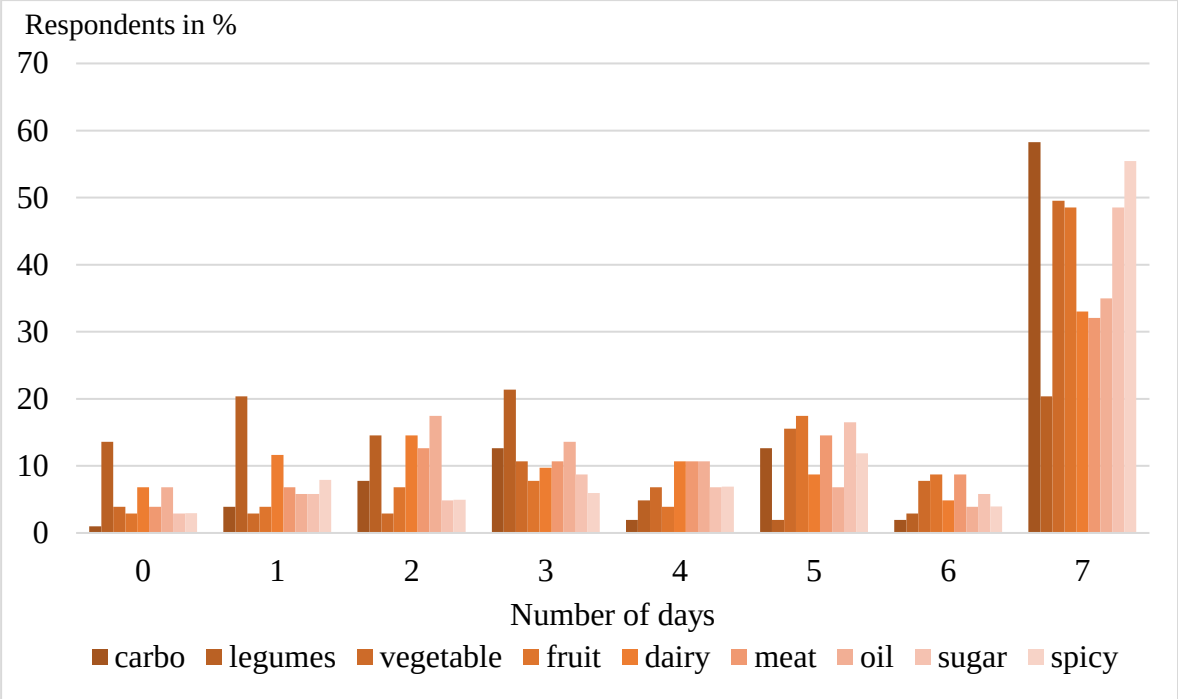

Figure 7. Type of consumed food and its frequency

The minimum score of HFIAS was 0 points and the maximum 18 points. Based on the HFIAP categories the majority of the surveyed household were food secure, 55 out of 103 households (see Table 5). In total, 48 respondents suffer from a certain level of food insecurity. Households classified as mildly food insecure is 15. Moderately food insecure are 16 households, and severely food insecure are 17 households.

Table 5. Results of HFIAP categories

	Frequency and number of respondents			
	Never (0)	**Rarely (1)**	**Sometimes (2)**	**Often (3)**
Worried about enough food	80	14	8	1
Preferred food	73	17	11	2
Limited variety	75	22	5	1
Not want	76	18	8	1
Smaller meals	84	14	3	2
Fewer meals	84	17	2	0
No food	94	6	2	1
Sleep hungry	89	10	2	2
Whole day	97	4	0	2

Food Secure (55)	Mildly food insecure (15)	Moderately food insecure (16)	Severely food insecure (17)

Figure 8 shows that 53 % of households are food secure. Half of them (26 %) have a household member who migrates. 16 % of respondents receive remittances often, and 2 % of households receive food often. Mildly food insecure is 15 % of the households, and 9 % of them have a migrant member. More households receive remittance often (7 %) than food often (2 %). Moderately food insecure households count 16 %, and 9 % of them have a member who migrates. Households receive equally both, remittance often and food often, 4 %. The severely food insecure household account for 17 %, and more than half of them have a household member who migrates (9 %). Migrants tend to send more often food (5 %) than remittance (2 %).

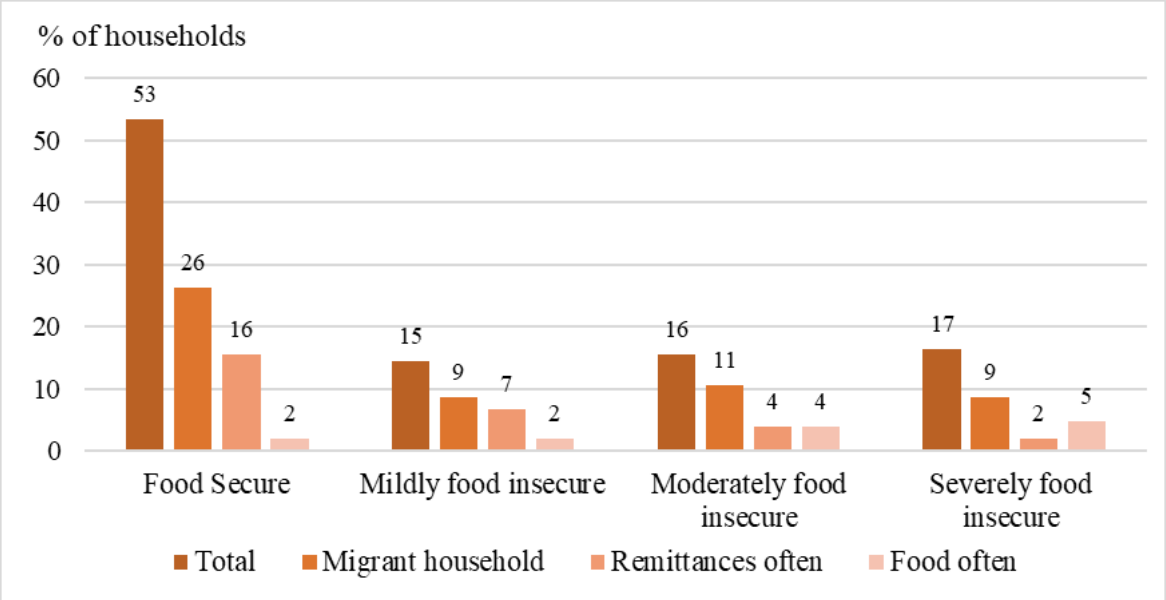

Figure 8. Result of HFIAP, migration and remittances

5.2. Results of Mann-Whitney U test, Fisher exact test and chi2 test

The Table 6. presents the results of the Mann-Whitney U test. Based on the results, there is no difference between households receiving remittances often or very often and those households that do not receive remittances or receive them rarely. The frequency of receiving remittance does not have a statistically significant effect on the food security status of households. However, there is difference between households often receiving food remittances and households receiving them rarely.

Table 6. Results of Mann-Whitney U test

	HH receives remittances often			**Food often**		
	no	yes	Coef. (p-value)	no	yes	Coef. (p-value)
HFIAP						
Food secure	39 (53 %)	16 (55 %)	0.922 (0.357)	53 (59 %)	2 (15 %)	**-3.203 (0.001)**
Mildly food insecure	8 (11 %)	7 (24 %)		13 (14 %)	2 (15 %)	
Moderately food insecure	12 (16 %)	4 (14 %)		12 (13 %)	4 (31 %)	
Severely food insecure	15 (20 %)	2 (7 %)		12 (13 %)	5 (39 %)	

The results of the Fisher exact test are shown in Table 6. The results revealed the difference between households receiving remittances often and those households receiving remittances less frequently or not at all. The frequency of receiving remittance have a statistically significant effect on household's experience with lack of food in some of the months during the past 12 months. Between households receiving food remittances often or not at all, there is no difference.

Table 7. Results of Fisher exact test

	HH receives remittances often			Food often		
	no	yes	Coef. (p-value)	no	yes	Coef. (p-value)
Months food	0.26	0.09	**4.646 (0.033)**	0.19	0.31	0.945 (0.461)

The results of the test of heteroscedasticity detected there is not significant heteroscedasticity (chi2 =7.86; p-value= 0.796) among the explanatory variables. The results are presented in the Appendix 2.

5.3. Ordered probit model - HFIAP

Results presented in Table 7 shows remittance has an insignificant positive effect on the food security status of the household of university students in Moldova. Factors that had a negative statistically significant effect on the food security status was the level of income and food remittances. In Table 8 is presented marginal effect for each group of household food insecurity.

For *food secure* households, variables having significant effects, level of income and food remittances. Households living in the Northern region were less likely to be food insecure compared to households living in the Central region. Households with income less than 3,000 and between 3,000 - 6,000 Lei per month were more like to be food insecure compared to the household with income higher more than 6,000 lei per month. Households receiving food remittances were less likely to be food secure compare to households who do not receive food remittances.

For *mildly food insecure* household, the factor having significant effect was the level of the income. Households having income higher more than 6,000 Lei were more likely to be food secure compared to households with a lower level of incomes. Food remittances have an insignificant positive effect on the food security of mildly food insecure households.

Variables with a significant effect on the food security of *moderately food insecure* and *severely food insecure* households were the level of income and food remittances. Households with income less than 3,000 and between 3,000 - 6,000 Lei per month were more likely to be food insecure compared to the household with income higher more than 6,000 Lei per month. Household receiving food remittances were less likely to be food secure compare to households who do not receive food remittances.

Variables showing an insignificant positive effect on the food security of households were a region, own source of food, and own animals. The insignificant negative effect on a household's food security was the gender of household head and the number of household members. Households from Southern a Northern region were less likely to be food insecure compare to the Central region. Households with own source of food and animals were less likely to be food insecure compare to the households who do not dispone by their own sources of food and animals. I the case the household head is female or both (male and female), the household is likely to be more food insecure. With an increasing number of household members, the household is expected to be more food insecure.

Table 7. Results of ordered probit model HFIAP

Variables	Coef	SE	p-value
Gender of HH head	0.187	0.258	0.469
North region	-0.519	0.326	0.112
South region	-0.271	0.342	0.429
No. HH members	0.010	0.091	0.915
Own source of food	-0.087	0.280	0.756
Own animals	-0.211	0.171	0.217
Income less than 3,000 LEI	**0.692**	**0.359**	**0.054**
Income between 3,000-6,000 LEI	**0.913**	**0.309**	**0.003**
Food remittances	**0.297**	**0.118**	**0.012**
Cash remittances	-0.079	0.100	0.428
Wald chi^2	25.79		
Prob > chi^2	0.004		
Pseudo R^2	0.075		

Table 8. Results of ordered probit model HFIAP – Marginal effects

	Marginal effects											
	Food Secure			Mildly food insecure			Moderately food insecure			Severely food insecure		
Variables	coef	SE	p-value	coef	SE	p-value	coef	SE	p-value	coef	SE	p-value
Gender of HH head	-0.066	0.009	0.463	0.007	0.011	0.483	0.020	0.028	0.469	0.038	0.053	0.467
North region	**0.183**	**0.111**	**0.100**	-0.021	0.015	0.174	-0.057	0.036	0.113	-0.106	0.069	0.120
South region	0.096	0.120	0.424	-0.011	0.014	0.439	-0.030	0.036	0.417	-0.056	0.072	0.438
No. HH members	-0.003	0.032	0.915	0.001	0.004	0.916	0.001	0.010	0.916	0.002	0.019	0.915
Own source of food	0.031	0.099	0.755	-0.003	0.011	0.760	-0.010	0.030	0.753	-0.018	0.056	0.756
Own animals	0.075	0.061	0.218	-0.008	0.007	0.233	-0.023	0.020	0.250	-0.043	0.036	0.230
Income less than 3,000 LEI	**-0.245**	**0.124**	**0.049**	**0.027**	**0.016**	**0.079**	**0.075**	**0.042**	**0.071**	**0.142**	**0.080**	**0.075**
Income between 3,000-6,000 LEI	**-0.323**	**0.101**	**0.001**	**0.036**	**0.018**	**0.043**	**0.100**	**0.036**	**0.006**	**0.187**	**0.072**	**0.009**
Food remittances	**-0.105**	**0.040**	**0.008**	0.012	0.008	0.115	**0.032**	**0.014**	**0.023**	**0.061**	**0.025**	**0.013**
Cash remittances	0.028	0.035	0.426	-0.003	0.004	0.441	-0.009	0.011	0.424	-0.016	0.021	0.438

5.4. Binary probit model

According to the results from Table 9, remittances have a positive statistically significant effect on enough food (products) in the past 12 months to meet the needs of households of university students in Moldova. Factors that had a negative statistically significant effect on enough food (products) in the past 12 months to meet the needs of households of university students in Moldova was the level of income and food remittances. Households with income less than 3,000 and between 3,000 - 6,000 Lei per month are more likely to have experience with lack of food in some of the months during the past 12 months, compared to the household with income higher more than 6,000 lei per month. Household receiving food remittances are more likely to have experience with a lack of food in some of the months during the past 12 months compare to households who do not receive food remittances.

Factors as the gender of household head and North region had an insignificant negative effect, and South region, size of household members, own source of food, and own animals had an insignificant positive effect on enough food (products) in the past 12 months to meet the needs of households of university students in Moldova. If the gender of the household head is a man, the household was less likely to have experience with lack of food in some of the months during the past 12 months compared to households where the household head was woman or both (man and woman). Households living in the Northern region were more likely to have experience with lack of food in some of the months during the past 12 months compared to households living in the Central region. However, households living in the Southern region were less likely to have experience with lack of food in some of the months during the past 12 months compared to households living in the Central region. Household having own source of food or own animals were less likely to have experience with lack of food in some of the months during the past 12 months compared to households which do not have own source of food or own animals.

Table 9. Results of binary probit model - experience with lack of food in some of the months during the past 12 months

Variables	Coefficient	Standard error	p-value	Marginal effect
Gender of HH head	0.521	0.312	0.103	0.120
North region	0.268	0.369	0.469	0.062
South region	-0.652	0.459	0.156	-0.151
No. HH members	-0.097	0.105	0.356	-0.022
Own source of food	-0.010	0.396	0.979	-0.002
Own animals	-0.237	0.334	0.477	-0.055
Income less than 3,000 LEI	0.903	0.520	0.082	0.209
Income between 3,000-6,000 LEI	0.868	0.503	0.085	0.201
Food remittances	0.382	0.169	0.024	0.088
Cash remittances	-0.343	0.146	0.019	-0.079
Constant	-1.198	0.660	0.069	
Wald chi^2	19.79			
Prob > chi^2	0.031			
Pseudo R^2	0.171			

6. Discussion

Based on the results of ordered probit model, remittances have an insignificant positive effect on the food security of the households of university students in Moldova. The different results of the impact of remittance on food security were found out by several studies. A significant positive effect of remittances on food security was found in the Global South countries (Ebadi et al. 2018), Malawi (Kangmennaang et al. 2017), Pakistan (Abdulah et al. 2019), and Nepal (Pandey & Bardsley 2019), where the findings bring attention to the dependency on the remittances and its short-time positive impact on food security (Pandey 2019). A significant negative impact of remittances on food security was found in rural Ethiopia due to the non-investments of remittances caused by the lack of awareness of productive using financial resources (Abafita & Kim 2014). An insignificant effect of remittance on food security status was found in Ghana by Aidoo et al. (2013). According to Sulemana et al. (2018), the effect of remittances on food security of households receiving remittances less frequently and not at all is not significant, compared to the households receiving remittances frequently. However, our results of Mann-Whitney U test show there is not a significant difference in the food security level between household receiving remittance often and who do not receive remittance often. The explanation of the insignificant effect might be the remittances are not necessarily spent on the food products. This idea is supported by Waidler et al. (2017) where authors mentioned the households in Moldova receiving remittances increase the share of expenditure on the utility bills and thus decrease the share spends on the foodstuff.

Variables that had a significant effect on the food security of households of university students in Moldova was the level of income and food remittances. The lower level income of households had a significant negative effect on the food security level. The results of the study from Kenya prove the statistical significance of the income level on food security where the odds of assuring food security of the household increase with a higher level of income (Kimani-Murage et al. 2014). This statement is supported by the study by Lestari (2018) where mention the calorie intake per capita is strongly and significantly affected by the level of income. Households with higher-level of income can afford to buy more food products for the family or choose calories rich foodstuff.

Food remittances have a significant negative effect on the food security of the households of university students in Moldova. Recipients of food remittances are more likely to be food insecure. The study in Ghana, conducted by Kuuire et al. (2013), investigates the relationship between household food security and food remittance, was based on the deep-in interview. This study underlines the growing importance of food remittances as a strategy to improve the security of livelihood. A survey from Zimbabwe focused on the food remittances from rural to urban areas conclude that food remittances as a non-monetary informal food source are important strategy ensuring food security (Tawodzera et al. 2016). However, there is a lack of scientific studies focused on the statistical relationship between food remittances and food security. Several scenarios might explain our result. Households receiving food remittances from abroad experience with new kinds of food products with different quality or tastes, which they would prefer to eat more frequently. As a result, the households indicated themselves as less likely to be food secure. Another explanation might be the endogeneity between the level of food security and food remittances. The household receiving food remittances might already be food insecure, so the purpose of the food send by migrants is to improve the food security status of the household. Thus, the receiving of food remittances does not decrease the probability of being food secure. In this case, the food remittances would serve as food aid from migrants.

Based on the results of experience with lack of food in some of the months during the past 12 months, remittances have a positive statistically significant effect on enough food (products) in the past 12 months to meet the needs of households of university students in Moldova. Cash remittances might help to overcome months when the family suffers from a lack of food (November, December, and January) by purchasing necessary foodstuffs. According to a study from Nigeria done by Obi et al. (2019), households receiving remittances were less likely to be worried about a lack of food during the food crisis. In this case, remittances serve as measures against the lack of food.

Factors with a negative statistically significant effect on enough food (products) in the past 12 months to meet the needs of households of university students in Moldova was the level of income and food remittances. Households with lower income were more likely to have experience with lack of food in some of the months during the past 12 months. Our result corresponds with findings of the study focused on food insufficiency

in the United States done by Helfin et al. (2007). A higher level of monthly income had a significant negative effect on food insufficiency. With increasing income households were less likely to be affected by lack of food.

Household receiving food remittances were more likely to have experience with a lack of food in some of the months during the past 12 months. As it was mentioned above, there is a lack of studies focused on food remittances. The endogeneity between the experience of lack of food within the past 12 months and receiving food remittances might be present as well. The household receiving food remittances might already be food insecure, so the migrants supply the household by the food to prevent a lack of food products during the year. Thus, receiving food remittances do not increase the lack of food within the past 12 months to meet the needs of households of university students in Moldova. The negative effect might be explained the food remittances are not sent during the crucial months when the household suffers from a lack of food products. Another explanation might be that the amount of food sends by migrants do not cover the required consumption of the household.

7. Conclusions

Almost half of the households of university students in Moldova is affected by a certain level of food insecurity (mildly food insecure, moderately food insecure, or severely food insecure). Additionally, more than one-fifth of the respondents have experience with food insufficiency in some of the month within the past 12 months.

The findings suggest the factors influencing the level of food security of households of university students were the level of income and food remittances. In the case of experience with a lack of food in some of the months within the past 12 months, the factors influencing the situation have estimated the level of income, food remittance and cash remittances.

Results of our study reveal remittances do not necessarily provide a source to overcome the situation affected by food insecurity or food insufficiency. Remittances sent by the family member living abroad have various impacts. Regarding food security status, cash remittances do not have a significant effect on the enhancement of the situation. On the contrary, cash remittances have a significant impact on the alleviation of food insufficiency. Surprisingly, the food remittances have a negative effect on both, the food security status and experience with lack of food within the past 12 months of the households of the university students. However, the endogeneity might be a potential issue and cause the misinterpretation of the effect of food remittances. In general, the effect of the food remittances on food security and experience with food insufficiency in some of the month within the past 12 months has not been profoundly studied. Based on the lack of studies focused on this topic, future research is recommended.

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9. Appendices

List of the Appendices:

Appendig 1. Results of Mann-Whitney U test

	HH receives remittances often			HH receives food remittances often		
	no	yes	Coef (p-value)	no	yes	Coef (p-value)
Enough food						
Never	55 (74 %)	25 (86 %)	1.468 (0.142)	70 (78 %)	10 (76 %)	-0.246 (0.806)
Rarely	10 (14 %)	4 (14 %)		13 (14 %)	1 (8 %)	
Sometimes	8 (11 %)	-		7 (8 %)	1 (8 %)	
Always	1 (1 %)	-		-	1 (8 %)	
Kinds						
Never	53 (71 %)	20 (69 %)	0.275 (0.783)	65 (72 %)	8(62 %)	-0.895 (0.371)
Rarely	8 (11 %)	9 (31 %)		15 (17 %)	2(15 %)	
Sometimes	11 (15 %)	-		8 (9 %)	3(23 %)	
Always	12 (3 %)	-		2 (2 %)	-	
Variety						
Never	55 (74 %)	20 (69 %)	-0.288 (0.774)	69 (77 %)	6 (46 %)	**-2.185 (0.029)**
Rarely	13 (18 %)	9 (31 %)		16 (18 %)	6 (46 %)	
Sometimes	5 (7 %)	-		4 (4 %)	1 (8 %)	
Always	1 (1 %)	-		1 (1 %)	-	
Not wanted						
Never	53 (72 %)	23 (79 %)	1.043 (0.297)	70 (78 %)	6 (46 %)	**-2.651 (0.008)**
Rarely	12 (16 %)	6 (21 %)		15 (17 %)	3 (23 %)	
Sometimes	8 (11 %)	-		4 (4 %)	4 (31 %)	
Always	1 (1 %)	-		1 (1 %)	-	
Small meal						
Never	60 (81 %)	24 (83 %)	0.332 (0.740)	74 (82 %)	10 (77 %)	-0.471 (0.638)
Rarely	9 (12 %)	5 (17 %)		12 (13 %)	2 (15 %)	
Sometimes	3 (4 %)	-		2 (2 %)	1 (8 %)	
Always	2 (2 %)	-		2 (2 %)	-	
Fewer meal						
Never	58 (78 %)	26 (90 %)	1.351 (0.177)	73 (81 %)	11 (85 %)	0.332 (0.740)
Rarely	14 (19 %)	3 (10 %)		15 (17 %)	2 (15 %)	
Sometimes	2 (3 %)	-		2 (2 %)		
Always	-	-				
No food						
Never	66 (89 %)	28 (97 %)	1.206 (0.228)	83 (92 %)	11 (85 %)	-1.004(0.315)
Rarely	5 (7 %)	1 (3 %)		6 (7 %)	-	
Sometimes	2 (3 %)	-		-	2 (15 %)	
Always	1 (1 %)	-		1 (1 %)	-	
Night hungry						
Never	62 (84 %)	27 (94 %)	1.208 (0.227)	80 (89 %)	9 (69 %)	**-2.020 (0.043)**
Rarely	9 (12 %)	1 (3 %)		8 (9 %)	2 (15 %)	
Sometimes	1 (1 %)	1 (3 %)		1 (1 %)	1 (8 %)	
Always	2 (3 %)	-		1 (1 %)	1 (8 %)	
Day hungry						
Never	69 (93 %)	28 (97 %)	0.659 (0.510)	85 (94 %)	12 (92 %)	-0.355 (0.723)
Rarely	3 (4 %)	1 (3 %)		4 (4 %)	-	
Sometimes	-	-		-	-	
Always	2 (3 %)	-		1(1 %)	1 (8 %)	
No. of resp.	74	29		90	13	

Appendig 1. Test of heteroscedasticity

HFIAP	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Gender	-0.013	0.661	-0.02	0.985	-1.308	1.283
edu12	-0.125	0.861	-0.15	0.884	-1.812	1.561
edu3	0.405	0.614	0.66	0.510	-0.798	1.608
north	-1.08	1.104	-0.98	0.328	-3.245	1.083
south	-0.169	0.811	-0.21	0.835	-1.759	1.420
HH members	0.001	0.237	0.00	0.998	-0.465	0.466
Own source	0.204	0.590	0.34	0.730	-0.953	1.360
animals	-0.463	0.634	-0.73	0.465	-1.705	0.779
income1	1.262	1.350	0.93	0.350	-1.384	3.908
income2	1.896	1.766	1.07	0.283	-1.567	5.357
food	0.138	0.710	0.19	0.846	-1.254	1.530
money	-0.303	0.326	-0.93	0.355	-0.945	0.339
c.xbhat#c.Gender	0.754	0.739	1.02	0.307	-0.694	2.202
c.xbhat#c.edu12	0.355	1.269	0.28	0.780	-2.132	2.841
c.xbhat#c.edu3	-0.229	0.863	-0.27	0.790	-1.920	1.461
c.xbhat#c.north	0.021	1.011	0.02	0.983	-1.961	2.003
c.xbhat#c.south	-1.366	0.920	-1.49	0.138	-3.169	0.437
c.xbhat#c.HHmembers	0.037	0.216	0.17	0.863	-0.385	0.460
c.xbhat#c.ownsource	-0.591	0.811	-0.73	0.466	-2.181	0.999
c.xbhat#c.animals	0.205	0.648	0.32	0.752	-1.065	1.475
c.xbhat#c.income1	-1.515	1.215	-1.25	0.212	-3.896	0.865
c.xbhat#c.income2	-1.473	1.213	-1.21	0.225	-3.850	0.904
c.xbhat#c.food	0.451	0.366	1.23	0.218	-0.267	1.169
c.xbhat#c.money	0.176	0.329	0.54	0.592	-0.469	0.822
/cut1	0.515	1.029		-1.502	2.532	
/cut2	0.981	1.033		-1.044	3.007	
/cut3	1.614	1.037		-0.419	3.647	

Appendix 3: Questionnaire in English language

Czech University of Life Sciences Prague
Faculty of Tropical AgriSciences

Dear respondent,

I would like to thank you in advance for participating in this questionnaire. This survey aims to address the current situation of migration and its impact on the food security in the Republic of Moldova.

The survey will take approximately 20 - 30 minutes to complete. The questionnaire is voluntary and completely anonymous.

Thank you for your time and your help.

Tereza Šiftová a Tereza Pilařová (pilarovat@ftz.czu.cz)
The Czech University of Life Sciences Prague, the capital city Prague

PERSONAL CHARACTERISTICS AND HOUSEHOLD COMPOSITION
Please write down information regarding your household and household head

HOUSEHOLD HEAD CHARACTERISTICS

Gender of household head	☐ Men	☐ Women			
Age of household head					
Marital Status	☐ Single	☐ Married	☐ Divorced	☐ Widowed	
Level of education completed	☐ No education	☐ Primary education	☐ Secondary education	☐ University education	
Citizenship	☐ Moldavan	☐ Romanian	☐ Russian	☐ Ukrainian	☐ Bulgarian
Occupation					
Region of living					
Village					

HOUSEHOLD COMPOSITION
Number of members living in household

Number of people in the household	Male	Female
Age below 5 years		
Age between 5-17 years		
Age between 18-30 years		
Age between 31- 59 years		
Age above 60 years		

AGRICULTURAL PRODUCTION

What is the total land size of your plots? _____ (plotka)
How many plots do you have? _____
What is the share of the owned land _____ %

1

How did you gain the land?

- ☐ Land reform in 90s
- ☐ Buying
- ☐ Inheritance
- ☐ Others, please name it

Do you use the agricultural land?

- ☐ Yes
- ☐ No

If you do not use the land, what is the reason?

Do you rent the agricultural land?

- ☐ Yes
- ☐ No

If you rent a land, who is the tenant?

- ☐ Other farmer/s
- ☐ Cooperatives
- ☐ Others, please, specify it

Have you sold the land?

- ☐ Yes
- ☐ No

If you sold the land, to who did you sell it?

- ☐ Other farmer/s
- ☐ Cooperatives
- ☐ Others, please, specify it

Would you or your family like to invest this money to the land agricultural land?

- ☐ Yes, I would like to lease the land
- ☐ Yes, I would like to buy the land
- ☐ No

Crop production

How was the situation of production of last season (2016-2017)?

Crop	Cultivated area	Chemical inputs used	Organic inputs used	Is the crop irrigated	Production quantity	Quantity consumed per year (% of total production)	Quantity marketed per year (% of total production)
	hectares	Yes/No	Yes/No	Yes/No	kilograms	%	%
Wheat							
Maize							
Sunflower							
Legumes							
Grapes							
Alfa Alfa							
Potatoes and vegetable							
Fruit in orchards							
Berries							

Animal production

Animal	Number	Purchased by remittances (yes/no)
Livestock		
Sheep		
Goat		
Poultry		
Pigs		

SOURCE OF INCOME

What is the share of each income source in your household total income? (the total of percentages should be equal to 100%)

Income source	Percentage of total income (%)	Was this source affected by any constraints? (yes/no)	If yes, state the main 3 reasons for this (chose from codes below the table)		
Plant production					
Animal production					
Agricultural labour					
Work in private sector					
Work in public sector					
Small trade					
Aids, gifts, assistance from NGO					
Remittances from abroad					
Credit					
Other (specify)					

Note: Reasons why the source of income was affected by the current crisis:

1. Difficulties of marketing 2. Inability to access land 3. Crop loss (damages, theft, drought...) 4. Loss of herd 5. Job loss 6. Immigration 7. Low income 8. Other (specify).

Which of these describes your average household income per month (in Leu)?

- ☐ 0 – 1000 1
- ☐ 1001 – 2000
- ☐ 2001 – 3000
- ☐ 3001 – 4000
- ☐ 4001 – 5000
- ☐ 5001 – 6000
- ☐ 6001 – 7000
- ☐ 7001 – 8000
- ☐ 8000 – 9000
- ☐ 9001 <

MIGRATION AND REMITTANCES

Please write down the household members who migrated from your household in the last five years

	Gender (male /female)	Age (years)	Highest level of education (No education / primary/secondary/ university education)	Place of destination (city, country)	Send remittances (yes/no)		
1					Often	Sometimes	Never
2					often	sometimes	never
3					often	sometimes	never
4					often	sometimes	never
5					often	sometimes	never

How often did you receive the following items from the migrant in the last year?

	Very often	Often	Sometimes	Seldom	Never
Food					
Money					
Farm input					
Cloth					
Others					

Do you receive money by members living abroad (remittances) trough bank account?

- ☐ Yes
- ☐ No

MIGRATION

How is the land of the people who live abroad handled?

- ☐ Relatives using it
- ☐ Rented
- ☐ Sold
- ☐ Abandoned
- ☐ Other, please specify it

What problems the landowners living abroad have?

HOUSEHOLD FOOD INSECURITY AND WATER QUALITY

What was the source of water in the past 7 days (% of total intake)?

1. Private household well _____ %
2. Well located in the village _____ %
3. Water from water supply system_____ %
4. Bottled water purchased in shop _____ %
5. Other _____ %

Do you have filters for water purification?

- ☐ Yes
- ☐ No

If yes, how much did you invest in the filter system? (LEI)

How much did you invest in the maintenance of the filter system during the last 5 years? (LEI)

How would you rate the quality of your drinking water service now (coming from the primary source – source you mainly used)

Clarity (no sediments in the water)	☐ Good	☐ Acceptable	☐ Poor
Colour	☐ Good	☐ Acceptable	☐ Poor
Smell	☐ Good	☐ Acceptable	☐ Poor
Taste	☐ Good	☐ Acceptable	☐ Poor
Healthiness	☐ Good	☐ Acceptable	☐ Poor
Stability of service	☐ Good	☐ Acceptable	☐ Poor
Convenience (time, distance, waiting)	☐ Good	☐ Acceptable	☐ Poor
Information regarding water quality in the village	☐ Good	☐ Acceptable	☐ Poor

(in past 30 days)	No	Rarely (once or twice in the past 30 days)	Sometimes (3-10 times in the past 30 days)	Often (more than 10 times in the past 30 days)
Did you worry that your household would not have enough food?				
Were you or any household member not able to eat the kinds of food you preferred because of lack of resources?				
Did you or any household member eat a limited variety of food due to a lack of resources?				
Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?				
Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?				
Did you or any other household member eat fewer meals in a day because there was not enough food?				
Was there ever no food at all in your household because there were not enough resources to go around?				
Did you or any household member go to sleep at night hungry because there was not enough food?				
Did you or any of your household members go a whole day without eating because there was not enough food?				
Do you sometimes feel lack of energy regarding to insufficient food intake?				
Did you or any of your household members have problem with quality of water (the taste of water, bacteria, contamination)				
Did you or any of your household members have health problem because of quality of water (diarrheal diseases)				

FOOD CONSUMPTION

How many days in the past week (7 days), your household had the following food groups that were prepared/consumed at home?

Nutritious groups: Only food prepared/ consumed at home should be considered (not at restaurants or in the street). Food quantities that are very small (less than one teaspoon per person) or consumed by one member of the HH are not to be considered	During the past 7 days, how many days you consumed the following food groups: 0. Never consumed 1. One day 2. Two days ... 7. Daily	Did you consumed yesterday	What was the source of food in the past 7 days? 0. Not consumed 1. Own production 2. Buy in cash 3. Buy by remittances 4. Swap / Borrowing 5. Gift from abroad 6. Hunting / Gathering in the forest / Fishing 7. Other (specify)
Carbohydrates (bread, wheat flour, bulgur, rice, pasta, potatoes, and other cereals)			
Legumes and nuts or seeds (beans, broad beans, peas, chickpeas, lentil, peanuts, etc...)			
Vegetables (carrots, cabbage, tomatoes, cucumber, parsley, onion, pepper, spinach, salad...etc.)			
Fruits (plumes, apple, raspberries, ...etc.)			
Meat, egg, and fish (eggs, white meat, red meat, fish)			
Dairy product except butter (milk, yogurt, cheese ...etc.)			
Oils and fats (vegetables oil, butter, ghee...etc.)			
Sugar and sweets (sugar, honey, jam, biscuits, cakes, sweetened drinks...etc.)			
Spices (salt, garlic, tea, mate...etc.)			

How much money do your household spend on food a day in average (LEI)?

How many % of total household income do you invest in food?

How many times per day does your family actually eat?

- ☐ 1 time
- ☐ 2 times
- ☐ 3 times
- ☐ 4 times
- ☐ 5 times
- ☐ 6 times and more

When your family eats, do all members of household satisfy their hunger?

- ☐ Yes
- ☐ rather yes
- ☐ rather no
- ☐ no

Were there months, in the past 12 months, in which your household did not have enough food to meet your family's needs?

- ☐ yes
- ☐ no

If yes, which were the months in the past 12 months, which you did not have enough food to meet your family's needs? (Example January, November…)

Are there some months where your household cannot use the main source of drinking water?

- ☐ yes
- ☐ no

If yes, which were the months in the past 12 months, which you did not have enough access to drinkable water? (Example January, November…)

If there is any season during the year when your family does not eat enough to satisfy its hunger, it is because of:

	Is it important factor?		
Insufficient agriculture production	☐ Important	☐ Less important	☐ Not important
Unavailability to agricultural inputs (seeds, fertilizers, etc.)	☐ Important	☐ Less important	☐ Not important
Low family income	☐ Important	☐ Less important	☐ Not important
Unemployment of family members	☐ Important	☐ Less important	☐ Not important
Insufficient amount of food on market	☐ Important	☐ Less important	☐ Not important
Problems with pests	☐ Important	☐ Less important	☐ Not important
Drought	☐ Important	☐ Less important	☐ Not important
Unavailability to credits or loans	☐ Important	☐ Less important	☐ Not important
Low soil quality	☐ Important	☐ Less important	☐ Not important
Other _____	☐ Important	☐ Less important	☐ Not important

Appendix 4: Questionnaire in Russian language

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Czech University of Life Sciences Prague
Faculty of Tropical AgriSciences

Уважаемые респонденты,

мы хотели бы заранее Вас поблагодарить за участие в этой опросной анкете. Целью данного исследования является рассмотрение нынешней ситуации касающейся миграции и её влияния на продовольственную безопастность в Республике Молдова.

Опрос займёт около 20-30 минут. Опросная анкета является добровольной и полностью анонимной.

Спасибо большое за Ваше время и сотрудничество.

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ЛИЧНЫЕ ХАРАКТЕРИСТИКИ И СОСТАВ ДОМАШНЕГО ХОЗЯЙСТВА

Пожалуйста напишите информацию касающуюся Вашего домашнего хозяйства и главы домашнего хозяйства

ХАРАКТЕРИСТИКА ГЛАВЫ ДОМАШНЕГО ХОЗЯЙСТВА

Пол главы домохозяйства	☑ Мужской	☐ Женский			
Возраст главы домохозяйства	50 лет				
Семейное положение главы домохозяйства	☐ Холост	☑ В браке	☐ Разведенный	☐ Вдова/ Вдовец	
Образование главы домохозяйства	☐ Без образования	☐ Начальное	☑ Среднее	☐ Высшее	
Гражданство главы домохозяйства	☑ Молдавское	☐ Румынское	☐ Российское	☐ Украинское	☐ Болгарское
Профессия	сварщик				
Регион проживания	Молдова Центр				
Село/Город	Тебленешты				

СОСТАВ ДОМАШНЕГО ХОЗЯЙСТВА

Количество членов, проживающих в домохозяйстве

Количество людей, проживающих в домохозяйстве	Мужчин	Женщин
Возраст менее 5 лет		
Возраст от 5 до 17 лет	1	
Возраст от 18 до 30 лет		1
Возраст от 31 до 59 лет	2	2
Возраст старше 60 лет		

СЕЛЬСКОХОЗЯЙСТВЕННОЕ ПРОИЗВОДСТВО

Каков общий размер Ваших земельных участков? 2,18 гектар

Сколько земельных участков у Вас имеется? 6

Какова доля собственности земельных участков 100 %

Czech University of Life Sciences Prague
Faculty of Tropical AgriSciences

Как вы получили землю?

- [x] Земельная реформа в 90-е годы
- [ ] Покупка
- [x] Осталась по наследствию
- [ ] Другое, пожалуйста поясните

Вы используете сельскохозяйственные землю?

- [x] Да
- [ ] Нет

Если вы не используете землю, в чем причина?

Вы арендуете землю?

- [ ] Да
- [x] Нет

Если вы арендуете землю, кто является арендатором?

- [ ] Другие фермеры
- [ ] Кооперативы
- [ ] Другое, пожалуйста поясните

Вы продали землю?

- [ ] Да
- [x] Нет

Если вы продали землю, кому вы ее продали?

- [ ] Другие фермеры
- [ ] Кооперативы
- [ ] Другое, пожалуйста поясните

Хотели бы Вы или члены Вашей семьи инвестировать деньги в сельскохозяйственную землю?

- [ ] Да, я хотел бы арендовать землю
- [ ] Да, я бы хотел купить землю
- [x] Нет

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РАСТЕНИЕВОДСТВО

Как сложилась ситуация с урожайностью в прошлом сезоне (2016-2017 гг.)?

Культура	Площадь	Химические удобрения использовались?	Органические удобрения использовались?	Орошаемая культура	Объем производства	Потребление в год (% от общего объема производства)	Количество в продажу в год (% от общего объема производства)
	Гектар	Да/Нет	Да/Нет	Да/Нет	Килограмм	%	%
Пшеница							
Кукуруза	0,6	нет		нет		50	50
Подсолнух	0,28	да	да	нет		70	30
Бобовые культуры	0,2	нет	да	нет		40	60
Виноград	0,4	нет		нет		50	50
Alfa Alfa (люцерна)	0,4	нет		нет		70	30
Картофель и овощи	0,1	нет	да	нет		100	—
Фрукты в садах	0,2	нет	да	нет		30	70
Ягоды							

Животноводство

Вид	Количество	Купленые с использованием денежных переводов от родных и близких из заграницы (да/нет)
Домашний скот (корова, бык)		
Овцы		
Козы		
Домашняя птица	15	нет
Свиньи	1	нет

ИСТОЧНИК ДОХОДА

Какова доля каждого источника дохода в **общем доходе** вашего домохозяйства? (общая сумма процентов должна быть равна 100%)

Источник дохода	Процент от общего дохода (%)	Был ли этот источник затронут какими-либо препятствиями? (да/нет)	Если да, укажите основные 3 причины этого (выбирать из кодов под таблицей)		
Растениеводство	80				
Животноводство					
Сельскохозяйственный труд	20				
Работа в частном секторе					
Работа в государств. секторе					
Мелкая торговля					
Помощь со стороны Неправительственных организаций (НПО)					
Денежные переводы из-за рубежа					
Кредит с банка					
Другое (поясните)					

Заметка: Причины, по которым конкретный источник дохода пострадал от данного кризиса:
1. Трудности с маркетингом **2.** Невозможность доступа к земле **3.** Потери урожая (ущерб, кража, засуха...) **4.** Потеря стада **5.** Потеря работы **6.** Иммиграция **7.** Низкий доход **8.** Другое (поясните).

Каков средний доход Вашей семьи в месяц (Лей)?

- ☐ 0 – 1000
- ☐ 1001 – 2000
- ☐ 2001 – 3000
- ☐ 3001 – 4000
- ☐ 4001 – 5000
- ☐ 5001 – 6000
- ☐ 6001 –7000
- ☑ 7001 – 8000
- ☐ 8000 – 9000
- ☐ 9001 <

МИГРАЦИЯ И ДЕНЕЖНЫЕ ПЕРЕВОДЫ

Пожалуйста, запишите членов семьи, которые мигрировали из вашей семьи за последние пять лет.

	Пол (мужской/ женский)	**Возраст (лет)**	**Образование** (Без образования/ начальное/среднее/ высшее	**Место назначения** (город, страна)	**Посылает ли денежные средства денежным переводом из-за рубежа?** (да/нет)		
1	мужской	40	среднее	Россия	часто	✓ иногда	никогда
2					часто	иногда	никогда
3					часто	иногда	никогда
4					часто	иногда	никогда
5					часто	иногда	никогда

Как часто в прошлом году Вы получили следующие пункты (предметы) от человека, который мигрировал?

	Очень часто	**Часто**	**Иногда**	**Редко**	**Никогда**
Питание					
Деньги			✓		
Фермерские материалы					
Одежда				✓	
Другое					

Получаете ли Вы денежные переводы от членов семьи, которые живут заграницей через банковский счёт?

- ☑ Да
- ☐ Нет

МИГРАЦИЯ

Как обрабатывается земля членов Вашей семьи, которые живут/работают за границей?

- ☑ Родственники используют эту землю
- ☑ Сдаётся в аренду
- ☐ Продано
- ☐ Земля заброшена
- ☐ Другое, пожалуйста поясните

Как вы думаете, какие проблемы возникают у землевладельцев, проживающих за рубежом?

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ПРОДОВОЛЬСТВЕННОЕ НЕОБЕСПЕЧЕНИЕ ДОМОХОЗЯЙСТВА И КАЧЕСТВО ВОДЫ

Какой был источник воды за последние 7 дней (% от общего потребления)?

1. Собственный колодец домохозяйства _____ %
2. Колодец расположенный в селе _____ %
3. Вода из системы водоснабжения 100 %
4. Бутилированная вода, купленная в магазине _____ %
5. Другое _____ %

У вас есть фильтры для очистки воды?

☐ Да
☑ Нет

Если да, то сколько вы инвестировали в систему фильтров (Лей)?

Сколько вы инвестировали в техническое обслуживание системы фильтров в течение последних 5 лет (Лей)?

Как бы вы оценили качество своей питьевой воды сейчас? (исходя из первичного источника - источника, который вы в основном использовали)

Чистота (без отложений в воде)	☐ Хорошо	☑ Приемлемо	☐ Плохо
Цвет	☑ Хорошо	☐ Приемлемо	☐ Плохо
Запах	☑ Хорошо	☐ Приемлемо	☐ Плохо
Вкус	☑ Хорошо	☐ Приемлемо	☐ Плохо
Безопасность для здоровья	☐ Хорошо	☑ Приемлемо	☐ Плохо
Стабильность услуг по воде	☑ Хорошо	☐ Приемлемо	☐ Плохо
Удобство (время, расстояние, ожидание)	☑ Хорошо	☐ Приемлемо	☐ Плохо
Информация о качестве воды в деревне	☐ Хорошо	☑ Приемлемо	☐ Плохо

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(за последние 30 дней)	Нет	**Редко** (1-2 два раза за последние 30 дней)	**Иногда** (3-10 раз за последние 30 дней)	**Часто** (более 10 раз за последние 30 дней)
Вы беспокоились, что у Вашего семьи не будет достаток еды?	✓			
Было ли такое, что Вы или кто-либо из членов Вашей семьи не могли питаться жилаемыми продуктами, из-за нехватки ресурсов?	✓			
Было ли такое, что Вы или кто-либо из членов Вашей семьи питались ограниченным разнообразием продуктов питания из-за нехватки ресурсов?	✓			
Было ли такое, что Вы или кто-либо из членов Вашей семьи из-за нехватки ресурсов купить желаемые виды продуктов, должны были питаться некоторыми продуктами, которые действительно не хотели есть?	✓			
Было ли такое, что Вы или кто-либо из членов Вашей семьи были вынуждены есть меньше еды, чем бы хотелось, потому что еды было недостаточно?	✓			
Было ли такое, что Вы или кто-либо из членов Вашей семьи ели меньше еды в день, потому-что еды недостаточно?	✓			
Было ли такое, что в Вашей семье совсем не было еды, потому что не хватало ресурсов?	✓			
Было ли такое, что Вы или кто-либо из членов Вашей семьи ложились спать голодными, потому что еды было недостаточно?	✓			
Было ли такое, что Вы или кто-либо из членов Вашей семьи провели целый день без еды, потому-что еды было недостаточно?	✓			
Вы иногда чувствуете нехватку энергии относительно недостаточного приема пищи?	✓			
У Вас или у кого-либо из членов Вашей семьи были проблемы с качеством воды (вкус воды, бактерий, загрязнение)	✓			
У Вас или у кого-либо из членов Вашей семьи была проблема со здоровьем из-за качества воды (желудочно-кишечные заболевания)	✓			

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ПОТРЕБЛЕНИЕ ПИЩИ

Сколько дней на прошлой неделе (7 дней) Ваша семья имела следующие группы продуктов, которые были приготовлены / потреблены дома?

	В течение последних 7 дней, сколько дней вы потребляли следующие группы продуктов питания: 0. Никогда 1. Один день 2. Два дня ... 7. Ежедневно	**Вы потребляли вчера** (да/нет)	**Каков был источник еды за последние 7 дней?** 0. Не потреблялось 1. Собственное производство 2. Куплено за наличные 3. Куплено благодаря денежным перечислениям 4. Обмен / заимствование 5. Подарок из-за границы 6. Охота / Сбор в лесу / Рыбалка 7. Другое (поясните)
Углеводы (хлеб, пшеничная мука, бульгур, рис, макароны, картофель и другие злаки)	7	да	2
Бобовые и орехи или семена (бобы, горох, нут, чечевица, арахис и т. д.)	3	нет	1
Овощи (морковь, капуста, помидоры, огурец, петрушка, лук, перец, шпинат, салат и тд.).	6	да	1
фрукты и ягоды (сливы, яблоки, малина и тд.)	5	да	1
Мясо, яйцо и рыба (яйца, белое мясо, красное мясо, рыба)	3	нет	1
Молочный продукт, кроме масла (молоко, йогурт, сыр и тд.)	2	нет	2
Масла и жиры (масло, топленое масло, масло из овощей)	2	нет	2
Сахар и сладости (сахар, мед, варенье, печенье, пирожные, подслащенные напитки и тд.)	5	да	1
Специи (соль, чеснок, чай и тд.)	7	да	1

Сколько денег Ваша семья тратит на еду в день в среднем (Лей)?

Сколько % общего дохода домохозяйства Вы инвестируете в пищу?

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Сколько раз в день Ваша семья потребляет пищу?

- ☐ 1 раз
- ☐ 2 раза
- ☐ 3 раза
- ☑ 4 раза
- ☐ 5 раз
- ☐ 6 раз и больше

Во время потребления пищи и после неё Все ли члены Вашей семьи удовлетворяют свой голод?

- ☑ Да
- ☐ Скорее да
- ☐ Скорее нет
- ☐ нет

Были ли за последние 12 месяцев такие месяцы, когда у Вашей семьи не было достаточного количества продовольствия (продуктов) для удовлетворения потребностей Вашей семьи?

- ☐ Да
- ☑ Нет

Если да, то какие это были месяцы (Пример: Январь, Ноябрь...)

Есть ли такие месяцы, когда Ваше домашнее хозяйство не может использовать основной источник питьевой воды?

- ☐ Да
- ☑ Нет

Если да, то какие это были месяцы, когда у Вас не было достаточного доступа к питьевой воде? (Пример: Январь, Ноябрь...)

Если есть какой-либо период в течение года, когда Ваша семья не потребляла пищу в достатке, чтобы удовлетворить свой голод, это происходило из-за:

	Это важный фактор?		
Недостаточное производство сельскохозяйственной продукции	☐ Важно	☐ Менее важно	☑ Не важно
Недоступность сельскохозяйственных ресурсов (семена, удобрения и тд.)	☐ Важно	☐ Менее важно	☑ Не важно
Низкий семейный доход	☐ Важно	☐ Менее важно	☑ Не важно
Безработица членов семьи	☐ Важно	☐ Менее важно	☑ Не важно
Недостаточное количество продуктов на рынке	☐ Важно	☐ Менее важно	☑ Не важно
Проблемы с вредителями	☐ Важно	☐ Менее важно	☑ Не важно
Засуха	☐ Важно	☐ Менее важно	☑ Не важно
Недоступность кредитов или займов	☐ Важно	☐ Менее важно	☑ Не важно
Низкое качество почвы	☐ Важно	☐ Менее важно	☑ Не важно
Другое _____	☐ Важно	☐ Менее важно	☑ Не важно

Appendix 5: Photo documentation - pilot study in district Străşeni

Appendix 6: Photo documentation - observation in district Străşeni