



**WORLD BANK GROUP**

Public Disclosure Authorized

Public Disclosure Authorized

Public Disclosure Authorized

Public Disclosure Authorized



Moldova Poverty Assessment 2016

# **Structural Transformation of Moldovan Smallholder Agriculture: Implications for Poverty Reduction and Shared Prosperity**









**WORLD BANK GROUP**

Report No. 105724-MD

Moldova Poverty Assessment 2016

Structural  
Transformation of  
Moldovan  
Smallholder  
Agriculture:  
Implications for  
Poverty and Shared  
Prosperity



# Table of Content

<b>Table of Content</b> .....	<b>iii</b>
<b>List of Tables</b> .....	<b>iv</b>
<b>List of Figures</b> .....	<b>v</b>
<b>Acknowledgements</b> .....	<b>vi</b>
<b>Overview</b> .....	<b>vii</b>
<b>1. Introduction</b> .....	<b>1</b>
<b>2. Moldova’s farming sector: key features and institutional environment</b> .....	<b>4</b>
2.1    Moldova’s farming sector and poverty in rural areas.....	5
2.2    The institutional environment for agriculture and rural development.....	8
<b>3. Small and (semi) subsistence farms in Moldova</b> .....	<b>12</b>
3.1    Small and (semi)subsistence farms: definitions and operationalization.....	13
3.2    Moldovan small farms: some stylized facts.....	15
<b>4. Small farms’ livelihood pathways towards structural change in agriculture</b> .....	<b>24</b>
4.1    Is structural change happening? Changes in farm sizes and subsistence orientation.....	25
4.2    Drivers of farm growth and market integration.....	30
4.3    Drivers of non-farm diversification and migration.....	33
4.4    Poverty implications of being a smallholder and following certain livelihood strategies.....	36
<b>5. Implications and policy recommendations</b> .....	<b>40</b>
5.1    Summary of key results and conclusions.....	41
5.2    Lessons for Moldova’s small-scale farms from Romania’s and Poland’s accession to the EU.....	42
5.3    Policy recommendations.....	45
<b>6. References</b> .....	<b>53</b>
<b>7. Annex</b> .....	<b>57</b>

# List of Tables

Table 1. Descriptive statistics of household welfare and farm characteristics (2007 – 2013).....	19
Table 2. Welfare and farm characteristics along poor and non-poor farms .....	20
Table 3. Welfare and farm characteristics along farm size classes .....	21
Table 4. Welfare and farm characteristics along farm types (subsistence vs more market-oriented) .....	22
Table 5. Welfare and farm characteristics along peripheral and urban locations (measured as proximity to Chisinau) ...	23
Table 6. Probability matrix for switches between farm size classes along total and available land.....	26
Table 7. Probability matrix for switches between farm types: subsistence oriented vs. more market integrated.....	26
Table 8. Probability matrix for switches between farm types: full-time commercial farm vs. diversified/subsistence farms...	28
Table 9. Major factors of influence on subsistence farm production .....	30
Table 10. Correlations of farm growth and shrinkage with selected variables .....	32
Table 11. Measures of income diversification at farm household level .....	34
Table 12. Factors of influence on income diversification by socio-economic and geographic strata (2013): Poisson regression .....	35
Table 13. Determinants of farm household's non-farm income activities: probit regression using the 2007-2013 HBS panel .....	36
Table 14. Poverty headcount (in percent) and Gini index in Moldova (2007-2013).....	37
Table 15. Income strategies and poverty effects (2013) .....	38
Table 16. Income distribution and remittances (2013) .....	39
Annex Table 1. Agricultural Holdings by Size Classes (Total Land, ha), 2011 .....	58
Annex Table 2. Agricultural Holdings by Size Classes (Total Land, ha) .....	58
Annex Table 3. Welfare and farm characteristics along urban and rural locations .....	59
Annex Table 4. Agriculture in EU, Poland, Romania and Moldova: Comparison of main indicators.....	60

# List of Figures

Figure 1. Structure of the agricultural sector by farm size, 2011 .....	vii
Figure 2. Cumulative distribution of farms and areas farmed, 2011 .....	6
Figure 3. Share of agricultural land in private ownership, 1980-2015.....	10
Figure 4. Cumulative distribution of family farms and land by available land (ha).....	15
Figure 5. Relevance of income sources conditional upon total number of income sources, 2013.....	33
Figure 6. Income versus expenditure based headcounts .....	36

# Acknowledgements

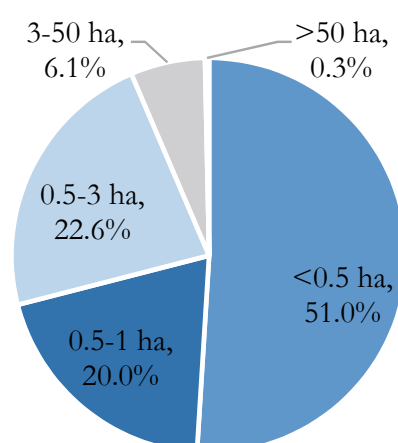
This report was prepared by a team of the Leibniz Institute of Agricultural Development in Transition Economies (IAMO), including Judith Möllers, Thomas Herzfeld, Simone Piras, and Axel Wolz, under the guidance of María E. Dávalos (ITL, Senior Economist, Poverty and Equity Global Practice, World Bank) and Caterina Ruggeri Laderchi (Senior Economist, Poverty and Equity Global Practice). The team is grateful for comments received from World Bank colleagues including Marianne Grosclaude, Hanan Jacoby, Tu Chi Nguyen, Felicia Pricop, Irina Schuman and Victoria Stanley.



# Overview

**The agricultural and food production sector plays a key role in fighting poverty and food insecurity in Moldova, but is facing critical challenges to modernize and integrate into the international market.** Not only is agricultural land the country's main natural resource, the agricultural sector still accounts for 30 percent of employment, with an additional 24 percent of the adult population engaged in low-intensity agricultural work. The agricultural sector is one of the focuses of the *National Development Strategy "Moldova 2020"* and a budget of 2 billion EUR is committed to finance the *National Strategy on Agriculture and Rural Development 2014-2020*, with the objectives to increase the sector's competitiveness, ensure sustainable resource management, and improve living standards in rural areas. Furthermore, Moldova currently finds itself at a decisive stage of its transition process as it re-orientates towards the European Union. This new direction of economic integration requires the country to guide the agricultural sector to take advantage of access to new markets and buffer negative consequences of increasing competition.

Figure 1 Structure of the agricultural sector by farm size, 2011



Source: National Bureau of Statistics of the Republic of Moldova (2013)

**This paper focuses on a segment of the agricultural sector – smallholder farms – and aims at exploring the potential for growth of this specific type of farms, and the poverty links.** According to the 2011 General Agricultural Census, there are around 900,000 farms working on 2,243,540 hectares of land in Moldova. Smallholder farms (defined as

farms of less than three hectares) make up 95 percent of all farms and account for 71 percent of total agricultural output, thus forming an extremely important part of the agricultural sector (Figure 1). These farms – on which this paper focuses - are seen as a pool for a viable, commercially oriented family farm sector that still has to be developed in the country. The other 5 percent of farms - not covered in this analysis - are composed of commercial medium-sized farms of 3 to 50 ha (around 42,000 farms) and big farms of more than 50 ha (around 3,000 farms). The agricultural sector in Moldova, therefore, has a strong dualistic structure.

**The formation of these small family farms is the result of the land privatization process at the end of the Soviet era.** During this process, most rural villagers received a small amount of land (*small share*), usually less than one hectare per household, to satisfy their consumption needs. In addition, every active and retired collective farm worker was entitled to a land share (*big share*) of one or two hectares when the collectives were dismantled at the end of the 1990s. Consequently, land ownership is almost universal in rural areas, but most rural households own less than three hectares of agricultural land, leading to a fragmented land structure. Medium-sized and big commercial farms emerged as a few former heads of collectives benefited from the transfer of considerable parts of collective farms from the public sector and consolidated (mostly through renting) the *big shares* from smallholders. The large commercial farms are powerful because they own most of the machinery and dominate the land rental market, but they hire mostly seasonal low paid labor and are therefore not an important source of employment for rural populations.

**Enhancing the livelihoods of smallholders is critical to the poverty reduction and shared prosperity agenda since they are more vulnerable to poverty due to high (farm) income volatility.** In 2013, farmers and agricultural workers accounted for 40 percent of Moldova's poor. The diagnostic of small farms and their growth potential presented in this report is based on the Moldovan Household Budget Survey (HBS). As the HBS focuses on households rather than businesses, it covers well the target group of this study - small farms -, while capturing few medium-sized or large family farms. However, the data poses several limitations. First, the HBS is not designed to specifically cover farm households, hence, for the purpose of this analysis, farm households are defined as households that indicate to own or rent land (around 35,000 observations out of the full dataset of 45,000 households in the 2007-2013 period). Second, the analysis of farm transformation makes use of the rotating panel of the HBS, but repeated observations are only a part of the HBS sample available (around 13,000 out of the full dataset). Nevertheless, the HBS provides rich data on socio-economic indicators and can link household welfare with farm activities, and is therefore used to identify the poverty outcomes of farm changes.

**Findings reveal that structural change is slow and smallholder farm growth in Moldova is an exception, not the rule.** Small farm activities are declining, and farm exits are exceptionally rare while subsistence farming is becoming more important. The majority of farms are engaged in semi-subsistence farming - a core component of the rural livelihood strategies in Moldova - and this is likely to persist in the medium and longer term. Between 2007 and 2013, very few farms gave up their land and farms are more likely to shrink than to grow (5.6 vs. 2.2 percent). Similarly, more farms moved toward subsistence (those with more than 90 percent of production for self-consumption) than commercialization (39 percent vs. 13 percent, respectively). This pattern is due to several reasons:

- First, families tend to keep the *small shares* to grow subsistence crops for self-consumption and lease the *big shares* to commercial farms. As the land market is only gradually developing, land sales are limited and families who cannot lease their *big shares* choose to leave them fallow or cultivate them in a very labor-extensive manner making use of mechanization services.
- Second, demographic aging and emigration result in rural populations getting smaller and older, which contributes to the decline of labor-intensive farm activities. Farm households headed by females or older or less educated individuals who stay behind increasingly turn toward subsistence farming. By 2013, subsistence farms make up around three quarters of all family farms. They tend to be smaller, are more likely to face food insecurity, and report lower farm and total incomes, yet subsistence farming is

perceived as an important safety net for smallholders.

- Finally, the few smallholders with slightly bigger farms, more household members in active age, and higher non-farm income (used for purchases of mechanization services and inputs) are more willing to commercialize, but they face challenges in market integration detailed below.

**Small farms engage in more diverse production activities, but only a small share of their products go to markets, and market integration opportunities are limited.** Different from large commercial farms which specialize in commodities, small farms produce a large range of vegetables, fruits, nuts, grapes, dairy products, livestock, and wine. Most of their produce are self-consumed and the surpluses are mostly sold in local open-air agricultural markets. They are generally excluded from the export markets since they cannot fulfil requirements in terms of food safety and quality, which will only increase as Moldova adopts EU regulations. Small family farms are also less likely to benefit from public investment (less than 0.05 percent) since they lack the capabilities to take advantage of such opportunities.

**Instead of commercialization, farm households often opt for diversification toward non-farm income, which is more effective in lifting them out of poverty.** Farm income contributes less than 20 percent of total household income on average and most farm households rely on additional income sources, primarily pensions and wage employment and, to a lesser extent, remittances. Higher education seems to facilitate the diversification of income sources and those households are also less poor. Indeed, a counterfactual exercise shows that remittances and diversification into the non-farm sector are associated with better livelihoods, while concentration on farm activities or commercial orientation of these small farms is correlated with higher poverty.

**To make agricultural commercialisation more attractive and effective for poverty reduction, the small segment of commercially oriented smallholder farms should be enabled to grow and modernize.** According to the World Development Report 2008, commercial smallholders not only benefit from expanding markets and higher values of their activities but also contribute to the growth of the agricultural sector through delivering surpluses to the market. Evidence from other agriculture-based economies show major declines in rural poverty accompanying agricultural growth. In view of Moldova's opportunity to integrate into the EU market, this paper reviews the EU accession process of Romania and Poland to derive important lessons for increasing Moldova's competitiveness and adaptation to EU rules. In particular, to enable a new generation of business-oriented family farms to commercialize and intensify their farm activities in a sustainable manner, the government should: (i) closely monitor market entry and exit conditions for small commercially oriented farms and provide (temporary) direct support where potential spillovers into the sector exist; (ii) generate incentives and build capacities for sustainable and productive agricultural practices; (iii) remove the barriers in the land market that hinder farm consolidation; (iv) address the market failures in access to finance; (v) implement food quality and safety programs that aim to reach international standards; (vi) support the penetration into higher value and organic product markets; (vii) encourage farmers to form cooperatives to strengthen their bargaining position and getting better access to input and output markets; and (viii) promote professional education and agricultural extension services to improve quality and productivity in the long term.

**However, the majority of smallholders in Moldova do not seem to have the interest or capacity to commercialize; for those, enhancing their livelihoods calls for policies beyond the agricultural sector.** The agricultural workforce tends to be older and less educated than in other sectors, which indicates the decreasing importance of agriculture as a source of employment in the future. Rural development therefore depends on unlocking the full potential of the rural economy through strategies that go beyond the agricultural sector. The policy agenda should focus on (i) promoting a viable rural non-farm sector that offers alternative local employment; this requires investments in infrastructure to strengthen rural-urban linkages, attract investment in rural areas and connects farmers to markets; (ii) promoting a business environment conducive to higher job creation in both urban and rural areas; and (iii) provision of social protection for elderly farmers who are likely poor and dependent on subsistence farming with limited income alternative. This can only happen in

an environment of rule of law, more efficient public spending and functioning public institutions, including local institutions.

**This paper is part of the Moldova Poverty Assessment 2016, which includes two analyses in addition to this paper:** “Poverty Reduction and Shared Prosperity in Moldova: Progress and Prospects” and “A Jobs Diagnostic for Moldova.” The first identifies the trends and drivers of poverty reduction and shared prosperity, while the second explores in details the main labor demand and supply challenges in Moldova.

**This paper is structured as follows.** The first section introduces the motivation and the research question of the paper. Section 2 provides an overview of the Moldovan farming sector and its policy environment. Section 3 describes the characteristics of smallholder livelihoods. Section 4 presents analyses of the livelihood pathways of smallholder farms and discusses some poverty implications. The final Section concludes with policy recommendations based on the results of Section 4 as well as the experiences of other EU accession processes by Romania and Poland.

# 1. Introduction



**The Republic of Moldova (hereafter Moldova) is one of the poorest countries in the EU's neighborhood.** Despite a clear downward trend in recent years, poverty and food insecurity are still significant. More than 20 percent of households consume less than the recommended level of calorie intake, and around 10 percent live below the poverty line. The agricultural sector and domestic food production play a key role in fighting poverty and food insecurity (World Bank & World Food Programme, 2015). However, the importance of the agricultural sector must also be seen in its key economic role: agricultural land, about 2.5 million ha, is the country's main natural resource (World Bank, 2015b). Currently, Moldova finds itself at a decisive stage of its transition process. It belongs to the few member states of the former Soviet Union who joined the Commonwealth of Independent States and decided later to re-orient towards the European Union. In 2014, it signed an Association Agreement, which includes the establishment of a so-called Deep and Comprehensive Free Trade Area, support in undertaking a number of reforms, and paves the way towards further integration within the EU economic space.

**Given the current challenges of a further economic integration of Moldova into the Common European market, strategies how to guide the agricultural development and restructuring process, including buffering negative consequences of increasing competition, are needed.** This paper focuses on smallholder farms. In Moldova, these small farms are typically strongly subsistence oriented, and make up about 95 percent of all farms. They are seen as the pool for a viable, commercially oriented family farm sector that still has to be developed in the country. At the same time, smallholders are particularly vulnerable in terms of poverty. It is therefore important to understand what constrains current smallholder livelihoods. Thus, the paper looks at recent trends in the development of farm structures and gives answers to the questions on what drives the progress of these smallholder farms and what are the related poverty implications. Experiences from other countries which recently joined the EU are used to derive important lessons with a view to increasing the sector's competitiveness and adapting to EU rules.

**The core results of this paper include a description of the current situation of Moldova's agricultural sector and a discussion on how its structural transformation affects the large number of smallholders in the country.** Semi-subsistence farming is found to be a core component of the rural livelihood strategies in Moldova, and it is likely to persist in the medium and longer term. Different livelihood options and their drivers are analyzed with a view to recent developments based on Household Budget Survey (HBS) data of the years 2007-2013. We look at poverty and shared prosperity impacts of certain livelihood pathways, and discuss the challenges of sustainable development of Moldova's rural areas.

**Results show that, in general, poverty in Moldovan farm households is declining over time. Yet, for most farm families non-farm oriented livelihood pathways seem to be the more promising choice.** A majority of farmers seems to hardly respond to market-based policy signals designed to provide incentives for market integration, and only a limited number of farms shows aspirations and potential to develop their farms into viable agricultural businesses. All policy efforts should distinguish these two groups, the subsistence oriented one and the more market oriented one, as each of them needs specific approaches. The latter group has an interest in commercialization and policies should facilitate this strategy. The large majority of smallholder families, however, is better served with general economic and social policies.

**A comparison with Romania and Poland reveals that the implementation of the *acquis communautaire* and the fulfilment of the EU administrative requirements is a tedious and complex task.** Poland is a good example of how giving priority to enhancing competitiveness, adapting to EU standards, and modernizing the sector resulted in a positive development of agriculture in the post-accession period. Romania is more similar to Moldova as for cultural and geographical aspects. In Romania, the strong dualistic structure of the sector, a lack of entrepreneurial experience and investment capacity of the large majority of smallholder farms, as well as prevailing market failures, that were not sufficiently and effectively addressed by policy makers, hindered a smooth transformation. The Moldovan government should learn from these experiences in order to let its citizens reap the full benefits of the association process.



**This report is accompanied by two additional pieces – with the three together comprising the Moldova Poverty Assessment - that are also critical to understanding in more depth the challenges that Moldova faces for poverty reduction and shared prosperity.** The paper *Poverty and Shared Prosperity in Moldova: Progress and Prospects* explored the recent poverty trends in Moldova and finds that its drivers – public transfers and remittances – are not sustainable forces for progress moving forward. The second research, *A Jobs Diagnostic for Moldova*, explores the demand and labor supply in Moldova to uncover the job creation challenges in a country with very weak labor markets. The three pieces are providing significant inputs to the more comprehensive approach of the Moldova Systematic Country Diagnostic (SCD) (World Bank, forthcoming) which precisely explores in depth what are the main constraints, across the economy, to achieving progress in poverty reduction and shared prosperity moving forward.

**The remainder of the paper is structured as follows:** Section 2 starts with an overview of some general structural features of the Moldovan farming sector including key policies. Section 3 introduces the Moldovan Household Budget Survey (HBS), and, based on this database, provides some stylized facts on the main features of smallholder livelihoods. Section 4 presents analyses of the livelihood pathways of smallholder farms and discusses some poverty implications. Finally, Section 5 discusses policy implications with view to the results of Section 4, but also along experiences of former EU accession processes. It concludes with policy recommendations.



## 2. Moldova's farming sector: key features and institutional environment

This section first introduces some general structural features of the Moldovan farming sector and rural poverty issues (sub-section 2.1). It further provides a brief overview of the key policies and those aspects of the institutional environment that affect the farming sector, in particular the well-being of smallholders (sub-section 2.2).

## 2.1 Moldova's farming sector and poverty in rural areas

**Moldova has a large rural population that is affected by rural-urban and international migration.** Overall, Moldova has the highest population density among European post-communist countries after Kosovo and the Czech Republic, placing it in the medium range compared to Western European countries (95 inhabitants per square km according to the 2014 Census), but with a clear preponderance of small-scale settlements instead of urban concentrations. According to preliminary data of the latest Census, around 1.9 million people, representing 66 percent of the total population, live in rural areas. The Census data further show that the urban population decreased considerably in the last decade due to significant out-migration. The rural population, although also affected by migration which has become an important livelihood strategy for many families (Bolganschi, 2011), remained constant.

**The country is divided into five development regions with different agricultural potential: North, Centre, South, Gagauzia, and Chisinau.** The North includes eleven districts and the municipality of Balti. Due to its more favorable climate, it has traditionally been the most developed area from the agricultural point of view, with larger farms and a specialization on orchards. The Centre comprises thirteen districts. It is the most densely populated area apart from the capital, with comparatively smaller farms and a long tradition of vine growing. The Centre can benefit from the spillover effects of the big Chisinau market. However, it includes also some more remote districts, like Soldanesti and Rezina. The South has eight districts. It is the most remote region. Due to the dry climate, yields in the South are lower, and the prevailing of steppes has favored extensive sheep breeding. Gagauzia is a small autonomous region located in the South and inhabited by a Turkish minority; its geographical features are analogous to those of the South.

**Agriculture is an important sector of Moldova's economy, but its productivity remains low.** In 2014, the share of agriculture in the GDP was at 14 percent (World Bank, 2015b). Although agricultural employment, after a tremendous increase over the 1990s, has dropped significantly since 2000, the agricultural sector still provided accounted for 30 percent of employment in 2014. Its low productivity is linked to missing investments, and a lack of capital and credit availability, which resulted in low-yield technologies and low use of fertilizers and pesticides (Moroz, Stratan, Ignat, & Lucasenco, 2015). It clearly affects the welfare of Moldova's rural population, who depends significantly on the farming sector.

**Rural poverty is a widespread phenomenon.** Moldova's economy fails to provide sufficient income sources for its rural population. The poverty incidence among rural inhabitants is significantly higher than among the urban population. In rural areas, 18.8 percent of the population was poor in 2013. In urban areas, this percentage was only 4.6 percent. Although poverty rates generally declined in recent years, the gap between urban and rural areas persists (World Bank, 2016). It seems also no longer true that rural households are less vulnerable to food insecurity (World Bank & World Food Programme, 2015). Thus, a close monitoring of rural poverty is needed.

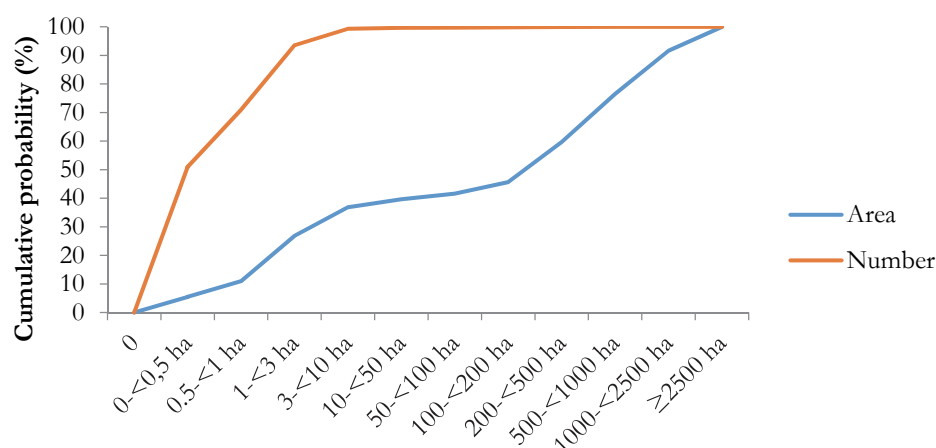
**Poverty is particularly found among landless people, small and medium-scale farmers, entrepreneurs, and people engaged in agro-processing in rural areas and small towns.** In general, rural people are more vulnerable to poverty due to high (farm) income volatility and a strong dependence on remittances (World Bank & World Food Programme, 2015). The poor tend to live in larger households with higher dependency rates. In addition, their educational level is relatively low: many have not completed secondary education (Davalos & Meyer, 2015). The heads of almost 70 percent of all poor households are employed, yet their wages are too low to enable their households to leave the poverty zone. Poverty and food energy deficiency are particularly high

among those who strongly depend on agriculture. In 2013, farmers and agricultural workers together account for 40 percent of Moldova’s poor (World Bank, 2015b; World Bank & World Food Programme, 2015).

**Almost all Moldovan farms are small family farms. These smallholders suffer from limited access to agricultural land and extreme fragmentation of land ownership.** This happens due to different reasons. First, at the end of the Soviet era most rural villagers received a small amount of land, usually less than one hectare per household, to satisfy their consumption needs. This land, called *small share*, was split into separate parcels, which became property of the family based on the 1991 Land Code (Law 828, 12.25.1991). Second, as a result of the equity-driven privatization process (Lerman & Cimpoies, 2006), every active and retired collective farm worker was entitled to a land share when *kollehozes* and *sovkhozes* were dismantled in the second half of the 1990s (Giovarelli & Bledsoe, 2001). These plots, called *big shares*, were designed in order to grant equal access to land of different types to every recipient, and therefore, they included a portion of arable land, one of orchards, and, if available, one of vineyards. Their surface varies between one and two hectares per entitled person, depending on the land stock of the collective farm (i.e. of the village). Finally, rural houses are surrounded by household plots whose area varies between 0.05 and 0.5 hectare. Hence, on average, rural households own between two and three hectares of agricultural land.

**Although small family farms form the overwhelming majority of agricultural enterprises, most of the available farmland is cultivated by a few large farms, implying a strong dualistic structure of the farming sector.** According to the 2011 General Agricultural Census, there are around 900,000 farms working on 2,243,540 hectares of land in Moldova (Figure 2 and Annex Table 1). More than half of them cultivate less than 0.5 ha, while about 95 percent of all farms use an area of less than 3 ha. Together the small family farms (below 3 ha) cultivate 26.8 percent of total agricultural land. Opposed to them, around 3,000 farms with more than 50 ha (but usually much more than that) cultivate over 60 percent of the total agricultural land. These big farms emerged during the chaotic years of the privatization process as a result of gathering together the *big shares*. People belonging to the rural nomenclature bought or, more often, rented land, and usually registered their new farms as limited liability companies (1,261 out of 3,029 farms, or 50.5 percent of land cultivated by farms over 50 ha), or similar enterprise types (896 farms, or 26.3 percent of land). Cooperatives (184 farms, or 11.0 percent of land) and State enterprises (46, 1.3 percent of land), but also large family farms (555, 7 percent of land) are rather marginal phenomena (National Bureau of Statistics of the Republic of Moldova, 2013). Large corporate farms usually have lease agreements of various types with individual landowners. They rely on employed labor, but due to the increasing level of mechanization of agricultural operations, the number of employees has been rapidly declining, from 125 workers per farm in 2004, to only 47 in 2012 (Moroz, et al., 2015, p. 12 based on figures provided by the Statistical Yearbook).

Figure 2. Cumulative distribution of farms and areas farmed, 2011



Source: National Bureau of Statistics of the Republic of Moldova (2013).

**Despite their smaller share in the total land area, small family farms form an extremely important part of the agricultural sector, as they provide a fundamental contribution to the overall food production and food security in Moldova.** They not only produce as much as 71 percent of total agricultural output (Volk, Erjavec, Rac, & Rednak, 2015), but seem also to be more productive and more efficient than large farms (Lerman & Sutton, 2008). Therefore, the difference in productivity most likely originates from a more intense use of labor and a different production portfolio, featuring more high-value products like vegetables, wine and livestock by smallholder farms. A similar situation is observed in Romania, where farms with larger land areas have a higher labor productivity, but a lower standard output value per hectare of farmland. This is explained also by the different production structure where the small-sized farms integrate crop and livestock production, while the large-sized farms are mostly specialized in crop production (Tudor, 2014).

**Large-scale agricultural companies specialize in the production of commodities such as cereals and sunflower, while small farms show higher diversity.** Cereals and industrial crops, in particular maize, sunflower and (in the North of the country) sugar beet, are dominating the production portfolio of agricultural companies. This specialization has been driven by a number of factors such as relatively low production costs, the availability of agricultural machinery, relatively simple and cheap post-harvest processes, as well as export markets for these commodities, which, up to the recent disputes with Russia, could be considered secure. However, the lack of appropriate rotation schemes and of irrigation as well as the cultivation of crops unsuited to the local soil and climatic conditions has led to depleted soils and low yields (Moroz, et al., 2015, p. 12). Differently from large commercial farms, small ones are more diversified. They typically divide their land into three major production activities: (1) vegetables, including potatoes and leguminous plants, and fruits; (2) cereals – mostly maize – and sunflower; and (3) vineyards (Moroz, et al., 2015, p. 12). Also livestock production is primarily managed by smallholders (World Bank & World Food Programme, 2015). We find that dairy cattle is the most common (and successful) investment of small farmers, including the elderly. According to Piras and Botnarenco (2015), cow breeders sell around one third of their milk; the rest is either self-consumed or used for producing cheese and sour cream. Such processed milk products are then often sold. Experienced milk and dairy sellers have a space in the open-air town market, and implement regular sanitary controls. Decent incomes can be obtained even with a limited number of cows (most of the interviewees had just one or two) especially if market access is given: in the village of Clișova (Orhei), for example, farmers benefit from a local collection point for cow milk, which facilitates market access for small producers.

## **Box 1: Small family farms and large commercial farms: are they direct competitors at all?**

Large commercial farms and the majority of the subsistence oriented smallholder farms are closely interconnected via several ways. Based on qualitative research, we identified three major types of relations:

- **Land rental markets:** Large commercial farms are renting in land from smallholders. In most cases, small farmers rent out their big shares and use the small shares for their own needs. The latter are closer to the village, but more fragmented and, thus, less attractive for tenants. In general, there seems to be no competition for rental land. However, it is not clear in how far the decision to lease land is always a completely free and revertible one (see Box 2). It seems that the current practice of one powerful large local farmer as the sole renter of land in a village may prevent that other farmers with growth potential would be able to compete in a fair way from the beginning on.
- **Private short-term loans:** Local large commercial farmers often lend money to smallholders at the beginning of the agricultural season to finance the purchase of seeds or the provision of machinery services. Smallholders usually pay back once they have sold their products after harvest. This type of

financing seems to be the most important source of credit for smallholders, as it goes with low administrative burden and with low or even without interest rates. According to our interviews with smallholders, this practice creates, however, an uncomfortable moral obligation to keep good relations with the moneylender. It thus strengthens the position of the local leader with view to the rented in land.

- Provision of machinery services: Due to their low level of mechanization, smallholders rely on contractors for machinery services. The local large commercial farmer usually offers these machinery services, but there is some limited competition, as also a few medium-sized farmers – for whom this activity might be a very important source of income – offer such services.

Overall, we observe that small and large farmers depend on each other. Large farmers depend on the land that they rent from smallholders. Small farmers rely on large farmers for financing their purchase of inputs and for this reason will not easily withdraw their leased big shares as this might lead to being refused a credit the following year. In this relationship, we find widespread resentment among smallholders toward large farmers, who often used to be directors, or heads of a brigade, in the former Soviet collective farms, and are respected for their economic success, but also feared for their influence if conflicts arise.

Concerning product markets, there is currently no direct competition between small and large farmers. Large commercial farms are mostly export-oriented and concentrate on the production of low value-added commodities, like cereals and oil seeds. Small farmers produce mainly for their own consumption. Sales refer to high value-added products that are offered at local open-air markets or to neighbors. Smallholders rely on direct relations with the buyers because their agricultural and processed products usually do not meet international standards on food quality. However, there are single cases where small dairy producers (two cows) mentioned that they do veterinary and sanitary controls, showing that there is a chance of improving quality and earning a decent profit, even with a small investment.

[based on qualitative interviews conducted by Piras and Botnarenco (2015)]

**Integration into international agricultural trade poses significant challenges, e.g. due to quality and food safety issues and the oligopsonistic structure of the agribusiness.** Moldovan agricultural products are in the low-price segment on international markets because of deficiencies in terms of quality and food safety standards. Indeed, Moldovan producers tended to rely on the positive reputation of their products within the CIS market dating back to the Soviet period, rather than innovating; therefore, they did not invest either in marketing or in a better product presentation (packaging, etc.) (Piras & Botnarenco, 2015). Furthermore, the national agribusiness sector presents an oligopsonistic structure, i.e. only a few private companies are allowed to export agricultural products and can thus set the purchasing prices from farmers. In general, only large commercial farms are able to serve the export markets and form the export potential of the agri-food sector, while small farms only generate a limited surplus of high value-added crops. These surpluses, which include fruits, nuts, grapes, vegetables, potatoes, but also milk, dairy products, eggs, poultry meat, and wine, are mostly sold in local open air agricultural markets (Moroz, et al., 2015, p. 12).

## 2.2 The institutional environment for agriculture and rural development

**The main actor in the field of agricultural and rural policies is the Ministry of Agriculture and Food Industry (MAFI).** Subordinated organizations are responsible for managing financial resources, implementing sectoral policies for the wine sector, implementing registers of producers, and for food safety aspects.



Furthermore, the Ministries of Economics; Environment; Construction and Regional Development as well as Labor, Social Protection and Family, develop policies, which, directly and indirectly, affect the agricultural sector and rural households.

**The National Development Strategy “Moldova 2020” aims at achieving economic growth and poverty reduction.** In line with these overall goals, there are a number of policy documents with a direct focus on agriculture and rural development. The current *National Strategy on Agriculture and Rural Development* for the period 2014-2020 guides the structure of spending on agriculture. For the seven-year period, an overall budget of more than 2 billion EUR is foreseen for financing the goals of the strategy (World Bank, 2015b). It has three general objectives: (1) to increase competitiveness of the agri-food sector through modernization and market integration; (2) to ensure sustainable management of natural resources in agriculture; and (3) to improve standards of living in rural areas. The *National Strategy for the Sustainable Development of the Agro-industrial Complex* (2008-2015) has the overall goal to ensure a sustainable growth of the agro-industrial sector with a consequent improvement of quality of life in rural areas by increasing the sector’s competitiveness and productivity. The *Food Safety Strategy* for the years 2011-2015 aims at achieving the highest standards of health protection and food safety. The *Strategy for the Development of Rural Extension Services* for the period 2012-2022 foresees a rapid transition to a modern model of organization of rural extension services based on knowledge and innovation, and oriented towards continuous improvement of the quality of life in rural area (Moroz, et al., 2015, p. 12).

**Despite a rather liberal foreign trade regime, agricultural producers are implicitly taxed.** Comparison of domestic and reference prices over the period 2004-2013 reveal negative price protection for crops. Domestic producer prices for wheat, maize, potatoes, and sunflower have been 10 to 51 percent below a border reference price. Furthermore, domestic prices for sheep meat and eggs are substantially lower (-60 percent and -40 percent) than the reference price whereas prices for pig meat and poultry are much higher (in some years up to 100 percent). Volk *et al.* (2015) relate this observation to an undervaluation of the Moldovan currency and the low purchasing power of Moldovan consumers. However, high transport costs could also cause price wedges. Furthermore, administrative costs represent an additional barrier to trade: based on the Doing Business Ranking, the country occupies a middle rank among the ECA countries (13 out of 26) (World Bank, 2015a).

**Moldova’s spending on agriculture is sufficiently high, but could be more effective.** The total value of the State budget expenditures for agriculture, forestry and fishery has been fluctuating between 1.4 percent (2013) and 1.7 percent (2009) of GDP during the last years. Due to the depressed economic situation, there is no fiscal space to increase spending; however, the current share of expenditure on GDP exceeds that of comparable countries such as Romania (Moroz, et al., 2015, p. 12; World Bank, 2015b). Still, the World Bank (2015b) clearly criticizes that, in particular, tax expenditures arising from preferential tax treatment arrangements for agriculture are not effectively addressing the challenges identified for the sector. Moreover, persistent delays in the administration of state payments create a sense of insecurity that hinders large investments by commercial farmers. Finally, public support for agricultural investment usually does not reach smallholders, who also lack capabilities to take advantage of such opportunities if they arise. For example, the 2011 Agricultural Census revealed that the number of family farms which had benefited from rural development measures during the previous three years was just 322 out of 898,768 for measures targeting farm modernization, and 297 for those targeting farm diversification (0.04 and 0.03 percent). The same figures were, respectively, 338 and 301 out of 3,446 for corporate farms (9.8 and 8.7 percent).

**The most important mechanism for supporting agricultural production are subsidies provided through the Agency of Intervention and Payments for Agriculture (AIPA).** AIPA subsidies flow into measures targeting farm restructuring; a smaller share of funds flows into direct producer support and post-harvest and processing infrastructure. In 2014, investment support for improving post-harvest and processing equipment received the largest amount (26 percent). Compared to 2009 figures where only 2.7 percent of the budget was devoted to this type of support, post-harvest and processing gained substantially. Support of investment into machinery and equipment comes second occupying 22 percent of AIPA’s budget in 2014. The third and fourth position of the budget, respectively, represents investment support for new orchards and vinery (17 percent) as well as protected field vegetable production (9 percent). The livestock sector received investment support for

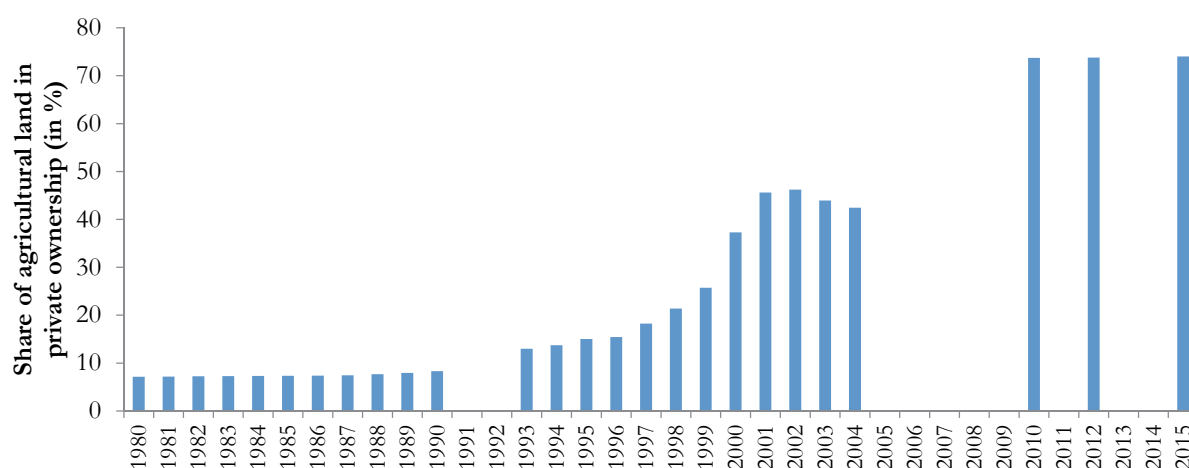
pedigree livestock as well as equipment and technological renovation (both measures occupy nine percent of the budget in 2014). Recurrent subsidies declined in budgetary relevance. The share of subsidies of risk insurance premiums, as the largest position among the group of recurrent subsidies, amounts to five percent in 2014 (World Bank, 2015b).

**However, subsidization alone is not enough: rural development and a healthy structural adaptation of the agricultural sector depend on a functioning institutional environment and a supporting governance structure.** For the farm sector, and for structural change within this sector, the land and credit markets are of core importance. Furthermore, the education system and extension services should play a major role for a successful restructuring. A smoothly functioning agricultural administration is known to be of key importance for increasing the effectiveness of any supporting measure. In particular, with a view to achieving budget support in the field of agriculture through EU funds, a sound financial management system is needed (Sobjak, 2015). Some of these aspects are discussed in more details in the following sections.

**A land market is gradually developing in Moldova.** Starting in 1999 real estate has been included in the Land Registry. Therefore, this year can be considered the start of the land market. The yearly number of land transactions grew from zero in 1999 to more than 70,000 in 2008. The price of land varies considerably within the country, and even within districts. Most of the overall around 400,000 transactions in this decade took place in the central districts. All in all, only around 38,000 ha (1.7 percent of the total agricultural land) changed owner in the first decade, and the average transaction involved barely 0.10 ha (Cimpoies, 2010).

**Most agricultural land is in private hands, constituting about 74 percent of total land at the beginning of 2015, while the remaining 26 percent was in public ownership (Figure 3).** However, there are drastic differences in the ownership status depending on the type of land. Most strikingly, only 2 percent of pastures and hayfields are private. They usually belong to the municipality, and management costs are covered with a modest annual tax proportional to the number of animals (cows, goats, sheep and horses) kept by the respective household. On the opposite, 94 percent of vineyards and 84 percent of the arable land are owned by private individuals (National Bureau of Statistics of the Republic of Moldova, 2015b).

**Figure 3. Share of agricultural land in private ownership, 1980-2015**



Source: Interstate Statistical Committee of the CIS; Department of Statistics and Sociology of the Republic of Moldova, various years

**Given the high fragmentation of parcels, land consolidation is an urgent problem among smallholders.** In the first decade of the 2000s, nine projects were implemented in order to achieve this objective, mostly in the South. However, small farm owners prefer to lease their land rather than selling (or exchange) it. Several studies show that land sales represent only one third of land market transactions. In 2009, 42 percent of the


total agricultural land was leased, of which 72 percent by limited companies, 15 percent by production cooperatives, and 8 percent by joint-stock companies. Most of the leasing contracts have a duration of one to three years, limiting the possibility for the tenant to plan in the longer term (Cimpoies, 2011).

**Despite a modest increase of agricultural lending in recent years, farms remain poorly financed.** The major deficiencies can be summarized as follows: (1) overall insufficient collateral options; (2) almost no supply of long-term loans; (3) hardly any support instrument to facilitate access to credits, like loan guarantee funds (Moroz, et al., 2015, p. 12). Interest rates are high, amounting to 15-20 percent annually, while annual inflation was below 5 percent during the last years. After 2014, due to the spreading effects of the crisis of the Russian ruble, inflation picked up again and interest rates grew. While large farmers can still negotiate a bank loan with 16 percent interest rate, small farmers, if loans were available at all, pay more than 20 percent for bank loans and up to 30 percent if, due to lacking collaterals, they have to take a credit from local agencies based in the villages (Piras & Botnarenco, 2015). Hence, the majority of farmers rely on own financial sources or do not invest at all.

**The agricultural education system in Moldova seems outdated and hampered by a mismatch between the skills and knowledge taught and those demanded by the labor market.** Agricultural education is offered by the State Agricultural University of Moldova, eight agricultural colleges (five of them situated in the North, where agriculture is more intensive and export-oriented, and one each in Chisinau, Ungheni, and in Gagauzia), and about 20 vocational schools. The EU funded EUniAM project, which aims at consolidating the higher educational system of Moldova, recently recommended the closure of the Agricultural University, whose branches should be included in other high educational institutions (Turcan & Bugaian, 2015). Indeed, public funding seems not enough for the development and consolidation of educational infrastructure, repair of buildings, modernization of equipment, and professional training. In addition, there is a lack of young, internationally trained teachers. The resulting negative image of the agricultural education system is reflected in the declining number of students. Similarly, the agricultural research and innovation system operate in isolation and did not manage successfully the transition. Due to insufficient funds, outdated methods, and low performing personnel, research institutes fail to offer viable solutions for the development of the agricultural sector (Moroz, et al., 2015, p. 12; World Bank, 2015b).

**The network of agricultural extension services (ACSA), established in 2002 with World Bank support, reaches out to about 50 percent of Moldova's farmers.** The extension network is coordinated from the head office located in Chisinau, and consists of 35 regional offices and regional advisers, involving 75 regional and 350 local consultants working in rural areas. Benefiting for a long time from financial support of international donors, the extension network services are free-of-charge (Moroz, et al., 2015, p. 12). Services are provided to all types of farms, including large-scale corporate farms, medium-size commercial farms, as well as small subsistence farms, which form the largest client group. Indeed, the 2011 Agricultural Census revealed that 25,313 family farms (2.8 percent) had benefited from consulting services in the previous three years, while this figure was 87 (2.5 percent) among corporate farms. Since the international donors have ceased their payments in 2013, the network is now exclusively depending on state funding.

**Agricultural policies especially target large farms and, to a lower degree, small farmers who aim at commercialization, yet, the majority of subsistence oriented farms would benefit most from general economic and social policies.** Social policies need to be developed in order to reach the most vulnerable groups. A considerable share of about one quarter of the socially vulnerable population in working age has, for instance, no adequate access to healthcare services (Molodikova, 2008). The poverty-targeted program *Ajutor Social* (Social Aid), which specifically addresses those most in need, is one recent, positively evaluated program (World Bank & World Food Programme, 2015). For smallholders, agricultural land represented an important social buffer during the economic hardship of the reforms aiming at economic liberalization and privatization that the country went through in the early years of transition. However, in the course of economic development, agricultural activities will increasingly lose their importance when subsistence farmers more and more diversify into non-farm sectors or exit production due to age and health reasons. Thus, the development of the non-farm rural economy needs to be in the focus of policy makers addressing rural areas as well.



### 3. Small and (semi) subsistence farms in Moldova

In this chapter, we turn toward our core database, the Moldovan Household Budget Survey (HBS) for the years 2007-2013. We start from a brief discussion of definitions of small and (semi)subsistence farms and their identification in the HBS (sub-section 3.1) and continue with some stylized facts on the main features of smallholder livelihoods (sub-section 3.2).

## 3.1 Small and (semi)subsistence farms: definitions and operationalization

**Defining small family farms is not a trivial task, as the sole consensus on small farms may be the lack of a sole definition** (Nagayets, 2005). Small-scale agriculture is often used interchangeably with smallholder, family, subsistence, resource-poor, low-income, low-input, or low-technology farming (Heidhues & Brüntrup, 2003). As a result, the issue spans a widely diversified group, from market-oriented, middle class family businesses, to poor subsistence farmers. Criteria such as the farm size, the economic size, and market participation are crucial to distinguish (semi-)subsistence farms from commercial farms (Buchenrieder, Fritsch, Wegener, Curtiss, & Gomez y Paloma, 2009). The most common approach, driven by availability of internationally comparable data, is to define small farms simply based on the size of landholding. It is important, however, to recognize the limitations of this measure, given that it fails to properly account for the quality and quantity of other resources (e.g. animal stock), the types of crops grown, the degree of commercialization or disparities across regions. Still, size based measures may be seen as more robust compared to income-based measures, which are always prone to bias.

**In this paper, we make use of the dataset of the Moldovan HBS, which, although rich, presents some limitations with respect to the analysis of smallholder farming.** The HBS is conducted annually by the National Bureau of Statistics and covers a representative sample of the whole population. It comprises between 5,000 (2013) and 6,000 (2007-08) interviewed households per annum. We use data covering the years 2007-2013. While 50 percent of the households are interviewed only once, or twice at a distance of 3 months, the remaining ones are foreseen to be interviewed four times at a distance of 12 months. However, since the sampling proceeds as a rotating panel, only a very small share of households reported data for the full period of four years (less than 6 percent). It has to be noted that this time period includes the financial crisis that started in 2008 (GDP declined by 6 percent from 2008 to 2009). Moreover, in 2007 and 2012 the Moldovan farming sector was affected by severe droughts (World Bank, 2015b). Apart from these setbacks, the decade between 2004 and 2013 witnessed impressive GDP growth rates (ranging from 3 percent in 2007 to 9.4 percent in 2013).

### Box 2: Defining small family farms

Definitions of farms and farmers vary across Europe. In the context of the EU Common Agricultural Policy (CAP), a farmer is an individual (or group of individuals, e.g. partnerships, companies, and other legal structures through which a business is conducted), whose holding is situated within the territory of the European Union, and who exercises an agricultural activity. A holding means all the units used for agricultural activities and managed by a farmer situated within the territory of the same Member State. The 2011 Moldova Agricultural Census defines a farm as follows: “An agricultural holding is a technical economic unit (with or without juridical status) having a single management and carrying out agricultural activities by utilizing agricultural land and/or livestock breeding, or activities related to maintaining agricultural land in good agricultural and environmental conditions, whether as its principal activity or as a secondary activity” (National Bureau of Statistics of the Republic of Moldova, 2013).



Commercially oriented farms need to be distinguished from subsistence and semi-subsistence ones. Subsistence farms are those that produce (almost) exclusively for their own consumption. The EU defines semi-subsistence farms as agricultural holdings, which produce primarily for their own consumption and market a proportion of their output (Regulation EC/1698/2005). However, the definition gives no threshold with respect to the share of farm sales (or any other indicators) in order to distinguish between subsistence and commercial farms. The European Commission (EC) advises Member States that a precise definition should take into account the minimum and/or maximum size of the farm, the proportion of production marketed, and/or the level of income of the farm (Regulation EC/1974/2006, Annex II).

**Various size-based definitions are used in Moldova to identify small farms.** According to the definition adopted in the quarterly *Research on Agricultural Activity of Small-Sized Agricultural Producers* (National Bureau of Statistics of the Republic of Moldova, 2015a), small farms comprise of personal auxiliary households (*gospodarii*) of citizens, peasant households holding a surface of land smaller than 10 hectares regularly registered, and people who received equivalent shares of land but did not register their agricultural household. The National Institute of Economic Research uses a three-hectare threshold for defining small and semi-subsistence farms when calculating standard agricultural costs, and does not calculate them for farms under this threshold. However, as shown in Figure 1, this group includes already about 93.6 percent of all farms of the country. An adequate definition of subsistence and semi-subsistence farms in Moldova should reflect the specific farm structure in the country. Therefore, even very small farms should not be omitted. Defining the farm size along income figures (economic size) is in theory preferable, but highly complex and prone to bias. The main limitations of this criterion are, first, data availability, in particular regarding the smallest entities, due to a lack of precise record keeping, and second, its reliance on standardized values, which could be erroneously misinterpreted as the actual economic results of the agricultural holding (EC, 2011).

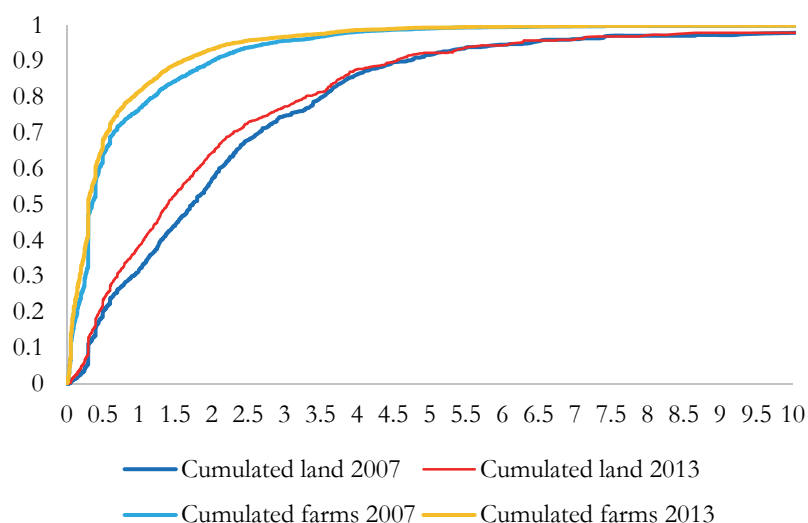
**The HBS is not designed to specifically cover farm households. Therefore, we identified farm households as those households who indicate to own or rent land.** This land includes shares distributed in line with §11 (82) and 39 of the Land Code (i.e. *small shares*) and in line with §12 of the Land Code and §2 of the Law amending it (i.e. *big shares*), as well as home gardens. We defined this group of households as farm households regardless whether they are located in urban or rural areas. We do not apply a minimum size threshold, thus reflecting the full range of typical small farms. In general, the majority of farms in Moldova are tiny (see Section 2.1). We excluded households who own only dachas, i.e. countryside houses with a garden. As a result of this selection, our sample size ranges from 4,782 in 2007 to 4,165 in 2013. In the following pages, if not indicated differently, we will refer to these farm households as the sample *tout court*. The biggest farm in our HBS sample has a size of about 49 ha and is a clear outlier. Large corporate commercial farms cannot be identified based on the HBS, which looks at households and not at businesses. Middle-sized and large family farms should in theory be included in the HBS. However, they are very rare, in line with their low relative share in the Moldovan family farm population. Figure 4 clearly indicates that farms of 10 ha or more are almost negligible in the HBS sample and that a targeted survey would be necessary to get a better picture of them.

**The terms small farms and smallholders are confined to all farms identified in the sample.** This has pragmatic reasons, as the HBS sample consists almost exclusively of small farms, as defined by the 3 or 10 ha thresholds mentioned above. The number of farm households with more than 3 ha is already extremely small. However, we distinguish three size groups: farms smaller than 1 ha, farms with between 1 and 2 ha, and farms larger than 2 ha. The farm size is measured here as the available land defined as owned land minus rented out land plus rented in land, thus reflecting the land utilized by the family including abandoned land on which the family can expand its production in the short term. We further classified subsistence farms by selecting



households who earn more than 90 percent of their farm income in kind<sup>1</sup>. Other aspects to be considered are whether farming constitutes a principal source of income for the family and whether the family provides the primary source of agricultural labor.

**Figure 4 Cumulative distribution of family farms and land by available land (ha)**



Source: HBS 2007 and 2013.

## 3.2 Moldovan small farms: some stylized facts

The analysis starts from an overview of a set of relevant annual smallholder indicators (Table 1). The discussion is deepened based on group comparisons along the economic situation (Table 2), farm size categories (Table 3), subsistence orientation (Table 4), and proximity to urban areas (Table 5). Due to space limitations, these group comparisons refer to the years 2007, 2010 and 2013 only. However, Table 1 provides the full time-line of core indicators.

**Smallholder farming is a predominantly rural phenomenon, although about one fifth of small farms is located in urban areas** (Annex Table 3). Since the official rural-urban divide is not depicting location effects in a fully convincing way, we prefer to use a center-periphery divide. Peripheral locations include the most remote regions, with a widely rural character, opposed to those in the vicinity of the capital Chisinau, the main urban center of the country<sup>2</sup>. Families in the periphery work on larger farms of 1.6 ha on average, compared to 0.8 ha for the non-peripheral farms in 2013 (Table 5). At the same time, the share of land that is leased out is on average higher in the periphery, while farmers near the capital leave a larger portion (more than a quarter) of their land fallow. This may be explained by the influence of Chisinau market, where non-farm employment or migration opportunities are better, which makes it more likely to leave the land abandoned.

**Farm sizes are small and declining over the years.** On average, farm households reported a total land size of about 1.6 ha in 2007. This value declined to about 1.5 ha in 2010 and 1.4 ha in 2013, respectively (Table 1). Almost all of this land is owned by the smallholders. If we look at actual farm sizes, i.e. the available land (excluding leased land, including rented in), along which we measure farm size classes in Table 3, we see that

<sup>1</sup> Agricultural income in kind (subsistence production) has been converted in the dataset to monetary values based on average acquisition prices in the period of reference. It is worth pointing out that farm expenditures are subtracted from the farm income in money, which is thus underestimated in comparison with farm income in kind. Before calculating the share of in kind income, all negative incomes in money were equated to zero, so that potential semi-commercial farms whose monetary income is lower than farm expenditures (so that their monetary farm income is negative) are classified as pure subsistence farms. Unfortunately, no separate data on farm sales are available in our database.

<sup>2</sup> The periphery indicator adds to the classical urban-rural divide. Since the capital Chisinau is by far the major agglomeration of the country, we separated the households of the sample into those settled within 60 km of road distance from it, and those settled further away in the periphery. We assume that those living next to the capital have better options in marketing their agricultural products, but also better opportunities for tapping non-farm jobs.

the share of extremely small farms (less than 1 ha) slightly increased, whereas the share of farms holding 1-2 ha or more than 2 ha slightly decreased (Table 3). This seems similar to Romania, where there is a trend of even further concentration of agricultural land around the farms of small and very small size (Timofti, Popa, & Kielbasa, 2015). The major reason for this decline seems to be the drop of families using their *big shares*. Indeed, the average area of *small shares* and house gardens remained constant at around 0.29 ha, while that of *big shares* declined from 1.29 ha (2007) to 1.05 ha (2013).

**Land productivity is higher within the smallest farms (<1 ha).** The agricultural income per farmed hectare is about three times higher for them compared to the middle-sized group (1-2 ha), and even more than that compared to farms over 2 ha. However, this should not be seen as the effect of size, but is most likely linked to the production portfolio. Typically, farm households use the land around their house for cultivating higher value crops (e.g. vegetables and berries) or for keeping their animals (for which they also use common grazing land). Surplus production of milk, dairy products, honey, etc. is sold. The *small share* includes some parcels of arable land and is used mostly for maize (animal feed), for subsistence crops like beans, or for vineyards. On the other hand, the *big shares* are used more extensively. Cultivating the larger fields of the *big share* without a minimum level of mechanization requires significant labor input. If this land is not leased out, families tend to cultivate it in a very labor-intensive manner, with crops like cereals, alfalfa and sunflower, paying for machinery services.

**Irrigation is rarely possible, since most irrigation facilities deteriorated after the collapse of the Soviet Union.** Only 213 thousand hectares of arable land (11.7 percent), and 13 thousands of permanent crops (4.6 percent) were irrigated in 2015; these figures have not changed since 2011 (National Bureau of Statistics of the Republic of Moldova, 2015b). No farmer in the 2007-2013 HBS sample reported expenditures for irrigation, apart from one in 2007. The same situation was detected by the qualitative survey: only two interviewees could benefit from the water of a nearby river and extracted it using a gasoline pump. Instead, wells are very common in the home gardens (Piras & Botnarenco, 2015).

**Farming provides an important source of income to smallholder households. Yet, its share in total household income is declining over time.** While, on average, farm income made up almost 30 percent in 2007, its share dropped to 18 percent in 2013. This drop took place mainly in the years until 2009. The share of farm income is higher for households with bigger farms, but decreased in all size categories (Table 3)<sup>3</sup>. Moreover, a higher dependency on agricultural incomes is found in poor households.

**Peripheral farms are highly dependent on farm incomes, and their absolute farm household income is lower.** Household incomes and their structure differ considerably between farms located in peripheral regions and those close to Chisinau. Peripheral farms have a generally higher share of farm income in total incomes. In 2007, they earned about 25 percent less than non-peripheral farms; the gap in 2013 was lower, at 18 percent. This gap between peripheral and more central regions is also observed in the poverty headcounts; again, the differences are getting smaller over the years (Table 5).

**Overall, poverty numbers show cautious positive trend.** Income figures in Table 2 show that the average household income is more or less stable over time, amounting to about 36,000 MDL. However, since the average household size declined during the same period, the average per capita income<sup>4</sup> gradually increased from 17,084 MDL in 2007 to 18,911 MDL in 2013. Hence, the economic situation is cautiously improving, and the overall share of poor farm households decreased from 28.5 in 2007 to 14.9 percent in 2013 (Table 2).

**Despite still high levels of poverty and food insecurity, small farms in Moldova tend to not make full use of their land and production potential.** Farms lease out a considerable share of their farmland, or even leave it abandoned. Particularly farms in the smallest farm size category (<1 ha) lease a relatively large share of over 30 percent of their initial land. Leased land usually comprises the *big share*, while the household plot and the *small share* are kept. A considerable portion of total farmland, on average almost 20 percent, is left fallow.

<sup>3</sup> Given that data on cash and in-kind farm income were collected in 2007 for the first time, the impressive drop from 2007 to 2008 is possibly caused by an adjustment of measurement methods after the first pioneering year.

<sup>4</sup> Per capita incomes are calculated based on equivalent family size, i.e. household head = 1, other adults = 0.7; children under 15 years = 0.5 (NBS, Poverty Measurement Note, [http://www.statistica.md/public/files/SeminareConferinte/Seminar26oct2007/Not\\_inf\\_mas\\_saraciei\\_en.pdf](http://www.statistica.md/public/files/SeminareConferinte/Seminar26oct2007/Not_inf_mas_saraciei_en.pdf), see page 8).

Land abandonment is likely to be the result of restitution, but old-aged farm operators and out-migration further contribute to the tendency to leave land unused; often the abandoned parcels are small, difficult to reach and/or of poor land quality (Dudwick, Fock, & Sedik, 2007; Rolfes, 2008). The average surface of land that is actually farmed decreased by 12 percent within the smallest category of farms, while it stayed constant within the middle one, and increased by 10 percent among the biggest farms between 2007 and 2013 (Table 1).<sup>5</sup>

**Out-migration of younger household members may be one reason why farm activities are shrinking and poverty rates decreased.** As mentioned above, declining household sizes helped to improve the poverty situation. The average household size is less than three members, and it declined from 2.76 in 2007 to 2.46 in 2013 (Table 1). Probably, younger household members have left rural areas in search of employment. Indeed, the *Moldova Food Assessment* reports a drop in agricultural employment due to massive outmigration, from 51 percent in 2000 to 26 percent in 2012 (World Bank & World Food Programme, 2015). The elder generation, however, stayed back<sup>6</sup>. This is in line with the gradual increase of the age of the household heads, from 55 years in 2007 to 57 years in 2013. The share of households headed by females increased gradually within the period under study, from 37 percent to 39 percent (Table 1). For life expectancy reasons, women tend to head old-aged households. As the average farmers' age increases, this group is getting more and more important. In small and old-aged households, labor-intensive farm activities may be expected to go down.

**The ageing of smallholders is linked to their subsistence orientation.** As mentioned above, we categorize subsistence farms as those who consume more than 90 percent of their farm production. In other words, they almost exclusively produce for their own consumption. Subsistence farm households are often small, female headed, have a lower education level, and older household heads with health problems (Table 4). Thus, ageing seems to be a driver of subsistence orientation. In line with this, subsistence is also linked to lower levels of education. In 2013, still 10 percent of the heads of the subsistence farms had only primary (or lower) education, while this share was less than 6 percent among the more market-oriented farmers. However, the share of household heads with a low educational level is declining among both subsistence and more market-oriented farms.

**In most farms, agricultural activities mainly serve the subsistence needs of smallholder families.** Subsistence farms make up around three quarters of all family farms in the sample (Table 4). Compared to the more market-oriented farms, subsistence farms are overall smaller. The gap in farm sizes seems to be expanding over time: while the difference was about 16 percent in 2007, it increased to 36 percent in 2013 (Table 4). On average, more than 80 percent of farm production is consumed directly by the farm family; in subsistence farms, this share is over 99 percent, while the more market-oriented farms still have a share of in-kind income of around 45 percent in 2013. The high level of subsistence has not changed much over time, although there is a clear declining trend for more market oriented farms. Hence, farm activities mainly serve subsistence needs, and only a small share of farm production reaches the markets. This is true even for the group of the biggest farms, having access to more than 2 ha (Table 3). The latter show, however, a noticeable drop of subsistence in recent time, from 85 percent in 2010 to 77 percent in 2013. As for peripheral households, the share of own consumption of farm output is slightly higher, but also close to Chisinau the subsistence level exceeds 80 percent (Table 5).

**Although subsistence production is an important source of food at household level<sup>7</sup>, families from subsistence farms are not automatically protected from food insecurity and poverty.** More than one third of all farm households indicate that they faced difficulties in paying for the food needed to ensure a decent nutrition of their members over the previous year. The numbers are higher for subsistence farms and for poor households (Table 4 and Table 2), but also for farms close to Chisinau (Table 5), where food prices are higher. Although subsistence farming does not seem to provide sufficient protection from food insecurity, it works as

5 The increasing average size of land held by the bigger family farms goes together with a declining number of observations from this group. The mobility between groups is further analyzed in Section 4.1.

6 This generation is still the one who was given land shares after the dissolution of the collective farms. Since most landowners tend to keep their land, outsiders, including the young generation, can hardly get access to land. However, it will be interesting to see what will happen to the land when the cohorts who worked in Soviet time reach a physical limit to work on the land.

7 HBS data reveal that between 8% and 12% of the rural household meals are sourced from own food stocks, while values for urban households are lower, between 5% and 8% (World Bank & World Food Programme, 2015).

a counterbalance to poverty-caused food insecurity: in every year between 2007 and 2013, the share of households reporting problems in paying for food is higher for non-farmers compared to farmers, and for families living in central regions compared to those living in the periphery.

**Compared to subsistence farms, more market-oriented farm households report significantly higher farm and total household incomes.** In general, household incomes are 15-20 percent higher in this group over the whole survey period. For more market-oriented farm households, farm income is by far more important, but its share in total income is declining. While it made up about 43 percent in 2007, it dropped to about 34 percent in 2013 (Table 4). For this group, farming is a relevant source of cash income, as almost half of household production is marketed (about 45 percent in 2013). Subsistence farms have lower farm income shares, declining from about a quarter in 2007 to less than 13 percent in 2013 (Table 4). Thus, subsistence farming is clearly a sideline activity. This is also reflected in the lower land productivity, which is steadily declining (from 26,373 MDL per hectare of used of land in 2007 to 16,509 MDL in 2013), whereas this decline is less pronounced and concentrated in the second half of the period among more market-oriented farms (from 35,541 MDL in 2007 to 28,579 MDL in 2013).<sup>8</sup> The observed decline in land productivity may be linked to the ageing of smallholders and labor-intensive production strategies, which cannot be efficiently implement by elderly farmers.

**Although commercial farming seems to be a potentially viable livelihood pathway, in many cases marketing of surplus production could be the result of a lack of employment opportunities in the non-farm sector.** The share of households with underemployed members (i.e. members who reported to like to work more hours during the interview) is, at least in recent years, higher among more market-oriented households. In 2013, 26 percent of them reported underemployment within the households, while just 21 percent of the subsistence-oriented ones did so. Since farm activities could be increased (as indicated by the generally high shares of rented out and abandoned land), this underemployment certainly refers to the wish to work off the farm. In line with this, market-oriented households reported also more often that at least one member was looking for a job. We interpret this as an indication that the lack of alternative non-farm employment pushes smallholder households into farm-based marketing activities. Tudor (2014) describes a similar situation for Romania and states that the large semi-subsistence sector is maintained by the lack of non-agricultural occupational opportunities.

**As long as local non-farm employment alternatives are missing, out-migration is the most attractive choice for the younger generation.** Currently, out-migration to urban areas and, even more, international migration, seem to be the most attractive options for the young generation. This is reflected not only in shrinking household sizes and ageing, but also in the importance of remittances. Indeed, Moldova is among the most remittance dependent economies in the world. In 2013, remittances represented one quarter of the country's GDP (World Bank & World Food Programme, 2015). In the HBS data, the average share of remittances on farm household incomes varies between 13 percent (2007) and 16 percent (2008), but it is significantly higher for non-poor farm households (14.9 percent) compared to poor ones (7.0 percent) (Table 1 and Table 2). Migration may have positive income effects on migrant-sending households (see Section 4.4): many non-poor ones are probably escaping poverty exactly thanks to remittances. However, migration may be seen as rather problematic with view to a viable regional economic development.

**If the local economy is not developing, structural change is not taking place in a way that family labor is sufficiently re-allocated between sectors.** Farming is a significant source of income, but already today local off-farm employment is the most important source of earned income for smallholder farms. It is without doubt vital for ensuring rural livelihoods. A lack of local non-farm income sources poses a major problem for sustainable rural development. It is not only key in fighting poverty, but successful farm restructuring is hindered if viable employment alternatives are missing.

**The successful development of both the farm and the non-farm sectors requires a well-educated labor force.** At least on paper, the educational level within Moldova's small farm households is high: about one fifth

---

<sup>8</sup> Careful interpretation of these numbers is advised, since we do not have sufficient information on the conversion rates for in-kind consumption and marketed products.



of all farm household heads passed higher education, i.e. college or university studies.<sup>9</sup> The share of households with at least one member having a high level of education stands at about 30 percent, while the share of households having a low level of education is gradually declining (from about 11 percent in 2007 to less than 7 percent in 2013, see Table 1). Lower educational levels are more common in peripheral areas (Table 5) and among poor households (Table 2). Non-farm income sources can be easier tapped by better-educated individuals. Farm development also seems to be linked with better educational levels, as suggested by the significantly higher share of educated households in the biggest farm size class in Table 3 in the most recent year (2013).

Table 1. Descriptive statistics of household welfare and farm characteristics (2007 – 2013)

	2007	2008	2009	2010	2011	2012	2013
Number of farm households in the sample	4,782	4,771	4,345	4,337	4,525	4,367	4,165
Share of farm households in the sample (%)	70.61	70.46	71.29	71.13	71.19	70.17	70.91
Subsistence farms (%)	72.36	72.17	76.98	77.24	75.83	75.38	73.65
Small farms <1ha (%)	76.21	76.60	78.92	79.00	80.90	79.83	81.32
Farms in the central territory (%)	24.77	23.84	26.50	26.08	29.50	28.52	26.10
Farms in urban areas (%)	20.31	21.63	22.27	22.04	22.26	22.07	23.59
Poor farm households (%)	28.50	30.87	31.62	25.45	20.51	19.21	14.94
Average HH size	2.76	2.71	2.74	2.66	2.62	2.58	2.46
Average age of HH head	54.69	55.16	55.23	55.66	55.65	56.31	56.55
Female household head (%)	36.91	37.70	36.85	36.96	37.54	38.73	39.16
Bad health status HH head (%)	24.41	24.16	22.99	22.79	23.71	24.59	21.57
Education of HH head is low (%)	14.64	14.24	13.43	12.23	11.85	10.82	8.89
Education of HH head is high (%)	20.10	20.15	19.97	19.95	20.46	18.92	19.58
Max education in HH is low (%)	10.63	10.36	9.42	8.59	8.28	7.39	6.30
Max education in HH is high (%)	30.28	29.40	29.43	29.48	31.70	29.76	30.06
HH with job seeker (%)	11.67	11.51	14.80	13.21	13.27	10.73	10.22
HH with underemployment (%)	27.01	24.99	29.61	28.99	23.33	21.79	22.14
Average HH income (MDL)	35,910	36,266	35,363	35,522	36,396	35,867	36,605
Average per capita inc. (equ.) (MDL)	17,084	17,664	16,719	17,484	17,934	18,114	18,911
Farm income (% of total income)	29.04	21.18	18.16	19.10	19.35	18.81	18.17
Earned non-farm income (%)	27.75	31.72	31.20	30.18	31.32	28.76	28.58
Income from remittances (%)	12.98	15.92	13.37	14.03	12.68	13.53	13.75
Difficulty to pay for food (%)	37.55	42.84	41.52	40.37	40.59	40.20	35.23
Average total land area (ha)	1.60	1.57	1.52	1.48	1.43	1.39	1.35
- Thereof owned (%)	99.39	99.47	99.25	99.26	99.25	99.31	99.34
- Thereof rented out (%)	30.84	29.28	30.33	29.64	28.29	27.87	27.80
- Thereof available (%)	69.16	70.72	69.67	70.36	71.71	72.13	72.20
- Thereof abandoned (%)	17.11	18.16	18.78	19.59	20.44	19.90	19.43
- Thereof used (%)	52.05	52.56	50.89	50.77	51.27	52.18	52.76
Mechanization (own tractor) (%)	2.06	2.60	2.78	2.65	2.31	2.32	2.31
Share of in-kind farm income	86.58	84.58	87.26	87.42	86.97	87.23	85.34
Land productivity (MDL/ha farmed/year)	28,479	20,196	18,340	20,209	22,319	21,731	19,554

Note: Farm households are defined here as all households owning individual plots (backyard or *small share*) and/or *big shares*. The total land includes all farm land reported by the household, including farm land that is currently rented out. Available land includes rented in land, but excludes rented out area. Incomes are adjusted according to consumer price index with 2010 = 100 (World Bank Development Indicators, accessed June 2015).

<sup>9</sup> It needs to be stressed, though, that university education in Moldova is hampered by deep-rooted systemic inefficiencies. This will of course limit the increase in capacity that better education should usually imply. Molodikova (2008) stresses that there is a persistent and widening inequality in education opportunities, and informal payments and bribes in higher education seem to be common.

Table 2. Welfare and farm characteristics along poor and non-poor farms

	2007				2010				2013			
	Total	poor	other	p-value	Total	poor	other	p-value	Total	poor	other	p-value
Number of farm HH (%)	4,782	28.50	71.50	NA	4,337	25.45	74.55	NA	4,165	14.94	85.06	NA
Average HH size	2.76	2.90	2.71	***	2.66	2.85	2.60	***	2.46	2.74	2.41	***
Average age of HH head	54.69	57.18	53.70	***	55.66	58.17	54.80	***	56.55	57.96	56.30	**
Female household head (%)	36.91	37.49	36.68		36.96	37.26	36.86		39.16	39.93	34.77	**
Bad health status HH head (%)	24.41	28.66	22.71	***	22.79	27.32	21.24	***	21.57	23.40	21.25	
Education of HH head is low (%)	14.64	21.92	11.74	***	12.23	22.41	8.76	***	8.89	16.04	7.64	***
Education of HH head is high (%)	20.10	9.07	24.50	***	19.95	8.40	23.89	***	19.58	5.28	22.09	***
Max education in HH is low (%)	10.63	15.60	8.64	***	8.59	16.44	5.91	***	6.30	10.69	5.64	***
Max education in HH is high (%)	30.28	15.58	36.14	***	29.48	13.40	34.96	***	30.06	10.20	33.55	***
HH with job seeker (%)	11.67	15.24	10.25	***	13.21	16.65	12.04	***	10.22	17.08	9.02	***
HH with underemployment (%)	27.01	33.04	24.83	***	28.99	40.54	25.19	***	22.14	34.43	19.97	***
Average HH income (MDL)	35,910	22,291	41,340	***	35,522	23,020	39,789	***	36,605	24,562	38,721	***
Average per capita inc. (equ.) (MDL)	17,084	10,178	19,838	***	17,484	10,923	19,723	***	18,911	11,699	20,178	***
Farm income (% of total income)	29.04	29.30	28.93		19.10	22.21	18.04	***	18.17	21.63	17.56	***
Earned non-farm income (%)	27.75	24.88	29.15	***	30.18	25.28	32.03	***	28.58	23.92	29.35	***
Income from remittances (%)	12.98	5.98	15.76	***	14.03	6.23	16.70	***	13.75	6.98	14.93	***
Difficulty to pay for food (%)	37.55	46.67	33.92	***	40.37	51.77	36.49	***	35.23	46.95	33.17	***
Average total land area (ha)	1.60	1.55	1.61		1.48	1.52	1.46		1.35	1.36	1.35	
- Thereof owned (%)	99.39	99.62	99.31	*	99.26	99.23	99.28		99.34	99.45	99.32	
- Thereof rented out (%)	30.84	33.17	29.91	**	29.64	33.28	28.40	***	27.80	27.94	27.78	
- Thereof available (%)	69.16	66.83	70.09	**	70.36	66.72	71.60	***	72.20	72.06	72.22	
- Thereof abandoned (%)	17.11	17.65	16.89		19.59	18.43	19.99		19.43	18.52	19.59	
- Thereof used (%)	52.05	49.18	53.19	***	50.77	48.29	51.61	**	52.76	53.54	52.63	
Mechanization (own tractor) (%)	2.06	1.08	2.45	***	2.65	1.44	3.06	***	2.31	0.94	2.48	***
Share of in-kind farm income	86.58	88.33	85.89	***	87.42	90.17	86.49	***	85.34	88.67	84.75	***
Land productivity (MDL/ha/year)	28,479	21,910	31,069	***	20,209	17,973	20,973	**	19,554	20,028	19,470	

Note: Farm households are defined here as all households owning individual plots (backyard or *small share*) and/or *big shares*. Incomes are adjusted according to consumer price index with 2010 = 100 (World Bank Development Indicators, accessed June 2015). Poor households are households lying under the absolute poverty threshold for each year. Significances for group differences are indicated at the 1 percent level (\*\*\*), 5 percent level (\*\*) and 10 percent level (\*).



Table 3 Welfare and farm characteristics along farm size classes

	2007					2010					2013				
	Total	According to farm size			p-value	Total	According to farm size			p-value	Total	According to farm size			p-value
		<1 ha	1-2 ha	>2 ha			<1 ha	1-2 ha	>2 ha			<1 ha	1-2 ha	>2 ha	
Number of farm HH (%)	4,782	76.21	13.56	10.23	NA	4,337	79.00	12.34	8.65	NA	4,165	81.32	11.95	6.73	NA
Average HH size	2.76	2.67	2.95	3.21	***	2.66	2.55	2.95	3.29	***	2.46	2.37	2.74	3.06	***
Average age of HH head	54.69	54.70	54.54	54.81		55.66	55.77	55.34	55.95		56.55	56.83	55.56	54.88	***
Female household head (%)	36.91	39.64	30.95	24.12	***	36.96	40.33	27.85	19.52	***	39.16	42.76	27.11	16.56	***
Bad health status HH head (%)	24.41	24.33	26.25	22.50		22.79	23.21	21.04	21.95		21.57	22.09	19.38	19.04	
Education of HH head is low (%)	14.64	15.14	14.06	11.65	*	12.23	13.02	9.64	8.96	***	8.89	9.58	5.47	6.78	***
Education of HH head is high (%)	20.10	21.22	17.18	14.93	***	19.95	20.49	16.96	18.15	*	19.58	20.26	15.11	19.60	**
Max education in HH is low (%)	10.63	11.78	7.98	5.63	***	8.59	9.63	5.03	4.34	***	6.30	7.21	2.83	1.56	***
Max education in HH is high (%)	30.28	30.90	28.02	28.07		29.48	29.65	27.17	29.93		30.06	29.40	28.48	41.30	***
HH with job seeker (%)	11.67	11.22	11.51	15.39	**	13.21	12.68	16.47	12.90	*	10.22	9.61	14.17	10.84	**
HH with underemployment (%)	27.01	25.41	29.78	33.81	***	28.99	27.38	33.76	35.50	***	22.14	20.15	28.14	34.21	***
Average HH income (MDL)	35,910	35,254	35,959	40,855	***	35,522	34,965	37,126	38,018	*	36,605	35,476	39,504	44,578	***
Average per capita inc. (equ.) (MDL)	17,084	17,190	16,044	17,659	*	17,484	17,747	16,855	15,899	***	18,911	18,854	19,017	18,690	
Farm income (% of total income)	29.04	25.00	40.16	44.42	***	19.10	16.96	23.37	32.89	***	18.17	15.91	25.04	33.66	***
Earned non-farm income (%)	27.75	30.05	21.72	18.34	***	30.18	31.06	28.30	24.85	***	28.58	28.68	29.25	40.00	
Income from remittances (%)	12.98	12.79	12.84	14.43		14.03	13.67	16.43	14.08		13.75	13.33	15.33	15.34	
Difficulty to pay for food (%)	37.55	38.05	34.70	37.73		40.37	39.71	43.25	42.49		35.23	35.69	35.89	29.18	*
Poor farm households (%)	28.50	30.20	26.23	19.26	***	25.45	25.68	26.03	22.74		14.94	14.91	14.29	16.68	
Average total land area (ha)	1.60	1.32	1.78	3.40	***	1.48	1.18	1.96	3.52	***	1.35	1.09	1.87	3.69	***
- Thereof owned (%)	99.39	99.57	98.47	99.34	***	99.26	99.61	98.35	97.42	***	99.34	99.59	98.51	97.78	***
- Thereof rented out (%)	30.84	38.37	9.28	2.46	***	29.64	34.80	14.14	3.16	***	27.80	31.79	12.77	4.96	***
- Thereof available (%)	69.16	61.63	90.72	97.54	***	70.36	65.20	85.86	96.84	***	72.20	68.20	87.23	95.04	***
- Thereof abandoned (%)	17.11	16.40	17.26	22.36	***	19.59	18.59	21.70	26.07	***	19.43	19.87	17.13	18.57	*
- Thereof used (%)	52.05	45.36	73.43	75.18	***	50.77	46.61	64.16	70.78	***	52.76	48.33	70.11	76.46	***
Mechanization (own tractor) (%)	2.06	0.67	3.37	10.68	***	2.65	0.82	4.15	17.28	***	2.31	0.92	4.18	15.76	***
Share of in-kind farm income	86.58	86.62	86.70	86.16	*	87.42	87.75	87.24	84.59	*	85.34	86.16	84.39	77.34	***
Land productivity (MDL/ha/year)	28,479	34,060	12,557	9,667	***	20,209	23,674	7,839	6,537	***	19,554	22,585	7,542	5,823	***

Note: Farm households are defined here as all urban and rural households owning individual plots (backyard or *small share*) and/or *big shares*. Households are grouped according to farm size classes defined along total available land. Total available land refers to owned land minus rented out land plus rented in land, i.e. the land on which the family can expand its production in the short term (otherwise it is left fallow); the relative stability of leasing agreements makes rented in land available for a reasonable period of time, while it is unlikely that a family can get leased land back in the short time. Incomes are adjusted according to consumer price index with 2010 = 100 (World Bank Development Indicators, accessed June 2015). Significances for group differences are indicated at the 1 (\*\*\*) , 5 (\*\*) and 10 percent level (\*).

Table 4 Welfare and farm characteristics along farm types (subsistence vs more market-oriented)

	2007				2010				2013			
	Total	subsistence	other	p-value	Total	subsistence	other	p-value	Total	subsistence	other	p-value
Number of farm HH (%)	4,679	72.36	27.64	NA	4,268	77.24	22.76	NA	4,089	73.65	26.35	NA
Average HH size	2.77	2.74	2.86	**	2.67	2.63	2.82	***	2.47	2.42	2.61	***
Average age of HH head	54.69	55.29	53.14	***	55.70	56.29	53.70	***	56.48	57.31	54.16	***
Female household head (%)	36.64	38.37	32.11	***	36.64	39.12	28.21	***	38.95	42.12	30.07	***
Bad health status HH head (%)	24.33	26.66	18.24	***	22.57	23.95	17.87	***	21.25	22.48	17.83	***
Education of HH head is low (%)	14.55	15.91	11.00	***	12.23	13.92	6.50	***	8.83	10.05	5.44	***
Education of HH head is high (%)	19.57	18.83	21.49	*	19.86	19.77	20.16		19.57	19.41	19.93	
Max education in HH is low (%)	10.62	11.72	7.73	***	8.58	9.86	4.26	***	6.25	7.25	3.44	***
Max education in HH is high (%)	29.77	28.97	31.84	*	29.42	28.96	30.98		30.10	29.35	32.22	
HH with job seeker (%)	11.69	11.60	11.92		13.31	13.09	14.07		10.18	9.39	12.40	**
HH with underemployment (%)	27.33	26.98	28.17		29.10	28.69	30.42		22.29	20.92	26.17	***
Average HH income (MDL)	35,912	33,683	41,748	***	35,548	34,051	40,628	***	36,648	34,800	41,811	***
Average per capita inc. (equ.) (MDL)	17,055	16,005	19,804	***	17,423	16,851	19,364	***	18,896	18,145	20,995	***
Farm income (% of total income)	28.90	25.05	42.60	***	19.44	14.46	36.37	***	18.63	12.80	34.93	***
Earned non-farm income (%)	27.54	28.33	24.77	***	30.33	31.18	26.87	***	28.48	28.90	27.45	
Income from remittances (%)	13.07	13.80	11.17	***	14.03	14.97	10.84	***	13.79	14.79	11.01	***
Difficulty to pay for food (%)	37.32	38.42	34.44	**	40.46	41.44	37.11	**	35.10	36.00	32.59	*
Poor farm households (%)	28.53	30.31	23.86	***	25.48	26.42	22.28	**	15.03	15.72	13.11	*
Average total land area (ha)	1.64	1.566	1.823	***	1.50	1.434	1.729	***	1.39	1.265	1.720	***
- Thereof owned (%)	99.38	99.40	99.31		99.25	99.37	98.86	*	99.32	99.38	99.18	
- Thereof rented out (%)	31.57	31.69	31.25		29.96	29.29	30.86		28.34	27.80	29.87	
- Thereof available (%)	68.43	69.31	68.75		70.04	70.31	69.14		71.65	72.20	70.13	
- Thereof abandoned (%)	15.37	14.90	16.60	*	18.50	18.07	19.92		17.66	18.02	16.65	
- Thereof used (%)	53.06	53.40	52.15		51.54	52.22	49.22	**	54.00	54.18	53.47	
Mechanization (own tractor) (%)	2.12	1.31	4.24	***	2.70	1.48	6.82	***	2.37	1.26	5.46	***
Share of in-kind farm income	86.58	99.55	52.63	***	87.42	99.79	45.48	***	85.34	99.79	44.96	***
Land productivity (MDL/ha/year)	28,836	26,373	35,541	***	20,288	16,145	35,287	***	19,617	16,509	28,579	***

Note: Farm households are defined here as all urban and rural households owning individual plots (backyard or *small share*) and/or *big shares*. Subsistence farms are those farms that earn more than 90% of their farm income in kind. Incomes are adjusted according to consumer price index with 2010 = 100 (World Bank Development Indicators, accessed June 2015). Significances for group differences are indicated at the 1 percent level (\*\*\*), 5 percent level (\*\*) and 10 percent level (\*).

Table 5 Welfare and farm characteristics along peripheral and urban locations (measured as proximity to Chisinau)

	2007				2010				2013			
	Total	center	periphery	p-value	Total	center	periphery	p-value	Total	center	periphery	p-value
Number of farm HH (%)	4,782	24.77	75.23	NA	4,337	26.08	73.92	NA	4,165	26.10	73.90	NA
Average HH size	2.76	2.93	2.71	***	2.66	2.78	2.62	***	2.46	2.59	2.41	***
Average age of HH head	54.69	53.77	54.99	**	55.66	53.48	56.43	***	56.55	55.40	56.95	***
Female household head (%)	36.91	34.95	37.55		36.96	37.95	36.61		39.16	36.07	40.25	**
Bad health status HH head (%)	24.41	24.94	24.23		22.79	19.37	24.00	***	21.57	21.73	21.52	
Education of HH head is low (%)	14.64	11.45	15.69	***	12.23	8.12	13.68	***	8.89	5.29	10.17	***
Education of HH head is high (%)	20.10	20.85	19.86		19.95	23.02	18.87	*	19.58	21.53	18.89	
Max education in HH is low (%)	10.63	7.60	11.62	***	8.59	5.21	9.78	***	6.30	3.82	7.18	***
Max education in HH is high (%)	30.28	32.60	29.51	*	29.48	33.30	28.13	***	30.06	33.08	28.99	**
HH with job seeker (%)	11.67	11.61	11.69		13.21	14.79	12.66		10.22	13.51	9.06	***
HH with underemployment (%)	27.01	28.20	26.61		28.99	25.56	30.21	***	22.14	20.11	22.85	*
Average HH income (MDL)	35,910	44,129	33,204	***	35,522	41,436	33,435	***	36,605	42,152	34,646	***
Average per capita inc. (equ.) (MDL)	17,084	19,920	16,151	***	17,484	19,735	16,690	***	18,911	20,747	18,263	***
Farm income (% of total income)	29.04	25.00	30.37	***	19.10	13.51	21.07	***	18.17	14.68	19.40	***
Earned non-farm income (%)	27.7	36.16	24.98	***	30.18	43.50	25.48	***	28.5	38.64	25.02	***
Income from remittances (%)	12.98	11.33	13.52	**	14.03	11.9	14.78	***	13.75	11.22	14.64	***
Difficulty to pay for food (%)	37.55	44.17	35.37	***	40.37	41.80	39.87		35.23	35.43	35.16	
Poor farm households (%)	28.50	22.10	30.61	***	25.45	21.01	27.01	***	14.94	10.11	16.65	**
Average total land area (ha)	1.60	0.97	1.80	***	1.48	0.79	1.72	***	1.35	0.77	1.56	***
- Thereof owned (%)	99.39	99.01	99.52	**	99.26	99.29	99.26		99.34	99.61	99.25	*
- Thereof rented out (%)	30.84	12.46	36.90	***	29.64	9.96	36.58	***	27.80	9.04	34.43	***
- Thereof available (%)	69.16	87.54	63.10	***	70.36	90.04	63.42	***	72.20	90.96	65.57	***
- Thereof abandoned (%)	17.11	26.26	14.10	***	19.59	29.22	16.19	***	19.43	27.93	16.43	***
- Thereof used (%)	52.05	61.28	49.01	***	50.77	60.81	47.23	***	52.76	63.03	49.14	***
Mechanization (own tractor) (%)	2.06	2.17	2.02		2.65	2.44	2.72		2.31	2.01	2.41	
Share of in-kind farm income	86.58	81.92	88.04	***	87.42	84.40	88.46	***	85.34	82.86	86.19	***
Land productivity (MDL/ha/year)	28,479	31,964	27,382	*	20,209	17,155	21,240	***	19,554	18,087	20,056	

Note: Farm households are defined here as all urban and rural households owning individual plots (backyard or *small share*) and/or *big shares*. Peripheral areas, in contrast to central areas, are defined as being located more than 60 kilometers street distance away from the capital Chisinau. The total land includes all farm land reported by the household, including farm land that is currently rented out. Incomes are adjusted according to consumer price index with 2010 = 100 (World Bank Development Indicators, accessed June 2015). Significances for group differences are indicated at the 1 percent level (\*\*\*), 5 percent level (\*\*) and 10 percent level (\*).



## 4. Small farms' livelihood pathways towards structural change in agriculture

Rural poverty in less developed countries is closely linked with the structural development in agriculture and the livelihood pathways of farms. This section starts with discussing whether there is a dynamic pattern in terms of farm sizes and the currently prevailing subsistence orientation in Moldova. We then identify factors that support or hinder certain livelihood options, like market integration, farm growth, and diversification into alternative income sources. Finally, we discuss poverty implications of different livelihood strategies.

## **4.1 Is structural change happening? Changes in farm sizes and subsistence orientation**

In this section, we make use of the HBS panel by looking specifically at variations in important indicators of structural change. Although dataset covers several ten thousands of households, more than one observation is available for just 13,505 cases. A complete four-year panel is reported for less than six percent of the sample households. This fact limits the use of dynamic panel data estimators.

**Generally, farm exits are almost not observed, and land sales are very limited, which implies that possibilities for farms to grow are severely hampered.** A strong indicator of structural change would be if a significant number of panel farms gave up their farm completely or at least a part of their land. However, as our analysis in the previous section has already shown, such transitions are in general not frequently observed. Only those households with consecutive observations in the HBS panel are considered. First, nine cases of farm exit through selling out all owned land are observed, all of them in 2008. Second, the share of farmers who sell or purchase a part of their land drops progressively: 23.2 percent of panel farmers changed the amount of land they owned between 2007 and 2008, while only 7.0 percent did so between 2012 and 2013. The decrease is also substantial if considering the total amount of land involved: 10.6 percent of the land owned by panel farmers changed owner between 2007 and 2008, only 3.6 percent between 2012 and 2013. These figures show that the land market is becoming less and less dynamic, at least if family farms are concerned. In addition, the share of farmers engaged in leasing contracts decreases, from 40.1 percent in 2007 to 36.9 percent in 2013. The share of lessors dropped from 39.0 to 35.8 percent, while that of tenants increased slightly, from 1.5 to 1.7 percent. Finally, the share of farmers who changed the amount of leased land also dropped, from 12.0 percent between 2007 and 2008, to 6.2 percent five years later. Land consolidation through renting is, thus, much more common: farmers tend to lease their land for a long time.

**Structural change is slow and farm growth is an exception, not the rule.** Structural change is often discussed along changes in farms sizes. Growing farm sizes are seen as a sign of increasing competitiveness and economies of scale. However, as discussed above, we observe overall shrinking farm sizes among the small family farms covered by the HBS in Moldova. At least part of the released land must have been overtaken by the large commercial farms which are not covered by the HBS. Farm growth among smallholder farms is an exception and not the rule: the large majority of farms do not change their size category over the observed period, no matter whether we look at total or available land (Table 6). If considering total land (including land that is leased out), the probability that a farm grows is clearly lower than its probability to shrink (2.2 percent versus 5.6 percent). This difference is even more pronounced if we look at the land that is actually available to the farm, i.e. owned land, minus leased, plus rented-in. Thus, we conclude that currently structural change affects only a minority of small family farms.

**Table 6 Probability matrix for switches between farm size classes along total and available land**

From...	To...	Total land			Available land		
		Small <2ha	Bigger >2ha	Total	Small <2ha	Bigger >2ha	Total
Small (frequencies) <2ha		5,549	127	5,676	7,462	101	7,563
	(probabilities)	97.8	2.2	100.0	98.7	1.3	100.0
Bigger (frequencies) >2ha		154	2,619	2,773	145	732	877
	(probabilities)	5.6	94.5	100.0	16.5	83.5	100.0

Note: Bold numbers denote probabilities to grow or shrink. The analysis refers to HBS panel observations for the years 2007-2013.

**Table 7 Probability matrix for switches between farm types: subsistence oriented vs. more market integrated**

From...	To...	More market integrated farm	Subsistence oriented farm	Total
		More market integrated farm (frequencies)	1,270	806
	(probabilities)	61.2	38.8	100.0
Subsistence oriented farm (frequencies)		823	5,346	6,169
	(probabilities)	13.3	86.7	100.0

Note: Bold numbers denote probabilities to switch to the other farm type, whereby subsistence farms are defined as having an in-kind farm income share of more than 90 percent. The analysis refers to HBS panel observations for the years 2007-2013.

**Smallholder farms furthermore show little interest in commercialization and market integration. Instead, they appear to be moving backward to subsistence farming.** This is underlined by figures in Table 7, which show that the transition probability towards almost pure subsistence farming (i.e. 90 percent of self-consumption) is much higher than vice versa (39 percent vs. 13 percent). On the one hand, dynamics are not very high. On the other hand, as we have shown above, there is a small segment of smallholders with slightly bigger farms (over 2 ha) who increased the share of marketed production in recent times. Whether this will result in a competitive middle-sized family farm business is not clear. Even for those who are utterly willing to commercialize, Moldova's gradual adoption of EU regulations on food safety, traceability, etc. will pose a major challenge – perhaps one reason why the probability to fall back into subsistence is comparatively high. The necessary investments cannot be shouldered by the large majority of small farms leaving them no other options but to keep relying on more informal marketing channels if they do not turn away from the market at all.



## **Box 3: Subsistence farming: a safety net that hinders farm consolidation and farm growth?**

To understand the persistence of subsistence farming, one needs to look at historic roots and the resulting mentality of today's smallholders. During Soviet times, about 60 percent of the Moldovan workforce was employed in the agricultural sector and related activities. The dissolution of the collective farms and industries was not only a livelihood shock, but left many with a feeling that decollectivization and privatization was an unfair process in which a small group of powerful people took the best assets for themselves (Petrick & Carter, 2009). Due to this experience, and due to the sluggish agricultural and economic development since the end of the Soviet Union, smallholders generally lack trust and confidence in government policies (Gorton & White, 2003). Adding to that, the 1998 Russian financial crisis and recent bankruptcies and scandals destroyed the confidence in the banking sector.

All this led to a mentality of building up private safety nets instead of relying on formal organizations and the banking sector: most people, including farmers, prefer to keep their money in cash despite the currency risk. One important source of private safety nets are remittances. They are often the only consistent income, and the most difficult to detect even by the HBS, since families want to avoid taxation. Remittances, if not used for consumption, are invested in assets like mini-buses or city apartments. Smallholders, who are usually not able to invest, tend to keep the few hectares they got as a security for bad times. During our interviews, many farmers pointed out that the "land feeds the people". Indeed, land is the personal safety net of thousands of (mostly elderly) smallholders who have no access to a viable state welfare system.

This explains well why land sales are a rare exception. Instead, the land is either cultivated, mostly for subsistence purposes, rented out to large commercial farms, or simply left fallow. Since this behavior is fully rational in the current situation, structural change towards a business-oriented middle class of family farmers is effectively hindered. Agricultural policies aiming at a more competitive family farming sector will thus face a situation in which farmers will probably react very cautiously, or not at all, because their interest is in subsistence farming, and their willingness to take part in consolidation programs will be certainly low<sup>10</sup>.

New dynamics in the land market situation might be set off when the next generation, who has a growing negative perception of agricultural activities, takes over. They might be more open to selling their land, if they see chances for a better future in the capital or abroad. However, experience shows that even for urban or international migrants (most of whom fear they will not receive a pension from their host country) a plot of land might still be considered a fallback option for a worst case scenario or, if migration is successful, land might not be sold out of nostalgic reasons. Furthermore, even if the land market situation would become more dynamic, large scale farms may make use of their better bargaining position compared to new middle sized family businesses (see Box 1).

[based on qualitative interviews conducted by Piras and Botnarenco (2015)  
as well as on experience of the team in other transition economies with  
a persistent subsistence farm segment]

**Similarly, the interest in commercial farming as a main income source is also shrinking.** Full-time commercial farms are defined here as having an in-kind farm income share of less than 90 percent and a share of farm income in total household income of 50 percent or more. This group is very small in the sample from the

<sup>10</sup> Indeed, the current subsidization program for land consolidation has not brought results so far. In 2013, only six applicants are reported (World Bank, 2015b).

beginning on, and the probability to quit commercial full-time farming (Table 8) is even higher than that of switching from commercialization to subsistence as shown in Table 7. Entering commercial full-time farming goes with a very low probability of 3.8 (Table 8). We see this as a strong sign that the large majority of smallholder farms has little interest in developing their farming activities. Instead, farms are kept as a sideline, subsistence-oriented activity while the livelihood strategies turn towards the non-farm sector.

**Table 8** Probability matrix for switches between farm types: full-time commercial farm vs. diversified/subsistence farms

From...	To...	Full-time, commercial farm	Non-farm oriented part-time farm	Total
Full-time, commercial farm	(frequencies)	333	378	711
	(probabilities)	46.8	53.2	100.0
Non-farm oriented part-time farm	(frequencies)	293	7,445	7,738
	(probabilities)	3.8	96.2	100.0

Note: The first line of each cell indicates frequencies, the second line probabilities. Bold numbers denote probabilities to switch to the other farm type, whereby full-time commercial farms are defined as having an in-kind farm income share of less than 90 percent and a share of farm income in total household income of 50 percent or more. The analysis refers to HBS panel observations of the years 2007-2013.

**In general, smallholders have only very limited possibilities to commercialize and to increase their farm size, even if they are willing to do so.** The observation that farms are shrinking, and the tendency to reduce agricultural activities to subsistence production could, theoretically, open up opportunities for farms with a potential to grow and modernize. However, as we have argued above, the land rental market seems not very dynamic. While many lease their *big shares* to large commercial farms, this leads to no visible dynamics in our sample of small family farms (where these farms are not included). Occurrence of renting in land is negligible among family farms. This is in line with qualitative interviews, in which smallholders stressed that they keep their land mainly as a sort of insurance to provide a certain minimum level of livelihood security for their family (see Box 4).

### Box 4: The reality of land rental markets – do smallholders have full command over their big share?

Many Moldovan smallholders, who received a *big share* when former collective farms were dissolved, lease this land to a local *leader*. This person is often the former head of the local collective farm, who is able to make use of the knowledge from this previous position. *Leaders* either manage large commercial farms themselves or sublet to large commercial farmers (local or from outside the village), who negotiate their lease contracts with the *leader*.

Interestingly, several small farmers interviewed in center-northern districts were not able to identify their *big share*. Initially, the shares were physically delimited by the land registry officers of the village. However, shareholders were not automatically given the land, but were only offered the possibility of leasing it to the local commercial farm. Thus, they never had full command over their land. This situation is also described by Dudwick *et al.* (2007: 23) for southern Moldova: “Workers on the farm reported that its powerful manager has used his ties with municipal authorities and police to prevent all but two well-connected and determined families from withdrawing land. The remaining people in this village of 6,000 lack land titles and do not know where their physical plots are located.”

Gaining actual access to the land, once it was leased out like this, means that the smallholder has to embark on a complex administrative procedure. Farmers reported that clear and complete information is hard to obtain for them, and it usually will involve unpleasant arguing with employees of the town hall. Moreover, local *leaders* are often in control – or coincide with – local institutions (mayors, village councilors), and may make use of this power for example in hindering administrative processes (Petrick & Carter, 2009). Farmers also fear, probably not without reason, that if land is physically given back, they will be given unattractive plots of low fertility and at a far distance from the village.

Renting is, in general, practiced on a rather informal basis, based on short-termed (three years) contracts. The leasing conditions usually foresee a fixed rent (not a share of the yield), which is given to the land owner in kind (a modal value of 400 kg of wheat, 100 kg of corn, and 100 kg of sunflower seeds for a *big share*, regardless of its area). The high degree of informality poses risks for both sides. The short duration of rental agreements, which have to be renewed regularly, certainly decreases the interest of tenants in longer-term investments. However, it seems that the power is generally on the side of tenant, as underlined by anecdotal evidence of several cases when low yields (evaluated by the tenant!) led to cutting down in-kind payments, sometimes to even nil. It also seems to be common that land renting contracts are renewed without informing the landowner. Smallholders are in general not in the position to easily resist such practices as they are strongly dependent on the local big commercial farm (see Box 1).

[based on qualitative interviews conducted by Piras and Botnarenco (2015)]

## 4.2 Drivers of farm growth and market integration

As mentioned above, farm growth and market integration are classical indicators of structural change towards a more competitive and viable (family) farm sector. Since in Moldova consolidation of the family farming sector is clearly hampered by land fragmentation and by farm sizes that are too small for viable commercialization, these two features need a more thorough investigation with view to their local drivers (or constraints).

**A deeper understanding of what keeps smallholder households in the state of subsistence is needed.**

The findings of a probit regression analysis estimating factors linked with the state of being a subsistence farm are presented in Table 9. As in the previous analyses, subsistence farming, our dependent variable, is a dummy turning one if the share of own consumption makes up more than 90 percent of farm income (subsistence farms), and zero if 10 percent or more of total farm production is sold on the market (more commercially oriented farms).

**Table 9 Major factors of influence on subsistence farm production**

	Coef.	Std. Err.	z	P>z	95% Conf. Interval	
Rural location	0.147	0.039	3.76	0.000	0.070	0.224
Active members	-0.020	0.014	-1.41	0.157	-0.049	0.008
Female head	0.253	0.030	8.3	0.000	0.193	0.313
Age head	-0.040	0.006	-6.31	0.000	-0.052	-0.028
Age squared	0.0004	0.00006	7.03	0.000	0.0003	0.0005
Bad health status	0.187	0.035	5.43	0.000	0.120	0.255
Pension income	0.140	0.039	3.6	0.000	0.064	0.216
Low education	0.075	0.063	1.19	0.234	-0.049	0.199
Size of big share	-1.57*E-05	1.05*E-06	-14.89	0.000	-1.78*E-05	-1.36*E-05
Location North	-0.088	0.033	-2.68	0.007	-0.152	-0.024
Location South	0.641	0.040	15.85	0.000	0.562	0.721
Constant	1.703	0.169	10.11	0.000	1.373	2.033
sigma_u	1.262	0.038			1.188	1.339
rho	0.614	0.014			0.585	0.642
Wald chi2(11)	753.93					
Prob > chi2	0.000					

Note: The analysis refers to HBS data of the years 2007-2013 using an xtprobit estimator. N=30,659 farm household observations.

Independent variables are the following: 1. 'Rural location' is a dummy that refers to the fact whether the household is located in an urban or rural area (urban=1, rural=2); 2. 'Active members' represents the number of household members in working age; 3. 'Female head' is a dummy indicating the sex of the household head (male=0, female=1); 4. 'Age of head' and 'age squared' present the age and squared age of the household head; 5. 'Bad health status' is a dummy based on how the household head assessed his/her health on a Likert scale from 1 to 5 (medium to very good=0, bad and very bad=1); 6. 'Pension income' shows whether a household receives a pension (no=0, yes=1); 7. 'Low education' is a dummy representing the highest educational level within the household (secondary level or higher=0, primary level or lower=1); 7. 'Size of *big share*' measures the total area of the *big share* in square meters; 8. 'Location North' and 'Location South' are dummies indicating whether the farm is located in the North or South respectively ('Location Centre' is omitted).

**Household and family characteristics are important determinants of whether a farm is commercially or subsistence oriented.** Regression results clearly indicate that certain characteristics of the family limit the possibilities for (and the interest in) market integration. If a household is headed by a woman, and/or the household's head is burdened by bad health or old age, the probability that this smallholder farm relies on subsistence increases. Market integration increases until a certain age of the household head and starts declining only for very high ages, as shown by the coefficient of age squared. The positive coefficient for the variable indicating pension income in the household underlines once more that old age is an important determinant of subsistence farming<sup>11</sup>. Yet, if the household is located in an urban region or in the North, the likelihood that this household uses almost its entire farm production for its own consumption decreases. Subsistence orientation is further negatively linked with increasing sizes of the *big share*.

**Despite a static land market, a few farms grow or shrink over time.** The fact that no middle-sized family farm sector is developing must be seen in relation to limited changes in farm sizes (see Section 4.1). Yet, it is still interesting to see what differentiates farms that grow (or shrink) from those that stay stable. This is done based on a multinomial logistic regression (Table 10). The dependent variable can assume three different values: -1 if the farm shrinks in comparison with the previous year, 0 if there is no variation, and 1 if the farm grows. The units are farm households for which data for (at least two) consecutive years are available. Overall, 746 cases of farm shrinkage, 783 of farm growth, and 6,926 cases of no variation are observed (Table 10).

**The crisis year 2009 induced some dynamic in the land market; however, this effect was limited and did not reach out to the following years.** In 2009, the probability for farms to either shrink or grow was particularly high (Table 10). In this year, Moldova was hit by the world financial crisis, which, among others, caused a severe decrease in remittances. After the drought in 2012, we observe a significant decrease in land dynamics in the following year.

**Farm size changes are linked with certain family characteristics and the location of the farm** (Table 10). A bigger family size is associated with more growth dynamics: bigger households have the possibility of using family labor for managing a bigger farm. Not surprisingly, older ages of the household head are negatively associated with farm growth. With an increasing share of unearned income (mostly pensions), shrinkage is inhibited, most likely due to a stronger dependence on subsistence farming. Farm size changes are furthermore correlated to the location of the farm. The probability of either shrinking or growing is lower if the farm is located in the North, where agriculture is more developed. It is also low for locations in the direct vicinity of the capital (within 60 km from Chisinau); landowners are probably not selling their land here because they expect land prices to keep growing, and at the same time, they can barely afford buying new land.

---

<sup>11</sup> State transfers account for between 40-50 percent of rural incomes. Pensions account for the bulk of transfers (80-90 percent) and represent an important safety net. However, pensioners need to complement their pensions, since these, on average, cover less than 60 percent of the minimum consumption basket (World Bank & World Food Programme, 2015).

**Table 10 Correlations of farm growth and shrinkage with selected variables**

	Coef.	Std. error	z	P> z	95% conf. interval		
Shrinkage	Land in ha (per cp)	-0.347	0.054	-6.39	0.000	-0.453	-0.240
	Age head	-0.004	0.003	-1.35	0.176	-0.011	0.002
	Active members	-0.057	0.045	-1.26	0.209	-0.145	0.032
	Low education	0.217	0.153	1.42	0.157	-0.083	0.517
	Non-farm income (MDL)	-0.0001	3.3*E-05	-3.6	0.000	-0.0002	-0.00006
	Unearned income (%)	-0.294	0.152	-1.94	0.052	-0.591	0.003
	Year 2013	-0.761	0.155	-4.9	0.000	-1.066	-0.457
	Year 2009	0.834	0.089	9.41	0.000	0.660	1.008
	Location South	0.605	0.110	5.51	0.000	0.390	0.820
	Location Centre	0.936	0.105	8.88	0.000	0.729	1.143
	Close to Chisinau	-0.883	0.114	-7.71	0.000	-1.107	-0.659
	Constant	-1.854	0.234	-7.94	0.000	-2.311	-1.400
	No change (base outcome)						
	Growth	Land in ha (per cp)	0.192	0.036	5.29	0.000	0.121
Age head		-0.009	0.003	-2.83	0.005	-0.015	-0.003
Active members		0.079	0.042	1.89	0.059	-0.003	0.161
Low education		-0.245	0.178	-1.38	0.168	-0.594	0.104
Non-farm income (MDL)		3.7*E-05	2.5*E-05	1.47	0.143	-1.3*E-05	8.7*E-05
Unearned income (%)		-0.023	0.144	-0.16	0.872	-0.306	0.260
Year 2013		-0.722	0.145	-4.98	0.000	-1.006	-0.438
Year 2009		0.584	0.091	6.44	0.000	0.407	0.762
Location South		0.394	0.107	3.74	0.000	0.190	0.607
Location Centre		0.850	0.103	8.27	0.000	0.648	1.051
Close to Chisinau		-0.750	0.112	-6.7	0.000	-0.970	-0.531
Constant		-2.351	0.225	-10.44	0.000	-2.791	-1.909

Note: The analysis refers to HBS panel observations of the years 2007-2013 using a mlogit estimator.

**While non-farm income seems to work against downsizing, the availability of more active household members and more land pushes farm growth.** If the land area per equivalent family member is bigger, this leads to a higher probability to further increase the farm size, while it becomes less likely that the farm shrinks (which shows that farming represents a viable economic activity for the family only over a critical point). A higher number of household members in active age also increases the likelihood of farm growth. Non-farm income is negatively linked to farm shrinkage. The more off-farm income is available, the more this works against downsizing the farm. This is consistent with what was declared by some interviewed farmers, who stated that they could keep cultivating their big shares only because they were earning money in other sectors. Thus, non-farm income is used for mechanization services and the purchase of other inputs (Piras & Botnarenco, 2015).



## Box 5: Consolidation versus intensification: which pathway is more promising?

Farm consolidation is confronted with a widespread lack of dynamics of the land rental markets as well as social security issues (see Box 3). Therefore, intensification could be a more promising alternative. If policies aim at relieving as many people as possible from poverty and at reducing rural outmigration, this strategy seems a better-targeted choice. Land consolidation implies that a large number of farmers are pushed out of the sector and involves the risk that the existing commercial farms, rather than a new class of family farmers, will obtain the land that is released. Instead, intensification of farm production would target also a large number of the existing semi-subsistence farms. Indeed, we observe that smallholders deliberately follow a low input – low output strategy due to significant market failures, including lacking access to product markets, no access to formal credit facilities, and extremely high interest rates, amounting to 20-30 percent p.a. Addressing these market failures could be a promising strategy for inducing intensification, and probably also commercialization of the smallholder sector.

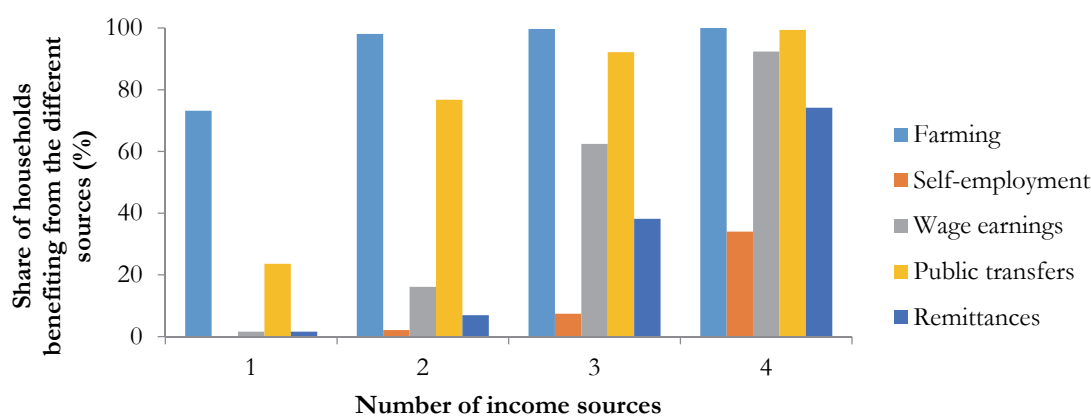
[partly based on qualitative interviews conducted by Piras and Botnarenco (2015)]

## 4.3 Drivers of non-farm diversification and migration

**Farming is a very important income source for rural households, but income diversification is the rule.**

Apart from farming (99 percent of all farm households report farm income), most farm households rely on additional income sources: primarily pensions (53 percent) and waged employment (40 percent). Around one quarter of all farm households receive remittances and less than 10 percent have income from self-employment. On average, farm households benefit from two to three income sources out of five possible ones (farming, self-employment, waged work, remittances and other income). Although almost all rural households are involved in farming, it contributes for less than 20 percent of total household income (Table 1). Public transfers (pensions and welfare), which are included into the category other income and make up the main part of this income category) represent the most important source (34 percent of family income on average in 2013), followed by waged employment (24 percent). They both accounted for 28 percent of family farm income in 2008, but the former has been increasing, and the latter decreasing since then, probably due to ageing effects. Almost one quarter of farm households with a single income source, fully rely on public transfers. Self-employment does not play a prominent role (it has been constant at four percent of family income). Figure 5 illustrates the relevance of different income sources along categories of the total number of income sources for the year 2013.

**Figure 5** Relevance of income sources conditional upon total number of income sources, 2013



Note: The figure presents the share of households reporting any income from the five sources. Reading example: Close to 100 percent of households reporting two sources of income draw from agricultural activities in combination with either public transfers, wage earnings, remittances or income from self-employment.

**Poor farm households benefit from slightly less income sources, but the shares of these sources on their total income are more equilibrated.** In 2013, non-poor households had 2.57 income sources on average, poor ones 2.46. Starting from 2009, non-poor households show a stronger concentration of income streams on few sources, as revealed by the Hirschman-Herfindahl Index (HHI) in Table 11. Non-poor households rely on more income sources, typically waged income, supplemented with remittances, part-time farming and, eventually, self-employment income. Poor ones, especially the elderly, mainly rely on farming and income from social transfers.

**The number of income sources is not only negatively correlated with poverty, but also with access to land, and low education.** As the number of income sources is a count, a Poisson regression is the most suitable econometric method to analyze the determinants of income diversification (Table 12). The negative correlation between poverty and the number of income sources is proven by a negative and statistically significant coefficient of the poverty variable in the basic specification (first column), as well as by a slightly smaller constant term in the specification for poor households (second column), implying that they draw from a lower number of income sources. Furthermore, not surprisingly, larger households benefit from more income sources, while those with an older head show significantly less sources. The number of income sources is positively linked to higher education levels and female household heads. It is negatively correlated with the amount of the big share (probably because these families chose a farm-centered livelihood), with more children in the household, and with low educational levels.

**Table 11 Measures of income diversification at farm household level**

Year	Number of income sources per household			HHI over all income sources		
	poor	non-poor	p-value	poor	non-poor	p-value
2007	2.44	2.63	***	0.58	0.58	
2008	2.43	2.65	***	0.61	0.61	
2009	2.42	2.62	***	0.62	0.64	***
2010	2.44	2.61	***	0.59	0.62	***
2011	2.38	2.60	***	0.59	0.61	**
2012	2.45	2.59	***	0.58	0.61	***
2013	2.46	2.57	***	0.59	0.62	***

Note: Significances for group differences are indicated at the 1 percent (\*\*\*), 5 percent (\*\*) and 10 percent level (\*).

**Higher education facilitates the tapping of non-farm income sources.** Table 13 presents estimated coefficients of probit models based on the HBS panel sample (2007-2013). Non-farm waged and self-employment incomes are equally correlated with the same factors. Besides a higher educational level, also a central location increases the probability to have income from non-farm work. This is understandable, as Chisinau represents the only sizeable urban area of the country, where off-farm sectors experienced a decent development. Taking up non-farm work is more likely for bigger households with younger and male heads, and less children. Household characteristics that work against taking on non-farm activities are female heads, a bad health status of the head, lower educational levels, and bigger farm areas, which bind the family to agriculture. The existence of unearned income (mainly welfare payments, pensions) is correlated to the same factors observed for non-farm incomes, however with opposite signs. The only exception is the size of the *big share*, which is significantly negatively correlated with all potentially available income sources apart from farming. Unearned income is more common among households that have heads who are older, female or with bad health status, and those that have more children or lower level of education.

**Table 12 Factors of influence on income diversification by socio-economic and geographic strata (2013): Poisson regression**

<b>Explanatory variable</b>	<b>All households</b>	<b>Poor households</b>	<b>Peripheral households</b>
Household size	0.056*** (0.005)	0.038*** (0.012)	0.054*** (0.006)
Female head	0.023** (0.009)	0.015 (0.020)	0.032*** (0.010)
Age head	-0.004*** (0.0004)	-0.004*** (0.001)	-0.004*** (0.0004)
No of children (<16 yrs)	-0.018** (0.008)	0.006 (0.018)	-0.019** (0.009)
Bad health HH head	0.005 (0.011)	0.003 (0.023)	0.009 (0.012)
Low education	-0.062*** (0.014)	-0.054* (0.031)	-0.068*** (0.015)
High education	0.041*** (0.010)	-0.013 (0.029)	0.044*** (0.011)
Area of big share	-1.02E-06*** (3.65E-07)	-3.89E-07 (1.11E-06)	-1.13E-06*** (3.80E-07)
Poor household	-0.042*** (0.012)		-0.033** (0.013)
Central location	0.007 (0.011)	-0.013 (0.029)	
Constant	1.010*** (0.030)	0.9998*** (0.076)	1.008*** (0.033)
F (Prob>F)	94.99 (0.000)	13.00 (0.000)	90.84 (0.000)
N	4165	615	3187

Note: Standard errors in parentheses; due to problems of convergence of the panel Poisson estimator, results are presented only for 2013. Diversification is measured as the number of income sources. Significances for group differences are indicated at the 1 (\*\*\*) , 5 (\*\* ) and 10 percent level (\*).

**Table 13** Determinants of farm household’s non-farm income activities: probit regression using the 2007-2013 HBS panel

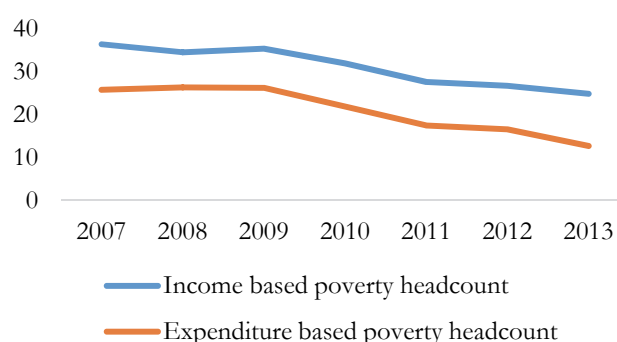
Explanatory variable	Self-employment	Waged work	Unearned income
Household size	0.486*** (0.030)	0.760*** (0.023)	-0.096*** (0.018)
Female head	-0.453*** (0.061)	-0.168*** (0.039)	0.666*** (0.044)
Age head	-0.034*** (0.003)	-0.046*** (0.002)	0.041*** (0.002)
No of children	-0.350*** (0.040)	-0.833*** (0.033)	0.387*** (0.030)
Bad health HH head	-0.263*** (0.073)	-0.454*** (0.045)	0.649*** (0.054)
Low education	-1.034*** (0.266)	-2.376*** (0.167)	1.721** (0.283)
High education	0.223*** (0.055)	1.085*** (0.044)	-0.189** (0.036)
Area of big share	-2.18*E-05*** (2.28*E-06)	-8.26*E-06*** (1.27*E-06)	-3.00*E-06*** (1.16*E-06)
Centre	0.639*** (0.062)	0.424*** (0.045)	-0.251*** (0.040)
Constant	-2.373*** (0.151)	0.458*** (0.093)	-0.336*** (0.094)
Wald $\chi^2$ (Prob> $\chi^2$ )	525.37 (0.000)	1896.66 (0.000)	849.17 (0.000)
N	31.275	31.275	31.275

Note: The analysis refers to HBS panel observations (2007-2013) using an xtprobit estimator. Standard errors in parentheses; dependent variables are dummies turning 1 if the household has the specific income source. Significances for group differences are indicated at the 1 (\*\*\*) , 5 (\*\* ) and 10 percent level (\*).

## 4.4 Poverty implications of being a smallholder and following certain livelihood strategies

The condition of being a smallholder in Moldova is clearly linked with poverty outcomes. Despite a substantial reduction of poverty in the period 2007-2013, poverty headcounts remained between four and seven percentage points higher for farm households compared to the entire population, if measured by the absolute poverty line (Table 14). We use expenditure-based indicators, whose absolute values are significantly lower (between nine and twelve percentage points) compared to income-based ones, but whose trend is similarly decreasing. This is illustrated

**Figure 6. Income versus expenditure based headcounts**



Source: Own calculation. HBS 2007-2013.

in Figure 6. Relative poverty, measured by taking as a threshold half the value of the median national income, results in lower but still substantial poverty rates, with a gap of between one and two points between farm households and the entire population. Poverty deficit and severity measures are also slightly higher for farm households: the poverty deficit, defined as the average distance of the poor from the poverty line, is two percent with respect to the absolute poverty threshold in 2013. Poverty severity, which gives a greater weight to households that are further away from the poverty line, lies at 0.5 percent with respect to the same threshold in 2013.

**Table 14 Poverty headcount (in percent) and Gini index in Moldova (2007-2013)**

	Group	2007	2008	2009	2010	2011	2012	2013
<b>Absolute poverty</b>	line (MDL)	839	946	946	1,016	1,093	1,143	1,196
	farmers	29.89	31.79	33.05	27.26	22.08	20.88	16.63
	all	25.83	26.39	26.31	21.93	17.50	16.59	12.70
<b>Relative poverty</b>	line (MDL)	589	637	648	712	795	834	932
	farmers	9.49	9.96	9.17	7.04	5.70	4.82	4.67
	all	7.90	7.84	7.09	5.45	4.41	3.66	3.44
<b>Gini index</b>	farmers	0.272	0.262	0.255	0.240	0.225	0.219	0.218
	all	0.285	0.280	0.279	0.259	0.246	0.238	0.231

Source: Own calculation. HBS 2007-2013.

Note: Poverty measures refer to expenditure based indicators. Relative poverty is measured in comparison to the 50 percent median income of all individuals in the sample.

**Various livelihood strategies have different impact on poverty outcomes.** In Table 15, we explore counterfactual scenarios, derived from a Propensity Score Matching analysis for the year 2013, for a number of livelihood strategies. We compare poverty headcounts for different scenarios. Here, poverty headcounts are calculated based on incomes instead of expenditures, since income is directly associated with the analyzed livelihood paths. The aim of this exercise is to better understand poverty effects. The counterfactual scenarios describe how the poverty situation would have been if households had followed certain earning strategies. Based on this, we are able to compare, for example, the situation in which a household follows a migration and remittances strategy with the counterfactual of having no access to remittances. If the counterfactual poverty headcount is higher (lower) than the sample headcount, this means that the respective livelihood strategy may be associated with a positive (negative) effect on poverty. Table 15 shows four different livelihood strategies and their associated poverty status: livelihood strategies that are farm-centered, commercially oriented, non-farm oriented and relying on migration and remittances; a definition is given below Table 15.

**Migrant remittances lift the highest number of households out of poverty; the second highest positive impact on poverty results from diversification into the non-farm sector.** Remittances show the strongest effect on poverty (Table 15). Yet, while for the single household, migration might be the optimal solution to ensure better livelihoods, the effects on Moldova's rural areas might be less beneficial. Only if trickle down effects materialize, longer-term positive impacts can be expected. Therefore, from the rural development perspective, local off-farm employment opportunities would be more desirable. If livelihoods are farm-centered, meaning that farming is the main income source of the household, this contributes to higher poverty levels in a household. This effect is also observed for commercially oriented full-time farms, but to a lower degree. Diversification into the non-farm sector, however, has a low, but positive impact on poverty levels.

**Income distribution is, overall, not extremely unequal, but farm and non-farm livelihood strategies have different impacts.** Gini indices for all years are shown in Table 14. Income inequality is slightly lower among farm households compared to the overall HBS sample. As for 2013, we show that certain livelihood strategies (see description in the Note to Table 15) have different impacts on the income distribution. Again, we use counterfactual income scenarios. Results are presented in Table 16. We find that the migration-based



livelihood strategy tends to increase inequality. Thus, the positive effect of remittances on poverty outcomes is unequally distributed. In addition, farm-centered livelihoods (i.e. if farming represents the main income source) have a disequalizing effect. The examination of partial coefficients in the lower section of Table 16 allows for quantifying elasticities. Here we see that, overall, farm income tends to decrease inequality, while non-farm incomes, including remittances, increase it. Especially for remittances, this effect is high: a one percent increase in this income would lead to an increase of the Gini coefficient of 19 percent. Other incomes, which include mainly pensions and social transfers, have the expected strong equalizing effect.

**Table 15 Income strategies and poverty effects (2013)**

Headcount indices based on counterfactual incomes for households following different livelihood strategies					
	Income based headcount index (%)	Farm-centered	Commercially oriented farm	Non-farm oriented	Remittances recipient
<b>Absolute poverty (1,196 MDL)</b>	31.28	25.27	30.16	32.42	37.27
<b>Relative poverty (886 MDL)</b>	13.30	8.40	12.42	14.19	17.94

Source: Own calculation.

Note: N=4,165 farm households (HBS 2013). Poverty headcounts in Table 15 are calculated based on incomes, using the same poverty line as in Table 14. Poverty headcounts are thus higher (see also Figure 6). Counterfactual incomes are derived from Propensity Score Matching analysis.

**Farm-centered livelihoods:** headcounts are calculated based on counterfactual income for farms with farm income as main income source

**Commercially oriented farm:** headcounts are calculated based on counterfactual income for farms with a farm income of 50 percent of more and a minimum market integration described by a subsistence share below 90 percent.

**Non-farm oriented livelihoods:** headcounts are calculated based on counterfactual incomes for farms with a share of non-farm income of 90 percent or more.

**Migration and remittances based livelihoods:** headcounts are calculated based on counterfactual incomes for farms that are remittances recipients.

**Table 16 Income distribution and remittances (2013)**

Gini coefficient	
▪ on the basis of equalized per capita incomes	0.325
▪ using counterfactual incomes for farm-centered livelihoods	0.294
▪ using counterfactual incomes for commercially oriented farms	0.320
▪ using counterfactual incomes for non-farm oriented livelihoods	0.322
▪ using counterfactual incomes for remittances based livelihoods	0.304
Decomposed Gini coefficients (elasticity in brackets)	
▪ on the basis of farm incomes	0.560 (-0.1086)
▪ on the basis of waged incomes	0.689 (0.0729)
▪ on the basis of self-employment	0.939 (0.0429)
▪ on the basis of remittances	0.858 (0.1936)
▪ on the basis of other incomes	0.594 (-0.2008)

Source: Own calculation.

Note: N=4,165 farm households of the HBS 2013. Gini coefficients are calculated based on per capita farm household incomes. Counterfactual incomes derived from Propensity Score Matching analysis. For the description of livelihood strategies, see Table 15.

## **Box 6 Is migration offering a solution to successful rural development?**

Rural outmigration may have both negative and positive effects. Migration in Moldova is driven by a lack of alternative local income opportunities, and the negative perception of agriculture by the younger generation, who prefers not to work in this sector even if other local jobs are not available. It is linked to an ageing farm population and depopulated villages where public services are not always offered any more. On the other hand, (international) migrants' remittances are an important income source. Remittances to Moldovan farmers overall are thought to be a more important vehicle for reducing poverty and food insecurity than public transfers (World Bank & World Food Programme, 2015)

However, the impact of remittances depends much on their use. While it is known that they are spent mainly for consumption purposes (Molodikova, 2008), targeted investment would increase the sustainability of the effect. We find anecdotal evidence that remittances flow into agriculture, however rather for current agricultural expenditures, e.g. buying seeds, animal feed, or paying for mechanization services. This was reported by several interviewed families – especially those where a child migrated abroad and the old parents live in the countryside. If remittances are invested, the money will seldom flow into agriculture, but rather into real estate in the cities, the transport sector (e.g. minibuses), or the small retail sector. Thus, apart from a short-term relief for recipient households, a broader effect of migration and remittances is rather theoretical at this stage. Yet, from very few examples where farm investments financed by remittances took place, it gets clear that remittances based farm development is possible. In two cases, the interviewed farmers had bought a few hectares of land for planting walnut trees. In three cases, they had built small greenhouses and bought drop irrigation equipment in order to cultivate berries and vegetables. Such small investments into family farm development are difficult to finance for most smallholders and farmers confirmed that they would not have invested at all if they had to rely on a bank loan.

[partly based on qualitative interviews conducted by Piras and Botnarenco (2015)]



## 5. Implications and policy recommendations

In this section, we summarize the core results of the paper and discuss their implications. We further offer some perspective lessons derived from the developments in two EU countries: the neighboring Romania, with many similarities to Moldova, and Poland, which went through a particular successful transition. We close with a number of policy recommendations targeted at the development of smallholder farming in Moldova. A poverty perspective guides these recommendations. We focus on the needs of smallholders with the will and potential to develop their farm business, and call for a balanced structural change accompanied by measures that protect and support the most vulnerable part of the farm population.

## 5.1 Summary of key results and conclusions

**Land privatization in Moldova has led to an unfavorable agricultural structure, with many subsistence farms.** Given the initial conditions, broad land distribution provided a minimum of social security to many rural households. While, initially, land privatization was expected to result in a quickly emerging agricultural sector dominated by family farms, reality brought about a rather unviable, fragmented land structure. Furthermore, insider privatization resulted in a transfer of considerable parts of the former collective farms from the public sector to a few powerful people, often the former heads of the collective, who nowadays manage large commercial farms. They not only kept most of the machinery, but also bought land shares of people who needed fast money during the first harsh years of independence. Until today, many smallholders lease parts of their property (usually the *big share*) under rather non-transparent conditions to these large farms and work on small pieces of land mainly for subsistence production.

**Structural change and land consolidation is extremely slow: for smallholder farms, there is even a tendency towards shrinking farm sizes and a pullout of commercial activities.** The hope that smallholder farms would develop into a successful class of middle-sized family farms were not fulfilled. Instead, we observe a general tendency to withdraw from (in particular commercial) farming activities, but without a visible effect of farm growth within the family farming sector. Farm sizes of Moldovan family farms, on average, decreased from 1.60 ha in 2007 to 1.35 ha in 2013. Only around 50 percent of this land is actually used for farming by the owners, while around 30 percent is leased out, and up to 20 percent is abandoned. Thus, it looks as if in a few years' time, the situation will be similar to the one of the late USSR, when families worked on small pieces of land (the so-called household plots) for fulfilling their family needs, with the difference that in Moldova there are no collective farms providing jobs and rural services any more. The large private farms hire mostly seasonal low paid labor, which cannot offer a significant income source to rural families.

**Semi-subsistence farming is a core part of the rural livelihood strategies in Moldova, and it is likely to persist in the medium- and longer term.** However, semi-subsistence farmers are not forming a homogeneous group. Most farmers pursue subsistence farming as a survival strategy and as an important fallback option and insurance for bad times and old age. Farmers who grew up in Soviet times tend to be conservative and risk-adverse: they prefer to neither sell their land nor invest in agriculture. Thus, they rarely respond to market based policy signals designed to foster market integration. This is also the case for those who deliberately chose subsistence farming and enjoy it as a lifestyle. Many farmers insist on producing their own safe food for cultural reasons. Subsistence production of food is highly esteemed by the society, so that working their land brings additional intangible benefits to small farmers. Only a very small minority of smallholders seems to be ready and willing to leave the subsistence zone towards growth and/or commercialization.

**Although a higher share of marketed production is linked to higher incomes, the interest in commercialization seems to be low.** This is reflected not only in the fact that the production potential is not fully used by most farms, but also in very few observations of actual farm growth or commercialization. Farm consolidation is currently hindered by the described widespread subsistence mentality, but also by the powerful position of large commercial farms who have not only rented much of the land that would be needed to develop a family farm sector, but are at the same time the main providers of financing. Those smallholders who would

like to dissolve existing renting contracts are sometimes confronted with ownership insecurity and with the fact that the power is generally on the side of large farm tenant, on whom they usually depend.

**Furthermore, market integration of more commercially oriented smallholders is a challenge.** On the one hand, the export markets are currently exclusively served by large farms and smallholder farms are excluded from international trade. On the other hand, domestic markets confront smallholders with local consumers who traditionally prefer to buy their food from neighbors, whom they know personally. Furthermore, town markets are saturated and town dwellers have a low purchasing power. Western-style market chains like supermarkets are generally difficult to enter due to quality and food safety standards that currently cannot be fulfilled by smallholder farms. Finally, the lack of storage facilities is a constraint to commercialization, as small farmers are forced to sell for a low price when there is a supply peak.

**Neither subsistence farming nor more commercially oriented farm strategies protect smallholders from poverty.** Although poverty among smallholder farms has been declining during the last seven years, it still represents a significant challenge. Poverty prevalence remained between 4 and 7 percentage points higher among farm households compared to the overall population. While the subsistence production of food contributes significantly to feeding the rural population, many small farms are not able to generate a sufficient income for overcoming poverty. Similarly, although commercialization of farm products generates higher incomes compared to a purely subsistence based strategy, it does not show significant poverty effects. One main challenge is, therefore, the lack of alternative employment opportunities, in particular in more peripheral areas. Especially young people are forced to search for work in urban centers or even abroad, causing further ageing of the rural population.

**The rural non-farm economy and international remittances seem the most promising starting points for rural development with visible effects on poverty.** In particular, remittances seem much more effective than agriculture in lifting rural families out of poverty. However, there are also negative effects as migration leads to ageing and shrinking of the rural population, while remittances increase income inequality and might fuel inflation by appreciating the real exchange rate through raising domestic prices, and lead to an unsustainable growth model.<sup>12</sup> Therefore, a flourishing local economy would be preferable and should be in the focus of rural development policies.

## 5.2 Lessons for Moldova's small-scale farms from Romania's and Poland's accession to the EU

**Moldova is advised to make use of the experience of the countries of Central and Eastern European that recently acceded the EU** (World Bank, 2015b). If and how the EU membership and the resulting CAP support helped countries such as Romania and Poland to restructure their farming sector could be an important lesson for Moldova (Annex Table 4). The situation of smallholders in Romania is, in many respects, comparable to Moldova's small farms. Both countries started transition as economies with a strong focus on agriculture. Both have a high, but under-used potential for agricultural production, and suffer from a similar dualistic and fragmented agricultural structure with a large subsistence sector. Experiences from Poland, a country with a similar large semi-subsistence farm sector, provide additional insights with a view to a successful adaptation.

**Both Romania and Poland showed a more dynamic structural change in agriculture compared to Moldova.** In Poland, the agriculture's share in GDP was comparatively low already in the 1990s, and went down from around 5 percent in the mid-1990s to slightly above 3 percent in 2013. But also in Romania, where in 1990 the importance of the agricultural sector was high (24 percent of GDP, compared to 36 percent in Moldova, according to World Bank WDI data), the share of agriculture in GDP decreased much faster over the first two

---

<sup>12</sup> See accompanying report on Poverty and Shared Prosperity in Moldova: Progress and Prospects (2016).

decades of the transition compared to Moldova. Romania halved its agricultural share in GDP within one decade (and again in the following decade). However, the share of employment in agriculture stayed high. In Romania, similarly to Moldova, employment in agriculture keeps being significant, with shares close to 30 percent. In both countries, the transition led to an increase in agricultural employment during the first decade, and only a slow decrease since then. Thus, agricultural productivity stayed low. Poland, which started transition with a share of agricultural employment of 25 percent, showed a slow but continuous decrease in this indicator, and could halve the initial share of agricultural employment by 2013.

**Farm restructuring is sluggish in Romania, while Poland's farm sector is on a good way to professionalize.** After more than five years of EU membership, Romania's farming sector continues to be strongly dualistic, and a viable, commercially oriented, middle-sized family farming sector has not yet evolved. There are still about 3.6 million agricultural holdings, with an average farm size of about 3.6 ha. In 2013, according to Eurostat data, about 73 percent of all Romanian farms cultivated less than two hectares, or about 13 percent of the total utilized agricultural area (UAA). On the other side, only 0.5 percent of the farms cultivated an area larger than 50 ha, but accounted for 53 percent of the total UAA. Based on national thresholds<sup>13</sup>, about 94 percent of all farms can be classified as subsistence farms (i.e. with less than two ESU), another five percent are semi-subsistence farms (i.e. between two and eight ESU), and just less than one percent are commercial ones. In Poland, instead, the number of farms dropped by more than 20 percent between 2000 and 2010. The decrease in the number of small farms is particularly significant, showing the professionalization of the sector (Potori, Chmieliński, & Karwat-Wózniak, 2014). However, even in Poland up to one sixth of all farms are subsistence farms (Wolz, Grau, Hockmann, & Levkovich, 2015).

**In Poland, smallholders could adapt more successfully due to several reasons.** First, Polish smallholders were mostly family farmers even during communist times. This means that they were better prepared to adapt their farms compared to those who became private farmers only as a result of land privatization. They were also comparatively well organized and gained a certain political influence. However, also in Poland the transition came with hardship for farmers, and many smallholders turned away from the markets, at least during the harshest economic periods. A turning point came with the EU accession in 2004. The agricultural sector not only benefited from high CAP support, but also from increased demand due to a general rise in incomes. In particular, middle-sized farms used this opportunity for investing in their business, and could increase their land productivity. At the same time the food industry, with the help of significant foreign direct investment, was modernized and became highly competitive – also because markets along the food chain were functioning well (Wolz, et al., 2015).

**Successful adaptation depends on a strategic, long-term focus on enhancing competitiveness.** Unlike in Poland, in Romania there is little progress in modernization of the agricultural production process and the farm sector is still not developing as it was expected given the good natural conditions and the large CAP support. This may be seen as a result of focusing too much on price and market support and too little on enhancing longer term competitiveness. In Poland, problems with adjusting to EU regulations seemed also pronounced. Yet, the country is a good example of how giving priority to enhancing competitiveness, adapting to EU standards and modernizing the sector resulted in a positive development of agriculture in the post-accession period (World Bank, 2015b)

**EU funds offer massive financial support for the farming sector. However, in particular income support measures could be seen as counterproductive, in the sense that they rather slow down farm consolidation.** Within the period 2007-2013, a total of about 13.5 billion EUR were made available to Romania under the CAP, including both the so-called direct payments (Pillar I) and rural development measures (Pillar II). The lion share of the support measures are direct and indirect income support measures for farmers (World Bank, 2010). This implies that the incentives for subsidy recipients to leave the farm sectors are lowered. Direct payments were also found to be one important barrier for land sales in Poland, as they tend to drive land prices up (Biró, Wasilewski, & Tóth, 2014).

<sup>13</sup> Romania adopted a 2 ESU threshold to define subsistence farms, instead of the Eurostat one (1 ESU).



**In Romania, funds are distributed highly unequally, and smallholders are widely excluded from support.** In order to be eligible for direct payments, Romanian farms have to fulfil certain criteria, including a minimum threshold of one hectare, based on a national decision. Hence, just about 1.2 million farms qualify and the distribution of funds is highly uneven. Whereas around half of the income support available under Pillar I went to about 11,000 large farms, one million small farms (operating 1 to 5 ha) received about one quarter of the available funds only. Nevertheless, most small-scale farmers did not benefit from this scheme at all due to the one-hectare threshold. Various measures under Pillar II aim at increasing competitiveness through promoting basic structural change in the farm sector; among them are the measures for supporting subsistence farms; early retirement; the setting up of young farmers; and the setting up of agricultural producer groups. However, farmers have to fulfil the same application criteria as for Pillar I. Thus, the Romanian case shows that the specific problems of smallholders are not automatically tackled by CAP support, but require targeted policies (Wegener, et al., 2011).

**Not all smallholder farms will become competitive and, as the case of Romania shows, they keep being loci of poverty.** Absolute poverty decreased dramatically during the last decade in Romania, from 35.9 percent in 2000 to 4.4 percent in 2009. However, in 2009, the poverty rate among farmers was still at 8.7 percent, while it stood at 3.4 percent among the non-farm population. Romanian smallholder farms are still strongly subsistence oriented and have an unfavorable age structure, with more than 40 percent of them being older than 65 years. These socio-demographic characteristics of farm managers influence the structure and organization of their production activity and the economic performance of the farm. Instead, younger and well-trained managers have a positive and significant influence on the level of agricultural production (Tudor, 2014).

The main conclusions for Moldova arising from the Romanian and Polish experiences are summarized in Box 7.

## **Box 7: Key perspective lessons for Moldova**

**1. The dualistic farm structure, with a high share of (semi-)subsistence farms is highly persistent and it bears the risk that smallholders are excluded from financial support and market integration.** The hope that a viable, commercially oriented family farm sector would quickly arise was not fulfilled in Romania. Policy measures widely failed to successfully target subsistence farmers, who were not able or willing to tap the offered support. Thus, policies need to specifically address smallholder farms and the market failures that work as a barrier to their development. A clear distinction should be made between more socially oriented measures and those that target the modernization of the farming sector.

**2. Farm growth and the formation of a class of middle-sized family farms is severely impeded by a lack of entrepreneurial spirit and/or a ‘subsistence mentality’, as well as by a number of market failures.** Unlike Poland, Moldova has no pre-transition tradition of entrepreneurial family farms. Also for this reason, smallholders tend to keep their land mainly as a social buffer within a harsh economic environment. Similar to the situation in Romania, Moldova’s farming sector is faced with significant market failures in the land and credit markets, and output market barriers for small producers. These factors need to be addressed as they are impeding the aspirations of (the few) farmers who would like to become commercial and expand their farms.

**3. To increase the effectiveness of agricultural policy measures, they should be targeted at longer-term competitiveness instead of direct income support.** CAP funds seem to have rather slowed down farm restructuring, and, in the case of Romania, did not help overcome prevailing deficiencies in the management of food safety and quality. Reasons for this might be seen in an unfavorable allocation of funds, which lacked the strategic vision of enabling competitiveness, but also in bottlenecks in the agricultural administration (World Bank, 2010). Poland offers some positive examples how modernization can be supported.

**4. Rural poverty rates are decreasing, but farm incomes stay low, and agriculture may not be the (main) key to alleviating poverty.** For most smallholder households, farming is an important source of subsistence and a last resort in case of economic problems. It therefore serves as a social insurance, but is not necessarily the main source of rural livelihoods. This helps explaining why, in an unfavorable general economic environment, modernization and commercialization are taking place so slowly. For the majority of rural people, significant improvement of their welfare situation is much more dependent on a dynamic non-farm economy, targeted socio-economic services, and infrastructural investments than on agriculture. If, however, like in Poland, the rural non-farm economy grows, this would clearly contribute to a successful transformation of the agricultural sector as well.

## 5.3 Policy recommendations

**The following recommendations focus on the reduction of rural poverty and the development of the agricultural sector with a particular view on smallholder farming.** However, the results of this paper pose significant limitations for drawing general conclusions. This is due to missing information on medium and large-scale farms in the HBS dataset analyzed. Also important macroeconomic conditions such as, for example, developments in the labor market or price policies and taxation were beyond the scope of the analysis at hand. Still, we suggest to policy makers to develop a vision of a business-oriented family farm sector and identify a number of fields in which policy could address such development of the smallholder sector. Some of our suggestions are targeting constraints to farm development identified in our analysis; others are more general and point at framework conditions that have to be improved to facilitate the development of a viable family farm sector. Recommendations 1 to 8 directly address the development of a commercial family farm sector. We explain why market integration and intensification of production play a key role for this and in which fields policies could target their support. It is important to stress that by far not all current smallholders will be able to develop their farms. Recommendations 9 to 11 point at policies for the majority of small farms who would benefit more from social measures and alternative employment in the rural non-farm sectors, and at necessary improvements in the general framework conditions that are key for both the agricultural and the wider rural development.

### I. Towards the vision of a commercial family farm sector

**Moldova should make better use of its great agricultural potential by enabling a new generation of business-oriented family farmers to commercialize and intensify their farm activities in a sustainable manner.** Smallholder farms generate already now a higher productivity per unit of land, while, at the same time, their agricultural practices seem in general well adapted to the ideal of conservation agriculture. Market integration and productivity growth are the main pathways towards this vision. They mutually reinforce each other, while productivity growth creates the basis for a surplus to be marketed, increased marketed production provides incentives for investment, creates cash surpluses, and can generate significant multiplier effects (FAO 2013).

The example of Romania shows that farm consolidation is a slow and tedious process, if it is hampered by high fragmentation of land parcels, missing cadaster, but also unfavorable mental models and a weak non-farm rural economy that fails to absorb the rural workforce. Therefore, we recommend that broad agricultural development that is inclusive for smallholders should start from the **sustainable intensification** of production. In Moldova, the sector is clearly in need of modernization, for example with view to new seed varieties, farming techniques

and practices, that would boost productivity and output (World Bank & World Food Programme, 2015). Sustainable intensification, but also bringing back abandoned land into production may be the best ways to achieve short-term successes. In the medium and longer-term farm consolidation and growth, and the development of and integration into modern food supply chains should be achieved. Successful **market integration** is known to be affected by a number of constraints, which must be first identified in their local context and then proactively addressed. Market integration therefore requires targeted and wisely timed policy support, but also patience as a significant level of trust from both buyer and producer has to be built up. Experience shows that the presence of an honest broker of the relationships and guardian of business confidentiality, for example an NGO, may facilitate market integration, and that appropriate support from the public sector is essential (FAO 2013). Proactive government intervention should first provide the necessary enabling framework conditions in which the smallholder sector can develop. Direct interventions often have undesired side effects and should therefore be used only with care. In the following, we discuss a number of fields that seem to be of particular importance for the development of Moldova's smallholder farms.

## **1. Targeting the smallholder farm**

While past and current policies seem to have favored large scale corporate farms, which also form an influential interest group in Moldova (World Bank, 2015b), we advise to focus more attention towards the development of small and middle-sized business-oriented family farms. Implementing the vision of increasing land and labor productivity based on sustainable intensification is, however, knowledge intensive. Therefore, a new generation of business-oriented professional farmers is needed to form the backbone of a strong rural middle class. Public policy should create an environment in which business-oriented smallholders, but also newcomers have a fair chance to establish viable farms. With view to the framework conditions, it is important to ensure that smallholders willing to engage in commercial agriculture get equal access to the markets (including both the land market and output markets), but also to important services such as financial services, public advisory services and subsidies, as well as food quality and safety programs. To allow small farmers to get this equal access, (temporary) direct support might be used to set the process in motion. The CAP measure for 'Setting up young farmers' was seen as a success in Romania and could give guidance to how the target group can be reached (ENRD, 2014; Tudor, 2014).

## **2. Promoting sustainable intensification of production**

To motivate smallholders to adopt sustainable intensification measures, first, policies need to ensure that commercial farming is profitable. At the same time, incentives should be set in a way to use natural resources wisely – for example, through payments for environmental services as done for example in the EU's CAP. Finally, smallholders should be protected from power imbalances when dealing with traders or large corporate farm competitors. Policies targeted towards intensification should build capacities and set incentives to introducing sustainable agricultural practices based on high yielding locally adapted varieties, integrated pest management, efficient soil and water management and the integration of crops, pastures and livestock (see for example FAO, 2011). Our analysis points at a very low level of irrigation used by smallholder farms. Upgrading irrigation facilities and ensuring that also commercial family farms get equal access, would certainly contribute to increasing productivity. As Rolfes (2008) has shown, smallholder farms are generally interested in and willing to pay for irrigation. However, experiences from almost all transition countries show that management of the irrigation infrastructure conceived for large-scale agricultural production cannot be easily transferred into a sector dominated by small-scale farms. Often collective action problems prevent the emergence of a new effective management structure (Ostrom, 2000). We also find that mechanization services are used only if necessary (e.g. for ploughing), while most smallholders harvest and weed manually. Hence, revitalizing interest in new types of cooperation and overcoming risk averse behavior, but also financial restrictions and other limitations is needed (see below).

Given the considerable area that is currently left unused by smallholders, bringing back suitable abandoned farmland into production is another important option for increasing production. Land abandonment is mainly

the result of a low attractiveness of agricultural production for respective land owners, an ageing rural population and out-migration of the youth (Dudwick, et al., 2007; Rolfes, 2008). Often the abandoned parcels are small, difficult to reach and/or of poor land quality. Still, making better use of potentially suitable farmland is desirable. Our recommendations with view to the land market should contribute to this.

### **3. Removing barriers in the land market that hinder farm consolidation (and farm exits)**

The land market may be seen as one key to smallholder farm consolidation and farm growth. Although Moldova's land market has seen a positive development since the early 2000s and may be described as generally operational (Rolfes, 2008), our results show a rather low dynamics on land markets from the perspective of smallholders, especially if land sales and purchases are concerned. High transaction costs of land transfers and the role of land as social buffer might be two of the underlying reasons.

As for land sales, a general slowdown was observed since 2008. One explanation is that the first wave of landowners interested in selling their land had done so by this time (Rolfes, 2008). Yet, in some places, there seems to exist a lack of transparency and asymmetric power relations that cause a certain degree of land ownership insecurity. This is the case, for instance, when the *big shares* have never been physically demarcated and transferred to the owner. If, in such cases, landowners want to dissolve existing renting contracts, they depend on the goodwill and support of the current user (usually the local large corporate farm) and the administration. Furthermore, land rights over the *small shares* need to be clarified all over the country. This is important because secure ownership of *small shares* will ensure enough subsistence production to increase the inclination of smallholders to rent out their *big shares* for longer periods or even sell them.

Land rental markets do not seem to be very active either in the sense that parcels hardly move from one lessee to another (Rolfes, 2008). Furthermore, official renting is usually restricted to short-term leasing contracts (up to three years), which are often extended due to lack of alternatives. The main reason may be seen in higher transaction cost for longer-term contracts which are often only concluded if the land user intends to invest in vineyards or orchards (Rolfes 2008). From the point of view of smallholders, we came across complaints of farmers who stated that leasing agreements are sometimes extended without the consent of the landowner or that (in-kind) payments were cut-down without the consent of the landowner.

For addressing problems in the land market, we suggest to consider the following: (1) for further increasing the transparency of land market transactions, an independent organization should be entitled to collect and publish all land lease rates and land sale prices. The qualitative survey showed that the land rent is quite constant all over the country, amounting to about 400 kilograms of wheat or corn and about 100 kilograms of sunflower seeds per share, regardless of its size; moreover, the tenant is paying the land tax. A public documentation of prices could reduce incentives for ex-post revisionary attempts and reveal opportunity costs of either keeping land in own use or refraining from renting in more land. In order to prevent asymmetric power relations such an organization should be independent from the village administration (i.e. at district level, where also the cadaster offices are located). (2) Similarly, rental contracts should be approved in a more transparent way. Requests for revisions of contractual terms have to be reasoned and all partners have to be informed. (3) Investments into soil fertility and other measures of land improvement need sufficient time to generate positive pay-offs. The currently cumbersome and expensive negotiation of long-term formal leasing contracts should therefore be simplified and could be made more attractive by providing notary services in the village. Several burdensome visits at the district center should be avoided, for example, by offering visits of district officers in local offices (see Rolfes, 2008).

Without additional incentives to release land that is in the hands of the ageing generation of subsistence farmers most likely attaching higher weights to land as social buffer, fast and successful land consolidation and farm growth among smallholders cannot be expected. Additionally, a number of several cultural issues prevent (subsistence) farm exits, among others a disapproving perception among the rural population of people in waged agricultural work under current conditions and a high esteem of self-produced food. In Romania, the



'Life Annuity Scheme' allowed about 90,000 elderly beneficiaries to receive a guaranteed amount of money until the end of their lives for selling or renting out their farmland. A positive side-effect of the program was the updating of cadaster data and the formalization of leasing contracts (Alexandri, 2013).<sup>14</sup> In Moldova, it would be important to give family farms with growth aspirations a preferential access to released land as otherwise they might not be able to compete with powerful corporate holdings (see concerns raised by Rolfe (2008) who states that land consolidation programs might be abused to promote large-scale corporate agriculture). With view to the vision of establishing a commercial family farm sector, land flows from large corporate farms to individual farms would be preferable to the opposite direction.

#### **4. Addressing market failures in capital markets**

Viable financial services are a bottleneck for intensification, but also for farm growth (World Bank, 2015b). Access to credit and cost of credits pose significant constraints to the agricultural sector, and in particular, small farmers are currently almost completely bypassed by the financial sector. Smallholders report about an unpleasant dependency on informal credits provided by the large farmers of their village. At the same time, high interest rates and a lack of trust in the crisis-ridden banking system lead to a low demand of bank loans. However, subsidized loans should only be considered if positive external effects are to be expected. Clearly, distorting market prices of credits comes at some costs to the society and do not represent a first-best instrument. In order to develop better-suited measures, the reasons for high interest rates need to be analyzed. Innovative means of lowering the risk for moneylenders offering services to smallholders could improve targeting of measures. As one option, government could provide the political framework and support in setting up self-help initiatives of saving and credit associations as well as reinsurance of microcredits for small farms. It should be explored in how far third parties could be supported in investing and providing services to farm households. Examples could be the establishment of machinery services or marketing cooperatives.

#### **5. Improving food quality and food safety, and, at least in the medium term, reaching international competitiveness**

It is necessary to pave the way to market integration for those smallholders with a potential and willingness to develop, and to ensure that surpluses resulting from intensification can be profitably sold on the market. Significant progress has been made in various areas of food safety and quality control (World Bank, 2015b), but structural improvements and investments are still needed (World Bank & World Food Programme, 2015). Integrating smallholders into food quality and food safety programs is without doubt a challenge and no easy solutions are available. Even in the EU, the functioning of agricultural value chains and price formation is contested in the context of increasing retail and processing sector's concentration. Single farm households will always form the weakest link of the agricultural value chain. More collectively organized marketing, for instance via group certification, may be one innovative option (see below), but investing in human resources is the foundation of an appropriate management of a food quality and safety control.

Government authorities should start implementing food quality and safety programs with those farmers who market most of their production and are willing to develop their farm. With view to reaching international competitiveness, it must be stressed that international trade in Moldova is currently dominated by an oligopsonistic structure: a few companies have export licenses and, more or less, dictate prices to agricultural producers. Further research on the functioning of the supply chain and on reasons for negative rates of protection needs to be conducted. Antitrust authorities should be enabled to analyze the concentration in agribusiness and to take necessary actions to better protect farmers from unfair competition practices.

#### **6. Tapping higher value and organic product markets**

As markets for low-price and low-quality fresh and processed products are shrinking, Moldova's farmers need to adjust through modernization of production as well as harvest, post-harvest, processing and handling

<sup>14</sup> Similar 'land for pension' schemes were introduced in Hungary and Poland (Cartwright *et al.*, 2010)

technologies (World Bank & World Food Programme, 2015). One promising option could be the market for certified organic production. This type of farming is not only seen as particularly suitable for smallholders (Barrett, Browne, Harris, & Cadoret, 2001; EC, 2012), but markets are expected to further grow and, as the Romanian example shows, have a high export potential towards the EU. Investments in organic production could not only be complementary with efforts to increase the resilience in face of climate and market risks, but also contribute to increased food safety. We therefore see this as a niche with some potential for Moldova, if smallholders receive necessary support for the certification and marketing. Within the EU, farmers converting to organic agricultural production certified according to the EU directive and maintaining organic production are entitled to apply for area-based direct payments under the heading of agri-environmental measures (Schwarz, Nieberg, & Sanders, 2010). Romania, beside compensation payments per area, offers additional support for the conversion period. Participatory or group certification schemes, which are currently discussed in Romania (Munteanu, 2014), could be one important door-opener for smallholders. For successful marketing, such producer groups furthermore need reliable partnerships with trustworthy exporters and EU importers (Barrett, et al., 2001). Mid-term developments and expected income growth will push the demand for high-value and/or more processed products also within Moldova. Furthermore, the establishment of wealthy consumer cohorts is expected to lead the development of environmentally concerned consumer. Even if it remains a small share of the population this development might open up new domestic market niches for Moldovan family farmers. Livestock production, such as dairying, or high value crops may provide further opportunities for income generation among small farmers. Based on current knowledge (such as Gorton *et al.*, 2006), future research should address their potentials.

As for the international markets, it might be advisable to increase the visibility of Moldovan agricultural products. This could be reached if the national authorities, in collaboration with international organizations, promote a branding strategy for Moldovan products, in particular those that are produced in a traditional way and/or along organic production standards. The EU developed an elaborated system of geographical indications and traditional specialties, which is intensively used by regions across EU member states. One possible challenge could be fraud, which, in a weak institutional environment, is a problem that cannot be denied. (EurActiv, 2016) reports that Romania plans to increase the controls and invest in laboratories for this reason. This should increase the credibility of the sector and the trust of consumers, while at the same time the certification bodies will become more efficient.

## **7. Organizing small-scale farmers to facilitate access to financing and market integration**

Assuming that Moldova's farming structure will not change fast, for many smallholders, cooperation would be a logical option to overcome many of the issues and market failures they face. Similarly, requirements of modern supply chains push farmers to cooperate – as shown by the example of group certification above.<sup>15</sup> However, we acknowledge that formal cooperation is not favored by small farmers in Moldova due to the historical legacy and widespread mistrust. Smallholders also generally lack group power (World Bank & World Food Programme, 2015). Nonetheless, farmers might be encouraged to set up their own (cooperative) processing and marketing channels in order to strengthen their bargaining position and getting better access to input and output markets as well as financing. It is recommended that the government not only sets incentives to voluntary formal cooperation by providing an appropriate legal framework and campaigning for the cooperative idea, but also seeks true understanding of the central market failures that prevent farmers from forming cooperatives (Stewart, 2014). Experience shows that a trusted and transparent management is of highest importance (Koester, 2012). For initiating cooperation, trusted third party support, for instance by NGOs, could be important. Such a selfless third party might help to initiate the group formation process through training and guidance during the first years of their establishment (Müller, 1994). First experience from Romania shows that agricultural producer groups supported under Pillar II need to meet these pre-conditions (Calinescu, 2012).

<sup>15</sup> The downstream industry of buyers has not yet established long-term relationships with farmers and farming contract arrangements in this field are weak ((World Bank & World Food Programme, 2015))



Promising starting points for cooperation in Moldova could be the above mentioned producer groups for organic certification and marketing or simple milk collection schemes, which have been successfully established in some villages. In addition, storage facilities are identified by farmers as a major barrier to successful marketing, thus, this is also a field in which cooperation could be beneficial for smallholders.

## **8. Promoting professional education and agricultural extension services**

If the vision of a business-oriented family farm sector should materialize, the new generation of farm entrepreneurs needs to be properly educated. Currently the Moldovan agricultural education system, at all levels from vocational, to college and university, is weak. Curricula have not significantly changed since Soviet times, so it has lost connection with present market requirements. Agriculture is a knowledge intensive business and without appropriate agricultural education, there is only limited scope for substantial picking up, modernization and sustainable growth of the farming sector. Addressing the education system is a general task of superior importance. Moldova's relatively low ranking (84<sup>th</sup>) on *The Higher Education and Training Pillar of the Global Competitiveness Report* of the World Economic Forum points at the unsatisfying quality of education and identifies poor education as a key weakness in the country's competitiveness performance. Neighboring Romania, ranking 58<sup>th</sup>, is still struggling with its higher education system. Unlike most other important policy fields, education, science and research are not part of the EU's *Acquis Communautaire*.<sup>16</sup> Therefore, there was no prescribed pathway and, most likely, less reform pressure. Georgia may be a good example of a courageous reform of their higher and general education (Sarychev & Livny, 2013). The system was in a short time successfully cleaned from endemic corruption<sup>17</sup> and access to higher education could be improved. Quality improvement, however, remains a challenge and is certainly a longer-term process.

A strategy of a sustainable intensification of agricultural production that is inclusive of small farms needs a strong agricultural extension service. Currently, the agricultural extension service seems to be hampered by top-down channels, a bureaucratic structure, and qualification deficiencies. However, these services seem to be much more accessible by family farmers than agricultural subsidies. Therefore, significant efforts in terms of increasing the manpower and professional capacity of the extension services are desirable. In addition, there is a lack of coordination and cooperation among the scientific community, educational institutions and extension services in creating innovation and transferring it to farmers. The link with farmers seems in general to be rather weak, so that fruitful cycles of mutual learning and innovation transfers are prevented. Moreover, farmers seem to have no trust in extension personnel and tend to follow traditional practice.

## **II. Widening the vision towards the rural economy, governance and social aspects**

**Rural development depends on unlocking the full power of the rural economy.** Agriculture certainly continues to have an important influence on the rural economy. However, it was long recognized that rural development requires a concerted effort that goes beyond sectoral policies. Thus, instead of purely sector-based strategies the diverse development needs of rural regions need to be addressed by more coherence among sectoral policies and the pooling of knowledge held by a wide variety of public and private actors (OECD, 2006). In line with the main principles of this 'new rural paradigm', we stress that smallholder farm development in Moldova must integrate the view on places (and their diverse livelihoods) instead of focusing only on sectoral policies. It should also be critical towards the effectiveness of agricultural policy and in particular agricultural subsidies as the predominant component of public policy for rural regions. Instead, more attention should be given to investments (OECD, 2006). Providing framework conditions, which reduce transaction costs and increase governance and rule of law are more difficult to quantify in monetary terms but are expected to have longer lasting effects.

---

<sup>16</sup> The *acquis* in the field of science and research does not require transposition of EU rules into the national legal order. The areas of education, training, youth and culture are primarily the competence of the Member States. See [http://ec.europa.eu/enlargement/policy/conditions-membership/chapters-of-the-acquis/index\\_en.htm](http://ec.europa.eu/enlargement/policy/conditions-membership/chapters-of-the-acquis/index_en.htm)

<sup>17</sup> The high level of bribery for grades or exams is, for instance, mentioned in a publication of the World Bank (Sondergard et al., 2012).

## **9. Promotion of a viable rural non-farm sector that offers alternative local employment**

Agricultural subsidies bring large resources into rural regions, but they are not intended to trigger rural development directly and, in most cases, they do not do so as experience from other European countries show (OECD, 2006). Even in Moldova, agriculture is no longer the major source of income for most farm families. While particularly elderly farmers keep depending on subsistence farming, the majority of young people is no longer interested to work on the farm. Ageing and depopulation due to outmigration could be the consequence.

There is ample proof that the rural non-farm economy has a large impact on rural livelihoods through income diversification and poverty alleviation, but it also works as a facilitator for the decision to leave the agricultural sector (Möllers, Buchenrieder, & Csaki, 2011). Although a flourishing family farm sector is in need of well-educated, entrepreneurial young people, most of the youth will inevitably leave the sector, and maybe even the rural areas or the country. Local employment alternatives are hence crucial to avoid land abandonment, rapid rural depopulation and mass emigration, which are certainly not desirable for Moldova. To make the rural space economically viable and attractive, rural-urban linkages, but also education as the main door opener for skilled non-farm employment, need to be part of the rural development agenda. One well-known factor to push rural development is investment into adequate infrastructure, which establishes the link to urban areas and other sectors, attracts investment in rural areas, and connects farmers to markets.

## **10. Social protection for elderly farmers**

While the young generation is in need of paid employment, elderly smallholders face with poverty and a high dependence on subsistence production from their farms. The challenges of an aging population, persistence of subsistence-based livelihoods and poverty cannot be solved by agricultural and rural policies alone. Better policy targeting, coordination and exploiting synergies with, for example, social policies, are required. Sufficient old age security systems are needed when consolidation is progressing and the subsistence sector shrinks. Up to now, many rural Moldovans, even if farming is only a sideline for them, depend on their land resources. Only if these farmers and their family members can make a decent living without depending on their farmland, it can be expected that farmland is released and land consolidation can progress. One option for such a social security policy would be a minimum pension system as was introduced in Romania in 2009. Such a system is part of the general poverty alleviation strategy. One advantage is that this support will only go to those who are in need and allow society to transfer limited resources to those in greatest need regardless of their previous work history. This would be in line with the already existing and positively evaluated poverty-targeted program *Ajutor Social* (Social Aid) (World Bank & World Food Programme, 2015). Anecdotal evidence shows, however, that improvements in the management of funds and raising public awareness for this program can be still realized (Piras & Botnarenco, 2015).

## **11. Good governance**

Although there is no unique model for managing rural development, and there exists no single determining factor of a region's economic trajectory, it is clear that rural policies should aim at enhancing local capacity and actors' participation (Wolz, Hubbard, Möllers, Gorton, & Buchenrieder, 2012). This is a challenging task when, as typical in Moldova, smallholders have no voice and public money seldom reaches the poorest people.

Rule of law, good governance and functioning institutions are indispensable for sound rural development. In that sense, we would stress that any intervention should be monitored closely in terms of how it is implemented. The spending of available funds<sup>18</sup> should be conditioned to a transparent and targeted use with participatory elements. Experiences from East Germany, for instance, illustrate that farms find ways to deal with scattered parcel ownership of land by means of voluntary exchanges or informal management agreements. Such

<sup>18</sup> This includes for example the EU's Neighborhood Policy, which places high priority on public administration and agriculture. The European Commission supports development and reforms in these two sectors during the period 2014-17 with a budget of 101 million Euros annually (of which 37 million Euro for Public Finance Reforms and 64 million Euro for the European Neighbourhood Programme for Agriculture and Rural Development (ENPARD)) (European Commission, 2014a, 2014b).

constructions require a high level of trust among actors. To build such trust, Moldova needs to fight inefficient institutions and weak governance at all levels. Indicators of institutional quality like the Worldwide Governance Indicators (WGI) published by the World Bank or Transparency International's Corruption Perception Index (CPI) suggest that Moldova faces significant challenges in this respect. Moldova belongs to the 20 percent worst performing countries worldwide with respect to WGI's dimension Control of corruption in 2014 and ranks 103 (out of 168) according to the 2015 CPI. The European Commission has also addressed this as a major challenge extending through all levels of public administration and judiciary (Secieru & Sobjak, 2014).

Experience of Georgia's administrative and anti-corruption reforms has been cited often as best practice example in the Eurasian region (World Bank, 2012). Major reforms include a reorganization of the system of municipal finances, cutting down numbers of licenses and inspections and a stricter separation of local administration and the sphere of political parties. However, the payoffs of such reforms emerge often with a substantial time lag and are difficult to assign to individual sectors.

# 6. References



1. Alexandri, C. (2013). The present and future of small farms in Romania. In *Conference on Competitiveness of Agro-Food and Environmental Economy*. Bucharest, Romania.
2. Barrett, H. R., Browne, A. W., Harris, P. J. C., & Cadoret, K. (2001). Smallholder Farmers and Organic Certification: Accessing the EU Market from the Developing World. *Biological Agriculture & Horticulture*, 19, 183-199.
3. Biró, S., Wasilewski, A., & Tóth, O. (2014). Land Tenure. In N. Potori, P. Chmieliński & A. F. Fieldsend (Eds.), *Structural Changes in Polish and Hungarian Agriculture since EU Accession: Lessons Learned and Implications for the Design of Future Agricultural Policies*. Budapest: Research Institute of Agricultural Economics.
4. Bolganschi, D. (2011). Rural Out Migration and Land Use in Moldova. In Center for Policy Studies at the Central European University (Ed.), *Policy Research Reports*. Budapest.
5. Buchenrieder, G., Fritsch, J., Wegener, S., Curtiss, J., & Gomez y Paloma, S. (2009). Semi-subsistence farm households and the non-farm rural economy - perspectives and challenges (Keynote paper). In *111. EAAE-IAAE Seminar 'Small Farms: Decline or Persistence'*. University of Kent, Canterbury, UK.
6. Calinescu, D. (2012). Support for Farmers' Cooperatives. Country Report Romania. Wageningen: Wageningen UR.
7. Cartwright, A., Medve-Bálint, G., & Svensson, S. (2010). Inheritance Matters. Changing land use trends amongst the elderly in rural Hungary. In Center for Policy Studies (CEPS) at the Central European University (Ed.). Budapest.
8. Cimpoiș, D. (2010). The Economics of Land Fragmentation in the Individual Farm Sector of Moldova. *Știința Agricolă*, 2, 101-108.
9. Cimpoiș, D. (2011). Land Lease as an Effective Mechanism of Agricultural Land Consolidation. *Știința Agricolă*, 1, 89-96.
10. Davalos, M. E., & Meyer, M. (2015). Moldova: a story of upward economic mobility. In *Policy Research Working Paper 7167*. Washington, DC.
11. Dudwick, N., Fock, K., & Sedik, D. (2007). Land Reform and Farm Restructuring in Transition Countries. The Experience of Bulgaria, Moldova, Azerbaijan, and Kazakhstan. In *World Bank Working Paper 104*. Washington, DC: World Bank.
12. EC. (2011). What is a small farm? In European Commission (Ed.), *EU Agricultural Economic Briefs*. Brussels.
13. EC. (2012). Organic Agriculture. Information Note. Brussels: European Commission.
14. ENRD. (2014). Measure 112 - Setting up of young farmers. In *Rural Development Programmes 2007 - 2013, Progress Snapshot 2013*. Brussels.
15. EurActiv. (2016). Romania wants to boost consumer confidence in organics. In: [www.euractiv.ro](http://www.euractiv.ro).
16. EUROSTAT. (2016). EUROSTAT database. [ec.europa.eu/eurostat](http://ec.europa.eu/eurostat).
17. FAO. (2011). Save and grow. A policy maker's guide to the sustainable intensification of smallholder crop production. Rome.
18. Giovarelli, R., & Bledsoe, D. (2001). Land Reform in Eastern Europe. Seattle, Washington: Rural Development Institute (RDI).
19. Gorton, M., & White, J. (2003). The Politics of Agrarian Collapse: Decollectivisation in Moldova. *East European Politics and Societies*, 17, 305-331.
20. Heidhues, F., & Brüntrup, M. (2003). Subsistence agriculture and development: Its role in process of structural change. In S. Abele & K. Frohberg (Eds.), *Subsistence agriculture in Central and Eastern Europe: How to break the vicious circle? Studies on the agricultural and food sector in Central and Eastern Europe* (Vol. 22, pp. 1-27). Halle, D: Institute of Agricultural Development in Central and Eastern Europe (IAMO).
21. ILO. (2016). ILO database. [LaborSta.org](http://LaborSta.org).
22. Koester, U. (2012). On Tractors and Agriculture. ISET Policy Institute, Tiflis, Georgia. <http://iset-pi.ge/index.php/en/iset-economist-blog-2/entry/from-the-comments-on-tractors-and-agriculture>.

23. Lerman, Z., & Cimpoies, D. (2006). Land consolidation as a factor for rural development in Moldova. *Europe-Asia Studies*, 58, 439-455.
24. Lerman, Z., & Sutton, W. R. (2008). Productivity and Efficiency of Small and Large Farms in Transition: Evidence from Moldova. *Post-Soviet Affairs*, 24, 97-120.
25. Möllers, J., Buchenrieder, G., & Csaki, C. (2011). *Structural Change in Agriculture and Rural Livelihoods: Policy Implications for the New Member States of the European Union* (Vol. 61). Halle: IAMO.
26. Molodikova, I. (2008). Trends in the field of social policies and welfare reforms in Ukraine and Moldova. Rome: Centro Studi di Politica Internazionale (CeSPI).
27. Moroz, V., Stratan, A., Ignat, A., & Lucasenco, E. (2015). Country Report: Republic of Moldova. In AGRICISTRADÉ (Ed.), *AGRICISTRADÉ country reports*.
28. Müller, J. O. (1994). Strategies Employed When Establishing Co-operatives. In E. Dülfer (Ed.), *International Handbook of Cooperative Organizations* (pp. 841-846). Göttingen: Vandenhoeck and Ruprecht.
29. Munteanu, A. R. (2014). The Potential Impact of Group Certification for Organic Agriculture in Romania. *Practical Application of Science*, 2, 631-638.
30. Nagayets, O. (2005). Small farms: current status and key trends. Wye, UK: Information Brief, Research Workshop on The Future of Small Farms, Organised by IFPRI, Imperial College and ODI.
31. National Bureau of Statistics of the Republic of Moldova. (2013). General Agricultural Census 2011. National results, Vol.1.
32. National Bureau of Statistics of the Republic of Moldova. (2015a). Agricultural Activity of Small Agricultural Producers in the Republic of Moldova in 2014.
33. National Bureau of Statistics of the Republic of Moldova. (2015b). Statistical databank.
34. OECD. (2006). Reinventing Rural Policy. In OECD (Ed.), *Policy Briefs*. Paris.
35. Ostrom, E. (2000). Collective Action and the Evolution of Social Norms. *Journal of Economic Perspectives*, 14, 137-158.
36. Petrick, M., & Carter, M. R. (2009). Critical Masses in the Decollectivisation of Post-Soviet Agriculture. *European Review of Agricultural Economics*, 36, 231-252.
37. Piras, S., & Botnarenco, S. (2015). Smallholder Survey Moldova. In: University of Bologna.
38. Potori, N., Chmieliński, P., & Karwat-Wóznia, B. (2014). A comparison of the agro-food sectors in Poland and Hungary from a macro perspective. In N. Potori, P. Chmieliński & A. F. Fieldsend (Eds.), *Structural Changes in Polish and Hungarian Agriculture since EU Accession: Lessons Learned and Implications for the Design of Future Agricultural Policies*. Budapest: Research Institute of Agricultural Economics.
39. Rolfes, L. (2008). Moldova: Report on Farmland Tenure Issues and the Probable Impact on Proposed Investments in Central Irrigation Systems.
40. Sarychev, A., & Livny, E. (2013). Georgia's Education System Reforms: Corruption is Gone but Where is the Quality? ISET Policy Institute, Tiflis, Georgia. <http://iset-pi.ge/index.php/en/iset-economist-blog-2/entry/georgias-human-resources>.
41. Schwarz, G., Nieberg, H., & Sanders, J. (2010). Organic Farming Support Payments in the EU. In *Landbauforschung vTI Agriculture and Forestry Research Special Issue 339* Braunschweig.
42. Secieru, S., & Sobjak, A. (2014). Reforms Wanted: A To-Do List for a Future Moldovan Government. In The Polish Institute of International Affairs (Ed.), *Strategic File No. 26 (62)*. Warsaw.
43. Sobjak, A. (2015). Anti-Corruption in Moldova and Ukraine. A V4 Handbook of Best Practices. The Polish Institute of International Affairs.
44. Sondergaard, L., Murthi, M., Abu-Ghaida, D., Bodewig, C., & Rutkowski, J. (2012). Skills, Not Just Diplomas. Managing Education for Results in Eastern Europe and Central Asia. In *Directions in Development*. Washington, DC: World Bank.



45. Stewart, T. (2014). Farmer groups. Why we love them and why they fail. In ISET Economist Blog (Ed.). ISET Policy Institute, Tiflis, Georgia <http://iset-pi.ge/index.php/en/iset-economist-blog-2/entry/farmer-groups-why-we-love-them-why-we-do-them-and-why-they-fail>.
46. Timofti, E., Popa, D., & Kielbasa, B. (2015). Comparative Analysis of the Land Fragmentation and its Impact on the Farm Management in some EU Countries and Moldova. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, 15, 345-356.
47. Tudor, M. M. (2014). Performance of the Farm Management in Romania after 20 Years of Transformations. *Lucrări Științifice Management Agricol*, 16, 8-17.
48. Turcan, R. V., & Bugaian, L. (2015). Restructuring, Rationalizing and Modernizing Higher Education Sector in the Republic of Moldova. In: EUniAM Project.
49. Volk, T., Erjavec, E., Rac, I., & Rednak, M. (2015). Agricultural policy in the European Union's Eastern Neighbours. In *AGRICISTRADe research report*.
50. Wegener, S., Labar, K., Petrick, M., Marquardt, D., Theesfeld, I., & Buchenrieder, G. (2011). Administering the Common Agricultural Policy in Bulgaria and Romania: Obstacles to accountability and administrative capacity. *International Review of Administrative Sciences*, 77, 583-608.
51. Wolz, A., Grau, A., Hockmann, H., & Levkovych, I. (2015). Zur Entwicklung der polnischen Land- und Ernährungswirtschaft seit 1989.
52. Wolz, A., Hubbard, C., Möllers, J., Gorton, M., & Buchenrieder, G. (2012). *Patterns Behind Rural Success Stories in the European Union: Major Lessons of Former Enlargements* (Vol. 68). Halle (Saale): IAMO.
53. World Bank. (2010). Romania: Functional Review – Agriculture & Rural Development Administration. In: Final Report. Washington DC, World Bank.
54. World Bank. (2012). Fighting Corruption in Public Services. Chronicling Georgia's Reforms. In *Directions in Development*. Washington, DC: World Bank.
55. World Bank. (2015a). Doing Business: Measuring Business Regulation.
56. World Bank. (2015b). Moldova - Public Expenditure Review: Agriculture. In T. W. Bank (Ed.). Washington, D.C.: The World Bank.
57. World Bank, & World Food Programme. (2015). Moldova Food Security Assessment. Analysis of the Current Situation and Next Steps. Washington, DC.
58. World Bank (2016). Poverty and Shared Prosperity in Moldova: Progress and Prospects. *Moldova Poverty Assessment 2016*. World Bank Report. Washington, DC: World Bank.

# 7. Annex



**Annex Table 1 Agricultural Holdings by Size Classes (Total Land, ha), 2011**

	Area		Agricultural holdings	
	Hectare	Share (%)	Number	Share (%)
TOTAL	2,243,540.02	100.00	902,214	100.00
0-<0,5 ha	122,287.12	5.45	459,909	50.98
0.5-<1 ha	123,326.86	5.50	180,529	20.01
1-<3 ha	355,773.94	15.86	203,644	22.57
3-<10 ha	224,951.66	10.03	52,023	5.77
10-<50 ha	63,434.04	2.83	3,080	0.34
50-<100 ha	44,425.41	1.98	617	0.07
100-<200 ha	89,859.58	4.01	621	0.07
200-<500 ha	314,416.18	14.01	963	0.11
500-<1000 ha	378,418.83	16.87	550	0.06
1000-<2500 ha	338,692.99	15.10	229	0.03
≥2500 ha	187,953.41	8.38	49	0.01

Source: National Bureau of Statistics of the Republic of Moldova (2013)

**Annex Table 2 Agricultural Holdings by Size Classes (Total Land, ha)**

Farm size (ha)	2007		2010		2013	
	frequency	percentage	frequency	percentage	frequency	percentage
Total	4,782	100.0	4,337	100.0	4,165	100.0
0-<0,5	2,906	60.8	2,707	62.4	2,660	63.9
0.5-<1	707	14.8	679	15.7	703	16.9
1-<3	940	19.7	776	17.9	668	16.0
3-<10	222	4.6	170	3.9	131	3.2
10-50	7	0.2	5	0.1	3	0.1
≥50	0	0.0	0	0.0	0	0.0

Source: Own calculation. HBS 2007-2013.

**Annex Table 3 Welfare and farm characteristics along urban and rural locations**

	2007				2010				2013			
	Total	urban	rural	p-value	Total	urban	rural	p-value	Total	urban	rural	p-value
Number of farm HH (%)	4,782	20.31	79.69	NA	4,337	22.04	77.96	NA	4,165	23.59	76.41	NA
Average HH size	2.76	2.79	2.75		2.66	2.53	2.70	***	2.46	2.27	2.52	***
Average age of HH head	54.69	53.52	54.99	**	55.66	56.07	55.54		56.55	58.16	56.05	***
Female household head (%)	36.91	38.18	36.59		36.96	40.00	36.11	*	39.16	44.71	37.44	***
Bad health status HH head (%)	24.41	21.82	25.07	*	22.79	20.08	23.56	**	21.57	22.62	21.25	
Education of HH head is low (%)	14.64	8.91	16.10	***	12.23	7.24	13.64	***	8.89	6.49	9.63	***
Education of HH head is high (%)	20.10	35.20	16.26	***	19.95	33.32	16.17	***	19.58	33.76	15.20	***
Max education in HH is low (%)	10.63	5.64	11.90	***	8.59	4.78	9.67	***	6.30	4.85	6.75	**
Max education in HH is high (%)	30.28	47.27	25.95	***	29.48	44.06	25.36	***	30.06	43.46	25.92	***
HH with job seeker (%)	11.67	11.78	11.64		13.21	11.42	13.72	*	10.22	9.17	10.55	
HH with underemployment (%)	27.01	20.27	28.54	***	28.99	19.28	31.30	***	22.14	13.88	24.35	***
Average HH income (MDL)	35,910	38,958	35,133	***	35,522	40,563	34,096	***	36,605	38,619	35,983	**
Average per capita inc. (equ.) (MDL)	17,084	18,448	16,737	**	17,484	20,408	16,658	***	18,911	21,011	18,263	***
Farm income (% of total income)	29.04	8.92	34.16	***	19.10	5.82	22.85	***	18.17	5.23	22.17	***
Earned non-farm income (%)	27.7	45.93	23.12	***	30.18	43.67	26.38	***	28.58	36.90	26.01	***
Income from remittances (%)	12.98	12.01	13.22		14.03	11.80	14.66	***	13.75	11.73	14.37	*
Difficulty to pay for food (%)	37.55	43.08	36.14	***	40.37	39.42	40.64		35.23	34.62	35.42	
Poor farm households (%)	28.50	24.80	29.45	***	25.45	15.74	28.19	***	14.94	8.67	16.87	***
Average total land area (ha)	1.606	0.30	1.93	***	1.48	0.33	1.80	***	1.35	0.27	1.69	***
- Thereof owned (%)	99.39	99.31	99.41		99.26	99.54	99.19		99.34	99.61	99.26	
- Thereof rented out (%)	30.84	5.44	37.32	***	29.64	7.83	35.81	***	27.80	7.81	33.97	***
- Thereof available (%)	69.16	94.56	62.68	***	70.36	92.17	64.19	***	72.20	92.19	66.02	***
- Thereof abandoned (%)	17.11	43.16	10.47	***	19.59	42.77	13.03	***	19.43	43.89	11.88	***
- Thereof used (%)	52.05	51.40	52.21		50.77	49.40	51.16		52.76	48.30	54.14	***
Mechanization (own tractor) (%)	2.06	0.47	2.46	***	2.65	0.74	3.19	***	2.31	0.27	2.94	***
Share of in-kind farm income	86.58	77.49	88.63	***	87.42	79.92	89.41	***	85.34	80.54	86.70	***
Land productivity (MDL/ha/year)	28,479	43,298	25,154	***	20,209	27,446	18,385	***	19,554	25,357	17,964	***

Note: Farm households are defined here as all urban and rural households owning individual plots (backyard or *small share*) and/or *big shares*. Incomes are adjusted according to consumer price index with 2010 = 100 (World Bank Development Indicators, accessed June 2015). Significances for group differences are indicated at the 1 percent (\*\*\*), 5 percent (\*\*) and 10 percent level (\*).

**Annex Table 4 Agriculture in EU, Poland, Romania and Moldova: Comparison of main indicators**

	EU27	Poland	Romania	Moldova
<b>Number of farms [thousand]</b>				
<b>2003</b>	15021	2172	4484	1125
<b>2007</b>	13627	2391	3931	987
<b>2010</b>	12015	1507	3859	902
<b>2013</b>	10684	1429	3630	
<b>Change 2013-2003 [%]</b>	-28.9	-34.2	-19.1	-19.8 <sup>a</sup>
<b>Number of farms &lt;5 ha [thousand]</b>				
<b>2003</b>	10854	1445	4205	746
<b>2007</b>	9526	1637	3531	229
<b>2010</b>	8298	831	3594	885 <sup>b</sup>
<b>2013</b>	7063	778	3347	
<b>Change 2013-2003 [%]</b>	-34.9	-46.2	-20.4	
<b>Average area of farm [ha]</b>				
<b>2003</b>	11.8	6.7	3.2	1.9
<b>2007</b>	12.9	6.5	3.6	2.5
<b>2010</b>	14.4	9.6	3.8	2.6
<b>2012</b>	14.7	10.4	4.1	2.9
<b>Labor force in agriculture [%]</b>				
<b>2003</b>	6.7	18	36	43
<b>2007</b>	5.6	15	29	33
<b>2010</b>	5.1	13	30	28

Notes: a - Change 2010-2003; b – Data from Agricultural Census 2011, not comparable with earlier years

Source: EUROSTAT (2016); (ILO, 2016); Timofiti, et al. (2015), p. 349