Subsistence farming, incomes and agricultural livelihoods in the New Member States of the European Union

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SUMMARY

Drawing on primary survey data and the literature on sustainable livelihoods, this paper analyses agricultural households in five new Member States of the EU which possess a large subsistence and semi-subsistence farming sector. The study indicates that the contribution of subsistence farming to household incomes is significant. The profiling of agricultural households, using cluster analysis, reveals four main types which differ significantly in terms of engagement in non-marketed production. The poorest households form the largest cluster. They possess low natural, physical and social capital, operating small-scale and undercapitalized farms with little non-agricultural income. The main EU Common Agricultural Policy (CAP) instruments are not well-suited to respond to the specific needs of these poor subsistence farmers.

KEYWORDS

Agricultural households; sustainable livelihoods, subsistence farming, rural development, Central and Eastern Europe.

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1 INTRODUCTION

The two enlargements of the European Union (EU) in 2000s, incorporating countries from Central and Eastern Europe changed significantly the farm structure in Europe and consequently the problems faced by rural areas. Eurostat (2009a) data indicate that the 27 Member States of the EU collectively possess 9.6 million agricultural holdings smaller than 5 hectares (ha). The New Member States (NMS) from Central and Eastern Europe account for 68% of these small farms and most NMS continue to be characterized by a large number of small-scale units and a small number of large operations. Although some of the EU-15 Member States also retain such a dualistic structure (Hubbard and Gorton, 2011), if the NMS are compared to the EU15 average, medium-sized, market oriented farms, both in terms of absolute numbers and share of utilized agricultural area (UAA), remain far less prominent. Most of the small-scale units in the NMS are subsistence or semi-subsistence farms with limited market participation (Fritzsch *et al.* 2009; Mathijs and Noev, 2004). The expansion of semi-subsistence farming in the EU represents one of the biggest challenges for the Common Agricultural Policy (CAP) (Davidova, 2011; Burrell, 2009).

The prevalence of subsistence farming (SF) and semi-subsistence farming (SSF) gives rise to important debates concerning agricultural incomes and livelihoods. Regarding livelihoods, a focus purely on agricultural cash incomes is too narrow; farm households may have multiple sources of income and non-marketed agricultural production may provide a substantial share of the food needs of poor agricultural households.

Subsistence production has different roots in Central and Eastern Europe. In most of the Central and Eastern European countries, prior to political and economic transition, agriculture was collectivised but the members of state and collective farms were allocated small plots, e.g. 0.3-1 ha for household use (Forgacs, 2010). After the start of the reforms in the late 1980s, land reform including restitution of land ownership to the previous owners or

their heirs, or distribution of plots to the former members and employees of co-operatives resulted in the creation of millions of small farms which due to the low living standards and high industrial unemployment produced mainly for household consumption. In some countries, e.g. Poland and the countries of the Former Yugoslavia, agriculture was never fully collectivised. Swain (1999) argues that since both countries did not want the development of capitalism in rural areas, farms remained small.

Whilst some authors (Kostov and Lingard, 2002; Kostov and Lingard, 2004) treat the engagement in SF/ SSF as distress driven, more recently, Larsen (2009) contends that SSF can play a different, positive role in improving rural incomes in the NMS. She argues that the characteristics of SSF (local food production, short supply chains, high biodiversity and rich cultural heritage) provide a valuable asset for the creation of greater value-added and alternative rural enterprises such as agro-tourism, environmental services, handicrafts and speciality foods. However this is not the prevailing view in the NMS (Gorton *et al.* 2008).

Regarding policy, the European Commission (Boel, 2005) recognizes the prevalence of SF and SSF in the NMS. Within the EU rural development menu for the programming period 2007-2013, a special transitional measure seeks to assist restructuring, focusing on the commercialization of semi-subsistence farms in the NMS.[2] An array of other rural development measures, not specifically targeted at SSF, is available but the uptake is limited either because SSF are too small to satisfy the eligibility criteria or they lack financial capital to make the required private contribution. As emphasised by Papadopoulos and Liarikos (2007), some proactive Member States manage to 'upload' their national approaches to the EU, but the passive ones are left with the only option to 'import' EU policies which do not always fit their structure and institutions. This seems to be the case of NMS. This raises the question of whether the EU requires a specific SF / SSF policy and if so, what measures may

[2] Council Regulation No. 1698/2005, Article 20(d)(i).

be appropriate. As evidenced in the contributions to a public debate on the future of the CAP (European Commission, 2010), at present there is no clear consensus on the topic.

The study has two interrelated objectives. First, to evaluate the role of non-marketed production for the incomes of agricultural households and the contribution of subsistence farming to assessments of poverty. Second, to produce a typology of agricultural households, drawing on the sustainable livelihoods literature and employing multivariate statistics (factor and cluster analysis). The typology provides the basis for engaging in the wider policy debate regarding the appropriateness of the CAP for the NMS. The two objectives of the research are linked: incomes per capita excluding and including subsistence production are used as cluster profiling variables.

The paper draws on data collected through survey work within the EU FP6 project 'Structural Change in Agriculture and Rural Livelihoods' (SCARLED). Data collection occurred between autumn 2007 and winter 2008 in five NMS - Bulgaria, Hungary, Poland, Romania and Slovenia. The selection of countries was driven by the fact that these states collectively account for 94% of all farms that use more than 50% of the output for own consumption in the NMS and 84% of those in the whole EU (Davidova, 2011). Specific regions and villages in these countries were selected so that the research engaged with the wide range of farm structures, incomes and living conditions present in rural areas in the NMS. As in most recent studies of rural livelihoods, the unit of analysis in this research is the farm household, treated as a single person or several individuals, not necessarily related, who live together, share meals and pool some or all of their income, and who cultivate land or keep livestock.

The paper consists of six sections. The next section outlines the conceptual framework that informed the study. Section three draws on secondary data to discuss the

pattern of SF / SSF in the NMS, beginning with a discussion of definitions. Section four describes the methodology. Section five presents the results and section six concludes.

2. CONCEPTUAL FRAMEWORK – SUSTAINABLE LIVELIHOODS

Sustainable livelihoods is an 'umbrella concept' (Buchenrieder *et al.* 2007), with the literature drawing on contributions from a range of academic disciplines. Chambers and Conway (1991, p.6) define sustainable livelihoods as "the capabilities, assets (stores, resources, claims and access) and activities required for a means of living". The approach seeks to understand the ways in which actors make a living and their vulnerability to stresses and shocks. Households possess differing amounts of human, natural, physical, social and financial capital with the poor usually possessing low endowments of most types (Ellis, 2000). Strategies to improve well-being therefore typically require asset building (Moser, 2007). The livelihoods approach has most commonly been employed in a rural context and for developing countries (Ellis *et al.* 2003; Buchenrieder et al. 2007; Ansoms and McKay, 2010). However to date the livelihoods approach has rarely been applied to the former socialist states of Central and Eastern Europe who have become members of the EU.

Three features distinguish the sustainable livelihoods approach, regarding focus, agency and methodology. First, livelihood strategies are typically diverse, with households drawing on a range of gainful activities. In an agricultural context, focusing on cash incomes generated from farming is therefore too restrictive; researchers should consider the role of non-marketed production and a household's engagement in the non-farm rural economy. The emphasis therefore should not be on specific sectors such as agriculture or manufacturing in isolation, but rather on people and households (Buchenrieder *et al.* 2007).

Second, the sustainable livelihoods literature acknowledges that outcomes depend not only on structures but also agency – actors in part shape their livelihoods (Ansoms and McKay, 2010). In this context, the role of rural development is to *enable* poorer households

to improve their well-being rather than for the state to provide on-going cash transfers or act as the guarantor of particular welfare outcomes (Moser, 2007; DFID, 2000).

Third, researchers should employ methods that capture the heterogeneity of poor households and document the varied sources of gainful activity and asset portfolios (Moser, 2007; Ellis, 2000). Researchers therefore typically study, within a particular geographical area, a cross-section of poor and relatively better-off households in both deprived and less disadvantaged villages (Ellis and Mdoe, 2003; Bouahom *et al.* 2004). Cluster analysis may be usefully employed to capture the heterogeneity of household profiles (Petrovici and Gorton, 2005; Ansoms and McKay, 2010).

3. DEFINITIONS AND FARM STRUCTURES IN THE NMS

A lack of data as well as the absence of a generally agreed definition constrains research on SF and SSF in the NMS. Subsistence is a concept indicating households who operate in a state of autarky, producing for self-sufficiency without recourse to the market (Wharton, 1969). This is unusual in Europe and used mainly as a reference point to measure varying degrees of market participation. Semi-subsistence farmers participate in the market but the proportion of output sold is typically low (Balint and Wobst, 2006). In practice, in order to define and assess the size of the SF/ SSF sector in Europe, there are three main criteria which can be applied: physical measures, economic size, and market participation.

Physical measures, such as agricultural land, volume of inputs and number of livestock define subsistence through size thresholds. McConnell and Dillon (1997) suggest 0.5 to 2.0 ha of cultivated land as a good proxy for semi-subsistence farms. Both Eurostat (2009a) and FAO (2010) define small farms as those operating on an agricultural area of 5 ha or less. However, there are doubts that physical measures, and land area in particular, are appropriate indicators due to differences in fertility of land and productivity, influenced by natural, social and economic conditions. Additionally, one important aspect is the

specialization of 'small farms' - for example, an intensive horticultural farm of 1.8 ha may be a substantial business operation.

Economic size is widely applied for statistical and policy purposes within the EU, expressed in terms of European Size Units (ESU).[3] Within the EU Farm Structure Surveys, farms smaller than 1 ESU are classified as "subsistence". In addition to this, Eurostat (2009b) defines farms with less than 8 ESU as small farms. On the basis of this measure, farms between 1 and 8 ESU can be classified as semi-subsistence.

Within the academic literature, definitions based on a market participation criterion are more common than economic size measures. While still arbitrary, the market participation criterion is fairly straightforward, taking either a consumption or production point of view. The former focuses on the share of household consumption covered by own production to assess to what extent subsistence production can cover household needs (Ellis, 1993). However, a consumption-based approach can disregard that even a large and commercially-integrated farming operation may still cover a substantial part of the food needs of the household, so it is not always appropriate in defining SFs and SSFs (Davidova *et al*. 2009).

The production side approach has been widely applied since Wharton (1969) first addressed the problems caused by non-uniform definitions of subsistence farming. Focusing on agricultural output markets, he argues that farm households can sell between zero and 100% of their agricultural output. At the two extremes are purely subsistence (autarkic) and purely commercial operations with different mixes in-between. With regard to this continuum, he introduced a threshold of 50% of marketed output, classifying farmers selling more than zero but less than this as semi-subsistence, while labelling those above the threshold as semi-commercial and commercial. Some more recent studies (Kostov and

[3] The value of one ESU is defined as a fixed number of EUR of Farm Gross Margin (FGM). Over time the number of EUR per ESU has changed to reflect inflation. Currently, one ESU equals €1,200. 1 ESU roughly corresponds to either 1.3 hectares of cereals, or 1 dairy cow, or 25 ewes, or equivalent combinations of these (https://statistics.defra.gov.uk/esg/asd/fbs/sub/europe_size.htm,).

Lingard, 2004; Lerman, 2001) utilize Wharton's approach. A market participation approach, albeit with no specified thresholds, was also adopted in Article 34 (1) of Council Regulation (EC) No. 1698/2005, where semi-subsistence farms are defined as "agricultural holdings which produce primarily for their own consumption and also market a proportion of their output".

The size of the semi-subsistence sector in the EU-27 varies depending on which of these criteria is employed (Table 1). Taking into consideration the EU-27 as a whole, in 2007 there were 9.65 million small farms, below 5 ha (70.4% of all agricultural holdings), operating on 8.4% of UAA. The use of this physical measure illustrates the enormous heterogeneity within the EU-27. In 2007, farms smaller than 5 ha represented more than 90% of all farms in Malta and Bulgaria, but only 2.8% in Denmark. Regarding agricultural land, with the exception of Malta, farms smaller than 5 ha operate less than half of UAA. Nevertheless, they are important in Romania (operating 35% of UAA in 2007), Cyprus (29%), Greece (27%) and Slovenia (22%).

Table 1 about here

Considering economic size, in 2007 there were 11.1 million farms below 8 ESU within the EU-27. Of these, 6.4 million were below 1 ESU. Expressed as a percentage, farms smaller that 8 ESU accounted for just over 80% of the total number of agricultural holdings in the EU-27. In six NMS (Bulgaria, Hungary, Latvia, Lithuania, Slovakia and Romania) farms below 8 ESU represented 95% or more of agricultural holdings. However, in view of the land area managed, the importance of SF and SSF is much more modest. In 2007, these farmers operated only 22.5% of the EU-27 UAA.

The market participation criterion, which is probably the most appropriate basis on which to produce a farm typology when subsistence production is involved, indicates big variations across EU-27, with a divide East-West and North-South. Following this criterion,

SSFs are of significance mainly in the NMS and some southern EU-15 MS, notably Italy. In seven NMS, most farms produce mainly for self-consumption. These are Slovakia, where in 2007 93% of the farms produced mainly for self-consumption, Hungary (83%), Romania (81%), Latvia (72%), Bulgaria (70%) and Slovenia (61%). Despite their prevalence in terms of the total number of farms, SSFs manage smaller shares of UAA.

4. METHODOLOGY

The research involved four inter-related methodological stages. The first stage focused on questionnaire design and data collection. The next step included the valuation of unsold output and the estimation of its contribution to total household incomes. The newly created variable income per capita including the valuation of subsistence production was used in the next two steps. The third step involved comparisons between key household and production characteristics of poor/non-poor households and those who were shifted from below to above poverty line due to the valuation of unsold output in order to identify variables that differentiate the groups. The fourth step identified homogeneous groups of farm households, using cluster analysis, to investigate whether there were systematic characteristics of households that were more dependent on subsistence production. This contributed to the formulation of more focused policy implications and conclusions.

4.1 Survey instrument and regional sampling

A questionnaire was devised to survey agricultural households in five EU NMS. The survey focused on farm households, where a farm household is defined as a household with agricultural production, including production from a house garden or yards belonging to the house. Only farm households that had agricultural production in both 2006 and 2003 or in either of these two years were included in the survey sample. Although the information requested for 2003 was less detailed than that for 2006, the survey of the two time points

allowed for the identification of households that entered or exited agriculture between 2003 and 2006 irrespective of whether they were SSF or commercial farms. Participation in the survey was determined by asking initial filter questions.

The questionnaire solicited information on household demographics, incomes and sources of incomes, factors of production, agricultural output and variable inputs (in quantities and value). Answers to qualitative statements on 5-point Likert scales generated an understanding of respondents' attitudes to farming and off-farm employment. As for this research market participation and the use of subsistence production to cover household food needs are of central importance, households were asked, first, to estimate the share of the total output sold and the share of the food consumption covered by own production, and second, to indicate their assessment of these shares on a product by product basis. The survey was implemented through face-to-face interviews using local enumerators.

The survey employed geographical cluster sampling**.** In the first stage, three regions in each of the five surveyed countries were selected according to their degree of economic development: (i) lagging behind (ii) average and (iii) prosperous, corresponding to a GDP per capita below, similar to and higher than the national average. The survey targeted rural areas, and for this reason the regions of the capital city and other large cities were excluded from the selection with the exception of Ljubljana which does not constitute a NUTS3 region. Eurostat data at the NUTS3 level were used as a basis for this selection.[4] In the second stage, three villages per NUTS3 region were selected (again with a view to cover the variations within the NUTS3 regions, namely a prosperous, average and lagging behind village in comparison to the regional mean). Figure 1 details the selected regions.

[4] The sample in Poland differed slightly from other countries in relation to the geographic selection criteria at NUTS 3 level. In Poland, sampling overlapped with the sample for a survey conducted for a previous EU funded research project 'Integrated Development of Agriculture and Rural Areas in Central and Eastern European Countries' (IDARA).

4.2 Valuation of output

The valuation of total agricultural output depended on using actual household selling prices. In cases where the household consumed all output produced, crops were valued using a weighted average price for the village. In cases where in a particular village there were only a few observations of output sold and there were large differences in reported prices, either regional averages or country averages were taken from national statistics.

An identical procedure was used to value unsold output. Product by product, it was valued at market prices as a proxy for opportunity costs. If a household sold a portion of their output, the same price was imputed to the unsold quantity as it was assumed that the price the household received was the best indication of the quality of the output. If the household did not report any sales of the product in question, the valuation procedure as explained above in relation to the total output was applied.

4.3 Identifying poor households

An important objective of this paper is to provide a more complete picture of household incomes by estimating the value of unsold output. Particular attention was paid to the importance of non marketed output for poor households. To define the latter, the Eurostat definition of at-the-risk-of-poverty was used. It refers to individuals living in households where the equivalised income is below the threshold of 60% of the national equivalised median income.[5] Equivalised income is a household's total income divided by the equivalent size of the household.[6]

[5] The at-the-risk-of-poverty thresholds per capita were in 2006: €1022 (Bulgaria); €2308 (Hungary); €1867 (Poland); €828 (Romania) and €5589 (Slovenia).

[6] The household equivalent size was calculated using the modified OECD equivalence scale, giving a weight of 1.0 to the first adult, 0.5 to any other household member aged 14 years and over, and 0.3 to each child. As the data from the five countries were merged, all income indicators were converted into EUR using Eurostat purchasing power parities (PPP) for 2006, the reference year for the data collected.

4.4 Household profiling

To better profile agricultural households and their livelihoods, cluster analysis was conducted to define groups with the maximum homogeneity within the groups and maximum heterogeneity between the groups (Hair *et al.* 2006). The cluster analysis followed a two-stage approach. First, because of its ability to form clusters based on both categorical and continuous data, the SPSS TwoStep cluster analysis procedure was used to discern the number of clusters and profile the cluster centres (Norušis, 2011). The TwoStep approach combines an initial pre-clustering procedure followed by hierarchical clustering of the pre-clusters. The decision on the number of clusters to retain was based on Bayesian Information Criterion (BIC). Then, the observations were clustered utilizing a non-hierarchical method (k-means) with the cluster centres from the TwoStep procedure used as the initial seed points. Non-hierarchical clustering requires the number of clusters to be pre-defined but in general is more reliable (in terms of similar results for split samples) and objects can switch between clusters (Everitt *et al.* 2001). The hierarchical clustering procedure provides the basis for deciding on the number of clusters in the second stage. This combined procedure thus allows one to draw benefits associated with both hierarchical and non-hierarchical methods, while at the same time minimize some of the drawbacks (Punj and Stewart, 1983; Milligan, 1996).

To produce the typology of agricultural households, variables were selected from the literature on sustainable livelihoods (Buchenrieder *et al.* 2007) relating to the five types of capital (financial, human, natural, physical and social). Specifically, financial capital was captured in terms of total household cash income, equivalised income per capita excluding subsistence production and equivalised income per capita including subsistence production. Age of the head of the household and the percentage of a household's time accounted for by off-farm work relate to human capital. The latter variable measures engagement in the non-farm economy and indicates an ability to operate outside of agriculture (Ellis, 2003). Two

variables capture natural capital: total cultivated area and land owned. The value of agricultural equipment is a measure of physical capital. Active membership in a marketing or purchasing agricultural co-operative was used as a measure of social capital (Svendsen and Svendsen, 2000). Measures of location (distance to nearest urban area in both kilometres and hours) were also included given the likely bearing on social capital (du Toit *et al.* 2007).

The validation of the clusters depended on an array of additional variables. This included variables characterizing the household and agricultural activities. Particular attention is paid to gender. We also consider the incidence of poverty per cluster. Profiling of the clusters also covers labour allocation, capital and technology use, and the potential impact of policy measures on stimulating the formation of non-agricultural businesses. The capital/technology variables provide an insight into whether the households that are most dependent on subsistence agriculture rely almost exclusively on manual technology. Tables 6 and 7 present the full list of validation variables.

5. RESULTS

5.1 Description of the Sample

The sample consists of 1012 NMS households, all of which produced agricultural commodities in 2006. This figure comprises 214, 165, 199, 251 and 183 responses from Bulgaria, Hungary, Poland, Romania and Slovenia respectively. Table 2 provides an overview of the key household and production characteristics of the merged five country sample.

Table 2 about here

As evident in Table 2, the sample encompasses very small to relatively large holdings measured by land area, covering the whole spectrum from fully subsistence (0% sales) to fully commercial (100% sales). Also, the survey includes rural agricultural households who do not consume any of their produce themselves, to households who claim they produce 100% of their own food. The mean farm size is 7.8 hectares (ha) and most farm within their local area – the average distance to household's largest plot is 2.4 km. The value of agricultural equipment, output, sales, subsistence production and incomes vary substantially around the mean values, indicated by large standard deviations.

5.2 Incomes and non-marketed output

The valuation of unsold output provides an indication of the contribution of subsistence farming to household income. Table 2 details that for the sample as a whole, on average, the equivalent value of subsistence food production is €4448 per household, accounting for, on average, 22.6% of household income. Adjusting for household size, equivalised income per capita in 2006 excluding and including subsistence production was €7910 and €9962 respectively. Turning to the measure of poverty, 15.1% of households can be classified as poor excluding the valuation of subsistence farming (Table 3). Valuing non-marketed output has a significant effect on the numbers classified as living in poverty. This adjustment leads to only 7% of the sample being classified as poor. Assessments of rural poverty are therefore sensitive to the valuation of subsistence production and SF/ SSF does make a significant contribution to household welfare.

Table 3 about here

Focusing on the importance of subsistence production at the country level, the analyzed NMS show large differences ranging from very little importance (Hungary) to a

substantial impact on the rural poor (Bulgaria) (Table 3). In Bulgaria, where the valuation of income in kind has the largest effect, almost two thirds of the poor households are shifted from below to above the poverty line when subsistence production is taken into account. The valuation of subsistence production also has a large impact for Slovenia, reducing the share of poor households from 24.6% to 15.8%. For these two countries, subsistence production is very important but not enough to fully eradicate poverty. This is however the case for Poland and Romania, where the valuation of subsistence production reduces the already low shares of agricultural households below the poverty line to less than 2%. In Hungary on the other hand, valuing subsistence production has only a modest effect in shifting households above the poverty line. It should be stressed, however, that the analysis presented in Table 3 relates to relative poverty lines, which vary significantly between countries.

5.3 Characteristics of poor households

In order to produce an overview of variables that differentiate between poor/non-poor households, ANOVA analysis was carried out. Table 4 compares the characteristics of households who were always below or above the poverty line, and those who shifted groups as a result of the valuation of subsistence production. Concerning households who were always below or above the poverty line, the results indicate that heads of poor households have generally a lower education level and spend more time on-farm and less on non-farm wage employment although they are located nearer to an urban centre. Poor households are also larger. For them, as expected, the relative contribution of subsistence production to household incomes is higher. With respect to production characteristics, households below the poverty line have smaller production assets (land, agricultural equipment) and consequently lower output level. Poor households sell on average only 39.7% of their total output compared against 53.3% for non-poor households. Using Wharton's (1970)

thresholds, in general, poor households are subsistence oriented and non-poor households - commercially oriented.

Table 4 about here

For this study of particular interest are those households shifted above the poverty line as a result of the valuation of unsold output. What characterizes these households in comparison to the other two groups is that they spend the largest share of time on-farm and the lowest in non-farm wage employment. They market the lowest share of output and for them the contribution of subsistence production to household food consumption and to incomes is the most important.

5.4 Typology of Agricultural Households

Applying the clustering approach discussed above, a four cluster solution was obtained (Table 5). Tables 6 and 7 present the cluster validation variables and Table 8 describes the distribution of cluster membership by country and the share of total cultivated land area and value of production accounted for by each cluster. Table 9 details their objectives for agricultural production, the impact of potential policy initiatives on the likelihood of establishing a non-agricultural business and intentions of households, by cluster, for the period 2006 to 2011. Due to missing data, the factor / cluster analysis incorporates 701 agricultural households.

Tables 5, 6 and 7 about here

The cluster analysis indicates two main routes out of poverty, represented by Clusters 1 and 2. Cluster 2 (*pluriactive farmers*) is the richest; with a mean cash income (€51,958) more than double that of clusters 3 and 4. No one in this cluster is classified as poor regardless of whether subsistence production is accounted for (Table 7). Most of these households combine farming with alternative, off-farm gainful activities and can be classified therefore as pluriactive (Kinsella *et al.* 2000)**.** They operate relatively large farms (mean of 20.8 ha) compared to the sample mean (9.3 ha). The cluster devotes the highest proportion of household time to off-farm work and the main motivation of farmers is to generate cash income. The value of production per hectare is the highest of any cluster. While accounting for 8.7% of the useable sample, these farms are responsible for 20.4% of the value of production. Eighteen percent of household heads in this cluster are female which is higher than any other cluster. The main objective in farming is to generate cash incomes. This cluster has a disproportionately large share of farmers from Hungary and Slovenia, the two countries in the sample with the highest GDP per capita (Table 8).

Table 8 about here

Cluster 1 (*relatively large, full-time farms*) is the smallest one (n=20), with the second highest mean cash income (€46,551). After accounting for non-marketed production, no households in this cluster could be classified as poor. This cluster's farms are sufficiently large (mean operating size of 32.6 ha) to generate incomes to remove the households from poverty, without requiring additional off-farm income. The cluster is also asset rich with respect not only to land, but also regarding agricultural machinery, and the value of machinery owned is over eight times the sample average. Moreover, three quarters are active

members of a marketing / purchasing agricultural co-operative and the use of both technical assistance and credit for production and marketing is far more widespread in comparison to other clusters. This cluster has the lowest share of female run households – 10%. This cluster has a disproportionately large share of Slovenian households and relatively few from Bulgaria and Poland. Similar to Cluster 2, the main motive in agriculture for this cluster is to generate cash income (Table 9).

Table 9 about here

The poorest cluster (Cluster 3) is the largest (n=530) accounting for 75.6% of the sample. *Undercapitalized and small-scale farms* characterise Cluster 3. Most operate farms of less than 5 ha. As a result this cluster accounts for three quarters of the useable sample but only 46.9% of total cultivated land area. The vast majority farm with household labour only. This cluster has the highest use of manual technology and the lowest mean value for physical assets. It has also the lowest workers to consumers ratio. It is disproportionately weighted to farms from Bulgaria and Romania, the two poorest countries in the sample. On average only 50.8% of output is marketed and over 42% of households are subsistence oriented. Subsistence production is critical to the welfare of members. Incomes from non-agricultural activities are rather modest so that 44.6 and 39.1% classify own production as essential or very important for survival respectively. Just under one-fifth is below the poverty line when subsistence production is excluded. Households in this cluster have poor social capital since only 31.9% are active members of agricultural co-operatives. Differently to the other clusters, only one-tenth are using credit and technical assistance. Their main motive for engaging in agriculture is to provide food for the household.

Cluster 4 operate similar sized farms to those in Cluster 2 (17.1 ha versus 20.8 ha) but with more than two times higher value of agricultural equipment. However, their average income per capita is less than 40% of those recorded by Cluster 2. This is because their engagement in off-farm work is low – on average less than one quarter of total household gainful activity is off-farm. Almost one-half of households in this cluster register no household member in wage employment. This cluster can be characterised as relatively *medium sized farms with significant underemployment*. Age is not a particular barrier to employment – this cluster registers the lowest average age of the head of the household (49). Prior to evaluation of subsistence production, 14.3% can be classified as below the poverty line. A high proportion of farms in this cluster come from Poland and Slovenia, with Bulgaria and Romania underrepresented. Most rate own production as either essential or very important to their survival and their main aim for agricultural production is to generate cash income.

As mentioned previously, within the sustainable livelihoods approach, it is recognised that actors partially shape their livelihoods (Ansoms and McKay, 2010) and that policy should enable households to improve their own well-being (Moser, 2007; DFID, 2000). In this context, policy initiatives promoting pluriactivity and the creation of non-farm businesses could help households to improve their situation. Regarding policy initiatives to improve livelihoods, Table 9 details the percentage of members of each cluster who say that a potential support mechanism would significantly increase their propensity to set up a non-agricultural business. Overall, farmers are most likely to respond to a reduced insurance and tax burden and better law enforcement. Cluster 1 (*relative large, full-time farms*) indicate that they are most likely to respond to the provision of low cost finance. Cluster 3, recording the highest incidence of poverty, report that they are most likely to respond to ‘improved

physical infrastructure', 'better information on business opportunities' and 'access to specific consulting service'. These ratings again underline their fairly poor social capital.

Larsen (2009) suggested that engagement in SSF may act as a basis for adding value through ancillary activities such as agro-tourism, food processing and artisan / craftwork. At present, this is not happening on a wide scale basis in the NMS. Only 6, 13 and 15 sampled households engage in agro-tourism, artisan / craft activities and food processing respectively. The group with the highest incidence of poverty (Cluster 3) possesses the lowest level of engagement in agro-tourism. Involvement in food processing and artisan / craft production is also modest. There may be mismatch between those most equipped to diversify into new business ventures and those most in need of enlarging their income base.

The bottom rows of Table 9 detail the intentions of farmers over a five-year time period. Overall, one-half envisaged no change and this was the most popular response for all clusters. Only 21.9% of households intended to make further commitments to agriculture in the near future, while 26.2% envisaged reducing their involvement in agriculture, principally by transferring to the next generation or scaling down operations. Only 6.6% planned to cease farming altogether. Cluster 2 (*pluriactive farmers*) were most keen on increasing their involvement in agriculture (via intensification and specialization) which is surprising having in mind their successful engagement in off-farm employment. In contrast, Cluster 3 (*undercapitalised, small-scale farms*) was most likely to envisage ceasing farming altogether. However, overall, the majority of households intended to pursue a similar level of agricultural activity in the future and produce a significant share of their own food needs.

6. CONCLUSIONS

The paper contributes to research on farming in the NMS by drawing on the sustainable livelihoods literature and a relatively large and comprehensive dataset of over 1,000 responses. The latter provides detailed information on agricultural households in contrasting rural regions of five countries (Bulgaria, Hungary, Poland, Romania and Slovenia). The sustainable livelihood framework provides a useful approach to discern the different constraints faced by varying groups of farmers and their differing policy needs. The research generates four key conclusions relating to agricultural livelihoods.

First, *subsistence production remains pervasive in the NMS*. Using Wharton's (1970) definition of subsistence farmers as those selling less than 50% of their output, 49.1% of those sampled can be classified as subsistence oriented (Table 2). The prevalence of subsistence production is unlikely to change in the short to medium term – the majority of those sampled envisaged no change in their farming operations in the next five years. Subsistence production should not be seen as merely a transitional phenomenon in Central and Eastern Europe – over twenty years after the downfall of socialist regimes it remains a critical characteristic of agriculture in the NMS. However, there is little evidence that SF / SSF are currently providing a platform for additional value-added activities such as agro-tourism, food processing and artisan / craft activities.

Second, *the contribution of subsistence production to livelihoods is uneven but significant*. The equivalent value of subsistence food production is €4,448 per household, accounting for, on average, 22.6% of the incomes of sampled households (Table 2). For the sample as a whole the valuation of subsistence production pushes 8% of households above the poverty line (equivalent to roughly one half of those classified as poor prior to the valuation of such production). Given the large number of small-scale farms in the NMS, this is an important finding. Estimations of poverty are sensitive to the valuation of non-marketed

production. Behind the above averages, country differences in the role of subsistence farming are significant. This research indicates that the impact of non-marketed production for moving households above the poverty line is strongest in the poorest Member State (Bulgaria).

Third, *subsistence production is most important for the poorest households (Cluster 3).* The poorest households engage in SF as a survival strategy: 80% of respondents in Cluster 3 rated own production as very important or essential for survival. In contrast the respective figure for Cluster 2 was 62%. Those with the most vulnerable livelihoods face a mixture of challenges. Cluster 3 operates scale-scale, undercapitalized farms without substantial non-agricultural earnings. It has the highest mean age of the head of household. These farmers are unlikely to obtain new sources of income and will probably depend increasingly on social safety nets. Overall, they are reluctant, however, to give up farming altogether. The poorest (Clusters 3 and 4) also possess poor social capital.

Finally, *the analysis reveals the on-going distinctiveness of farming in the NMS compared against structures in Western Europe*. Cluster 1 has a mean farm size of 32.6 ha and agricultural equipment worth €124,179. Such farms roughly equate to what would be considered a medium sized family farm in some Western European countries. It is the latter group which is central to the 'European model of farming' and the traditional focus of the CAP (Brookfield and Parsons, 2007). However, Cluster 1 accounts for only 2.9% of the analysed sample. Most agricultural households studied, as well as land cultivated, do not fit with notions of what constitutes a typical family farm in Western Europe. While Cluster 3 accounts for the majority of those sampled, due to the relatively small size of the farms, such households are not the main beneficiaries of CAP direct payments (Davidova, 2011), which, for the most part, in the NMS are currently paid on a simple per hectare basis. While a central objective of the CAP remains to ensure a 'fair standard of living for the agricultural

community' (European Commission, 2009), current policy is unsuited for the large subsistence and semi-subsistence sector in the NMS. It is likely that farmers in Cluster 3 require a different set of non-standard measures targeted at their differing needs. This is likely to involve decreasing the costs to access information and improving social capital in rural areas, special development projects, sources of micro / low cost finance, and improved synergies between agricultural, regional and social welfare policies.

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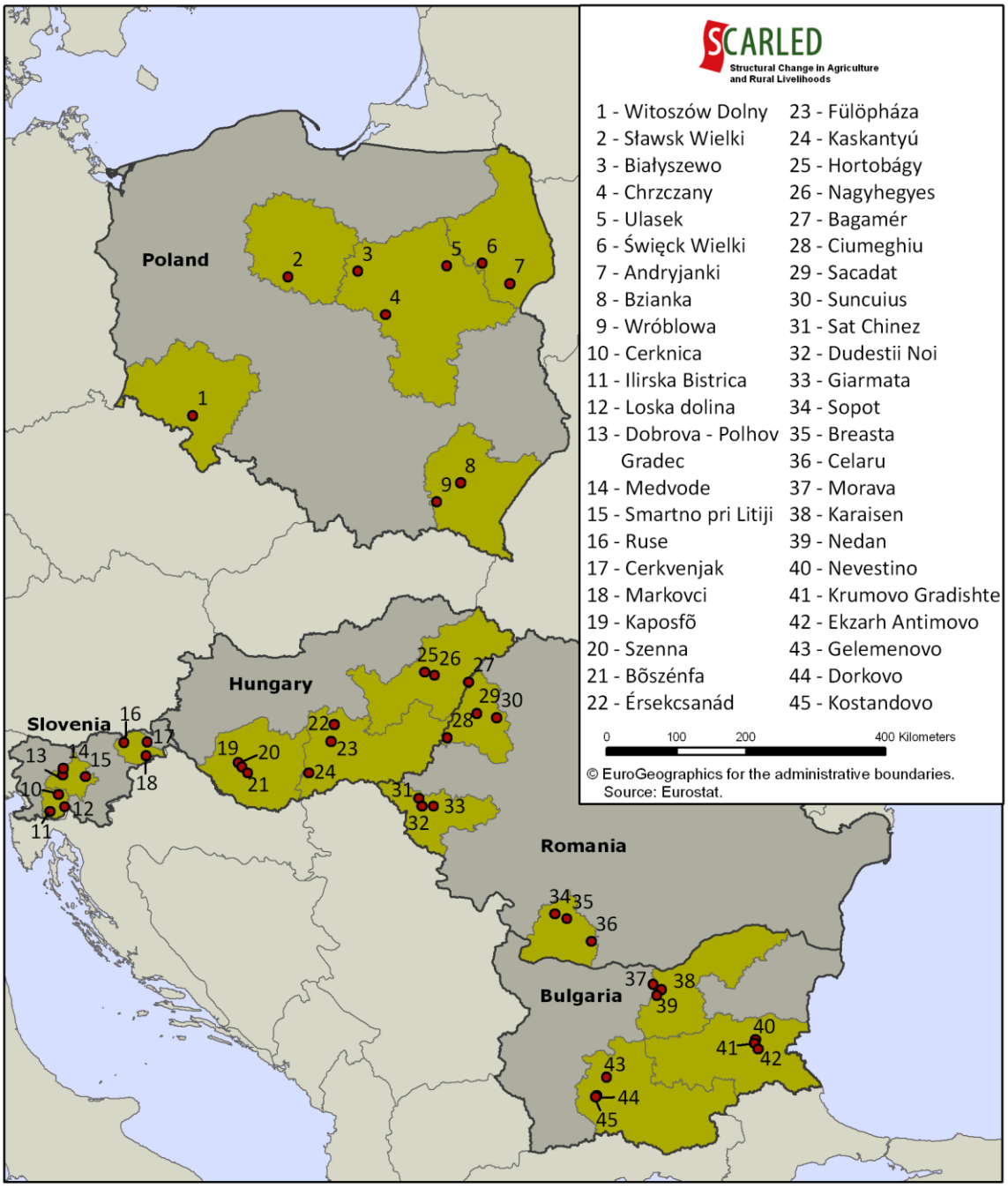
Figure 1: Location of survey villages and regions



Source: Baum (2008)

Table 1: Prevalence of Subsistence and Semi-Subsistence Farming in the EU by different criteria (Year 2007)

	EU15			NMS-12			EU-27		
	Number	% of total No of farms	% of UAA	Number	% of total No of farms	% of UAA	Number	% of total No of farms	% of UAA
Smaller than 5 ha	3,087,110	54.5	4.4	6,557,740	81.6	18.5	9,644,850	70.4	8.4
Smaller than 8 ESU*	3,427,010	60.5	14.7	7,677,200	95.5	42.9	11,104,210	81.1	22.5
Less than 50% of output sold**	588,010	16.4	2.8	5,300,410	65.9	21.5	5,888,420	43.0	12.8

Source: Eurostat (2009a; 2009b)

* No data available for farms <2ESU for The Netherlands. This means that this figure is likely to be somewhat understated.
** For EU-15 data only available for Greece, Italy and Spain; thus aggregate for EU-27 is here NMS-12 plus EU-3.

Table 2: Descriptive statistics for the merged sample for the five analysed countries (2006)

	Min	Max	Mean	Std. Dev.
Age of household head (HH) (years)	18	91	54.31	13.141
Time spent on-farm by HH (%)	0	100	74.25	35.995
Time spent on non-farm wage employment by HH (%)	0	100	18.82	32.144
Total number of household members	1	9	3.48	1.580
Total cultivated land area (ha)[1]	0	132	7.81	12.151
Distance to most distant plot (km)	0	80	3.75	5.400
Distance to nearest urban centre (km)	4	78	23.68	18.740
Total value of production (PPP€)	70	215 707	14 374	22030.077
Total value of sales (PPP€)	0	215 707	9 926	18668.749
Total value of subsistence production (PPP€)	0	209 478	4 448	8932.772
Total cash income (PPP€)	0	119 337	17 000	15500.275
Equivalised income per capita (PPP€) without subsistence production	0	52 264	7 910	6887.373
Equivalised income per capita incl. subsistence production (PPP€)	183	68 627	9 962	7860.460
Value of agricultural equipment (PPP€)	0	680 343	15 691	36019.557
Share of sales in output (%)	0	100	50.71	32.726
Share of food consumption from own production (%)	0	100	44.45	26.569
Subsistence production contribution to total income (%)	0	100	22.56	18.573

[1] The case of 0 area cultivated is explained by the situation where the household only keeps livestock and does not cultivate crops.

[2] PPP€ stands for Purchasing Power Parities in Euros. All monetary values have been converted from national currencies to PPP€ by applying Eurostat currency conversion rates for 2006.

Table 3: Household distribution by country (%)

	Poverty line excluding subsistence production		Poverty line including subsistence production	
	Below	**Above**	**Below**	**Above**
Bulgaria	26.6	73.4	8.9	91.1
Hungary	11.5	88.5	9.1	90.9
Poland	9.5	90.5	2.0	98.0
Romania	5.2	94.8	1.6	98.4
Slovenia	24.6	75.4	15.8	84.2
Sample total	*15.1*	*84.9*	*7.0*	*93.0*

Table 4: Comparison of households below, above and shifted above the poverty line by the valuation of subsistence production, sample merged for the five countries (ANOVA analysis)

	Below poverty line N = 71	**Above poverty line** N = 859	**Shifted above poverty line** N = 82	**Total** N = 1012	**F-value**	**Sig.**	
Age of household head (HH) (years)	55.42	54.28	53.67	54.31	0.353	0.703	
Education level of HH[1]	2.75	3.22	3.04	3.17	11.053	0.000	***
Time spent on-farm by HH (%)	81.52	72.54	85.88	74.25	6.779	0.001	***
Time spent on non-farm wage employment by HH (%)	12.32	20.17	10.27	18.82	5.156	0.006	***
Total number of household members	3.82	3.42	3.74	3.48	3.361	0.035	**
Equivalised household size	2.32	2.13	2.26	2.15	3.473	0.031	**
Total cultivated land area (ha)	4.39	8.34	5.18	7.81	5.617	0.004	***
Distance to most distant plot (km)	2.33	3.91	3.30	3.75	3.123	0.044	**
Distance to biggest plot (km)	1.83	2.55	1.53	2.41	4.743	0.009	***
Size of biggest plot (ha)	1.52	2.90	1.71	2.71	4.650	0.010	***
Share of sales in output (%)	39.68	53.29	33.28	50.71	18.990	0.000	***
Share of food consumption from own production (%)	46.76	43.72	50.12	44.45	2.349	0.096	*
Subsistence production contribution to total income (%)	24.35	20.36	44.08	22.56	69.763	0.000	***
Total value of production (PPP€)	6227	15253	12221	14374	5.990	0.003	***
Total value of sales (PPP€)	4693	10879	4475	9926	7.500	0.001	***
Total value of subsistence production (PPP€)	1534	4374	7745	4448	9.553	0.000	***
Value of agricultural equipment (PPP€)	7594	17135	9472	15691	2.740	0.065	*
Distance to nearest urban centre (km)	20.68	23.45	28.68	23.68	3.922 $X^{2??}$	0.020	**
HH female (%)	11.7	78.9	9.4	16.2	7.242	0.027	**
HH male (%)	6.2	85.9	7.9	83.8			

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level

[1] Five education levels were recorded: 1 no schooling, 2 primary school, 3 middle school, 4 high school and 5 university degree.

Table 5: Cluster Analysis – Cluster profiling variables

	Cluster				
	1 n = 20	**2** n = 61	**3** n = 530	**4** n=90	**Mean** N=701
Financial Capital					
Total cash income (PPP€)	46551	51958	13481	21759	18840
Income per capita excl. subsistence production (PPP€)	17045	23387	6244	9247	8431
Income per capita incl. subsistence production (PPP€)	21300	27208	8158	12700	10776
Human Capital					
Age of head of the household	51	52	54	49	53
Household off-farm work, time allocation (%)	28.6	41.3	35.7	22.8	34.3
Natural Capital					
Cultivated land area (ha)	32.58	20.80	5.80	17.07	9.33
Land area owned (ha)	22.32	11.40	5.15	14.20	7.36
Financial Capital					
Value of agricultural equipment (PPP€)	124179	17071	5635	39728	14426
Social Capital					
Active membership of co-op (%)	75.0	50.8	31.9	44.0	36.3
Distance to nearest urban centre (km)	13.1	15.5	13.4	15.0	13.8
Distance to nearest urban centre (hrs)	0.29	0.30	0.26	0.30	0.27

Table 6: Continuous variables for cluster validation

	Cluster						
	1	**2**	**3**	**4**	**Mean**	**F-test**	**Sig**
	n=20	n=61	n=530	n=90	n=701		
Size of biggest plot (ha)	6.6	6.9	2.4	4.2	3.1	17.6	***
Subsistence production contribution to total income (%)	20.3	11.9	23.2	25.9	22.5	8.6	***
Education level of HH	2.9	3.4	3.3	3.3	3.3	1.8	
Number of household members	5.1	3.9	3.6	4.3	3.7	10.5	***
Share of sales in output (%)	73.1	77.0	50.8	66.5	55.8	20.3	***
Share of food consumption from own production (%)	44.6	35.3	43.2	35.8	41.6	3.0	**
Total value of production (PPP€)	57928	42678	11217	33490	18169	87.0	***
Total value of sales (PPP€)	45094	33881	7006	25301	12798	84.7	***
Total value of subsistence production (PPP€)	12834	8797	4212	8190	5371	10.3	***
Workers to consumers ratio	.70	.73	.65	.68	.67	1.3	

*** Significant at the 1% level, ** Significant at 5% level

Table 7: Binary variables for cluster validation, (share of cluster membership, %)

	Cluster membership				
	1 n=20	**2 n=61**	**3 n=530**	**4** n = 90	**Mean n=701**
Below poverty line					
- Excluding subsistence production	5.0	0.0	19.2	14.3	16.5
- Including subsistence production	0.0	0.0	7.9	5.5	6.7
Pushed above poverty line when including subsistence production	5.0	0.0	11.3	8.8	9.8
Household Characteristics					
% HH is female	10.0	18.0	14.5	13.2	14.5
No household member self-employed	70.0	83.6	93.6	85.7	91.0
No household member in wage employment	36.8	38.3	38.9	48.3	40.0
Income from agro-tourism	5.0	1.6	0.4	2.2	0.6
Household member engaged in artisan / crafts	0.0	6.6	1.7	3.3	1.7
Household member engaged in food processing	0.0	1.6	1.9	4.4	1.8
Farming with household labour only	75.0	75.4	85.3	83.5	83.9
Use of credit and technical assistance					
Used credit for production and marketing	45.0	19.7	9.0	20.2	12.4
Technical assistance used	50.0	26.7	9.5	29.2	14.7
Main farming technology					
- Own agricultural machinery	95.0	78.7	52.4	96.6	61.6
- Other peoples' agricultural machinery	0.0	13.1	15.4	2.3	13.0
- Manually	5.0	4.9	19.4	0.0	15.2
Orientation					
- Commercial	100.0	86.9	57.5	81.3	64.3
- Subsistence	0.0	13.1	42.5	18.7	35.7
Self-assessment of level of income					
- Not enough for food and housing	5.0	9.8	23.0	4.4	19.0
- Enough for food and housing only	30.0	27.9	41.5	33.3	38.9
- Enough for food and housing and to cover some extra needs	50.0	50.8	31.4	50.0	36.1
- Sufficient to cover a wide range of needs and live comfortably	15.0	11.5	4.0	12.2	6.0
Importance of contribution of own production to household welfare					
- Not important	16.7	38.3	16.3	33.3	20.5
- Very important	77.8	48.3	39.1	37.8	40.8
- Essential for survival	5.6	13.3	44.6	28.9	38.7

Table 8: Cluster membership by country (%)* and contribution of total production

	Cluster membership				Total
	1 n = 20	**2** n = 61	**3** n = 530	**4** n=90	
Country membership within clusters					
Bulgaria	0.9	7.5	88.7	2.8	100
Hungary	2.5	13.6	65.4	18.5	100
Poland	0.9	4.4	76.7	18.1	100
Romania	2.3	9.1	81.8	6.8	100
Slovenia	9.5	14.6	56.9	19.0	100
Cluster total:	2.8	8.7	75.5	13.0	100
Share of aggregated sample values					
Cultivated land area	9.9	19.4	46.9	23.7	100
Value of production (PPP€)	9.1	20.4	46.6	23.9	100
Value of agricultural equipment (PPP€)	24.5	10.3	29.5	35.7	100

Table 9: Objective for agricultural production, favourability of potential policy initiatives and intentions for the period 2006-2011 by cluster (% of cluster total)

	Cluster membership				
	1 n = 20	**2** n = 61	**3** n = 530	**4** n = 90	**Sample Mean**
Aims for agricultural production (1=totally disagree, 5 = total agree)					
To provide food for the household	3.60	3.67	4.15	3.64	4.03
To generate cash income	4.65	4.52	3.50	4.04	3.69
To enjoy farming	4.00	4.02	3.34	3.65	3.46
To transfer to the next generation	3.85	3.74	3.08	3.66	3.24
To provide work for household members	3.50	2.97	3.23	3.73	3.28
Policy Initiatives					
% replying that measure would significantly increase likelihood of setting up new non-agricultural business					
Better information on business opportunities	20.0	21.3	28.9	24.2	26.9
Access to specific consulting service	20.0	23.0	27.4	25.3	25.9
Access to low cost finance	35.0	34.4	33.0	27.5	29.5
Improved physical infrastructure	5.0	23.0	27.5	25.3	25.5
Special development projects	30.0	32.8	34.0	38.5	32.3
Reduced insurance and tax burden	35.0	37.7	41.9	39.6	39.3
Better law enforcement	30.0	36.1	33.8	35.2	34.4
Intentions for 2006-2011					
Objectives committing to farming					
- To increase the share of sales	10.0	4.9	5.5	8.8	6.0
- Intensify farming (increase labour/resource input)	10.0	26.2	9.4	19.8	12.3
- Specialise farming	15.0	6.6	2.6	4.4	3.6
Category total	*35.0*	*37.7*	*17.5*	*33.0*	*21.9*
Objectives to decrease farming					
- To cease farming	0.0	0.0	7.7	5.5	6.6
- To scale down farming	0.0	1.6	7.7	7.7	7.0
- To retire	0.0	3.3	2.6	1.1	2.4
- To transfer to the next generation	30.0	11.5	8.7	5.5	9.1
- Decrease farming intensity (decrease labour/resource input)	0.0	0.0	1.3	1.1	1.1
- *Category total*	*30.0*	*16.4*	*28.0*	*20.9*	*26.2*
No answer	0.0	0.0	1.9	0.0	1.4
No change	35.0	45.9	52.5	46.2	50.6