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**From Workers to Owners:  
Survey Evidence on the Impact of Property Rights Reforms on Small Farmers  
in Two Regions in Romania**

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Regions in Romania**

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## **Abstract**

In Romania, the 1991 Land Reform marked the beginning of a series of transformations in the ownership structure and the production system in agriculture. Nevertheless, after recently joining the EU it became evident that the agricultural sector is in need of major improvements in performance. We present preliminary findings from a unique village-level panel data at household level. Preliminary findings suggest that there are wide regional differences in terms of agricultural performance and organizational forms. Also, we find that productivity levels do not differ significantly between farming arrangements, and that labor supply, capital endowment, and contractual arrangements might be more important.

Keywords: transition, land reform, property rights, productivity, Romania.

JEL Codes: D23, D24

## Executive Summary

Having just recently joined the European Union (EU) institutional and economic structures, it became evident that the agricultural sector in Romania is in need for major improvements in performance, after going through one of the most complex post-socialist land reforms in the region.

In Romania, the 1991 Land Reform marked the beginning of a series of transformations in the ownership structure and the production system in agriculture. By 2005 almost 95% of land was in private ownership as compared to only 9% in 1990, at the start of post-socialist reform. Collective farms have been dismantled, land has been successfully redistributed to former owners based on the 1940s land structures, and state farms have been slowly reorganized into large corporate farms. Currently, a bi-modal production system exists: a large number of small and fragmented household farms coexist with a few large corporate farms, with serious social and economic implications for a balanced development pattern.

Despite the dominant role of the sector in the Romanian economy, research on identifying the sources of growth and regress in agriculture, as well as the socio-economic outcomes of land reform, has been limited. Moreover, since the beginning of land reform, major organizational changes took place, small individual farmers reorganizing into different institutional arrangements (legal associations and family associations), and engaging in land transactions (leasing and sales).

In this working paper we present preliminary findings from a household survey implemented in the summer of 2006 in two agro-regions in Romania, in which we assessed the main outcomes of the post-socialist transition sixteen years after land reform, and prior to EU enlargement. Our survey supplements data already collected a decade ago by the World Bank and European Commission. This allowed us to develop and analyze unique village-level panel data at the household level. The results of this survey provide empirical evidence about the efficacy of property rights reforms to improve agricultural productivity and market access during transition.

We found significant regional differences between the Western Plain and the Central Romanian Plain in terms of farming arrangements and land market participation, which can be accounted for by several structural factors. In the Western Plain individual private farms prevail, average age levels are lower, and the regional economy is more diversified and developed. Participation in land markets is more dynamic than in the Central Romanian Plain. By contrast, in the Central Romanian Plain associational forms (especially formal associations), created by restructuring the former socialist collective farms immediately after land reform (before 1992), dominate the organizational structure. Farm sizes are smaller, population is older, income levels are much lower, and work opportunities in the rural areas appear to be limited to farming.

In addition, preliminary econometric analysis suggests that productivity levels do not differ significantly between farming arrangements, and that labor supply, capital endowments, and contractual arrangements might be more important. Lack of alternative sources of income and a high attachment to land, are factors that also affect the decision to reallocate land to more productive uses. Therefore, improving the performance of this large segment of farms (small and

medium household farms/subsistence and semi-subsistence) requires a stronger reliance on social measures along with economic solutions. Third, land markets are important mechanisms for land consolidation and for facilitating the flow of resources to more productive users. However, land markets in Romania are still in formation, with pockets of activity and unbalanced prices. High transaction costs (survey and notary fees), and land fragmentation, are strong barriers for participation in the market, leading to the persistence of informal contractual arrangements.

Lastly, family farms in Romania differ in size and organization from the EU model. Therefore, in the policy realm, failure to acknowledge and negotiate appropriate measures for the Common Agricultural Policy (CAP) support, as Poland did, could lead to the exclusion of many private individual farms from receiving direct payments, and to longer delays in shifting from subsistence to commercially based farming.

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**1. Introduction**

Having just recently joined the European Union (EU) institutional and economic structures, it became evident that the agricultural sector in Romania is in need of major improvements in agricultural performance, after going through one of the most complex post-socialist land reforms in the region. Analysts in the field argue that earlier reform measures were mostly driven by external pressures (i.e. in mid 1990s conditionality imposed on loans from the World Bank, IMF, and EU, and in 2000s commitment to finalize the EU negotiations), rather than being the result of domestic convergence of interests for agricultural development.

Accession to the EU is expected to bring about rapid changes in the new member states, the rural economy being a major sector affected by these transformations. The experience of previous accession countries has shown the positive outcomes that integration has on the agricultural sector for less developed countries. Higher farm investments, productivity increases, improvements in rural incomes and more rapid restructuring of the agricultural sector are expected as a result of accession.

In Romania, the 1991 Land Reform marked the beginning of a series of transformations in the ownership structure and the production system in agriculture. By 2005 almost 95% of land was in private ownership as compared to only 9% in 1990, at the start of post-socialist reform. Collective farms have been dismantled, land has been successfully redistributed to former owners based on the 1940s land structures, and state farms have been slowly reorganized into large corporate farms. However, the slow pace of implementing institutional reforms for the newly created small and medium farms resulted in extreme land fragmentation, limited access to markets, and in effect the inability to “make the magic leap” from subsistence farming to more commercially oriented production. Currently, a bi-modal production system exists: a large number of small and fragmented household farms coexist with a few large corporate farms, with serious social and economic implications for a balanced development pattern.

Despite the dominant role of the sector in the Romanian economy, research on identifying the sources of growth and regress in agriculture, as well as the socio-economic outcomes of land reform, has been limited. Moreover, since the beginning of land reform, major organizational changes took place, small individual farmers reorganizing into different institutional arrangements (formal associations and family associations), and engaging in land transactions (leasing and sales).

In this working paper, we present preliminary findings from a household survey implemented in the summer of 2006 in two agro-regions in Romania, in which we assessed the main outcomes of the post-socialist transition sixteen years after land reform, and prior to EU enlargement. This



survey supplements data already collected a decade ago by the World Bank and European Commission. This allowed us to develop and analyze unique village-level panel data at the household level. We also conducted extensive fieldwork for interviewing the development of other important institutional factors such as the availability of credit, input and output markets, and infrastructure. The results of this survey provide empirical evidence about the efficacy of property rights reforms to improve agricultural productivity and market access during transition. For the purpose of this paper we present the main findings from descriptive statistics and econometric analysis, on characteristics of household farms, their choices in terms of farming arrangements, land market participation, and household productivity differences among different arrangements.

The most important preliminary findings at this stage of the research can be summarized as follows. First, family farms in Romania differ in size and organization from the EU model. Therefore, in the policy realm, failure to acknowledge and negotiate appropriate measures for the Common Agricultural Policy (CAP) support, as Poland did, could lead to the exclusion of many private individual farms from receiving direct payments, and to longer delays in shifting from subsistence to commercially based farming. Second, preliminary econometric analysis suggests that productivity levels do not differ significantly between farming arrangements, and that labor supply, capital endowments, and contractual arrangements might be more important. Lack of alternative sources of income and a high attachment to land, are factors that also affect the decision to reallocate land to more productive uses. Therefore, improving the performance of this large segment of farms (small and medium household farms/subsistence and semi-subsistence) requires a stronger reliance on social measures along with economic solutions. Third, land markets are important mechanisms for land consolidation and for facilitating the flow of resources to more productive users. However, land markets in Romania are still in formation, with pockets of activity and unbalanced prices. High transaction costs (survey and notary fees), and land fragmentation, are strong barriers for participation in the market, leading to the persistence of informal contractual arrangements.

Significant regional differences were found between the Western Plain and the Central Romanian Plain in terms of farming arrangements and land market participation, which can be accounted for by several structural factors. In the Western Plain individual private farms prevail, average age levels are lower, and the regional economy is more diversified and developed. Participation in land markets has been more dynamic than in the Central Romanian Plain. By contrast, in the Central Romanian Plain associational forms (especially legal associations) formed by restructuring the former socialist collective farms immediately after land reform (prior to 1992), dominate the organizational structure. Farms are smaller, population is older, income levels are much lower, and work opportunities in the rural areas appear to be limited to farming.

In the following sections we describe the data collection (through household surveys and face to face interviews) challenges and limitations, findings from the survey, preliminary results for our research questions and directions for future research.

## **2. Survey data collection**

Data at the household (farm) level are extremely scant in Romania. Therefore, we made use of an earlier national household survey that was implemented in 1996 with joint funding from the World Bank and the European Commission (EC). Because our colleagues assumed they had access to the household contact information, we intended to build on this study by resurveying the same households in the two largest agricultural regions in Romania: Western Plain and Central Romanian Plain. However, this proved to be the most difficult and controversial part of the project. Past organizational problems, lack of coordination among the institutions involved earlier, as well as a lack of long-term vision, led to loss of contact information for the households surveyed in 1996.

The organization that was responsible for preparing and administering the survey was the Center for Urban and Regional Studies (CURS). CURS is one of the most important survey and pooling agencies in Romania, conducting research in a variety of fields spanning from economic, social, political, and market research. Therefore, a major advantage was the opportunity of being able to work with them again in administering our survey. Having already a team of field-interviewers familiar with the rural context and farming issues is essential in ensuring a good understanding of the questionnaire while collecting the data. Another institution that we collaborated with in preparing the implementation phase was the Institute for Agricultural Economics (IEA). IEA is a prominent national research agency affiliated with the Ministry of Agriculture and the Academy of Sciences, having first class researchers and policy makers working on critical aspects related to the agricultural sector and rural development.

After detailed archival research and contacts with the team that was responsible for data entering in 1996, we managed to obtain the list of communes and villages that were surveyed in the previous years. Unfortunately, we did not find the names and contact information of the interviewed households, despite establishing contacts with the main participants in the study (survey agency, database manager, research advisors). A poor archival process, at a time when computers were not widely used in Romania, as well as a multiple interests and organizations involved, rendered those lists lost.

Nevertheless, knowing the sampling strategy and finding the names of the villages that were previously surveyed, we created a representative sample to be comparable at village level. The implementation phase of the survey (training, fieldwork, field control, data entering, database cleaning) lasted between 8 June and 23 August 2006. Below we describe why the two regions are interesting cases through which to explore the land reform outcomes, the sampling procedure we used and some preliminary findings.

### **2.1 Regional case studies**

Following preliminary research in 2005, we selected for fieldwork two larger regions (agro-regions)<sup>1</sup> that concentrate most of the agricultural production in Romania, are similar in terms of

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<sup>1</sup> Romania's administrative units, counties (judete), can be grouped into eight agro-regions. Agro-regions are clusters of counties that have similar patterns of agricultural land use (arable land, pastures, vineyards, and orchards) (Sandu 1999 p. 17). According to Sandu, using the agro-region as a unit of analysis allows

geo-physical characteristics but provide challenging contrasts in terms of institutional aspects related to land. These two agro-regions<sup>2</sup>, Western Plain and Central Romanian Plain, are made out of eight counties, both located in the rich land plains (see Figure 1 and 2).

Central Romanian Plain has a drier climate, is flatter, being more suitable for grains cultivation, while the geography and climate makes agriculture in the Western Plain appropriate for both grains and vegetables (see Figure 3). Nevertheless, while these differences in climate are marginal, the two regions are very similar in terms of having the highest land quality as compared to the rest of the country.

Table 1 illustrates that Central Romanian Plain has the largest share of arable land. However, even if Western Plain is not the second largest region in terms of arable land, its share of arable land is above the national level and its production mix, land quality, and climate, make it the closest comparison with the Central Romanian Plain.

**Table 1: Arable land as a % of total agricultural land by agro-regions**

	<b>2004</b>
Western Plain	68.9
Transylvania	38.1
Hilly Moldova	56.7
South Sub-Carpathians	53.0
South Oltenia	79.0
Central Romanian Plain	94.0
Low Danube Delta	84.6
Plateau Moldova	71.7

Source: Calculations based on data from NIS (2005)

The critical differences between the Western Plain and the Central Romanian Plain, that are of interest for the purpose of this study derive from two main aspects. First we point to differences in the stage of modernization and institutional legacies in land rights in the pre-communist period, and second to differences in the social and cultural values attached to land. Ownership structures were very different in these regions, as were the property relations between peasants

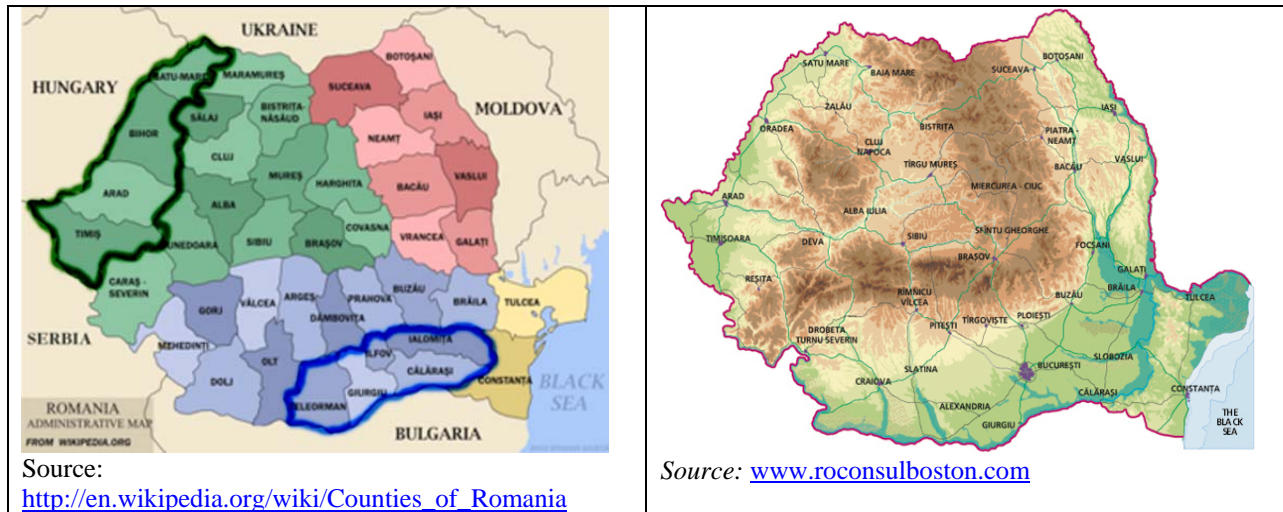
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one to connect the information on land use to economic and social characteristics of the area (Idem p. 17). In addition, there is a very close match between the agoregions and the historical Romanian provinces: Western Plain is part of the larger region of Transylvania (made out of Banat, Crisana, and part of Maramures), and Central Romanian Plain includes the most area of the oldest historical region of Romania, Muntenia. However, another advantage of grouping the counties in agoregions rather than historical regions is that it extends the classification criteria to socio-cultural and demographic characteristics as well.

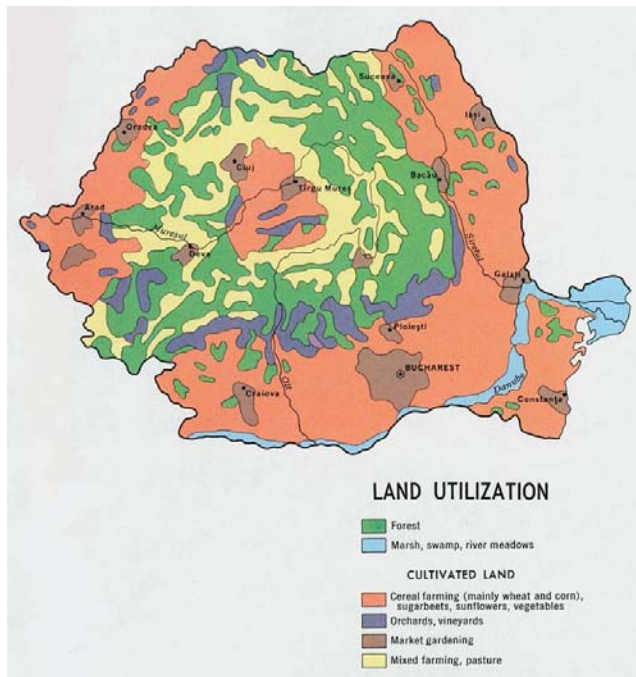
<sup>2</sup> Based on cluster analysis eight agoregions were identified: Transylvania (Caras-Severin, Hunedoara, Alba, Cluj, Salaj, Maramures, Bistrita-Nasaud, Mures, Harghita, Covasna, Brasov, Sibiu), Western Plain (Timis, Arad, Bihor, Satu-Mare), Hilly Moldova (Suceava, Neamt, Bacau), Plain Moldova (Botosani, Iasi, Vaslui), Danube Delta Plain (Braila, Galati, Tulcea, Constanta), Central Romanian Plain (Ialomita, Calarasi, Ilfov, Giurgiu, Teleorman), South-Sub Carpathians (Gorj, Valcea, Arges, Prahova, Dambovita, Buzau, Vrancea), and South Oltenia (Mehedinti, Dolj, Olt).

and the aristocracy (the large landowners), which we hypothesize to have partially contributed to different outcomes in property rights arrangements and land market participation. Moreover, these historical differences in property rights led to variation in land valuation, social meaning of land, and as a result, in a different response to de-collectivization and land restitution (Vidican-Sgouridis 2008). Therefore, a cultural and historical layer is critical in exploring regional differences.

**Figure 1 and Figure 2: Map of Romania’s Counties with the two agro-regions highlighted and superimposed on the historical regions (1) and the Geographical Map of Romania (2)**



**Figure 3: Land utilization**



Western Plain<sup>3</sup> has been historically under the Austro-Hungarian Empire from 1867 to 1947, period in which individual property rights in land have been granted to the population and the process of industrialization has begun much earlier than in other regions of Romania. Aside from a longer history of property rights, for the Romanian population living in Transylvania, land had a deeper significance being intertwined with issues related to national identity. As we will mention later, we hypothesize that this aspect was influential in the post-socialist de-collectivization and the quest for land in this region.

Central Romanian Plain differs significantly from this aspect. The region is part of old Romania, also called Muntenia (Tara Romaneasca) or Valahia<sup>4</sup>, and for the most part its land relations have been shaped by feudalism almost up until the 1920s. Here, traditional agriculture predominated and property rights have been granted only for a limited period of time. Nevertheless, large land estates dominated the organizational structure and private plots for farmers were too small to suffice their subsistence needs. Therefore, property rights were hollowed of their meaning and peasants continued to be laborers on large hacienda estates. Not having cadastral maps and clearly specified property titles (as in the Western Plain region), the efforts to reconstruct the new properties after the 1990 land reform based on pre-collectivization land structures were very feeble. Most people preferred to just receive the title on the amount of land they contributed to collectivization, which differed from the Western Plain where the new owners pushed hard for getting back the land on the exact location. These differences raise pertinent questions related to the role of property rights in development, institutional path-dependence, and organizational implications. Did property rights evolve similarly in the two regions? If not, what impact did these differences have on regional economic development? Did the history of land reform affect land claims at restitution? Was production reorganized differently in the two regions following policies for de-collectivization and land privatization?

**Table 2: Rural Development Index<sup>5</sup> by agro-regions**

	<b>1992</b>
Western Plain	63.55
Transylvania	59.31
Hilly Moldova	58.57
South Sub-Carpathians	63.47
South Oltenia	61.37
Central Romanian Plain	61.18
Low Danube Delta	61.35
Plateau Moldova	62.80

Source: Calculations based on data from Harta Saraciei, CASPIS (2002).

<sup>3</sup> The counties included in the Western Plain agroregion are part of the larger historical region called Transylvania, which extends from the west, north-west and the center of the country.

<sup>4</sup> Valahia is the larger region formed by Oltenia (to the west) and Muntenia (to the east).

<sup>5</sup> In the CASPIS (2002) report, rural development is measured by an index based on the hypothesis that the development level in a commune depends on the levels of education, employment, age groups, population density, a better endowment with housing and infrastructure, and location closer to regional development centers. It does not however, take into account the economic structure in the community nor the type of institutions and organizational arrangements present at the local level for administering these resources.

Additional differences between the two regions derive from the level of regional economic development (see Table 2). The Western Plain has been traditionally more industrialized and currently enjoys one of the highest levels of economic growth in Romania. Its diverse economic base and its location on the border with Central and Western Europe, was able to attract significant amounts of foreign investment in the past decade. Unemployment rates have been the lowest and average real incomes were maintained above the national average. The Central Romanian Plain, despite its location around the dynamic capital Bucharest, has exhibited lower levels of development and higher poverty levels along with Hilly Moldova (see Table 3) (World Bank 1998). Its economy is less diversified and unemployment rates are higher. These differences are salient in shaping the outcomes of land reform since they affect market size as well as economic diversification.

**Table 3: Poverty rates<sup>6</sup> in the rural areas in 2002 by agro-regions**

	2002
Western Plain	0.33
Transylvania	0.35
Hilly Moldova	0.48
South Sub-Carpathians	0.40
South Oltenia	0.45
Central Romanian Plain	0.43
Low Danube Delta	0.46
Plateau Moldova	0.51

Source: Calculations based on data from NIS (2005)

## 2.2 Sampling

A sample of 619 rural households was selected at random from 45 villages in eight counties<sup>7</sup> grouped into two main agricultural regions, Western Plain (316 households) and Central Romanian (303 households). One person from each household, the household head, was interviewed.<sup>8</sup> The sampling procedure was carried out in two stages with stratification in the first stage. Sample strata were a function of the agricultural profile of the commune and the development level of the county (judet) in which the communes are located. Table 4 and Table 5 describe the sampling methodology.

<sup>6</sup> For a note on the calculation of poverty rate, see the report prepared by the Bucharest University and the National Institute of Statistics for The National Commission for Poverty Reduction and Promotion of Social Inclusion (CASPIIS 2002).

<sup>7</sup> The eight counties part of the two agricultural regions are: Western Plain: Timis, Arad, Bihor, Satu-Mare; Central Romanian Plain: Calarasi, Teleorman, Ialomita, Giurgiu.

<sup>8</sup> During the interviews data was collected on other members of the household as well. Nevertheless, for the purpose of this report only responses from the household head are used.

**Table 4: Main characteristics of the sample**

Representativeness for:		Rural agricultural households
Sampling design		Two stage random sample with stratification in the first stage
Stratification criteria		1. Commune type strata 2. County development level (2 strata)
Sample size	designed	650
	accomplished	619

**Table 5: Sampling design by stages**

Stage 1		
Inputs	Selection units	Rural communes
	Stratification criteria (2*2*3*2=24 strata)	<ul style="list-style-type: none"> <li>• GEO soil quality (2 classes)</li> <li>• MIG migration attraction (2 classes)</li> <li>• GRAIN land use pattern (3 classes)</li> <li>• County development level (2 classes)<sup>9</sup></li> </ul>
	Sampling frame	Farm survey data with all the communes of the country, built on the National Commission of Statistics' data (1994), Agricultural Economics and Sociology Institute, and 2002 published census data.
Operations	Stratifying the sample	The distribution of the agricultural active population in the 24 cells of the stratification table is the basic structure of the sample.
	Distributing the sampling points (=communes) by strata	1. The volume of the sample of 619 households is divided according to the proportion of active agricultural population by strata. The number of the communes by stratum is given by dividing the strata subsample by 14 (=the number of farms to be interviewed by commune)
	Selecting the communes randomly by strata	2. From the total number of communes by strata communes are randomly selected according to the number of sampling points by stratum.
Stage 2		
	Selection units	Agricultural households
	Sampling frame	Local agricultural records (Registrul Agricol)
Operations	Selection of the farms for the survey	Random selection of farms having at least 0.5 ha of agricultural land, from Registrul Agricol in each village.

The primary sampling unit in this case is the household, private individual farm. A household is considered (potentially) agricultural if it owns at least 0.5 hectares of agricultural land. Owning less than 0.5 hectares reduces very much the probability of using land as a source of income or as

<sup>9</sup> Using the classification from Regional disparities in Romania.1990-1994, Phare Programme- Regional Policy, Ramboll Consultancy Group, Bucharest, 1996

a primary occupation. Even if agricultural activities are present not only in rural localities but also in some urban communities<sup>10</sup>, the selection included only rural farms.

The main hypothesis of the sampling design is that agricultural activity at the commune level is function of:

- the pattern of land use, measured by the percentage of arable land cultivated with grain;
- the soil quality, measured by a specific index ('bonitare' GEO);
- the labor and social pulling profile of the community, measured by the temporary net migration rate for 2002.

The stratification criteria did not change since 1996. Therefore we did not have to go through the process of determining the distribution of sampling points (the communes) by strata and randomly selecting the communes. We used the same communes and villages that were surveyed in the previous years, but we had to do a new selection of the households, using the local agricultural records available in each village or each commune. A random selection of farms was made based on the total number of questionnaires in each commune and the total number of households in the commune/village. The refusal rate, that is, the number of respondents who refused to participate in the survey or who were not at home repeated times, was less than 5%. Key descriptive statistics from the 1996 and 2006 surveys will be presented in section 3.2.1.

## 2.3 Questionnaires

We collected data from two survey units: households, and commune level. In order to ensure comparability with earlier data, the household questionnaire was based on the 1996 survey instrument to which we added few questions and took out some in order to keep it within a reasonable interview time frame. Feedback from a pretest on 20 households before implementing the full survey suggested that the questionnaire had to be maintained within a manageable size in order to ensure reliability and completeness of collected data. The questionnaire consisted of more than 100 questions. Interviews were conducted person to person by a research team from the CURS, located in Bucharest and having eight regional offices. Two training sessions were conducted by us and CURS: one in Bucharest for the field interviewers from the Central Romanian Plain, and one in Oradea for the Western Plain. We participated in part of the data collection during the fieldwork.

Random field checks were performed at the end of the surveying procedure for ensuring accuracy of data collection. Due to lack of phone lines in most of the rural areas, field trips were made in randomly selected villages. Having the contact information for the surveyed households (name and address), we were able to trace them back and inquire as to whether a field operator from CURS approached them recently with questions about their farm operations. Random questions from the questionnaire were also posed in order to verify the accuracy of information.

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<sup>10</sup> The percentage of the population occupied in agriculture, living in urban communities is reported to be of 8% out of the total population occupied in agriculture, in the third trimester of 1996, according to the survey of the National Commission of Statistics, "Ancheta asupra fortei de munca in gospodarii (AMIGO), Trimestrul III 1996."



The *household questionnaire* had the following sections: background information on the household members (age, education, occupation); land ownership; land market participation (leasing in, leasing out, sells, purchases); size of the livestock; agricultural production; capital and buildings; participation in product market; purchases of inputs; investment and credit access; labor force; sources and levels of income; changes in wellbeing; and relations with farming associations

The *commune questionnaire* was administered to mayors<sup>11</sup> or agricultural secretaries in 19 communes (8 communes in Western Plain and 11 in Central Romanian Plain), and gathered information on: distance to the closest urban center, age of the population in the commune, land market participation, share of land left fallow, traditional market for agricultural products, labor migration, and problems faced by farmers in the commune.

## **2.4 Key informant interviews**

During a three-month period, between June-August 2006, we conducted several interviews with key informants on the topic of policy-making and implementation for the agricultural sector, as well as with small, medium, and large farmers in the two regions. In Bucharest, we interviewed representatives of the Ministry of Agriculture, and representatives of the Romanian Government to the European Agricultural Commission. In addition, we participated in two conferences organized by the Ministry of Agriculture, Academy of Sciences, and EU commission for agriculture, where we had the opportunity to engage in discussions related to the future of the agricultural sector in Romania, the changes triggered by integration into the EU, and the institutional capacity of the sector to absorb the EU direct payments under the CAP.

### 2.4.1 Policy makers

From interviews with policy-makers we learned that this period represents a crucial time for restructuring the agricultural sector. Integration in the EU economic and institutional structures creates a unique momentum for establishing a development agenda that would allow catching up with the rest of the EU members. However, there is wide agreement in the policy circles on the fact that the administrative capacity is too weak to be able to cope with the sudden changes imposed by aligning to the EU standards of competitiveness after years of stagnation and slow processes of change. Comparisons with other countries in the region suggests that the ten countries that joined EU in 2004<sup>12</sup> have been much more strategic in their pre-integration policies, focusing on early incremental changes that would reduce the shocks immediately after enlargement. The most important such measures have been: a) land registration and cadastral mapping which allows not only an easy transfer of funds from the CAP support programs but also a precondition for land market development; b) market support measures by stimulating investment in higher technologies and improved product quality. Nevertheless, to date Romania (as well as Bulgaria) has lost the chance of restructuring the agricultural sector prior to

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<sup>11</sup> In many cases the mayor was the same person as the agricultural representative, which eased the process of data collection.

<sup>12</sup> Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia.

enlargement, which places serious pressures on catching up with its peers, running the risk for further delays.

#### 2.4.2 Farmers

The interviews with farmers aimed at inquiring into the incentives and constraints confronting farmers as they adjust to a new economic environment created by the transition to a market economy. The goal was to detect more subtle factors than what could be learned through structured survey techniques, by extracting meaning from social relations around land and farming, and from perceptions on market creation. The key findings from these interviews can be grouped into several themes: a) social value of land; b) local solutions to agriculture; c) social networks; d) adjusting to change; e) entrepreneurial initiatives; f) learning to change; g) rural-urban linkages. Below I will briefly summarize the arguments for each theme.

##### *a) Social value of land*

The value and meaning of land varies between different types of farmers. For the majority of landowners the value of land goes beyond its economic price. It conveys identity, socially constructed way of life, and it is a tool for class differentiation. While post-socialist land restitution aimed to correct the wrongdoings of communist collectivization, it resulted in re-creating the pattern of class differentiation that existed in the 1940s between “land rich” and “land poor”.<sup>13</sup> Beside the embeddedness of land in social relations, for another smaller group of individuals, land was viewed as a profit generation asset, being able to take advantage of older networks of production (input supply and product marketing).

##### *b) Local solutions to agriculture*

Despite extremely difficult conditions, the new landowners found local solutions to agriculture, which prevented further declines in production and sustainability, suggesting an unquestionable process of evolution and change. Some of these solutions are: part-time farming, associations, social networks manifested in labor exchange or production barter, tapping into the network of former collective and state farms for input supply, mechanical services, and expertise.

##### *c) Social networks*

Interestingly, social networks do not always act as a benefit for the local economy. While social networks are critical when market imperfections prevail as is the case of transitional economies, there are cases in which strong social networks can act as hindrance to productive farming. In this project, we found that social networks (specifically among family members) can sometimes act to restrict the right to exit from a production system, preventing farmers to shift their land assets to more productive uses. In addition, these findings also suggest that choice is not always based on rational (profit maximization) grounds.

##### *d) Adjusting to change*

Changes associated with land reform came as a shock to most people. Adjusting to a different way of life has been difficult, while the collective farms provided a sense of security against market unpredictability. Land restitution has been a blessing for most individuals, by regaining a

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<sup>13</sup> Initially there was a limit of 10 hectares to be restituted to each household, but later the threshold was increased to 50 hectares.

sense of dignity and freedom, and also providing an additional source of income to supplement the highly depreciated wages (or social benefits) during transition. But, the constraints imposed by market imperfections and the lack of comprehensive rural development policies have transformed this blessing into an actual burden.

*e) Entrepreneurial initiatives*

Entrepreneurial initiatives in farming, while limited, have not been lacking since land reform. Entrepreneurs can be grouped into two categories: old and new. The old entrepreneurs are the former leaders of collective and state farms, who currently face problems in being adaptable, flexible in a market economy. The new entrepreneurs grew out of the market, being able to use more effectively both the networks from collective and state farms, as well as the market mechanisms. These entrepreneurs are engaging into more diversified investment activities, and are more responsive to market needs.

*f) Learning to change*

Despite the slow pace of reform, there is a process of adaptation and learning taking place, but those that adapt and learn faster are those that “had a foot in both worlds,” able to tap the former communist networks of production, and having capital to invest in an entrepreneurial farming activity.

*g) Rural-urban linkages*

Rural-urban linkages have proved to be key for agricultural and rural development in Romania for three main reasons. First, as a result of industrial restructuring a large pool of unemployed workers migrated to rural areas, reducing the risk of land degradation by leaving the land fallow. Also, rural in-migration provided a larger labor supply in the rural areas, where a large share of population is more than 60 years old. Second, rural in-migration also played a role in reducing the incidence of absolute poverty during transition by securing a source of food and income from farming. Third, to the extent that jobs are created in the urban areas, rural-urban areas are important in providing the rural population with off-farm incomes, which could be a first step in diversifying the rural economy.

### 2.4.3 Commercial farmers

Besides small household farms, we also conducted interviews with medium and large farms in the two agro-regions (three farms in the Western Plain and five farms in the Central Romanian Plain). These interviews contributed greatly to our understanding of this different class of farmers and their interaction with the household farms. Most of these farms (associations or private corporate farms) were created as a result of restructuring the former socialist collective farms. In almost all cases the leadership has stayed the same, which at times could be both an advantage (in terms of easier access to markets) as well as a constraint (inability to operate based on market based principles). Overall it does seem that, farming experience, reliance on former networks of production, and improved access to markets, were key factors in ensuring good performance during the uncertainties of transition.

Additionally, most of the land in these farms is leased from small household farms, contributing to land consolidation efforts. However, agricultural restructuring (which also led to dismantling the Machine and Tractor Stations created during collectivization, and the backward and forward

linkages in production) affected these (mid-large sized) producers. The main problems that these farmers are confronting with are production marketing and high input costs. In the Central Romanian Plain for instance, most of the larger corporate farms have contracts with a single client (food processing firm, or an agricultural products trading company). Such circumstance can have both positive (stable product demand) and negative outcomes (higher risks depending on the changes in prices and national/global demand). The post-EU integration period brings a lot of uncertainty as demands for increased competitiveness (higher product quality and equipment standards) resulted in higher indebtedness as farms made significant investments in upgrading their production systems. The question of who will be able to survive the post-integration period builds anxiety among most farmers, but at the same time it has created conditions for taking advantage of many opportunities that were made available through different programs financed by the government and lending institutions (i.e. EU, World Bank). However, “the last minute” reforms do little to decrease the level of uncertainty that afflicts all the producers.

### **3. Preliminary survey results**

#### *3.1 Commune questionnaire*

In this section we will underline the key findings from the commune questionnaire, which should provide more information on the social and economic conditions at the community level. The aggregate statistics at commune level show that, on average, the villages from the Western Plain are located closer to urban centers (17 km) as compared to those in the Central Romanian Plain (19 km)<sup>14</sup>. This suggests that access to markets is better in the Western Plain. The largest age group in the western communes is between 45-54 years (63%), while in the Central Romanian Plain, the 55-60 years age group predominates (55%).

On average, in the Western Plain 1,100 hectares of agricultural land (on average 13.4% of total land) were sold in the commune, at an average price of 2,888 RON/hectare. In the Central Romanian Plain, much less land was sold (an average of 293 hectare, which represents only 4.2% of the commune agricultural land), but at much higher price level (on average 2,565 RON/hectare). Nevertheless, there are quite significant disparities between the level of land market activity in these communes, as illustrated by Figure 4.

Interestingly, however, a higher share of the land in Western Plain remained fallow (25% on average), as compared to only 15% in Central Romanian Plain, despite what appears to be a more vibrant land market. One explanation for this finding is that while more off-farming jobs are available in the Western Plain (due to a more diversified economy, as we will see later), the attachment to land is still strong, preventing landowners to renounce their property rights.

The level of remuneration for hired farm workers is higher in the Western Plain than in the Central Romanian Plain (33 RON/day as compared to 20 RON/day). Nevertheless, the standard

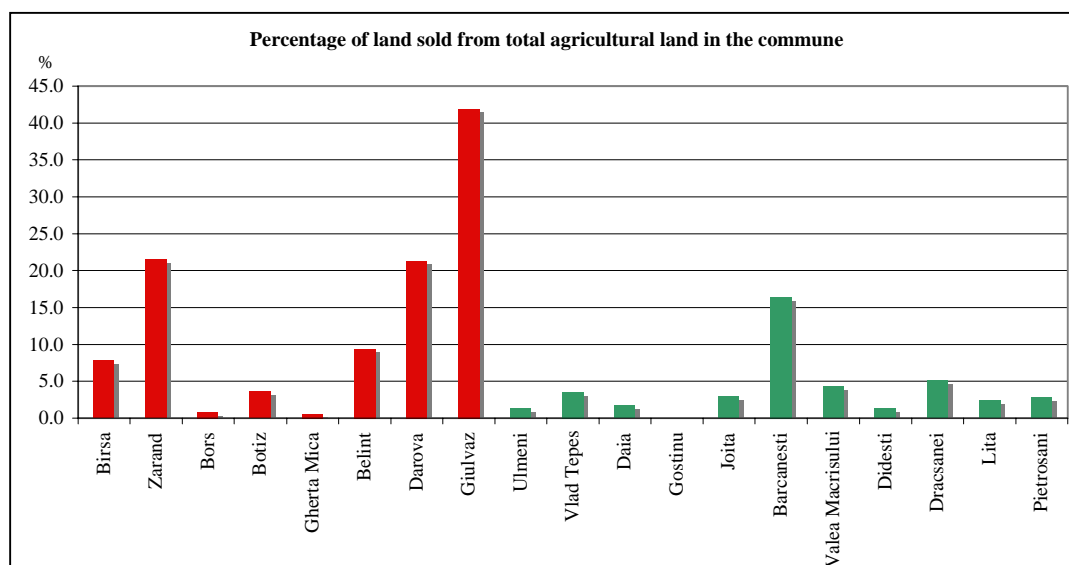
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<sup>14</sup> The rate of urbanization in the Western Plain is higher than in the Central Romanian Plain (55% as opposed to 37% in 2005).

of living is higher in the Western Plain as compared to the Central Romanian Plain as indicated by the GDP per capita (see Figure 5).

Youth migration is relatively high in both regions (22% in the Western Plain and 20% in the Central Romanian Plain). However, the variation among the 19 communes is very high, from communes with as low as 0.5% to communes with 90% youth migration seeking work opportunities abroad.

**Figure 4: Percentage of land sold from total agricultural land in the commune (red bars are communes in the Western Plain and green bars are communes in Central Romanian Plain)**



Source: Household Surveys in 1996 and 2006.

Access to local traditional markets is not very widespread. Only 25% of the communes in the Western Plain have a local market where to sell agricultural products (crops and animals), and 27% in the Central Romanian Plain. For the communes that do not have a local market, the average distance to a market is relatively high (14 km in the Western Plain, and 19 km in the Central Romanian Plain), considering that most farmers in the rural areas use horse drawn carriages for transportation.

Among the most acute problems faced by farmers in these communes, we identified the following issues, consistent across the two regions: marketing channels for agricultural production, lack of mechanical equipments, limited access to financing, lack of knowledge about new farming technologies, and natural disasters<sup>15</sup>. Some commune representatives also mentioned old age and lack of irrigation implements as problems for their communes.

<sup>15</sup> In the past three years Romania confronted with severe floods in the spring and fall (at critical times in the agricultural cycle) especially in the west, Central Romanian Plain, and east of the country. The rural areas, having poor infrastructure were severely affected to the point to which entire villages were swept away and thousands of hectares of land inundated. We found cases in our survey in which because of floods, no production was obtained in several households.

### 3.2 Household questionnaire

#### 3.2.1 Background stats

Table 6 summarizes the main descriptive statistics for the two surveys. In 2006 the average household size in our survey was 3.1 persons, slightly higher in the Western Plain (3.3 persons) as compared to the Central Romanian Plain (3 persons). A decade ago, in 1996, the average household size was higher. This decline could be due first to a natural dynamic in rural population (lower birth rates than mortality rate), and second to increased rural-urban (or international) migration. The average age in Western Plain is lower than in Central Romanian Plain (57 years old and 64 years old respectively). Additionally, the educational level of the household head is higher in Western Plain and more people have agriculture as a secondary occupation (25% as compared to 6% in Central Romanian Plain).

**Table 6: Descriptive statistics for the 1996 and 2006 surveys**

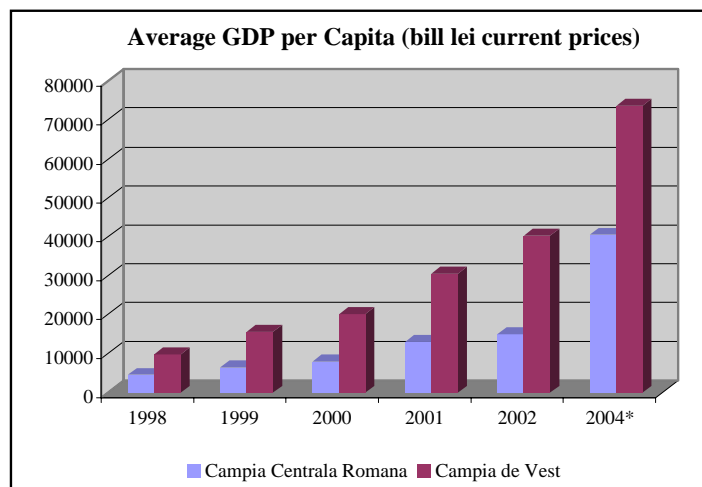
	Western Plain		Central Romanian Plain	
	1996	2006	1996	2006
Household size (nr. pers)	3.9 pers	3.3 pers	3.1 pers	3.0 pers
Age (yrs)	53 yrs	57 yrs	64 yrs	64 yrs
Gender (% male)	74.0%	57.0%	74.5%	63.0%
Education (% gymnasium)	69.5%	63.0%	84.4%	79.0%
Main occupation (% agriculture)	64.8%	52.0%	85.8%	86.0%
Secondary occupation (% agriculture)	24.0%	25.0%	12.7%	6.0%
Occupational status (% pensioners)	54.3%	55.0%	79.3%	69.0%

Source: Household Surveys in 1996 and 2006.

These data illustrate that in the rural areas in the Western Plain less people are engaged in agriculture as a primary occupation, which could be due to a younger population able to find work in a different sector, higher educational levels, a more diversified rural economy, and a higher regional development level.

The striking differences between the two regions in terms of GDP per capita, especially after 2000 (as illustrated by Figure 5), suggests that the economy is more vibrant in the Western Plain and more diversified in other industries as well. Manufacturing and services have a higher share in the regional GDP in the Western Plain than in the Central Romanian Plain.

**Figure 5: Average GDP per capita in the two agro-regions from 1998 to 2004**



Source: NIS (2005)

### 3.2.2 Land ownership and farming arrangements

The process of restitution and distribution of agricultural and forest land that started in 1991, involved about 5 million people and transferred into private ownership 10,989.2 thousands hectares of the country's 14,856.8 thousand hectares of agricultural land (Dumitru et al. 2004, p. 10). Currently, 99% of the property titles have been delivered to the new landowners. About 10.3 million hectares of agricultural land owned by more than 4 million individual households. However, landownership is very fragmented, with average farm sizes of less than 2 hectares of arable land. Additional problems with restitution were created by the allocation of a significant share of agricultural land (between 30% and 43.1% according to different estimates as per Dumitru et al. (2004)) to owners that do not activate in agriculture (city dwellers, wage-earners and rural pensioners) and have no interest in cultivating directly the land.

#### Land ownership

According to our survey, by 2006, 90 percent of the households in the two regions had acquired ownership title, 8.2 percent have a temporary proof of ownership (*adeverinta de punere in posesie*) and 1.8 percent has other legal endorsements. Ten years ago, in 1996, only 47% of the households had ownership title (more in Western Plain as compared to Central Romanian Plain), while 50% had only temporary proof of ownership. This indicates that significant progress has been made in creating an ownership society for agricultural land.

Property restitution in the Central Romanian Plain caught up with the Western Plain, so that 93.4% of the households in Central Romanian Plain have ownership titles, as compared to 86.7% in the Western Plain. It remains to be seen whether this difference plays an important role in farm performance.

Since 1996 the average size of the household farm has decreased from 3.80 hectares to 3.12 ha in 2006. This decline in farm size is rather surprising since one would expect that over time family farms will increase, especially after 1998 when land market was formally set-up (Law 54/1998).

However, it could suggest that as land markets became more consolidated, and since there were few marketing and financing opportunities for small farmers, many households decided to sell part of the land to entrepreneurs that probably have used the land for non-agricultural purposes.

Interestingly, in Western Plain, the size of the landholding has slightly increased since 1996 (from 3.63 hectares to 3.97 hectares in 2006), while in the Central Romanian Plain it has significantly declined (from 3.93 hectares to 2.94 hectares in 2006). Why has the size of landholdings increased in one region while in the other it has declined over a decade? It is true that since 1996 land markets became more developed once Law 54/1998 was implemented, formalizing land transactions (buying and selling of land). On the one hand, since the Western Plain is economically more developed, we assume that land consolidation through the land market was much faster. On the other hand, in the rural Central Romanian Plain, since land is the main source of income, further land fragmentation might have occurred through inheritance, and limited involvement in the land market.

Nevertheless, family farms are still very small compared to the EU15 model, where the average farm size is 18 hectares (Lerman et al. 2004, p. 78)<sup>16</sup> revealing huge differences between farm structures. In 2006 in Romania 81% of the farms are smaller than 5 hectares. On average, landholdings are larger in Western Plain (3.97 hectares) as compared to Central Romanian Plain (2.94 hectares). Interestingly, as Table 7 illustrates Western Plain has both a higher number of very small farms and a higher number of larger farms (over 5 hectares) as compared to Central Romanian Plain.

**Table 7: Distribution of farms based on landholding size in 2006 (%)**

	<b>2006 Average</b>	<b>Western Plain</b>	<b>Central Romanian Plain</b>
Under 1 ha	12.2	13.3	10.9
1-3 ha	44.9	40.0	50.0
3-5 ha	24.1	22.5	25.8
5-10 ha	15.6	19.4	11.6
10-20 ha	2.3	2.9	1.7
More than 20 ha	1.0	1.9	0.0

Source: Household Surveys in 1996 and 2006.

A share of 19% of the farms are over 5 hectares (between 5 and 70 hectares) and of these, 17% are more than 10 hectares. As Table 7 illustrates, Western Plain has more large individual farms than Central Romanian Plain (24% and 13% respectively). These relatively large individual farms are likely to be the backbone of Romania's commercial individual farms, closer in size to the EU family farm model, while the segment of less than 5 hectares, is likely to stay semi-subsistence and subsistence and gradually become the reserve of land for increasing the size of the commercial individual and joint stock farms provided that alternative job opportunities (or sources of incomes for pensioners) will be created.

<sup>16</sup> In the United States, a farm operated by full owners has an average of 112 hectares, while in Canada it has an average of 164 hectares (Lerman et al. 2004, p. 78).



**Table 8: Distribution of farms based on landholding size in 1996 (%)**

	1996 Average	Western Plain	Central Romanian Plain
Under 1 ha	5.7	10.5	2.1
1-3 ha	39.1	43.8	35.5
3-5 ha	26.4	18.1	32.6
5-10 ha	23.2	19.1	26.2
10-20 ha	5.7	8.6	3.6
More than 20 ha	-	-	-

Source: Household Surveys in 1996 and 2006.

Table 8 illustrates that a decade ago farm size was higher in both regions, with more mid-level farms. Nevertheless, the maximum size reached 20 hectares, lower than in 2006. This pattern of land reallocation suggests that a class of family farms entrepreneurs has not yet emerged in Romania, and that the unfavorable conditions in terms of access to markets and financial resources lead to the perpetuation of the subsistence sector.

After de-collectivization and restitution based on the 1940s plot locations, land fragmentation became a serious problem for the newly created private farms. Following the fall of the communist regime, countries had the choice of adopting either land restitution, or a form of distribution of land to former owners. Overall, the decision was influenced more by political rationales than by historical circumstances around collectivization. Romania, along with Hungary, implemented both land restitution and land distribution. However, by choosing to return the exact same plots of land to the original pre-collectivization owners or their heirs, land reform in Romania resulted in a variety of farms divided into a multitude of plots and strips. This level of fragmentation was almost unprecedented in the region. In 2006 almost 62% of the household farms had their land divided in more than 3 plots, which is considered a major obstacle for technological progress in agriculture and increased productivity levels.

Land fragmentation has not declined significantly in the past ten years, as was expected. In 1996, 69% of the households had the land divided into 3 or more strips of land. A more active land market, especially after 1998, created better conditions for land consolidation. However, tables 9 and 10 illustrate an interesting finding: an increase in farm sizes has indeed occurred across farm sizes, but in the Western Plain, the share of farms with more than 7 plots of land has increased. This suggests that despite the fact that on average landholdings are larger in Western Plain, the type of farming arrangements that are operating in this region were not able to absorb land fragmentation.

**Table 9: Land fragmentation in 2006 (%)**

	Sample	Western Plain	Central Romanian Plain
1-2 plots	38.5	39.9	37.1
3-4 plots	36.7	30.7	43.0
5-7 plots	20.4	21.5	19.2
>7 plots	4.4	7.9	0.7

**Table 10: Land fragmentation in 1996 (%)**

	Sample	Western Plain	Central Romanian Plain
1-2 plots	31.1	33.3	29.5
3-4 plots	34.6	36.4	33.3
5-7 plots	27.6	24.2	30.2
>7 plots	6.6	6.1	7.0

Source: Household Surveys in 1996 and 2006.

The small size of the household (family) farms in addition to high land fragmentation leads to a perpetuation of subsistence farming even after integration in the EU. As of now, out of more than 4 million private individual farms, only 1,500,000 farms were found eligible for the CAP direct payments.<sup>17</sup> Nevertheless, cadastral measurements, which are another requirement for EU subsidies in agriculture, exist only for 38% of farms. Pillar II of the CAP policy will provide some financial assistance to semi-subsistence farms<sup>18</sup> (approximately 15,000 Euro/year), but only for a limited number of years (approximately 5 years). Therefore, reliance only on the CAP payments, without broader social and economic institutional policies for addressing structural changes in agriculture is likely to have limited outcomes.

### Farming arrangements

In the aftermath of de-collectivization, a variety of organizational arrangements were created in order to cope with the hardships of transition and agricultural restructuring. The following farming arrangements are operating for small and medium farms: private individual farming, family (or informal) associations, legal (or formal) associations, and a variety of leasing arrangements.<sup>19</sup>

At the national level, the private sector, which accounted for 12.56 million ha (i.e. 85% of total agricultural area) was in 2000 represented by four major type of farming arrangements (Dumitru et al. 2004, p. 10): individual farms representing 80% (10,054,000 hectares); formal associations representing 12.7% of total agricultural land (1,592,000 hectares); informal associations representing 5.2% (648,000 hectares) and large private joint stock companies presenting 1% (180,000 hectares) (see Table 11 from Dumitru et al. (2004)).<sup>20</sup>

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<sup>17</sup> Direct payments will be made on farms that are at least 1 hectare in size, split into parcels of not less than 0.3 hectares.

<sup>18</sup> The difference between subsistence and semi-subsistence relates not only to the size of farms (smaller than 3-4 hectares) but also to the share of production being sold on the market. Subsistence farms produce only for consumption, while semi-subsistence farms sell only a very limited share of the production. Data from the 2002 Agricultural Census in Romania, show that 40% of the agricultural area in private individual use is occupied by subsistence farms, and 39% by semi-subsistence farms. Only 7% of the area is used by farms with commercial activity (Giurca et al. 2006).

<sup>19</sup> Appendix A describes in more detail each farming arrangement (individual private farms, family associations, legal associations, and leasing).

<sup>20</sup> After 2000 official statistics collapse all these categories (with the exception of private joint stock companies) into the broader category of private individual farms, making it difficult to find out details about how the associational forms evolved.

**Table 11: Private farming structure in Romania<sup>1</sup> 2000**

End of:	Individual farms				Formal Agricultural Association				Informal Agricultural Association			
	No. '000	'000 ha	Average size	% of total land	No.	'000 ha	Average size	% of total land	No.	'000 ha	Average size	% of total land
1993	3,419	7,333	2.14	66.6	4,265	1,910	448	17.4	13,772	1,763	128	16.0
1994	3,578	7,905	2.21	70.3	3,970	1,771	446	15.8	13,741	1,537	112	13.7
1995	3,597	8,052	2.24	70.7	3,973	1,733	436	15.2	15,915	1,596	100	14.0
1996	3,625	8,348	2.30	72.3	3,759	1,752	466	15.2	15,107	1,440	95	12.5
1997	3,973	8,897	2.24	76.6	3,913	1,714	438	14.8	9,489	1,000	105	8.6
1998	3,946	9,182	2.33	78.5	3,578	1,558	435	13.3	7,175	950	132	8.1
1999	4,119	9,377	2.40	81.5	3,573	1,429	399	11.5	6,264	868	138	7.0
2000	4,259	10,054	2.36	80.1	3,724	1,592	427	12.7	6,836	648	95	5.2

<sup>1</sup> Does not include the land owned by private joint stock companies  
Source: MAFF, News Bulletin, 1993-2001

Most households farming part of the land in associations joined immediately after reform, in the early 1990s (72% joined at the time of de-collectivization, before 1992). The main reasons for joining the associations was the lack of money and mechanical equipments for farming, and the lack of labor force. The management in associations is rather centralized. Decisions are made by the association leader and by the management council. There is very little involvement of the association members in decisions related to planting, harvesting, or marketing. Therefore, most of these associations function less like a classical collective organization but more like a private enterprise.

A household can be engaged in more than one arrangement (i.e. part of the land can be farmed by the household itself, while some can be farmed in an association or leased out). Table 12 and Table 13 illustrated that farming arrangements diversified since 1996, when the majority of households farmed the land either in associations, leased-out or by themselves. Regional differences prevail in terms of farming arrangements in 2006 (see Table 9). In the Western Plain 85% of the households farm their land individually, and there is less organizational diversity (5% also farm part of the land in associations, and 6% lease-out part of the land). In the Central Romanian Plain we observe more diversified farming arrangements, with 43% of households working the land by themselves, 32% individually and in associations, and 12% using leasing arrangements also. One of the questions that we intend to answer in this study is whether there are productivity differences between households choosing different farming arrangements. Section 4 provides preliminary results for this question.

**Table 12: Farming arrangements (% from total households) in 2006**

	Campia de Vest	Campia Centrala Romana
In household	85.1	42.9
In associations	0.3	7.3
Leased out	3.8	5.0
In household and associations	5.1	31.7
In households and leased	5.7	12.2
In household, associations, and leased	-	1.0

Source: Household Surveys in 1996 and 2006.

**Table 13: Farming arrangements (% from total households) in 1996**

	<b>Western Plain</b>	<b>Central Romanian Plain</b>
In household	72.4	31.2
In associations	21.9	56.7
Leased out	8.6	12.1
In household and associations	-	-
In households and leased	-	0.01
In associations and leased	-	-
In household, associations, and leased	-	-

Source: Household Surveys in 1996 and 2006.

The most common explanation in policy circles for diversity in farming arrangements is that, due to high age levels and inability to farm individually, landowners diversity their land assets. The average age of the household head varies across different farming arrangements. The most pronounced differences are between the average age of the household head and the different farming arrangements. Older age is associated with either leasing operations or mixed farming choices (see Table 14).

**Table 14: Average age by farming arrangements**

	<b>Average household age</b>	<b>Average age of the household head</b>
In household	52	59
In associations	57	60
Leased out	63	65
In household and associations	58	64
In households and leased	60	62
In household, associations, and leased	53	69

Source: Household Surveys in 1996 and 2006.

As Table 12 illustrates, most of the land in ownership is farmed by the household itself (89% in the Western Plain, and 50% in the Central Romanian Plain) in 2006. In the Central Romanian Plain, 24% of the land in ownership has been leased out and 18% has been farmed in associations (family association, or legal/formal associations). Land leasing appears to be an important factor in households' decisions for farming arrangements.

In 2006 leasing-in arrangements accounted for 3.4%, while leasing-out accounted for 20%. In the past decade, since 1996, the market for land leasing has increased considerably, especially for leasing-out land. In 1996 only 2% of the households in the two regions leased-in land, and only 11% leased-out (see Table 15). This is a positive outcome since the market might have become more fluid, consistent with other countries in the CEE and CIS region, where leasing of land “from various sources and in various guises” emerged as the main practical mechanism for adjustments in farm sizes (Lerman et al. 2004, p. 82).

**Table 15: Land leasing market**

	<b>1996</b>	<b>2006</b>
<i>Leasing-in</i>	2.0%	3.4%
Western Plain	0.0%	4.4%
Central Romanian Plain	3.5%	2.3%
<i>Leasing-out</i>	10.6%	19.9%
Western Plain	8.6%	10.4%
Central Romanian Plain	12.1%	29.7%

Source: Household Surveys in 1996 and 2006.

Regional variation in terms of land leasing shows that leasing-in practices increased in the Western Plain (from none to 4.4% in 2006), but declined in the Central Romanian Plain (from 3.5% to 2.3% in 2006). Leasing-in land tends to be regarded as a better method of enlarging farm size (as opposed to buying land), when land markets are imperfect and the risks associated with farming are higher. This trend may suggest a change in farming capacity and overall economic conditions. Leasing-out practices have, however, increased in both regions, more so in Central Romanian Plain, where the number of households leasing out land more than doubled.

In both regions, arrangements for renting-in land are not determined in a formal market, based on contractual agreements, but rather informally, based on mutual understandings between the two parties. In the Western Plain, the common practice is for the household renting in land to pay all the farming expenses. However, in the Central Romanian Plain, different practices prevail where the two households (or the household and the private entrepreneur) share the costs. These differences might be due to the overall level of risk and wellbeing. From interviews with farmers in the two regions, we found that the average amount of rent paid for leasing –in land ranges between 600-900 kg per hectare in the Western Plain, while in the Central Romanian Plain it ranges between 400-600 kg per hectare.

Leasing-out land is a more common practice among the small and medium farms, which is hardly surprising, more so in the Central Romanian Plain than in the Western Plain (10.4% in the Western Plain as compared to 29.7% in the Central Romanian Plain). Who do these households lease-out land to? Who are the local actors that participate in these land transactions? As we can notice from Table 16, there are significant regional differences between the types of actors involved in leasing operations. In the Western Plain almost half of the household lease land to private individuals, only 36% lease land to associations, and 15% to relatives. In Central Romanian Plain, there are no households in our sample that lease land to private individuals, but more than 90% rent out land to associations, and 7% to state farms. This pattern says a lot about the scale of farming (as associations are larger in size) in the two regions, as well as the organizational structure. It also suggests that in the Western Plain mid-sized private family farms are more likely to emerge.

**Table 16: Land leased out to... in 2006**

	<b>Western Plain</b>	<b>Central Romanian Plain</b>
Legal association*	21.2%	63.3%
Family association*	15.2%	30.0%
State farm	-	6.7%
Relatives	15.2%	-
Private individual	48.5%	-

\* Does not include the land in associations where the household is a member

Source: Household Surveys in 1996 and 2006.

Of course, the type of actors involved in the transaction affects the degree of contractual formality. Therefore, in the Western Plain, 79% of the households have an informal verbal or written agreement for the terms of the lease. In the Central Romanian Plain, however, since land is rented-out to associations and state farms, the degree of contractual formality is higher. Nevertheless, there are still 37% of households that leased-out land without an enforceable contract, suggesting that land markets are very thin, and the legal enforcement mechanisms are underdeveloped. In the short term this practice is preferred as it might reduce transaction costs associated with formalizing the transaction (e.g. notary fees). However, in the long term weak (or lack of) enforceable contracts might result in higher risks associated with leasing and lower land rents.

Differences between regions also arise when we look at the terms of leasing agreements. In the Western Plain, farming costs are covered by those that rent-in the land. In the Central Romanian Plain, even if associations and state farms rent-in the land, expenses are covered by both parties (in 10% of the cases costs are covered by the household that owns the land, 68% are covered by the association/state farm, and in 22% of the cases, costs are covered by both parties).

Overall these data suggest that Western Plain has participated less on the land leasing market and that cooperation in farming has been less prevalent than in Central Romanian Plain. Additionally, contract enforcement in leasing arrangements has been low in both regions. Does this pattern in land leasing mean that farmers in Central Romanian Plain are more entrepreneurial? Is age or household size a factor in these decisions? Further research is needed to provide answers for these questions.

Structural factors such as household size, age, or education, size of the landholding, and land fragmentation, could be elements explaining participation in land market (leasing arrangements). Crosstabulations between household size and leasing-in land shows that larger households (more than 3 persons) are more likely to lease-in land in both regions (86% in Western Plain and 71% in Central Romanian Plain), even if there is not a strong statistical association. However, we observe a stronger association between household size and leasing out land. In both regions, smaller households are more likely to lease out land suggesting, first, that farming is very labor intensive and second that subsistence farming (securing consumption for larger households) prevails.

A similar pattern can be observed when it comes to the age of the household head. There is no strong association between households that leased in land and those that did not across different age levels. Most of those that leased-in land are between 36-65 years old, which suggests that farming experience plays an important role, and that younger farmers are the ones with a stronger entrepreneurial capacity. However, age of the household head is more significant when leasing-out land. More than 70% of the households that leased-out land are 56 years or older. This suggests that facilitating leasing operations is central for transferring land to more productive users.

Leasing-in land does not appear to be associated with the amount of land in ownership<sup>21</sup> or with the degree of land fragmentation. Interestingly, there is no significant difference between households that lease-out land and those that do not based on the degree of fragmentation. Contrary to what we would expect, households with a smaller number of plots are more likely to lease out land, even if the difference is not statistically significant (42% of those who leased out land were households with 1-2 plots, while only 20% had more than 5 land plots). This pattern suggests that land consolidation is hard to achieve even through land leasing operations when the degree of fragmentation is high. Matching land plots in terms of land quality and location, with farmers that have the opportunity and resources for farming at a larger scale, might be very challenging. Therefore, policies that encourage land leasing without acknowledging the complexities of consolidating dispersed plots (e.g. transaction costs) are likely to have limited results.

### *3.2.3 Land transactions*

Participation in land markets (leasing or selling and buying) has been emphasized as a channel for adjusting the size of land holdings and allocating resources to the most efficient producers. While restrictions on land transferability are a barrier to the flow of resources from less efficient to more efficient producers and thus an impediment to agricultural growth, some scholars argue that temporary restrictions on buying and selling of land (especially in the transition countries) may be necessary for political or social considerations (Lerman et al. 2004, Banerjee 2001). There is concern that land market liberalization will lead to re-concentration of land, especially when access to information, capital, and markets is asymmetric (Lerman et al. 2004).

In Romania, it was only in 1998 that land transactions were permitted by law, which marked the beginning of a very slow process for setting up land markets.<sup>22</sup> While before 1998 informal land transactions were still registered, one would expect to observe an increased participation in land markets once markets were institutionalized based on Law 54/1998.

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<sup>21</sup> With the exception of Central Romanian Plain, where the amount of land in ownership appears to be significantly associated with leasing-out practices: when a household owns more than 5 ha of land, it is more likely that it will lease out part of it. We did not find the same strength of association in Western Plain.

<sup>22</sup> There are few legal restrictions to the land transactions today in Romania. The most limiting one is the maximum area of 200 hectares a person could own. This limit will restrict the maximum size of family farm to this ceiling, but the farm could lease more land and the family business could expand the farm above the 200 hectares.

Today the new landowners have the full range of options regarding the use of their land: to farm individually, to join legal associations or family associations, to lease land, to sell or buy land.<sup>23</sup> According to Dumitru et al. (2004, p. 14), during 1999-2004 private landowners sold 355,725 hectares of agricultural land (3.1% of private agricultural land) and other 25,104 hectares changed ownership through donations. More than 4% of rural landowners entered into land transactions during this period. At the national level the prices for land vary among different regions. By 2003 a price of 230-270 Euro/hectares was common for agricultural land and 2,100-2,300 Euro/hectares for residential land in rural areas. In 2004 the MAFDR indicate an average multi-annual price of land of 396 Euro/ha (Dumitru et al. 2004).

Our survey in the two agoregions shows that from 1998 to 2006 23% of the landowners participated in land transactions – 13% of the households sold land and 11% purchased land. While leasing operations were less prevalent in the Western Plain, land sales are more common here than in the Central Romanian Plain. In Western Plain land sales were much higher than in Central Romanian Plain (22% as compared to only 3%).<sup>24</sup> Similarly, 18.4% of the households in Western Plain have purchased land since 1997, while only 4% did so in the Central Romanian Plain. As we can notice from Table 17, on average, land prices have increased in this period, but there is no clear trend, which denotes a market still in formation.

**Table 17: Land market participation**

	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Campia de Vest</b>									
* Sold (ha)	1.45	1.73	2.59	1.52	3.87	0.70	3.37	1.39	1.37
* Selling price (lei/ha)	263.4	721.4	350.0	329.1	732.7	495.7	164.3	660.0	10188.9
* Purchased (ha)	1.60	1.38	3.17	3.13	6.50	3.50	7.40	0.85	0.51
* Purchased price (lei/ha)	1089.5	151.2	533.3	385.7	633.3	1740.0	733.3	1725.0	1350.0
<b>Campia Romana Centrala</b>									
* Sold (ha)			0.50		0.50	1.00	2.00	1.00	0.90
* Selling price (lei/ha)			50.0				1200.0	3500.0	7200.0
* Purchased (ha)	1.10			1.50	0.32	1.05	1.80	0.30	1.55
* Purchased price (lei/ha)	766.7			650.0	815.0	450.0	350.0	1500.0	533.3

Source: Household Surveys in 1996 and 2006.

Nevertheless, why are households in the Western Plain more likely to participate in land markets (rather than land leasing) as opposed to the households in the Central Romanian Plain? More in-depth analysis is required to uncover the factors that contribute to a more dynamic land market. Overall regional economic development could create more opportunities for individuals to move away from farming since, as we saw earlier, more people in the Western Plain work in

<sup>23</sup> Foreign nationals can only lease land, while foreign entities (i.e. firms) can also buy and sell land.

Romania negotiated a period of 5 years for residential land and 7 years for agricultural land from the date of accession when land will not be sold or bought by foreign nationals.

<sup>24</sup> Since land transactions (sales and purchases) were not formal (and hence, registered) before 1998, we do not have earlier data on the degree of land market participation. We do know, however, from the 1996 survey, that 11% of the households from the Western Plain claimed that they would sell approximately 2 hectares of land if they could. Only 4% of the households in Western Plain were willing to sell land at that time (not more than 2 hectares also).



agriculture as a secondary occupation.<sup>25</sup> Among the reasons for selling land mentioned by the household head, the most important ones were: 1) the need for money; 2) lack of mechanized implements; and 3) health problems and physical inability of working the land due to old age.

Interestingly, the attachment to land seems to be high in both regions as more than 30% of the households (34% in Western Plain and 39% in Campia Romana Centrala) argued that the reason for not selling land is because they either inherited the land from parents or grandparents or they want to hold on to it for their children. This could be one important reason that prevents land markets from developing in the near future. Other reasons evoked for not participating in land markets are that land is the only source of income (20% in Western Plain and 14% in Central Romanian Plain) and that land prices are too low (15% in Western Plain and 23% in Central Romanian Plain).

Land ownership has shielded most of the small landowners against poverty during industrial restructuring and macroeconomic stabilization and liberalization policies. The social role of land was strengthened by the lack of land taxation. The exemption of land taxation since the beginning of reforms in 1991 was decided on political rationales following mainly social considerations. The lack of land taxation does not provide any incentives for owners to use or sell the land, having in turn consequences on the land market development.<sup>26</sup>

What are the factors associated with land purchases? In the Western Plain (which registered the most land purchases), larger households are likely to purchase land more so than smaller ones. However, more significant is the association between larger capital endowments and land purchases in this region. This suggests that aside from other structural factors (such as age, education, household size), technological endowments that would allow for more efficient farming, matter more for developing land markets.

A high level of transaction costs associated with land transactions also affects the development of land markets. Since Romania does not have yet a fully operational cadastre, survey costs are fairly high. Notaries play a central role in the transfer of ownership, as they are responsible for validating the title. Notary fees and surveying fees are two major components of the land transaction costs. These costs may reach 400-600 RON per hectare, which is close to the average sales value of land. Usually these costs are paid by the buyer, increasing the cost of the land for the farmers wanting to extend and consolidate their farms. Since farms are very fragmented, the costs for reaching an efficient agricultural structure are higher in the Romanian context. Therefore, transaction costs are also seen as major obstacles in the development of land markets.

All these factors suggest that agriculture still plays a key role in providing subsistence means for the majority of the population engaged in farming and that land markets are not sufficiently

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<sup>25</sup> Extreme cases such as those in Timis and Arad counties might have influenced the overall results. Here, in the past years massive amounts of agricultural land were sold to foreign investors (i.e. Italian and German) mostly for speculative reasons with the hope that once in the EU, land prices in Romania will quickly be aligned to the European levels. While most of this land has remained fallow, some investors have started large corporate farms in these areas.

<sup>26</sup> Another effect from not imposing land taxation is the lack of local revenues that could be invested in rural development.

developed yet. If an adequate level of rent (or land prices) is not provided, within an overall context in which alternative job opportunities are lacking, the incentives for shifting land to more efficient uses (engaging in land transactions) are likely to be very low.

### 3.2.4 Capital endowment

The dismantling of collective farms and the Tractor and Mechanical Stations (MTS) that were serving them, the return to small private farming after land restitution, and a slow privatization of state farms, led to decapitalization of the agricultural sector. Large irrigation systems became obsolete and land fragmentation made mechanical equipments ineffective on small land plots.

Overall, capital endowment has increased since 1996. However, when we break it down by regions, we notice that capital endowment has increased only in Western Plain, specifically the number of households that own a tractor, plow for tractor, and seeder (see Table 18 and 19). In Central Romanian Plain capital endowment has declined consistently across the different physical assets. This is very interesting considering the pattern of farming arrangements in these two regions. We cannot assert with certainty whether lack of capital in the Central Romanian Plain created conditions for associations to predominate in this region, or whether the existence of farming associations led to a lower capital endowment for these households.

Also, this pattern does not explain why households in Central Romanian Plain are leasing in more land than in the Western Plain where capital endowment is higher. *Is labor supply more important than capital endowment in making choices between farming arrangements that would ultimately affect productivity and welfare?* This question will be answered using more rigorous analysis. It might be that considering the more fragmented household plots in the Western Plain, households are over-endowed with capital. In Central Romanian Plain most households (38.6%) are using horse drawn carriages for transportation. More than 40% of households in the Western Plain own a tractor and a mechanical plow, while only 9% do so in the Central Romanian Plain.

**Table 18: Physical assets in 2006**

% of households	Western Plain	Central Romanian Plain
Truck	2.8	0.7
Tractor	21.2	4.3
Plow for tractor	19.3	4.6
Combine for grains	2.2	1.3
Carriage	19.3	38.6
Seeder	8.5	2.6
Equipments for irrigation	3.5	0.3
Equipments for processing	1.6	0.0

Source: Household Surveys in 1996 and 2006.

**Table 19: Physical assets in 1996**

% of households	Western Plain	Central Romanian Plain
Truck	4.8	1.4
Tractor	9.5	8.5
Plow for tractor	9.5	6.4
Combine for grains	2.9	2.8
Carriage	22.9	43.3
Seeder	7.6	5.7
Equipments for irrigation	6.7	3.5
Equipments for processing	16.2	3.5

Source: Household Surveys in 1996 and 2006.

We computed an index, called the machinery index, which allows us to get an overall understanding of the differences between capital endowments in both these regions. The index is based on Rizov et al. (2001) developed for the 1996 dataset. The machinery index is a proxy for the size of owned farm machinery measured as a weighted index of the presence of six machinery and equipment items (truck, tractor, plough for tractor, combine for cereals, carriage, sowing machine). The following weights were used: truck=1, tractor=1, plough for tractor=0.2, combine for cereals=2, carriage=0.5, sowing machine=1.

The index shows that Western Plain has an average of 9.9 machinery units, while Central Romanian Plain has an average of 10.7 units, slightly lower than in 1996 (10.9 in the west, 10.7 in the Central Romanian Plain). The decline in the machinery index over a period of ten years, may suggest that new machinery were not purchased and that those that were available in 1996 became obsolete, trend confirmed by regional secondary statistics published by the Ministry of Agriculture as well (Agrinews 2007). However, despite these differences, as Tables 15 and 16 illustrate, the equipment endowments in the Central Romanian Plain are less capital intensive (mostly horse drawn carriages).

Capital endowment at national level is too low compared to the size of the agricultural area despite continuous increase in the stock of mechanical equipments. Statistics show that Romania has 55.34 hectares of arable land per tractor, while the European average is approximately 12.7 hectares per tractor (Agrinews 2007). In addition, more than 70% of the tractors have been in operation for more than eight years, which increases the operation costs making mechanical works unaffordable for many farmers.

### *3.2.5 Marketing of products*

With a low capital endowment, high land fragmentation, and low prices for agricultural products, small and medium farms in Romania are able to produce just enough for household consumption without having the capacity to market their production. According to the two surveys one decade apart, the ability of the small and medium farms to market their production has significantly declined. In 1996 more than 90% of the households claimed to have sold agricultural products, while in 2006 only 33% marketed some of their production. This is a significant decline and further research is needed to explain the drastic worsening of the marketing potential.

Central Romanian Plain has experienced the most drastic decline in the share of households able to commercialize part of their production (from 87% in 1996, to only 24% in 2006). In Western Plain 40% of the households sold any agricultural products in 2006, as compared to 98% in 1996. This decline in market participation might be due to structural changes in the food industry in Romania in preparation for accession to the EU, when in the past years, approximately 80% of the food processing industries were closed due to inability to compete and to establish quality standards. As a result, many of these small producers lost a significant number of their customers. Moreover, decline in agricultural subsidies, coupled with increases in imports at lower prices from the highly subsidized EU countries, led to a decline in the demand for local products.

However, regional differences in market access in 2006 led to higher average incomes from selling agricultural products in the Western Plain than in the Central Romanian Plain (4,693 RON<sup>27</sup> respectively 2,458 RON). Potential reasons for the difference in product commercialization between the two regions derive from accessibility to markets, a more diversified economy, capital endowments, as well as the composition of agricultural production (in the Central Romanian Plain farmers cultivate mainly grains, while in the Western Plain the production is more diversified). Structural factors, in terms of farming practices and the degree

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<sup>27</sup> RON is the Romanian currency (Lei Noi).

of farm fragmentation, are also critical and affect produce sales through their potential effect on farm performance. For example, since the majority of the farmers in the Central Romanian Plain lease-out part of the land to associations, farmers have a lower ability to sell agricultural products. This suggests that the agricultural products obtained as rent are just enough for domestic consumption.

Interestingly, in several instances, we learned that due to high prices for harvesting (i.e. gas for tractors and combines, and seeds), households that rented out land did not receive anything (in money or products) from the association or lessee, because the amount would have compensated for the seeds and expenses for planting. Therefore, barter accounts for most of the production relations.

Table 20 illustrates that the households that were able to derive income from selling agricultural products had larger landholdings, which is another indication that land consolidation is required for making the transition from subsistence farming to a more commercially oriented production.

**Table 20: Market participation by the size of the landholding in 2006**

	<b>Sold agricultural products:</b>	
	<b>Yes</b>	<b>No</b>
<0.99 ha	5.5	15.3
1-2.99 ha	31.0	51.6
3-4.99 ha	30.0	21.3
>5 ha	33.5	11.8
Total	100	100

Source: Household Surveys in 1996 and 2006.

The majority of the farms that marketed part of their crops sold them directly in town or village markets. After accession to the EU structures, this practice will exclude all these small producers from CAP (Common Agricultural Policy) price and market support measures. The current CAP system grants support at the wholesale or processing level and not at the farm gate (milk delivery, fruit and vegetables, potatoes starch, sugar, etc.) (Dumitru et al. 2004). Therefore, in order to benefit from these CAP measures, the small commercial farmers need to start immediately to organize in marketing cooperatives or to move from traditional outlets to wholesale markets. This also means that many households will not benefit anymore from this source of income after integration.

### *3.2.6 Investment and finance*

As Table 21 illustrates, investment behavior for small household farms, has been very low in both regions. Most households invested in purchasing livestock and very few bought physical assets or agricultural machineries. This outcome is actually characteristic of subsistence farms, and it is consistent with the results from the 1996 survey.

**Table 21: Share of households that invested in any of the following categories (%)**

	<b>Western Plain</b>	<b>Central Romanian Plain</b>
Buy agricultural equipments	1.9	1.0

Plant trees	1.6	2.3
Buy animals	12.3	13.2
Buy land	0.3	1.7
Build house annex	5.7	2.0
Develop a private non-agric. enterprise	0.3	0.3
Develop and food processing enterprise	0.3	0.7
Buy car	0.9	0.3
Children's education	25.0	8.9

Source: Household Surveys in 1996 and 2006.

Interestingly, in the Western Plain most households (83%) purchased agricultural equipments from savings derived from selling agricultural products, while only 33% in the Central Romanian Plain had this source of income. For the rest of investments it seems that savings from other sources than selling agricultural products were used.

The credit market is an important contributing factor to investments in land and other assets. Titling programs are critical for increasing the activity of commercial banks in the agricultural sector and giving access to smallholders to financial services by using land and other assets as collateral. Nevertheless, since landholdings are so small, affordable credit options have been very limited for small and medium farmers.<sup>28</sup> It is possible that after the accession to the EU, banking institutions would show more interest for this segment of the population, since they will get involved in handling the direct payments to farmers.

Therefore, few households in our survey took loans for investment or to supplement their incomes. In the Western Plain 15% of the households took a loan (58% from a bank, 25% from a private individual, and 10% from a relative), while in Central Romanian Plain 11% of the households took loans mostly from banking institutions (81%). The more diverse source of financing to overcome the constraints imposed by the banking system, suggests that social capital might be stronger in the Western Plain than in the Central Romanian Plain. The loans have been used for other expenses besides agricultural works, mostly for consumption purposes.

Moreover, economic instability, an undeveloped financial sector for the small and medium farmers, and lack of information about the financial services in rural areas, led to limited trust in banking institutions. In both regions respondents claimed that if they would need a larger sum of money they would rather borrow from relatives (74% in the Western Plain, and 81% in the Central Romanian Plain). This denotes that social networks are still very strong in the rural areas, overruling market relations, which is characteristic of the subsistence economy.

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<sup>28</sup> Another obstacle for farmers to get access to credit has been created by the fact that the majority of these farmers does not have bank accounts and therefore credit records to do exist for them.

### 3.2.7 Household incomes

The sources of household incomes, illustrated in Table 22, also illustrate that most farmers in the rural areas are aged, as shown by the large share of households that have pensions<sup>29</sup> (76%) as one of the income sources. It is important to note the smaller share of households that derive income from selling agricultural products (33%). More farmers in Western Plain (41%) derive incomes from selling agricultural products, than in Central Romanian Plain (23%), and from wages (43% respectively 26%). Since more households in the Central Romanian Plain lease out land, it is not surprising to observe that incomes from renting land are higher in Central Romanian Plain.

**Table 22: Income sources**

	<b>Average</b>	<b>Western Plain</b>	<b>Central Romanian Plain</b>
Selling agricultural products	32.5	41.1	23.4
Associations	8.9	2.2	15.8
Leasing	8.1	2.2	14.2
Wages	34.7	43.4	25.7
Non-agricultural entrepreneur	1.3	1.3	1.3
Pensions	75.8	68.4	83.5
Other state funds (i.e. scholarships, unemployment compensation)	13.6	12.3	14.9
Relatives	3.7	5.7	1.7
Other sources	8.7	10.4	6.9

Source: Household Surveys in 1996 and 2006.

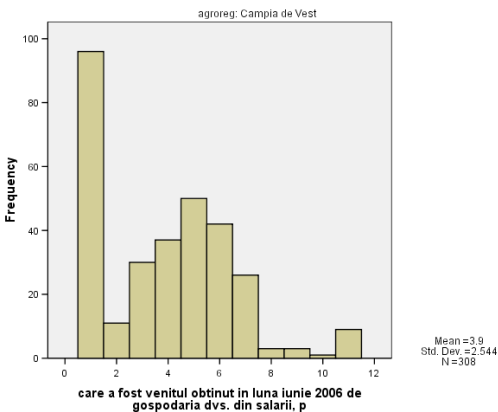
In terms of income value, we found that on average pensions represent 54% of total household income, wages represent 23%, and selling agricultural products accounts on average 10% of total income. Based on the weights of each source of income in total income, we can identify the following types of households: households in which pensions represent the main source of income (55%), households in which wages are the main source of income (29%), and households in which the main source of income is derived from selling agricultural products (7%).

Incomes from salaries and pensions are on average very low. Based on official statistics, in June 2006, 57% of the households from Western Plain were earning less than 500 RON (US\$180), while in Central Romanian Plain this share was higher, 72% earning less than US\$100. More importantly, 32% of the households in the Western Plain are earning less than the minimum wage (330 RON/month in 2006), while in the Central Romanian Plain this share is much higher, 51%.

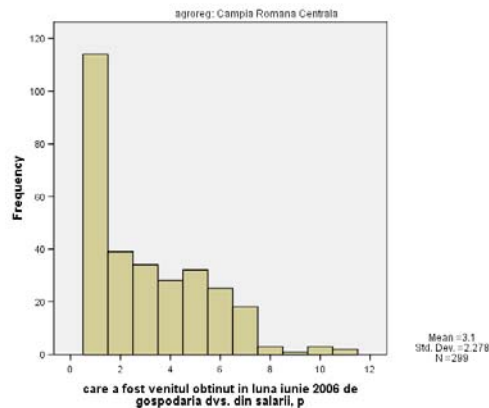
The graphs below (Figure 6 and 7) illustrate the concentration of incomes towards the lower level in both regions. Nevertheless, the Western Plain has a more normal distribution for the mid-level incomes.

<sup>29</sup> In pensions we included both agricultural pensions and other types of pensions. A high pension level might be due to agricultural pensions, which increased since 1993 (MAA 1997, p. 7-1).

**Figure 6: Earned incomes in the Western Plain**



**Figure 7: Earned incomes in the Central Romanian Plain**

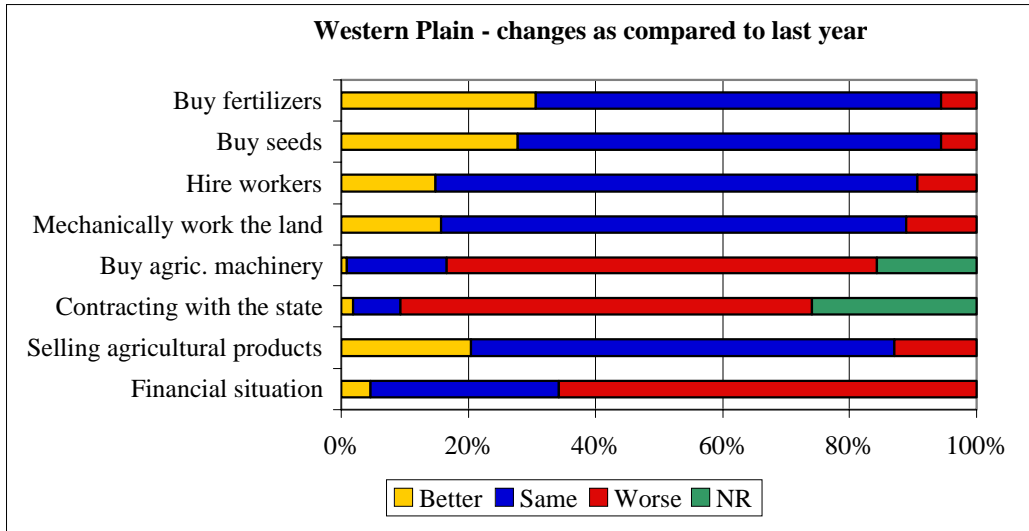


Even if there is no strong statistical association between the monthly household income from salaries and pensions and land market participation, it is interesting to note that households that have a lower income tend to lease-in more land than households that have a larger stable source of income. This suggests that we could make a differentiation between “ability” and “need” for engaging in land market. Poorer households need to rent in land because they need to grow more food for consumption while wealthier households could purchase food items from the market. Since incomes are much lower in the Central Romanian Plain, this outcome might help explain why despite lower capital endowments, households are leasing in more land than in Western Plain.

Looking more into how households behave in choosing between farming arrangements, based on different sources of income, we found that in the Central Romanian Plain households that derive most of the incomes from pensions farm mostly in a mixed farming arrangement (49%), while those that have salaries as their main source of income farm their land mostly by themselves (62%). What is more interesting, is that households that derive most of the income from selling agricultural products farm their land partly in associations and partly individually (51%). This outcome has relevant policy implications in that mixed farming arrangements in a region in which alternative job opportunities are lacking, are able to create conditions for shifting from subsistence to commercially oriented production system.

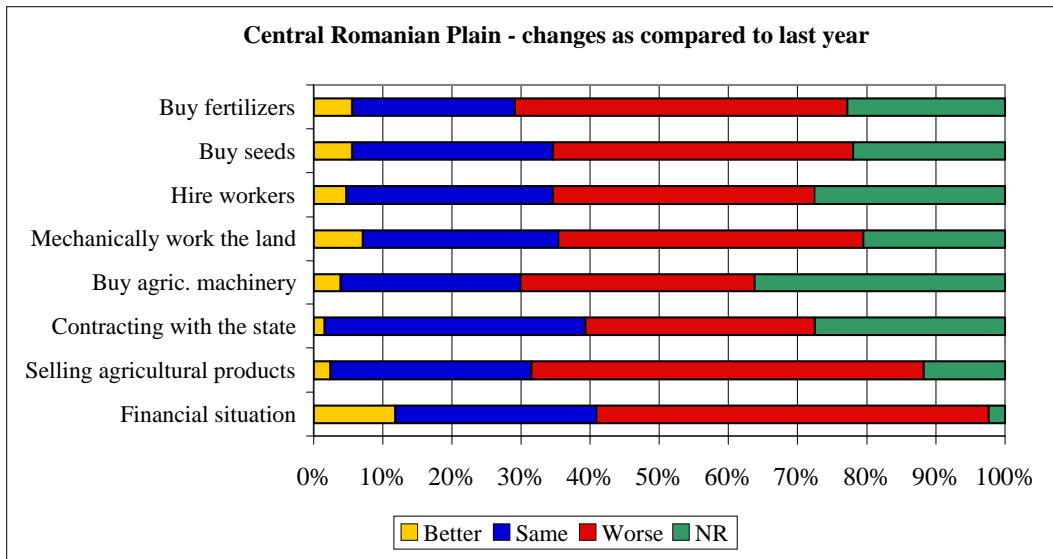
As we notice from Figure 8 and Figure 9 below, the overall perception is that as compared to a year earlier, the general market conditions for farming have worsened. Even if the degree of non-response is higher in Central Romanian Plain, most households responded that 2006 has been a worse year mainly in terms of the financial situation, purchasing seeds and fertilizers, as well as hiring labor and the possibility of working the land with mechanical implements. As we saw earlier, capital endowment is lower in the Central Romanian Plain.

**Figure 8: Overall perceptions in 2006 regarding specific changes as compared to a year ago in the Western Plain**



Source: Household Surveys in 1996 and 2006.

**Figure 9: Overall perceptions in 2006 regarding specific changes as compared to a year ago in the Central Romanian Plain**



Source: Household Surveys in 1996 and 2006.

In the Western Plain, as Figure 8 illustrates, most households considered that conditions have worsened especially around contracting with the state for selling agricultural products and buying agricultural machineries, as well as the overall financial situation. The market for seeds, fertilizers, and labor, seems to be better than in the Central Romanian Plain. As far as labor is



concerned, despite higher migration for jobs abroad, a younger rural population in the Western Plain has created better conditions for hiring labor as compared to the Central Romanian Plain. Moreover, a larger capital endowment created conditions for increasing productivity by working the land with mechanical implements.

#### **4. Projecting household productivity levels**

One of the questions we want to answer is how does productivity level vary between households engaging in different farming arrangements. Before accession to the EU institutional and economic structures, the most challenging task for reforming the agricultural sector has been to increase the productivity level of small family farms, which account for the majority of the private sector occupying more than half of the agricultural land. In addition these farms have an essential social and economic role in the rural areas, since land represents the main source of income for the rural population.

Nevertheless, there are very few studies on the efficiency of agriculture in formerly planned economies. Unavailability of farm level data has been one of the main constraints (Mathijs and Swinnen 2001; Sabates-Wheeler 2005). Currently, there are no studies on Romania's agricultural productivity at farm level or aggregate at the national level.<sup>30</sup> Therefore, this analytical section also contributes to the literature from an empirical perspective, by estimating productivity levels in the two agricultural regions, for 1996 and 2006.

As Bravo-Ureta and Pinheiro (1997) argue, there is considerable agreement that an effective development strategy depends critically on promoting productivity and output growth in the agricultural sector, particularly among small-scale producers (Johnston and Mellor 1961; Hayami and Ruttan 1985). In addition, productivity gains, stemming from a more efficient use of resources, are critical especially when the implementation of new technologies is less feasible in the short term.

Since Sollow's (1956) contribution to economic growth models, there have been a multitude of theoretical and methodological studies on productivity in different sectors as well as macro level country comparisons. The literature is quite rich in the field of agricultural economics, especially since the advent of the Green Revolution. The economic theory of production provides the analytical framework for most empirical research on efficiency and productivity. This strong interest in the topic led to different methods for estimating farm productivity, each having its own advantages and limitations. The most common method for analyzing productivity is through linear programming methods, such as those developed by Farrell (1957). Stochastic frontier analysis (SFA) is the most widely used method especially in the agricultural economics literature (Battese 1992; Bravo-Ureta and Pinheiro 1993; Bravo-Ureta et al. 2007). This technique assumes that each firm potentially produces less than it could due to a degree of inefficiency or a random shock (Aiger et al. 1977).

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<sup>30</sup> See for instance the paper presented at the conference "Tenth European Workshop on Efficiency and Productivity Analysis" in Lille, France in June 27-30, 2007 (Vidican and Aldea 2007).

The functional form for our model is given by the Cobb-Douglass specification, similar with other studies (Hofler and Payne 1993; Piesse et al. 1996; Mathijs and Swinnen 2001).<sup>31</sup> The Cobb-Douglas function has the advantage that it is relatively easy to estimate and the resulting returns to scale are broadly in line with common sense (Arnold and Hussinger 2005). For explanatory reasons, we assume the simplest two-factor production function, written as:

$$Y_i = A_i L_i^\alpha K_i^\beta \quad (1)$$

where  $Y_i$  is output,  $L_i$  is labor input,  $K_i$  is capital input,  $\alpha$ , and  $\beta$  input elasticities, and  $A_i$  is the total factor productivity (TFP) as it increases all factors' marginal product simultaneously. Transforming the above production function into logarithms allows linear estimation, such as:

$$\log(Y_i) = \alpha_l + \beta \log(L_i) + \gamma \log(K_i) + U_i \quad (2)$$

Given this equation, one can estimate the error term  $U_i$ , providing that the coefficients are consistently estimated. The residual is the logarithm of farm specific total factor productivity  $A_i$ . For my specific case, the equation looks like:

$$\log(Y_i) = \alpha_i + \sum (\beta_i \log(X_i)) + U_i \quad (3)$$

where  $Y_i$  represents the output for the  $i$ -th farm. The  $X_i$  is a  $K \times 1$  vector of inputs hypothesized to affect productivity level, and  $U_i$  is the residual. The output from the households' endowment with land, labor, and other inputs, depends in general on the farming efficiency of the agent managing the farm operation, and on the economic risks under which the household operates, assuming that the household is risk averse (Rizov 2003). Economic risks are determined by market imperfections in access to finance and inputs.

The primary technical problem with the above classic Cobb-Douglas production model is that any measurement error in  $\log(Y)$  must be embedded in the residual. The practical problem is that the entire estimated function becomes "a slave to any single errantly measured data point" (Greene 2000 p. 394). Therefore, Aigner, Lovell, and Schmidt (1977) proposed a formulation which assumes that deviations from the production function result from two sources: 1) productive inefficiency, and 2) idiosyncratic effects, method called stochastic frontier analysis (SFA).

In the SFA model the disturbance is the central focus of the analysis rather than the catchall for the "unknown and unknowable factors omitted from the equation", while the parameters of the production function are usually of secondary interest in these studies (Greene 2000 p. 395). Consider a farm denoted by  $i$ , using  $n$  inputs ( $x_1, x_2, \dots, x_n$ ) to produce a single output  $Y$ . The efficient transformation of inputs into outputs is characterized by the production function, which

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<sup>31</sup> The data does not fit well a Translog specification (which is more flexible not requiring a priori restrictions), which would have been the best alternative for the production function. However, since we do not have a priori information on the actual form, a method that does not rely on specific parametric specifications is preferred (Chavas and Cox 1995). The selection of Cobb-Douglas frontier also solves the problem of degrees of freedom normally encountered in the translog model estimation.

shows the maximum attainable output from the given inputs. The stochastic frontier production function is defined by:

$$\log(Y_i) = \alpha_i + \sum (\beta_i \log(X_i)) + v_i - u_i, \quad i=1, 2, \dots, n \quad (4)$$

where  $(v_i - u_i)$  is the error term decomposed into: (1) a two-sided error term (positive or negative) that is normally distributed,  $v_i \sim N(0, \sigma_v^2)$ , and represents statistical noise (such as luck, weather, machine breakdown, and other events beyond the control of the firm), identically and independently distributed of the  $u_i$ , and (2) a non-positive, one-sided error term,  $u_i \geq 0$  that follows a half-normal distribution with mean  $\mu$  and variance  $\sigma_u^2$  and stands for technical inefficiency (that is, failure to produce maximal output, given the set of inputs used). This model is called SFA because the output values are bounded from above by the stochastic (i.e., random) variable  $\exp(\log(X_i)\beta + v_i)$ .

Technical efficiency of the farm is defined in terms of the ratio of observed output to the corresponding frontier output, given the available technology. That is,

$$\begin{aligned} \text{Technical efficiency (TE)} &= Y_i / Y_i^* & (5) \\ &= Y_i / \exp(\log(X_i)\beta + v_i) \\ &= \exp(\log(X_i)\beta + v_i - u_i) / \exp(\log(X_i)\beta + v_i) \\ &= \exp(-u_i) \end{aligned}$$

where  $Y_i$  is the observed output and  $Y_i^*$  is the frontier output. This measure of technical efficiency takes values between zero and one. TE measures the output of the  $i$ -th farm relative to the output that could be produced by a fully-efficient farm using the same input vector (Coelli et al. 2005 p. 244). The estimation of the parameters will be made using the maximum likelihood (ML) estimator, with a half-normal distribution assumption for the random variables, as specified above. We will estimate the efficiency level for both 1996 and 2006 in order to account for dynamic changes.

The residual from model (4) provides a better measure of efficiency if we control for differences in technology and other factors that could affect efficiency levels. To obtain this level of household efficiency a series of other factors (aside from the production inputs  $X_i$ ),  $Z_i$ , hypothesized to affect the production function will be included, which can be grouped into four categories: human capital, wealth, land quality, and economic and social environment. In this way the residual becomes orthogonal (a projection) on all these other variables, splitting it into observable and unobservable characteristics. The final specification for the production function model is:

$$\log(Y_i^c) = \alpha + \sum (\beta_i \log(X_i)) + \sum (\gamma_i Z_i) + v_i - u_i \quad (6)$$

where  $v_i - u_i$  is the decomposed error term for SFA. The subscript indicates the observation for the  $i$ -th farm in the survey,  $\alpha$  denotes the intercept,  $\beta$  is the production elasticity at the frontier for the variables in the production function. The output, variable  $Y_i^c$ , measures the physical

production<sup>32</sup> of farm  $i$  and crop  $c$  produced on the household farmed land. If more than one crop is planted by one household, we assume that technology may vary across crops, but the household has access to the same technology for producing crop  $c$  (Udry 1996). The parameter  $\gamma_i$  is the estimation coefficient and  $Z_i$  stands for the additional factors estimated to affect the production function.

By incorporating other factors in the production function this study differentiates itself from most other studies who assume a more traditional approach to estimating efficiency (Dong and Putterman 1997; Liu and Zhuang 2000). Nevertheless, it has been emphasized earlier in the literature that researchers should consider including a more varied list of variables that could potentially affect the production function of a farm, along with the conventional inputs (Domar 1961; Griliches 1963; Ajibefun and Daramola 2003), although there is no formal procedure that can be followed in deciding what variables should be included (Tian and Wan 2000).

### Potential endogeneity issues

One of the main concerns with productivity estimation is endogeneity. The residual from the production function might be correlated with the production inputs, resulting in biased and inconsistent coefficients. The correlation between the residual (the productivity level) and the inputs derives from the knowledge that the farmer has about the productivity of his land and of the household in extracting value from his land (unmeasured confounders). Such knowledge is based on past farming experiences, and on shared experiences at community level related to how much one hectare of land can produce depending on weather conditions, plot quality, type of crop, and input market conditions. Based on these factors, the farmer adjusts the inputs accordingly to produce a certain level of output. In addition, depending on the knowledge of his productivity level the farmer adjusts the size of land he will cultivate (by selling, buying, leasing, or giving part of land to associations).

While one can never fully eliminate such bias from the analysis, three factors will demonstrate that endogeneity is not a major source of concern for our particular case. First, the aim of this productivity analysis is not to estimate the marginal return of labor, capital, and land (as in a conventional production function estimation), but to obtain a projection of household productivity based on factors hypothesized to affect output levels. Second, by splitting the error term into measurement error and inefficiency estimates, the stochastic frontier “cleans” the efficiency projection from the bias that endogeneity would generate.

Third, input markets are not well developed in Romania even to this date. Land was fairly even distributed in the beginning of land reform, based on the 1940s land records and not more than 10 hectares (and 50 hectares later on) per individual. As discussed in earlier chapters, land markets were formalized in 1998 but since then very few land transactions were registered. Transaction costs generated by market operation and the transfer of ownership rights are still high, preventing individuals to participate in land markets. In addition, land has a value beyond

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<sup>32</sup> We also transformed the output into values by using regional produce prices in 2007 (published by the Ministry of Agriculture) deflated with the Consumer Price Index for food products for 2005. However, since the results were not significantly different, we choose to use output in physical units in order to avoid any bias from valuing production since we did not have village level prices in 2005 and 2006.

its economic price, resulting in a few farmers being willing to sell their land at this early stage of market development. Capital ownership has been fairly static over time as well. Access to credit resources is very limited for farmers, which makes the purchase of mechanical equipment prohibitive for most landowners. Similarly, the labor variable is also likely to have been static since the demographic profile of the regions stayed almost the same over the past decade. Moreover, as Sabates-Wheeler (2005) also points out, the average age in the villages is high and the younger generation is offered little incentives for starting farming.

There are several statistical procedures for reducing the effect of endogeneity on the coefficients and the residual. Nevertheless none of them do entirely remove this problem. If time series data would be available, fixed effects models or the use of lagged dependent and/or independent variables would be appropriate. If the endogeneity problem is produced by an omitted variable, then adding that variable (if data allows) can eliminate the bias of the coefficients. Lastly, in situations in which the explanatory variables are not independent of the disturbance, an instrumental variable technique is applicable, providing consistent estimates (Kennedy 1998 p. 165). The main challenge, of course, is finding appropriate instrumental variables, especially for a production function analysis.

## 5.1 Description of variables

### Dependent variable

The dependent variable for this model is yield, measured as quantity per hectare.<sup>33</sup> We choose to consider only the households that produce corn and/or wheat in order to avoid aggregation of different crops that might exhibit different production functions. From the total sample in 2006, 76% produced corn, 42% wheat, 31% vegetables, 22% hay, 13% sunflower, 13% grapes, 12% oat, 7% barley, 2% fruit, and 1% sugar beats and soy.<sup>34</sup> The average acreage for each crop is the following: 0.89 ha for corn, 0.46 ha for wheat, 12.76 ha for sugar beats, 0.21 ha for hay, and less than 0.15 for the rest of the crops. This shows clearly that corn and wheat are the main crops in these two regions. A similar distribution of crops across households is seen in 1996.

By including only households producing corn and/or wheat, the sample size was reduced from 619 to 491 cases in 2006, and from 246 to 185 cases in 1996. Nevertheless, in order to increase the power of the analysis, we stacked the data based on crop type, which gave us a larger sample (690 cases for 2006 and 258 cases for 1996). The 2006 sample is distributed in the following way based on crop type: 229 households produce only corn, 23 produce only wheat, and 239 produce both corn and wheat. From the difference of 128 households that cultivate no corn or wheat, 48 households have all owned land in associations, 49 households leased out all land to other farmers, and 31 households cultivate other crops than corn and wheat.<sup>35</sup> For 1996, 100 households produce only corn, 4 produce only wheat, and 81 produce both. The difference of 61 households cultivate other crops than corn or wheat.

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<sup>33</sup> See Chapter 3 for a detailed description of the output measurement.

<sup>34</sup> The shares do not sum to 100% because several households cultivate more than one type of crop.

<sup>35</sup> The households that do not work any of the land individually are older in age, have a lower level of education, and do not have children living in the households that could help with farming.

**Table 23: Farm types based on crop mix**

	<b>1996</b>	<b>2006</b>
Only corn	40.7	37.0
Only wheat	1.6	3.7
Both corn and wheat	32.9	41.7
Other crops*	24.8	20.6

\* In 2006 some households released all land to associations or leased out, which are included in this category as well.

Source: Household Surveys in 1996 and 2006.

### Independent variables: production inputs

*Land*, measured in hectares, represents the amount of owned land and rented-in land farmed by the household individually, as a proxy for farm size. The average size of land farmed individually has not changed significantly in the past decade. In 1996 a household farmed on average 3.1 hectares of land, while by 2006 this share has increased to only 3.3 hectares. This finding is rather surprising since based on economic theory, policy makers expected that once land markets become formalized and the leasing legislation becomes less cumbersome, small farms will increase to a more economical size, closer to the western model of family farms.

*Labor* stands for the number of days-labor by full-time and part-time household<sup>36</sup>, hired, and exchange labor on the farm. To convert the labor variable to labor-days I used Eurostat (2005) measurements according to which a worker employed on a full time basis in Romania works 245 days per year. Therefore, a half-time worker is considered to work 122.5 days and less than half-time 61.3 days. The 1996 labor data will be slightly underestimated because there is no record of the number of exchange labors (relatives and non-relatives) used between spring and autumn by the household. It has been often argued in the literature that hired (and exchange) labor should be valued lower than family labor effort due to labor monitoring problems, principle agent, and moral hazard problems (Rizov 2003; Sabates-Wheeler 2005). However, one limitation for this variable is that we did not account for this quality variation in labor inputs. Nevertheless, as Sabates-Wheeler (2005 p. 125) mentions, hired labor is not widely used in Romania, and most of the time they work side-by-side with the owners of the land, reducing monitoring problems. Moreover, day-laborers gain a reputation in small communities, which acts as an indirect monitoring instrument and moral hazard prevention for the hired labor.

*Capital* is very scarce in the Romanian countryside. The survey instrument includes a list of eight different physical capital (agricultural equipments) items: truck, tractor, plow for tractor, combine for cereals, carriage, seeder, irrigation equipment, and processing equipments. However, very few households owned any of these equipments (13% owned tractor, 12% owned plow for tractor, and fewer than 6% owned any of the other items, with the exception of carriages that were owned by 29% of the households). Since carriages allow only traditional farming practices we use a dummy variable to account for whether the household owns a tractor

<sup>36</sup> The concept of family (household) labor is important in this context. This type of labor, as Chayanov (1966) argues, operates in a more or less closed universe where the producers also constitute the consumption unit, and therefore there is no separately identifiable concept of wage costs.

and/or a plow for tractors. Owning a tractor allows a household not only to farm at a larger scale. A tractor is also a source of revenue by providing services to other farmers. All these variables are expected to positively affect the level of output. *D\_Seeds* is a dummy for whether the household purchased seeds, and *D\_Fertilizer* is a dummy for whether the household purchased fertilizer in the past year. The questionnaire did not allow us to account for the quantity of seeds and fertilizer used by the household. Therefore, we used dummy variables instead of the purchased quantity of seeds and fertilizer. Purchasing seeds and fertilizer suggests a tendency of the household to move away from traditional farming. Most of the time, subsistence farmers rely on seeds produced by themselves that are of lower quality affecting the level of production, and on natural fertilizers, which, especially for crops such as corn and wheat, are not sufficient for improving productivity levels. Table 24 and 25 present a summary description of the input variables for 2006 and 1996. As can be seen, the area farmed individually has only slightly increased since 1996. Moreover, the share of households that own a tractor and purchased seeds and fertilizer, has stayed relatively the same.

**Table 24: Summary descriptive statistics of the production function inputs in 2006**

	Mean	St.Dev.
Output (kg)		
- corn	3625.3	5171.9
- wheat	1754.4	1334.9
- corn and wheat:		
- corn	4502.5	5534.2
- wheat	2415.7	2712.3
Land (ha)	3.3	4.1
Labor (days)	429.8	248.3
Land_adult ratio	1.6	1.9
Land quality (% qual I)	43.9	33.5
Land fragm (nr plots)	3.5	2.4
Distance to city (km)	18.3	7.5
	<b>% with a score of "1"</b>	
D_Capital	18.6	
D_Seeds	73.7	
D_Fertil	57.7	
Age (>60 yrs)	60.1	
Education (<=4 yrs)	82.2	

Source: Household Surveys in 1996 and 2006.

**Table 25: Summary descriptive statistics of the production function inputs in 1996**

	Mean	St.Dev.
Output (kg)		
- corn	2957.4	2929.9
- wheat	1375.0	582.5
- corn and wheat:		
- corn	5678.4	7485.1
- wheat	2298.9	2944.1
Land (ha)	3.1	2.7
Labor (days)	533.6	270.4
Land_Man ratio	1.6	1.6
Land quality (% qual I)	46.9	33.4
Land fragm (nr plots)	3.9	2.5
Distance to city (km)	17.7	7.3
	<b>% with a score of "1"</b>	
D_Capital	4.1	
D_Seeds	59.8	
D_Fertil	37.6	
Age (>60 yrs)	45.0	
Education (<=4 yrs)	38.0	

Source: Household Surveys in 1996 and 2006.

#### Independent variables: quality measures

Human capital reflects the managerial skills and capabilities of rural households (Sahn and Alderman 1988; Foster and Rosenzweig 1994; Rizov 2003). The human capital variables employed here are age and education of the household head. We consider that the head of the household is likely to have more decision power over the farm than other household members. *Age* is a dummy variable indicating whether the household head is 60 years of age or more. In 1996 45% of the sample were 60 years or older, while in 2006 the share was higher, 60%.

The level of *education* (measured here as a dummy for whether the household head completed four years of schooling or less) matters not only as a proxy for managerial skills and ability to start up and run a farm and business but also as an indication of access to off-farming job opportunities (Rizov 2003).<sup>37</sup> In 1996 38% of the sample had an education of at most four years of schooling, while in 2006 the share was much higher, 83%.

The *land-man* variable, the ratio of owned land to household size is an indication of wealth. Availability of large land holdings is hypothesized to have a positive effect on production not only from scale effects but also from increased opportunities for financing as land is most commonly used as a collateral in transitional economies if the owner decides to apply for a loan. The average *land\_man* ratio in 1996 was 1.5 hectares/person, almost the same as in 2006 (1.6 hectares/person).

<sup>37</sup> I use a dummy format for both age and education because it renders the best estimation. Different measurements were considered, but based on the data and hypothesis I decided to use dummy variables.



*Land quality* is measured as the share of good quality land (category I and II) into total agricultural land at the commune level. One of the limitations of this dataset is the unavailability of farm (or plot) level land quality information. To partially overcome this drawback, commune level data is supposed to provide some indication of the returns at farm level based on the land quality of the commune. An indirect indicator for land quality (more so of farming difficulties) is given by the degree of land fragmentation.

*Land fragmentation* affects farm performance by increasing farming costs and reducing the ability to obtain benefits from scale economies. The variable is measured as the total number of plots that the land in ownership is divided into. Fragmented small land plots have been one of the main challenges that Romanian agriculture was confronted with following land restitution. In 1996 the average number of plots owned by a household was 4, and by 2006 there was almost no improvement in land consolidation (an average of 3.7 plots). Land fragmentation prevents the use of mechanical land exploitation that would increase productivity and reduce costs. Nevertheless, at times in a traditional economy and when market imperfections are pervasive, land fragmentation can act as an economic risk buffer despite higher costs incurred by needing more labor at peak harvesting times, and commuting between the different plots. At the same time, however, extensive land consolidation could leave many people landless, which would put much more social pressure on the rural communities (FAO 2005). Land fragmentation can also reduce risk through the differences in land quality among plots (Scott 1976). Nevertheless, despite the positive aspect of fragmentation for subsistence farmers, the costs spawned as a result (especially when it comes to crops such a corn and wheat requiring more mechanical implements) are not negligible.

The economic and social environment, within which the rural households operate are important determinants of their performance level. I use three proxies for market access, regional effects, and village specific fixed effects that account for this larger environment affecting farming performance. *Market access*, measured as the distance from the commune to the closest city, is an estimation of accessibility to local markets. We expect a negative correlation between the access variable and the level of output (the higher the distance to markets, the lower the level of production) since a restricted access to markets will increase transaction costs for individual farmers. A regional dummy for whether the household is located in the Western Plain or in Central Romanian Plain is added to account for institutional and economic development differences that could affect the overall farming performance level. The *village dummies* are supposed to capture community level specificities.

The results from the productivity analysis are displayed in Table 26.<sup>38</sup> The predicted efficiency scores vary from 3% to 86%, with an average of 52%, but highly concentrated on the lower smaller scores. There are no significant differences in terms of efficiency levels between the two regions. However, in 1996 Western Plain has a slightly higher efficiency level than Central Romanian Plain (54% as compared to 47%). This finding is similar with Tomasi (1998), who

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<sup>38</sup> In order to test whether the model will be different for different types of farms, we run the analysis with a dummy for farms cultivating only corn, a dummy for farms cultivating only wheat, and with a dummy for farms cultivating both corn and wheat. Nevertheless with the exception of only corn producing model (where the land-man ratio significantly affects the level of production), the rest of the models are fairly similar.

observed that in the southern plains of Romania, productivity levels are less than the national average for both corn and wheat producers. However, by 2006 Central Romanian Plain performed better (54% in the Central Romanian Plain as compared to 51% in the Western Plain).

The ratio of the standard error of  $u$  ( $\sigma_u$ ) to the standard error of the  $v$  ( $\sigma_v$ ), is known as lambda ( $\lambda$ ). Based on  $\lambda$  we can derive gamma ( $\gamma$ ) which measures the effect of technical inefficiency in the variation of observed output ( $\gamma = \lambda^2 / [1 + \lambda^2] = \sigma_u^2 / \sigma_\varepsilon^2$ ). The estimated value of  $\gamma$  is 0.74, which means that 74 percent of the total variation in farm output is due to technical inefficiency. This outcome is very important because it suggests that efficiency levels explain an important share in total output variation. Therefore, understanding the meaning of this residual is critical.

The level of efficiency is a measure of total factor productivity (TFP). TFP is the most common productivity index, measuring the amount of increase in production not accounted for by the increase in inputs. In other words, the residual absorbs “like a sponge” (Domar 1961) all increases in output not accounted for by the growth of explicitly recognized inputs. The discussion on TFP has received more emphasis after Solow (1957) and other scholars stressed that conventional inputs (e.g. capital, labor) leave a large portion of growth unexplained. The residual from a production function specification becomes a weighted sum of the growth rates of the quality changes embodied in the conventional inputs (Nadiri 1970). Nevertheless, since the residual can absorb any misspecification errors in estimating the parameters of the production function (errors in measuring the variables, errors due to omission of relevant inputs), these will spill over to the measure of productivity. Griliches (1957) discusses the problem of omitted variables in a production function, and it provides a solution by including variables related to farm management in the specification model. If the sources of bias are successfully removed, the remaining portion of unexplained variance is the “true” productivity. Removing this source of bias is probably one of the most challenging tasks for economists, without being entirely solved.

**Table 26: Results from the SFA efficiency prediction**

Variable	1996
<b>Factors of production (X<sub>i</sub>)</b>	
Labor_days	.047 (.044)
Land	.568** (.078)
D_Tractor	.176* (.091)
D_Seeds	.106 (.069)
D_Fertilizer	.270** (.075)
<b>Other variables (Z<sub>i</sub>)</b>	
<i>Human capital</i>	
Age	-.072 (.064)
Education (0-4 yrs)	-.107 (.087)
Education (5-8 yrs)	-.143* (.081)
Education (8-12 yrs)	-.246** (.113)
<i>Wealth</i>	
Land-man ratio	-.064 (.059)
<i>Land quality</i>	
Land quality at the commune level	.020** (.003)
Land fragmentation	-.044** (.013)
<i>Economic and social environment</i>	
Access to markets (distance to city)	-.016 (.011)
Region (1-Western Plain, 0-Central Romanian Plain)	.612** (.245)
Dummy for corn production	.129 (.159)
Year (2006=1)	.053 (.072)
Commune dummies	Yes
$\lambda$	1.690 (.121)
$\sigma^2$	1.386 (.129)
Log-likelihood	-1202.9688
N	961

Notes: (\*) Significant at p=0.05; (\*\*) Significant at p=0.10; Values represent standard beta coefficients; Values in parentheses are SE.

After controlling for differences in input endowment, human capital, and other quality variables, the residual outcomes denotes a stock of farming knowledge unaccounted for by other factors. It should reflect the true measure of productivity. Some of the elements that would be reflected in this residual productivity level are better entrepreneurial skills, higher levels of farming expertise, better organizational structures, newer equipment, land quality at parcel level, the care and timing of planning.

**Table 27: Productivity levels by farming arrangements and land market participation**

	1996		2006	
	Yes	No	Yes	No
Joined farming associations	.41	.45	.55	.59
Leased-in land	-	.44	.63	.58
Leased-out land	.44	.46	.53	.59
Sold land	-	-	.57	.58
Bought land	-	-	.58	.58

Source: Calculations based on the Household Surveys in 1996 and 2006.

Overall we do observe that there are some differences between household productivity levels based on what farming arrangement they are engaged in. Households that released some land to associations, and those that leased out have a lower productivity level than those that did not and are farming the land individually. The largest difference is between households that leased-in land, and those that did not, suggesting that this option is taken by farmers with a much stronger entrepreneurial behavior, in a business environment still characterized by wide uncertainties and market imperfections. Interestingly, there are no differences between households that sold or bought land, suggesting that land market is still in formation and other factors aside from productivity levels matter in the decision to participate in land transactions.

## 5. Conclusions

The agricultural sector plays a dominant role in the Romanian economy employing a large share of the labor force and having a large contribution to the GDP all throughout the transition period. The restitution of private property rights in land following the post-socialist land reform resulted in major social, economic, and institutional transformations. Nevertheless, due to limited availability of data, the outcomes of land reform have not been fully assessed. The household survey that we conducted in 2006 aims to reduce this gap in the literature, by evaluating the effect of land reform on small landowners over time. A ten year difference between the earlier survey and the one we recently conducted allows us to factor in important institutional changes that were adopted within this period, such as the phasing out of agricultural subsidies in 1997, and the opening up of land market in 1998.

We find that regional differences are sizable in terms of household characteristics, but most importantly in terms of farming arrangements. While in the Central Romanian Plain farming associations are widespread, in the Western Plain land transactions predominate along with individual farming. These differences, which are analyzed in more detail by Vidican-Sgouridis (2008), have critical implications both on theoretical grounds for post-socialist transaction and land tenure, as well as for development policy. Moreover, preliminary econometric analysis suggests that productivity levels do not differ significantly between farming arrangements, and that access to farming resources might be more important in choosing different institutional arrangements. Lack of alternative sources of income and a high attachment to land, are factors that also affect the decision to reallocate land to more productive uses. Another relevant finding is that while land markets are important mechanisms for land consolidation, these institutions are

highly undeveloped in Romania. High transaction costs and severe land fragmentation are strong barriers for small household farms to participate in land markets.

Moreover, interviews with policy-makers reveal this time frame is crucial for restructuring the agricultural sector. EU integration creates a unique momentum for establishing a development agenda that would allow Romania to slowly catch up with the rest of the EU members. Interviews with farmers showed that changes as a result of land reform came as a shock to most people. Land restitution was welcomed by most individuals by regaining a sense of dignity and freedom, and also providing an additional source of income to supplement the highly depreciated wages during transition. But, the constraints imposed by market imperfections and the lack of comprehensive rural development policies, transformed this blessing into an actual burden for many of the small landowners.

This evaluation of small household farms and analysis of household productivity offers a rich set of information and data, opening up future venues for researching the effect of transition policies on small farmers. Given the context of European Union enlargement and the restructuring of the Common Agricultural Policy, a better understanding of the socio-economic condition of small household farms is critical.

## **Appendix**

### **Profiles of farming arrangements in Romania**

Currently, Romanian landowners who wish to farm their land face a range of options: individual farming, to large formal associations, and anything in between (Sabates-Wheeler forthcoming). Moreover, both landowners and farmers can enter in various land-renting arrangements with two specific types of rental contract: *dijma* – a sharecropping contract, or *arenda* – a standard lease contract that provides the lessee with cultivation and use rights over a fixed period.

*Individual private farming* refers to a single-family farmer or farm family cultivating land (this can include owned land and/or leased land) and making cultivation decisions independently from other individuals or farmers. At different stages in the production process the individual farm may draw on outside resources, for example, on labor supply and machinery services. This category also includes individual farmers with a final land title deed as well as those that did not receive yet the final property title.

*Formal associations* (or “agricultural societies” in the language of Law 36/1991) are legal entities that employ both members and non-member workers (a minimum of 10 associates). The members are farmland owners and they can theoretically retire at any time from the association. These legally recognized associations are direct offspring of the former socialist agricultural cooperatives (CAPs) that have been transformed according to the provisions of Law 36/1991 (Law for Agricultural Societies and Other Forms of Associations in Agriculture). These formal associations are mostly engaged in agricultural farming, animal breeding, and agricultural investments. The establishment of the agricultural societies have been sought due to several conditions: (1) the high share of elderly population in rural areas; (2) migration of young rural population to urban areas; and (3) a large percentage of the land owners are living in urban areas (more than 40%) (Leonte and Alexandri 2001). Although these associations are formed on the previous structure of the former CAPs, many have undergone visible or significant changes. The most notable change is the significant reduction in size, both in the total amount of land farmed and the number of associated members (Sabates-Wheeler forthcoming). The same author argues that although there have been some visible changes to the associations, such as new management, it is difficult to know whether they reflect meaningful internal restructuring or whether the new management has merely changed the ‘sign on the door.’

*Family associations* are groups of people who have their lands in similar locations and are able to consolidate their landholdings for the main purpose of ease in mechanization. Family societies are recognized as an organizational form by Law 36/1991, but they are not regarded as legal entities. They are based on gentleman agreements between two or several families. Verbal or written agreements are allowed. Their main aim is agricultural farming (vegetal production) animal breeding, supply, storage, processing and marketing of their own output. The fact that family associations do not legally have to register their existence, but are at the same time defined by law is confusing. Kideckel (Kideckel 1995) offers an explanation for this situation. He claims that at the time when Law 36 was passed, the Romanian Government clearly favored legal associations. However, by including family societies within the Law, the government tried to promote the idea that associative activities other than formal associations, were encouraged. This appears to be the most logical explanation as to why family associations were excluded

from the realms of law. Moreover, empirical evidence suggests that these farming options are not mutually exclusive, some farmers engaging in two or more types of organization.

*Land rental options* - A formal leasing market as a means of reallocating land from owners to operators has only recently begun to develop in Romania. This is partly because of the delays in establishing a legal basis for such leasing. The first land lease law was passed in 1994 (Law 16/1994). Due to the heavy number of restrictions imposed on the eligibility to lease in or out and on the nature of the leasing agreements, Law 16/1994 was not successful in promoting a fluid leasing market. Law 16 was amended in 1998 by Law 65. Among other changes, the five-year minimum lease period established in the previous law was abolished, as was the imposition of a rental value (Sabates-Wheeler forthcoming).<sup>39</sup> This gave the parties in the lease contract more flexibility to reach bilateral agreements on the terms of the lease. Although leasing contracts have been liberated somewhat, a formal leasing market is still in the initial stages of development.

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<sup>39</sup> Law 16/1994 stipulated that the minimum value of the rent for 1 ha of land should be represented by 600kg of wheat (calculated as being 30% from the total production).

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