Deliverable n.5.2

WP5: Chain Effects

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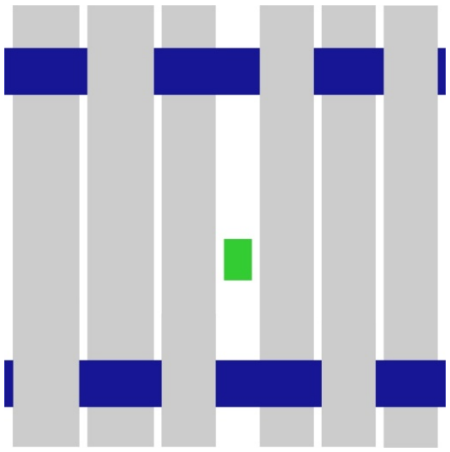

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Chapter 1: Introduction

This Deliverable reports the findings from Work Package 5 (WP5) of the CAP-IRE project on the links between farm households and the wider economy, or "chain effects".

Farm households do not operate in isolation, but rather have economic (and social) relations with a range of different actors in the economy. The overall objective of the work package is to understand a) the extent to which farm households are integrated in their local economies, and b) the role of the CAP in maintaining and/or influencing these linkages. The work package thus complements research in WP6 and WP7 of the CAP-IRE project on the relationships between the CAP and environmental and social sustainability respectively.

A traditional argument connected to the CAP is that, by supporting agriculture, the CAP is helping to maintain the economic vitality rural communities, particularly in disadvantaged regions where alternative income opportunities are limited. Through buying inputs, using local labour and through the supply of output to downstream customers and processors, farm households support employment and generate income in the local rural economy. However, the types of linkages between farm households and the broader economy are not completely captured by analysis of agri-food systems alone. Instead, through farm diversification, farm household consumption and off-farm work, other linkages exist. For example, pluriactivity is clearly an important strategy for many farm households. Moreover, the nature of rural economies themselves are changing, with more dependence on non-traditional sources of income. The research conducted as part of WP5 thus adopts a broad theoretical and conceptual framework for understanding the chain effects that exist between farm households and rural economies, and the role that CAP plays within this framework.

Building on the findings from Survey A of the project (Raggi *et al*., 2010), research is based on a mixed methods approach (see Chapter 2). Having reviewed some of the findings from Suvery A (Chapter 3), SAM-based modelling is used to explore the contemporary nature and strength of linkages between farm households and the regional economy in which they are situated. Empirical findings focus on one particular CAP-IRE case study area (CSA) – North East Scotland in the UK. This approach allows assessment of the dependence of the regional economy on farm households, and, using scenarios developed as part of WP8, the economic impact of CAP policy reform. Results from the SAM analysis are presented in Chapter 4.

Second, statistical analysis of the spatial pattern of direct links between farm households and other economic agents (input suppliers, purchasers of farm output, off-farm work) is used to assess the nature and strength of local linkages. This explores, amongst other things, whether there are systematic differences in the degree of local integration by farm type or according to farmer and farm household characteristics. The analysis explores the extent to which income and employment effects associated with farm households are retained within localities, and explores differences in the degree of local integration across CSAs. The results are presented in Chapter 5.

Finally, Chapter 6 provides a summary of key findings from the research and also considers the implications in relation to future CAP reform.

Chapter 2: Research Methods

2.1 Overview of the research approach and the link to WP5 objectives

As discussed in Deliverable 4.1 (Roberts and Liu, 2009), a number of different methods have been used to explore the linkages between agriculture and the wider rural economy. The types of linkages and spatial scale of analysis vary between methods. Moreover, each approach has different strengths and weaknesses in relation to the reliability, clarity, and transparency of results. Based on the background analysis and the objectives of the project, a multi-method approach was adopted for WP5 of the CAP-IRE project. In particular, analysis of chain effects was based on a combination of:

- descriptive analysis of the responses to specific (chain-related) questions from Survey A of the project,
- a SAM analysis of a CAP-IRE CSA involving both multiplier analysis and policy simulations, and
- an econometric analysis of the direct links between farm households and other economic agents (input suppliers, purchasers of farm output, off farm work, household expenditures etc.) in the local economy, henceforth referred to as "spatial tracking" analysis.

The analysis of Survey A responses, across all eleven CAP-IRE CSAs, provides a general context for subsequent in-depth analysis of chain effects, while the SAM and spatial tracking analysis each address specific objectives of the Work package (see Table 2.1). Importantly, as indicated in the Table, the two methods focus on different spatial scales: the SAM analysis considers linkages between the farm sector and other sectors and actors at the regional level, while the spatial tracking analysis considers the extent to which farm households are integrated within their particular local economy. While the policy simulations in WP5 are incorporated in the SAM-model, the findings from the spatial tracking analysis are clearly of policy relevance, as will be discussed in Chapters 5 and 6.

Table 2.1 Link between in-depth methods and objectives of WP5

	In-depth Approach	
Specific Objectives	SAM analysis (Regional level)	Spatial tracking analysis (Local level)
1. to analyse the nature and extent of integration of farm-related activities within rural economies.	X	X
2. to analyse the dependence of rural areas on agriculture and farm households.	X	
3. to identify trends in the agri-food chain and related sectors.		X
4. to assess the ***impact of the CAP on linkages*** between farming and the wider economy.	X	

2.2 SAM Leontief model

2.2.1 Outline of model

There are many descriptions of the basic Leontief model (see for, example, Miller and Blair, 2009). This section therefore restricts itself to a brief summary of the model, focusing on the particular application of the model presented in Chapter 4.

As the name implies, the SAM Leontief model is based on a Social Accounting Matrix (SAM) database which gives a complete, consistent and comprehensive picture of how all the various actors in an economy interact at a certain point in time (normally a year). Each account in the matrix is represented by both a row and a column where a single entry in the matrix, r_{ij}, represents an expenditure item of account j and income receipt of account i. SAMs are similar to input-output tables except that the latter only include detailed information on interactions within the production sphere of the economy, while a SAM extends the focus to the full circular flow of income around the economy - typically including, in addition to the production accounts, accounts for factors, households and government (together labelled "institutional accounts"), capital, and the "rest of world".

Assuming that some accounts (typically the activity (y_1), commodity(y_2), factor (y_3), and household accounts(y_4)) are endogenously determined, while the remaining accounts (y_5) are exogenous, the basic row accounting balances implied in a SAM can be written as:

$$\begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix} = \begin{bmatrix} 0 & K & 0 & 0 \\ A & 0 & 0 & C \\ V & 0 & 0 & 0 \\ 0 & 0 & Y & 0 \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix} + \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$$

$$y_5 = Ry_1 + Dy_2 + Fy_3 + Sy_4 + x_5$$

where, with m activities, n commodities, f factors, k endogenous institutions and q exogenous accounts, *A* is a (nxm) matrix of input-output coefficients; *K* a (mxn) matrix of commodity supply coefficients; *V* a (nxf) matrix of value added coefficients, *C* a (nxk) matrix of current account expenditure coefficients, and *Y* a (kxf) matrix of coefficients reflecting how factor income is distributed between institutional categories. In the exogenous account balance, the matrices R, D, F and S represent leakages from each set of endogenous accounts to outside the system.

Simplifying, the endogenous accounting balance can be written as

$$y = By + x$$

where y is a column vector of endogenous account totals, B a normalised transactions coefficients matrix (derived by dividing the elements in the SAM by the column total in which they occur), and x a column vector showing flows from the endogenous accounts to the combined exogenous account. Assuming that matrix B has constant elements (that is, that the average expenditure propensities elicited from the SAM equal the marginal propensities of each account), one can solve for the aggregate multipliers from the system by a simple inversion process:

$$y = (I - B)^{-1}x$$

$y = Mx$

Multiplier analysis

The multiplier matrix, M, captures the whole range of relationships in the system. It is therefore useful to decompose the aggregate multiplier matrix, M, to elicit the relative importance of the various different types of linkages and interdependencies that exist using the inverse of a partitioned matrix (Pyatt and Round, 1979). For example, the composition of output multipliers from the SAM model can be contrasted to the composition of multipliers from an input output model (Roberts, 1995). In this case, the extra feedback effects in the SAM multipliers measure the importance of relationships within the income distribution in the economy and the structure of production. This will be more important in economies where the pattern of factor ownership varies significantly between sectors.

The extent to which the model reveals insights into the structure of the economy and key linkages therein depends on the level of disaggregation of the SAM. The CAP-IRE SAM developed as part of WP5 was designed to emphasise the non-traditional linkages of farms and farm households associated with on-farm diversification, off-farm employment and farm household expenditure, as well as the traditional linkages associated with agricultural production activities. Therefore, the multiplier analysis can focus on the comparison of linkages by farm type and household type as well as looking at the sector as a whole. Further, given the objective of CAP-IRE project of assessing the extent to which farm households have impacts that cross the rural-urban divide, the CAP-IRE SAM has been constructed on a bi-regional basis, thus allowing decomposition of multipliers on a spatial basis. In particular, the impact of an increase in exogenous demand for output from a rural sector (e.g. agriculture) on the sectors in the urban region can be assessed, as can the impact of an exogenous change in demand for output on an urban sector for the rural economy (or for an individual sector within the rural area, such as agriculture). Again, because of the extra feedback effects incorporated in a SAM as compared to an input-output model, the results

reflect not only linkages within the production sphere of the economy but also the importance of linkages associated with factor distribution and the ownership of factor services. The results from such analysis are included in Chapter 4.

Through the analysis of multipliers and through multiplier decomposition, it is possible to assess key sectors in an economy. In relation specifically to the objectives of CAP-IRE, the multipliers will reveal both the dependence of a regional economy on the farm sector and farm households and, *vice versa*, the extent to which the farm sector and farm households are dependent on the regional economy. Subject to appropriate disaggregation of accounts, it shows which farm types have the strongest linkages within the region and the extent to which farm household linkages create spillover effects across rural-urban space.

Policy impact analysis

The SAM Leontief model can also be used to assess the impact of specific policy scenarios. Given the strong underlying assumptions in Leontief models (in particular, fixed relative prices, no supply-side constraints) the results from such models are typically interpreted as providing upper-bound estimates of the impacts arising from a specific policy shock. In this case, four policy scenarios are investigated based on the scenarios developed as part of WP8. These are:

Baseline scenario	-	The CAP continues in current form
No-CAP scenario	-	The CAP is completely abolished
Regionalisation scenario	-	The CAP budget is reduced by 50% from current levels; relative importance of Pillar 1 and Pillar 2 remains as in baseline.
Environment scenario	-	The CAP budget is reduced by 50% from current levels; all Pillar 1 funding switches to Pillar 2

A key issue in SAM Leontief modelling policy analysis is how to implement policy shocks into the model. The way in which they are implemented in this case is described in detail in Chapter 4 but, importantly, it draws on responses from Survey A to the two policy scenarios (baseline and No CAP). Therefore, this part of WP5 makes use of not only research from WP8 but also the common survey instrument used across the full project.

2.2.2 Choice of study area

The application of SAM methods was originally proposed for three of the CAP-IRE CSAs but this was not carried out due to data limitations. Instead, the SAM analysis focused on the North East Scotland case study area (which is both a NUTS 2 and 3 region, UKM50). The region has a single large urban centre (Aberdeen) which dominates the regional economy, and this facilitated the rural-urban presentation of the SAM.

While agriculture is not very important (as in most UK regions) in terms of standard indicators, the region provides a disproportionate amount of total Scottish farm output and has a traditionally strong food processing sector. A general description of the CSA region is provided in Entwistle (2007) while further information is provided in Chapters 4 and 5 of this report.

2.2.3 Construction process

The various steps involved in the construction of the North East Scotland SAM are shown in Figure 2.1:

Figure 2.1 Stages in the SAM construction process

The process is extremely data-demanding, and depends, in the first instance, on the availability of recent national input-output tables and sectoral level employment data which can be used to "regionalise" the input-output table and convert the account information onto a rural-urban basis. In this case, the 2004 Scottish input-output tables were the most recent available at time of construction. These included a combined use matrix with 126 industries and commodities distinguished (Scottish Government, 2009). To avoid disclosure issues, a full supply or "make" matrix is not published, even at national level. However, an aggregate supply matrix showing the production of 11 industries and commodities is released, along with detailed percentage market share and percentage secondary production information at the 126 sector/commodity level to guide the construction process. Using the information contained in these tables, in conjunction with data on employment from the Annual Business Inquiry workplace analysis, a balanced regional input-output table was produced for the North East Scotland region for calendar year 2005 (the base year of the SAM). The assumptions used in the regionalisation process were as follows:

- Financial Intermediation Services Indirectly Measured (FISIM) accrues to individual sectors in proportion to their expenditure on Finance and business inputs.
- Productivity per employee is the same in the region as at national level
- Product mix of regional industries is the same as at national level
- Production technology of regional industries is the same as at national level
- Income levels per household and expenditure patterns is the same as at national level

- Proportion of commodities purchased by Government, constituting GCFC, is the same as at national level

Drawing on these assumptions, location quotients were used to adjust the use and final expenditure coefficients, while exports were calculated residually.

One of the distinguishing features of the CAP-IRE SAM is the fact that it distinguishes between rural and urban industries and households. The "spatial disaggregation" step of the construction process shown in Figure 2.1 involved splitting these two sets of accounts so as to differentiate sectors according to where they operate and households according to where they live. In particular, the activity accounts were split using intra-area employment data (implicitly assuming that the same technology is used and the same productivity achieved across both sub-areas). Similarly, the split of household accounts was based simply on the number of households in each area (assuming the same income, expenditure and sourcing patterns of households regardless of whether they live in the rural or urban part of the region). The agriculture sector was disaggregated into farm types based on secondary data sources (in particular the Farm Accounts Survey and sector-specific reports). In addition, secondary and survey information was used to complete the entries of those accounts only partially articulated within input-output tables (e.g. the factor, household and government accounts) thereby moving the tables into the required (symmetric) SAM format.

Having generated an initial bi-regional SAM for the North East Scotland economy, the next step in the construction process involved the "superiorisation" of the entries in the matrix based on the findings from the survey of agri-businesses (see below). In other words, mechanical estimates in the tables were replaced with survey-based estimates where the latter were considered to be more accurate. Particular attention was paid during this process to the relative strength of assumptions used in the mechanical process as well as the accuracy of survey findings. Finally, the SAM was balanced using cross-entropy methods (Robinson *et al*., 2000). Throughout the process, the choice of sectors, commodities, household and factors separately distinguished in the matrix was guided both by the desire to keep distinct in the matrix those sectors important in terms of employment, output, and level of integration within the economy as well as the requirements of the CAP-IRE analysis and model simulations.

Chapter 4 provides full details the final structure of the North East Scotland SAM as well as reporting performance indicators generated from the SAM, and the results from the multiplier and policy analysis.

2.3 Spatial tracking analysis

2.3.1 Theoretical background

As explained in Deliverable 4.1, the purpose of the spatial tracking analysis is to provide some understanding of the extent to which farm households are integrated into their immediate surrounding economy. The focus is therefore at the local level as opposed to the regional-level focus of the SAM analysis. The aim is to ascertain whether there are systematic differences in the patterns of direct linkages by farm, farmer and farm household characteristics, how these vary according to local context, and how these linkages have changed over time. Although the focus in this case is on first-stage linkages only, the

literature confirms that direct linkages are by far the most important in terms of economic integration of a business or sector (Miller and Blair, 2009). Further, the analysis will indicate the extent to which income and employment effects associated with farm households are retained within a particular locality.

Theory suggests that farm purchasing and output sales patterns are influenced by farm and farmer characteristics. It suggests, amongst other things, that larger farms will be more likely to bypass local input suppliers in order to take advantages of economies of scale. They are also more likely to bypass local marketing outlets and supply large-scale buyers. Farmer characteristics thought to influence purchasing and sales patterns are age, education and experience. Deliverable 4.1 also highlighted how community attachments and business structure (such as whether it is locally owned, or part of a cooperative) may influence the degree of local purchasing and sales patterns through both loyalty factors and the equity investment of owners/cooperative members.

In terms of diversification and off-farm work, a number of different internal influences on farm households' decisions have been identified including size of holding, farm type, land quality, the age and number of family members, the stage in the family life cycle and educational background. However, all of these, and the effects influencing input purchasing and output sales, will be mediated by the economic structure and geographical characteristics of the local economy. Therefore, how the local economy is defined is of vital importance to the spatial tracking analysis.

2.3.2 Defining "local"

Several different approaches have been taken to define "local" in the context of first-stage economic linkages. For example, Chism and Levins (1994) define local on the basis of a set distance from a particular town, while other authors have used administrative boundaries to define what are recorded as local or non-local transactions. As Lambert *et al*. (2009) note, administrative boundaries and functional boundaries (such as travel-to-work areas or retail market areas) usually have little or no correspondence with one another, while simple distance-based measures of locality ignore the structural characteristics of the region. For example, a farmer may buy fertilizer from the local supplier but that supplier may be based in a different administrative area and/or may be quite some distance from the farm simply due to market concentration or geographic barriers.

The definition of local used in the WP5 corrects to some extent for these issues by defining local as being within market reach of the nearest local major town. This is the USDA convention used in their analysis of ARMS data (USDA, 2008). In particular, the distance over which each transaction relating to a particular farm households takes place is compared to the distance of that household to the nearest settlement with a certain minimum population. If the transaction takes place within the reach of the nearest settlement, it is classified as local, while if it takes place at a distance further than the nearest settlement, it is classified as non-local.

2.3.3 Econometric analysis and study areas

Descriptive statistical analyses, including multinomial probit regressions, are used to test whether, as hypothesised, there are systematic differences in the local linkages of farm households dependent on their farm characteristics (size type, legal status, etc), farm household characteristics (age, educational background, gender, community attachment, etc), or the characteristics of the particular case study area.

As described further below, four CSAs were involved in this part of the WP5 analysis – North East Scotland (UK), Podlaskie (PL), the Centre region (FR) and Midi Pyrénées (FR). These study areas provide a good contrast in terms of the types of farming in each region, dependence on CAP support, and economic geographies. Chapter 5 provides a more extended comparison of the four CSAs before moving on to report the results from the analysis.

2.4 Data collection

The SAM analysis and linkage analysis used in WP5 were supported by three surveys, two of farm households, one of agri-businesses. In addition, the construction of the SAM drew heavily on secondary data sources. Figure 2.2 summarises how the surveys were used within WP5. Importantly, as well as informing the policy analysis with the SAM model, Survey A provided background context on the importance of chain effects as reported in the following chapter. The following sections describe the data collection process involved with the spatial tracking and agribusiness survey while Survey A is described in Deliverable 2.13-23.

Figure 2.2: Methods and data sources.

2.4.1 Agribusiness Survey

A survey of agri-businesses operating in the NE Scotland CSA (UK) was conducted February 2010. The purpose of the survey was to obtain economic data for use in the superiorisation

stage of SAM construction (see above) and qualitative information on changes and trends across the sector and region. The latter were valuable in interpreting the findings from the spatial tracking survey and are thus discussed further in Chapter 5.

A sample of 10 agri-businesses respondents drawn from a list of the principal agri-businesses operating in the North East of Scotland was drawn from across the major sectors of the agri-business industry to represent:

- Cereals & OSR trading – representing approximately 31% of agricultural output in the NE in 2007.
- Beef & Sheep processing – representing approximately 27% of agricultural output in the NE in 2007
- Pigs & Poultry processing and marketing – representing approximately 19% of agricultural output in the NE in 2007
- Potato trading – seed potatoes – representing approximately 15% of agricultural output in the NE in 2007
- Agricultural machinery manufacturers and dealers
- Animal feed manufacturers
- Agricultural merchants

Businesses were contacted by telephone after an initial letter of introduction from Aberdeen University setting out the objectives of the survey. Eight of the businesses agreed to participate in the survey. Once agreement to participate was confirmed, a personal interview arranged which provided high-quality data with significant time inputs from senior management. A copy of the questionnaire used is available from the authors on request.

2.4.2 Spatial tracking survey

The Spatial Tracking Survey was conducted in two CSAs, North East Scotland and Podlaskie, Poland. As in the case of Survey A, the sampling frame for the Spatial Tracking Survey was based on recipients of the Single Farm Payment (SFP). While in North East Scotland the Spatial Tracking Survey was conducted on a different sample of farm households to those included in Survey A (so as to avoid survey fatigue), in the Podlaskie study area the survey was done on the same sample of farm households as in Survey A. This means that, in principle, it would be possible to relate responses to the policy scenarios directly to responses from the spatial tracking survey although, at this stage, this has not been done.

The full spatial tracking questionnaire is available from the authors on request. In brief, it had nine sections covering the following areas.

- Preliminary information;
- Individual/household characteristics;
- Holding details;
- Output;
- On-farm diversification;
- Labour;
- Inputs;

- Off farm work;
- Open questions

The questions were primarily closed questions, with the exception of the final section.

In the Centre and Midi Pyrénées CSAs (FR1 and FR2), the following additional spatial tracking questions were asked as part of Survey A:

About how far is it from your home to ... (km)

a) Where you do most of your shopping for groceries, clothes, household supplies, etc.?
b) Where you buy most major household items like furniture, and household appliances?
c) Where you buy most farm fertilizers and chemicals?
d) Where you buy most farm machinery and implements?
e) Where you obtain most of your farm credit?
f) Where you do most of your other farm-related business and purchasing? (seed, feed, parts, supplies, fuel, etc)
g) Where the purchaser of your major product is based?
h) Your local elementary school?
i) Your local high school?
j) The nearest hospital?
k) The nearest town (>3,000 inhabitants)?
l) The nearest city (>50,000 inhabitants)?

The final sample sizes for each study area are shown in Table 2.2.

Table 2.2 Spatial Tracking Analysis Sample Sizes

Country	**Region**	**No.**	**Technique**
United Kingdom	North East Scotland	225	Telephone
Poland	Podlaskie	246	Face to Face
France	Centre	140	Face to Face
France	Midi-Pyrénées	155	Face to Face

In the UK study area, approximately 400 farm businesses were phoned in relation to the survey. Of these, approximately 25% could not be reached despite repeated calls at various times of the day. Of those contacted – representing approximately 300 farming business – approximately 75% willingly participated in the survey while around 25% refused to participate due to a variety of reasons, including pressure of work, survey fatigue, and an unwillingness to share information.

Secondary data for the spatial tracking analysis is drawn from the CSA descriptions and official websites such as Eurostat. Such data includes the number and size distribution of farms in each area, the number of local agribusinesses and how this has changed over the last few decades, the urban structure of the region, unemployment rates in the areas, economic structure etc. These values provide context variables required in the analysis, in some instances to aggregate the findings up to regional level and more generally to help explain the differences that emerge between the CSAs.

2.5 Summary

This chapter builds on Deliverable 4.1 (Roberts and Liu, 2009) by describing the various methods used to investigate chain effects within the CAP-IRE project. In addition to analysis of responses to chain-related questions in Survey A, two in-depth analyses were conducted: a SAM-based analysis of North East Scotland and an analysis of the linkages between farm households and their locality, conducted in four CSAs : North East Scotland, Podlaskie in Poland, the Centre Region, France and Midi Pyrénées, France. The chapter also describes data collection processes and how the various methods and surveys involved in WP5 inter-relate. The chapter has thus provided the basis from which results can now be presented.

Chapter 3: Chain-related findings from Survey A.

3.1 Introduction

Survey A is the principal survey for the CAP-IRE project as a whole and is used by all the work packages. Survey A collected information on a large number of different household and farm characteristics, as well as the stated behaviour of respondents to two contrasting policy scenarios. This chapter focuses on some of the findings from Survey A that relate particularly to the aims of WP5. These provided contextual information for the SAM-based analysis of the North East Scotland CSA and the spatial tracking analysis of the Polish, UK and French study areas. The responses also provided information for the SAM policy impact analysis which is described in Chapter 4 below. More broadly, the Survey A evealed differences between the CAP-IRE CSAs in relation to:

- the proportion of household income that come from farming;
- levels of diversification activities;
- destinations of produce in terms of the type of agri-businesses;
- off-farm working by household members,

Deliverable D2.13-23 (Raggi et al., 2009) reports the methods, sample characteristics and full set of results from Survey A, while the responses to the spatial tracking survey questions incorporated into Survey A for FR1 and FR2 are discussed in Chapter 5.

3.2 Income from Farming

Table 3.1 summarises the responses to the Survey A question 2.08 – *"What proportion of your total household gross revenue comes from farming (on average)?"*

Table 3.1 Percentage of household income derived from farming

	IT n=300	**NL n=300**	**GR n=300**	**PL n=249**	**UK n=168**	**ES n=201**	**BG n=273**	**FR1 n=140**	**FR2 n=155**	**DE1 n=116**	**DE2 n=160**
less than 10%	30.0	5.7	1.0	0.4	3	20.4	1.8	7.9	6.5	49.1	18.1
10-29%	11.3	11.0	0.3	2.8	10.1	18.4	5.5	5.7	7.1	26.7	19.4
30-49%	10.3	8.3	4.0	10.4	13.1	9.5	18.0	15.7	14.8	6.9	14.4
50-69%	7.7	14.7	14.7	21.3	14.9	9.0	20.2	21.4	23.2	5.2	13.1
70-89%	7.0	15.7	26.7	24.1	16.7	8.5	21.6	5.7	12.9	1.7	6.3
>89%	21.0	44.3	53.3	41.0	41.7	27.9	31.9	42.1	34.8	3.5	25.6
Missing	12.7	0.3	0.0	0.0	0.6	6.5	1.1	1.4	0.7	6.9	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The table shows marked differences between the CAP-IRE CSAs in terms of farm household dependence on agriculture as a source of income. Farm households within DE1 (Lahn-Dill) are least dependent on farming for income, with more than three-quarters of households deriving less than 30% of their income from agriculture. The Spanish, Italian and other German CSAs have in the region of 40% of their samples deriving less than 30% of household income from farming. The Polish and UK CSAs have similar profiles, although

there is a higher percentage of farm households in UK that are less dependent on agriculture for income. Only DE1 (Lahn-Dill) and IT (Emilia-Romagna) have fewer than 25% of households that are more than 89% dependent on agriculture for household income. Farm households in the Greek CSA are the most dependent on agriculture for income, with 80% of the sample deriving at least 70% of household income from agriculture. These variations between the CSAs have implications for the role of agriculture and farm households in their local economies.

3.3 Diversification

Building on the findings above, there are a number of possible alternative sources of income for farm households, apart from that associated with their agricultural production activities. These include income form off farm work by one or more family member and income from investment income. Another possible source of income would be from income from diversification activities on the farm. The adoption of diversification strategies by farm households is an important element in the rural economy, and it may also have important effects on farm household linkages with the local economy.

Question 3.05 of survey A explored the level of diversification activity, asking " *Does the agricultural holding do any other activity different from crop cultivation and animal rearing?".*

Yes answers were allocated to one of four categories:

- contract work using farm labour and / or machinery
- food processing and manufacturing
- retailing
- recreational services

Table 3.2 below gives the percentages of farm households that have diversification activities.

Table 3.2 Percentage of farm households where diversification is present

	IT n=300	**NL** n=300	**GR** n=300	**PL** n=249	**UK** n=168	**ES** n=201	**BG** n=273	**FR1** n=140	**FR2** n=155	**DE1** n=116	**DE2** n=160
% diversified	9	45.3	12	10	36.9	3	13.7	24.3	21.9	10.7	35.7

Overall, the number of farm households in the CSA samples that have diversification activities in their portfolio is small. The highest percentages of households that are diversifying are in the NL, UK and DE2 (Ostpringnitz-Ruppin) CSAs.

Table 3.3 indicates how the type of diversification activities varies across CSAs. Importantly a farm may be involved in more than one type of diversification activity therefore the total number of activities in a particular CSA can may be higher than the number of farms with diversification activities suggested in Table 3.2 above.

Contracting was the most common form of diversification in all but the IT, FR2 (Midi-Pyrénées) and DE2 (Ostpringnitz-Ruppin) CSAs with very few (only 51 out of the total sample of over 2,360 farms) involved in food processing.

Table 3.3 Type of Diversification activities by CSA.

CSACode	Contracting	Food processing	Retailing	Recreational Services	Total
IT (n)	9	5	10	11	35
%	25.7	14.3	28.6	31.4	100
NL (n)	39	12	24	21	96
%	40.6	12.5	25.0	21.9	100
GR (n)	13	5	11	11	40
%	32.5	12.5	27.5	27.5	100
PL (n)	15	0	0	12	27
%	55.6	0.0	0.0	44.4	100
UK (n)	44	1	8	14	67
%	65.7	1.5	11.9	20.9	100
ES (n)	3	2	0	1	6
%	50.0	33.3	0.0	16.7	100
BG (n)	21	2	15	2	40
%	52.5	5.0	37.5	5.0	
FR1 (n)	23	3	13	2	41
%	56.1	7.3	31.7	4.9	100
FR2(n)	6	8	24	10	48
%	12.5	16.7	50.0	20.8	100
DE1 (n)	5	3	3	2	13
%	38.5	23.1	23.1	15.4	100
DE2 (n)	20	10	25	16	71
%	28.2	14.1	35.2	22.5	100
Total	198	51	133	102	484
%	40.9	10.5	27.5	21.1	100

The responses to questions 2.08 and 3.05 of Survey A presented above suggest that the local linkages of farm households consist of more than agriculture and diversification activity. They support the more detailed questions on and analysis of off-farm work contained in the spatial tracking survey (see chapter 5).

3.4 Destination of output

The destination of farm output is an important element in local economic linkages. Question *3.13of Survey A asked "To whom does the holding sell its products?".* Answers are allocated to the following categories:

- processor
- private wholesaler/retailer
- cooperative wholesaler/retailer

- direct to final consumer
- another farm

It was possible to choose more than one category, and Survey A did not ask for proportions.

Table 3.4 below shows the proportions of farm outputs that are sold to different types of purchaser by CSA. As with diversification activities above, more than one answer was permissible and columns total to more than 100%.

Table 3.4 Destination of produce by purchaser type

%	IT n=300	NL n=300	GR n=300	PL n=249	UK n=168	ES n=201	BG n=273	FR1 n=140	FR2 n=155	DE1 n=116	DE2 n=160
Processor	9.7	32.7	15.7	10.4	38.7	9	54.6	9.3	18.1	27.4	34.4
Private wholesaler/ retailer	46.7	2.3	81	27.3	72.6	27.9	58.2	42.9	45.8	28.2	52.5
Cooperative	66.7	56.7	14.7	16.9	26.8	84.6	7	75	64.5	13.7	23.8
Direct to final consumer	11.3	9.3	21	0.4	6.5	1.5	1.8	20	19.4	38.5	35
Another farm	3.7	10.7	2	39	18.5	0.5	1.8	7.1	10.3	17.1	11.9

The results in Table 3.4 show that more than 25% of farms in every CSA except the NL CSA sell produce to private wholesalers/retailers. The NL figure of 2.3% is strikingly low and reflects the structure of agri-business in The Netherlands, where cooperatives are strong. Processors are most significant in the Bulgarian CSA with more than 50% of the sample selling to them. Farm households in the NL, UK, and two German CSAs also sell to processors but at levels around 30% of their samples. Cooperatives are most significant in the ES, IT, FR2 and NL CSAs. Selling direct to the final consumer is a feature in both German CSAs, and is also part of the local economy of the Greek and the French CSAs. However, this does not seem important in the other CSAs. Selling to another farm is significant only in PL, although it is a feature for both UK (18.5%) and DE1 (17.1%).

3.5 Use of internet

The use of the Internet for buying farm inputs and selling farm produce has the potential to reduce local linkages through farmers being able to access a wider market, and consequently better prices. Question.15 of Survey A asked *"Does the holding using the internet to buy production means/sell products". ?* Table 3.5 below shows the results to this question,

Across the CSAs, farmers are more likely to use the internet to buy inputs than sell output, within the exception of farm households in FR1 (Centre region). However, in all cases, the use of the internet seems limited.

Table 3.5 Use of internet for buying inputs and selling outputs (% of holdings)

	IT n=300	NL n=300	GR n=300	PL n=249	UK n=168	ES n=201	BG n=273	FR1 n=140	FR2 n=155	DE1 n=116	DE2 n=160
Buying inputs	4	38.7	8	2.4	17.3	4.5	25.3	20	15.5	28.2	29.4
Selling output	0.7	12	3.3	0.8	4.2	2	19.8	24.3	10.3	2.6	15.6

Table 3.6 investigates further patterns of internet use and indicates that only a third (32.5%) of those that use the internet to buy inputs also use the internet to sell their output. The vast majority of holdings are not involved in internet transactions.

Table 3.6 Patterns of internet use

		Does the holding use the internet to sell output?			
		Yes	No	Missing	Total
Does the holding use the internet to buy inputs?	Yes	129	262	6	397
	%	*32.49*	*65.99*	*1.51*	*100*
	No	61	1,886	2	1,949
	%	*3.13*	*96.77*	*0.1*	*100*
	Missing	3	1	13	17
	%	*17.65*	*5.88*	*76.47*	*100*
	Total	193	2,149	21	2,363
	%	*8.17*	*90.94*	*0.89*	*100*

Feedback from interviewees in UK suggested that the closed nature of the question in Survey A masked the fact that many farmers use the internet for research purposes, for example to find compactor prices for inputs/output etc, even if they did not use it for actual trade purposes. Only 17.3% of farmers use the Internet for selling and an even lower percentage (4.2%) for buying. If farmers are using the Internet for research, this suggests that they are using the information on prices and costs to drive harder bargains with existing suppliers, with whom they have developed trust based relationships.

3.6 Change in diversification activities and off farm work in reaction to policy.

As described in Chapter 2, a key aspect of Survey A was to collect information from farmers on how they would react to two CAP policy scenarios: the baseline scenario where the CAP continues in its current form post 2013, and the "No CAP scenario" where all existing elements of the CA are abolished. Of particular interest to WP5 are the responses of farm households under both scenarios in terms of diversification activities and off farm work as these give an insight into potential changes in the linkages between farm households and the local economies in which they are based.

3.6.1 Diversification

Table 3.7 indicates that, of the 1789 farm households who stated that under the baseline scenario someone in the farm household would remain in farming, the majority (56%) had no intention of changing their level of involvement in diversification activities. Of those farmers who do intend to change, the stronger trend is towards increasing on-farm activities that are not farming or animal rearing, 14% stated an intention to increase their involvement in diversification, and only 1% stated an intention of decreasing farm diversification activities.

Table 3.7 Stated change in diversification activities of those farm households remaining active under the baseline scenario.

	Freq.	Percent
Increase	263	14.7
No change	999	55.84
Decrease	23	1.29
Other	42	2.35
Do not know	103	5.76
No answer	359	20.07
Total	1,789	100

Table 3.8 shows that farm households in the PL, ES and IT CSAs have particularly weak diversification tendencies although the high number of no responses in the Italian sample should be noted.

Table 3.8 Stated change in diversification activities of those farm households remaining active under the baseline scenario by CSA.(percentage)

CSA	**IT n=228**	**NL n=131**	**GR n=264**	**PL n=240**	**UK n=143**	**ES n=145**	**BG n=208**	**FR1 n=108**	**FR2 n=100**	**DE1 n=89**	**DE2 n=133**
Increase	4	26	31	7	19	6	14	14	15	11	12
No change	4	60	65	90	73	88	26	57	73	61	35
Decrease	0	4	1	1	3	0	1	1	1	0	4
Other	0	0	0	0	0	0	0	0	0	10	25
Do not know	1	8	3	0	6	3	13	9	10	9	8
No Answer	90	2	0	2	0	3	45	19	1	9	16
Total	100	100	100	100	100	100	100	100	100	100	100

In contrast, Tables 3.9 and 3.10 show the results for intended diversification under the No-CAP scenario. A smaller total number of farm households (1,070) stated an intention of remaining in farming under this scenario. Whilst there are still substantial numbers of farmers that do not intend to change their level of diversification under the No-CAP scenario , the percentage of those who would increase diversification has risen overall to almost 18%. From Table 3.10, a net increase is observed in all CSAs except Poland where no change in off farm work is anticipated.

Table 3.9 Stated change in diversification activities of those farm households remaining active under the No Cap scenario

	Freq.	Percent
Increase	192	17.94
No change	519	48.5
Decrease	27	2.52
Other	13	1.21
Do not know	72	6.73
No answer	247	23.08
Total	1,070	100

Table 3.10 Stated change in diversification activities of those farm households remaining active under the No CAP scenario by CSA.(percentage)

CSA	**IT n=171**	**NL n=111**	**GR n=93**	**PL n=210**	**UK n=75**	**ES n=68**	**BG n=135**	**FR1 n=66**	**FR2 n=56**	**DE1 n=26**	**DE2 n=59**
Increase	4	30	39	0	31	15	16	38	29	12	29
No change	4	46	53	98	55	75	23	42	48	54	25
Decrease	1	13	0	0	5	0	1	2	4	4	3
Other	0	0	0	0	0	0	0	0	0	12	17
Do not know	0	10	9	0	9	7	12	11	18	12	8
No Answer	91	2	0	2	0	3	49	8	2	8	17
Total	100	100	100	100	100	100	100	100	100	100	100

3.6.2 Off-farm working

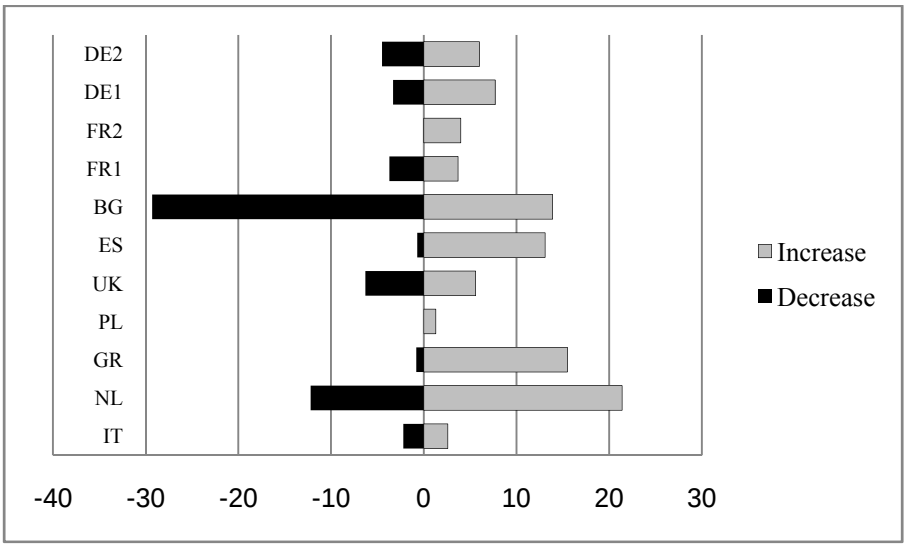
In common with the diversification findings, under both scenarios the majority of farmers stated that there would be no change to current levels of off-farm working by household members (see Table 3.11 below).

Table 3.11 Stated change in off farm labour of those farm households remaining active under the baseline scenario and no-cap scenarios.

	Baseline Scenario		No CAP Scenario	
	Freq.	Percent	Freq.	Percent
Increase	157	8.78	151	14.11
No change	1,324	74.01	736	68.79
Decrease	106	5.93	66	6.17
Other	18	1.01	9	0.84
Do not know	89	4.97	66	6.17
No answer	95	5.31	42	3.92
Total	1,789	100	1,070	100

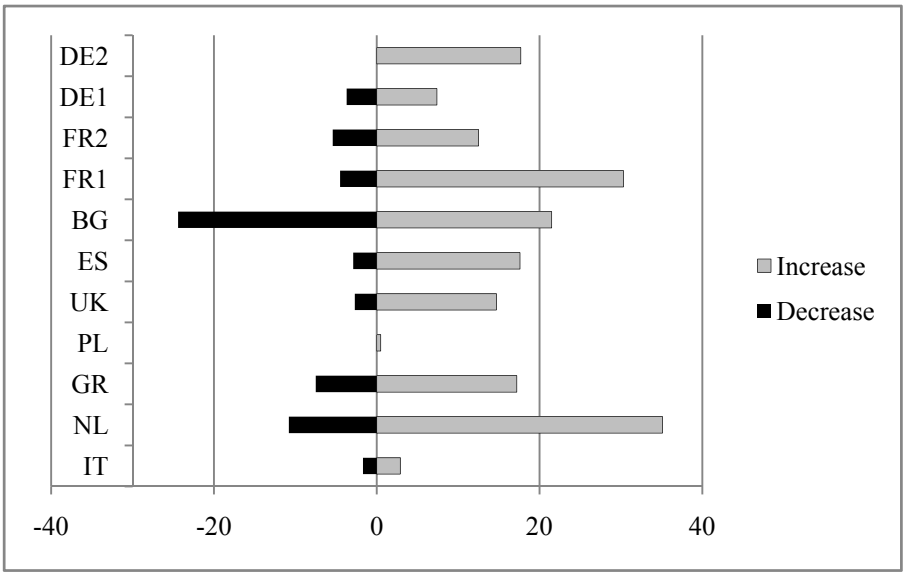
However, there were differences in responses across CSA as shown in Figures 3.1 and 3.2. In particular, one interesting finding from the reactions to the baseline scenario was the number of farmers intending to decrease off-farm working in the Bulgarian and UK CSAs, where the figures are higher for decreasing than increasing. In the case of UK, whilst the effect is small, it is surprising as off-farm income is important in the UK CSA. For BG the difference is enormous and we suggest that this has something to do with the different CAP conditions in that country.

Figure 3.1 Percentages stating intention to increase/decrease off-farm working under Baseline Scenario



Under the no-CAP scenario, as would be expected, off farm work was expected to increase on more farms than it was expected to decrease, and this effect is seen for the majority of CSAs (Figure 3.3 below). However again in nearly every CSA there is a mix of responses as farm households react in manners which reflect their specific circumstances.

Figure 3.2 Percentages stating intention to increase/decrease off-farm working under No-CAP Scenario



In summary, there are clear differences both within and between the 11 CSAs in their reactions to the policy scenarios. An analysis of the qualitative comments in Survey A suggests that farmers have a clear perception that CAP is important to rural economies, mostly with reference to the viability of farms and maintaining farming in the landscape and communities. The purpose of the SAM analysis and Spatial Tracking Survey analysis discussed in Chapters 4 and 5 is to test these perceptions against data on economic flows within the region, and to identify specific linkages at a more local level.

Chapter 4: SAM analysis

4.1 Introduction

This chapter presents the findings from the SAM-based analysis of North East Scotland. The specific CAP-IRE aims addressed by the analysis are:

- to analyse the nature and extent of integration of farm-related activities within the regional economy, differentiating between links contained with the rural part of the region and those that cross the rural-urban divide;
- to analyse the dependence of the region on agriculture and farm households.
- to assess the impact of the CAP on linkages between farming and the wider economy.

The underlying SAM approach and Leontief model used in the analysis have already been described in Chapter 2. Therefore this chapter begins with a presentation of the final balanced North East Scotland SAM. This provides the basis for generating a number of alternative indicators of the performance of the North East Scotland economy as described in the following Section 4.3. In addition to performance indicators such as Gross Regional Domestic Product (GRDP) and Gross Regional Domestic Expenditure (GRDE), Section 4.3 highlights the importance of farm households and farm sectors in the region as well as other agriculture-related upstream and downstream sectors, and considers differences between the economic structure of rural and urban parts of the region.

Section 4.4 reports and discusses various different types of multipliers generated from the SAM including output, income and employment multipliers. These measure the effect of external impacts such as changes in export demand or increased transfer income. The strength of spillover effects, from the rural to urban area and *vice versa*, are considered. Section 4.5 describes and analyses a number of CAP scenarios with the focus on the magnitude and distribution of economy-wide impacts arising from shocks to the farm sector. Section 4.6 concludes.

4.2 Presentation of SAM

4.2.1. Structure of the SAM

As described in Chapter 2, a SAM is a comprehensive data framework which provides full accounting of all the flows within the economy. Each cell in the SAM represents a payment from the column account to the row account and, for each account in the SAM, total revenue (row total) equals total expenditure (column total).

Figure 3.1 illustrates the structure of the North East Scotland SAM which includes multiple accounts for activities, commodities, factors of production, households and other institutions as well as some addition macro accounts (trade and investment). The SAM was specifically structured to capture urban-rural linkages and key agricultural linkages, and thus includes a number of distinguishing features. In particular, the figure shows that the productive activities of firms, the factors of production (labour, land and capital) and the household accounts have been spatially disaggregated into urban and rural regions. Although not explicit in Figure 3.1, households in the SAMs are not only spatially differentiated, but are

also distinguished according to whether they derive income from agriculture, with households with small and large farms further distinguished. In contrast, the commodities accounts have been kept identical across the whole study region since the disaggregation of commodity accounts was inhibited by data availability.

The following section details the accounts distinguished in the SAM.

Figure 3.1: The basic TERA SAM structure

		Production sectors			Factors		Households							
		Urban	Rural	Commod-ities	Urban	Rural	Urban	Rural	Farm	Govern-ment	Capital	Tourists	Rest of World	Total
Production sectors	Urban			Marketed output										Urban gross output (basic prices)
	Rural			Marketed output										Rural gross output (basic prices)
	Commod-ities	Intermediate inputs	Intermediate inputs	Transaction costs			Consumption expenditure	Consumption expenditure	Consumption expenditure	Government consump-tion	GFCF plus change in stocks	Tourist expend-iture	Exports	Demand (purchaser prices)
Factors		Value added	Value added											Factor income
House-holds	Urban				Factor income	Factor income				Transfers to urban households			Factor and transfer income from ROW	Urban household income
	Rural				Factor income	Factor income				Transfers to rural households			Factor and transfer income from ROW	Rural household income
	Farm				Factor income	Factor income				Transfers to farm households			Factor and transfer income from ROW	Farm household income
	Govern-ment	Activity taxes		Sales taxes	Factor taxes	Factor taxes	Direct taxes	Direct taxes	Direct taxes				Transfer to Government from ROW	Government income
	Capital						Savings	Savings	Savings	Government savings			Foreign savings	Savings
	Tourists												Transfer to tourists	Income used by tourists
	Rest of World			Imports	Factor income to ROW	Factor income to ROW				Government transfers to ROW				Foreign exchange outflow
	Total	Urban gross input (Basic prices)	Rural gross input (Basic prices)	Supply (purchaser prices)	Urban factor expend-itures	Rural factor expend-itures	Urban household expenditures	Rural household expenditures	Farm household expenditures	Government expenditures	Investment	Tourist expend-iture	Foreign exchange inflow	

4.2.2 Description of accounts

The final North East Scotland SAM contains a total of 86 accounts. The choice of accounts reflects the research objectives of WP5, that is to understand the links between the farm sector, farm households and the wider regional economy. As a result, the SAM includes a disaggregated farm sector, and farm households are kept distinct from non-farm households. In addition, the choice of accounts was influenced by:

- the desire to keep sectors which have particularly strong backward or forward linkages with the agriculture sector separately distinguished in the matrix,
- the need to reflect key employment and priority sectors in the region
- the availability of secondary data essential to the SAM construction process.
- the rural-urban structure of the SAM.

The following sector provides a detailed description of each type of accounts in the SAM.

Production Sectors

The production sectors included in the SAM are shown in Table 4.1. Each sector is represented in the rural and urban part of the SAM (even though their significance in each area may be very different), resulting in 48 production sectors in total. The table also indicates their SIC2003/NACE Rev.1.1 classifications.

Table 4.1: Production sectors in the North East Scotland SAM

SAM Code	Name	Standard Industry Classification of economic activities 2003
1	Small cereal farms	01 (part)
2	Large cereal farms	01 (part)
3	Small livestock farms	01 (part)
4	Large livestock farms	01 (part)
5	Small other farm types	01 (part)
6	Large other farm types	01 (part)
7	Forestry	02
8	Fishing and service activities incidental to fishing (incl fish farming)	05
9	Extraction of crude petroleum and natural gas plus associated services; mining	11,12
10	Other Mining	10,14
11	Processing and preserving of fish and fish products; fruit and vegetables	15.2,15.3
12	Other food products	15.1, 15.4 - 15.8
13	Alcoholic and soft drinks	15.9
14	Wood and paper products (except furniture)	20, 21.1, 21.2
15	Machinery	29
16	Other manufacturing	16-19, 22-28, 30-37
17	Utilities	40, 41
18	Construction	45
19	Wholesale and retail trade	50-52
20	Hotels and restaurants	55
21	Transport and communications	60-64
22	Financial services	65-67
23	Public service activities	75-90
24	Other services	70-74, 91-95

Twelve different farm accounts (six in each sub-area) are distinguished in the SAM according to farm type and farm size. As explained in Chapter 2, the disaggregation of the agricultural account in the region was based on FADN data. Only the two major farm types in North East Scotland (cereals and livestock) are shown separately with the remaining FADN farm types aggregated into an "Other" category. Farm size was based on European Size Units (ESUs), with small farms less than 40 ESUs, and large farms 40 ESUs or above.

Commodities

The twenty commodity accounts in the North East Scotland SAM (shown in Table 4.2) reflect closely the production sectors. The main difference relates to agricultural output where two commodity types are distinguished – crop and livestock. As noted above, the commodity accounts are spatially indistinct, i.e. there is no distinction between commodities produced in the rural and urban part of the region (and thus, implicitly in subsequent modelling, it is assumed that commodities are identical regardless of whether they are produced by a rural or urban firm, and that there is a single market within the region for each commodity).

Table 4.2: Commodity accounts in the North East Scotland SAM

SAM Code	Name	Standard Industry Classification of economic activities 2003
1	Crops	01 (part)
2	Livestock	01 (part)
3	Forestry	02
4	Fishing and service activities incidental to fishing (incl. fish farming)	05
5	Extraction of crude petroleum and natural gas plus associated services; mining	11,12
6	Other mining	10,14
7	Processing and preserving of fish and fish products; fruit and vegetables	15.2,15.3
8	Other food products	15.1, 15.4 - 15.8
9	Alcoholic and soft drinks	15.9
10	Wood and paper products (except furniture)	20, 21.1, 21.2
11	Machinery	29
12	Other manufacturing	16-19, 22-28, 30-37
13	Utilities	40, 41
14	Construction	45
15	Wholesale and retail trade	50-52
16	Hotels and restaurants	55
17	Transport and communications	60-64
18	Financial services	65-67
19	Public service activities	75-90
20	Other services	70-74, 91-95

Factors

Four factors of production are distinguished in the SAM – two types of labour (skilled and unskilled), capital and land. Land is defined such that it only includes agricultural land, and, as a consequence, the only production sectors paying into this factor are the farm sectors. The capital account in the matrix includes, in addition to returns to capital, gross profit and payments for self-employment (the latter form of labour dominates agricultural labour input in North East Scotland).

The factor accounts can be presented and analysed on a rural urban basis if they are defined in relation to the user sector. For example, urban sectors use urban factors while rural sectors use rural factors. This does not however mean that factors are provided only by households resident in the same area where they are used. Instead, the mapping of factors into household accounts shows the distribution of factor ownership and income in the region.

Households

Four different household groups are distinguished in the North East Scotland SAM:
Urban households..... Households resident in Aberdeen City local authority area
Rural households..... Households resident in Aberdeenshire local authority area
Small farm households ..... Households managing farms of less than 40 ESUs
Large farm households ..... Households managing farms of 40 or more ESUs

The small farm household category receives factor income from the small farm types, and the large from the large farm types. An explicit tourist household account is also included. The latter (which includes the expenditure of day visitors to the area as well as overnight tourists) differs from the households in that its income is provided entirely by a transfer from the rest of the world (i.e. it is not treated in the model as "local").

Other Institutional Accounts

For accounting purposes, an account reflecting non-profit institutions serving households (NPISH) is included to capture expenditure on the services of such institutions. A single government account, incorporating both local government and central government transactions, is distinguished in the SAM. Three categories of taxes - activity taxes, commodity taxes and income tax – collect payments (from production sectors, commodity accounts and households respectively) and pay into the combined government account. Investment and savings in the region are represented in another account, with the column entries showing levels of Gross Fixed Capital Investment by commodity plus changes in stocks, and the row entries showing savings of institutions (households plus government).

External Account

A single Rest of World (ROW) account showing transactions between the region with both the rest of the country and rest of the world is included. The ROW entries reflect imports and exports, as well as factor payments to/from the region and income transfers. Additionally, payments from the ROW to the 'tourist' account constitute demand for tourist services in each of the regions.

4.2.3 Presentation of balanced SAM

The final SAM is shown in Table 4.3 below. The SAM is also available on request.

Table 4.3: North East Scotland SAM , 2005

	U-CerFarmS	U-CerFarmL	U-LiveFarmS	U-LiveFarmL	U-OtherFarmS	U-OtherFarmL	U-Forest	U-Fish	U-Oil	U-Mining	U-FFproc	U-OtherFood	U-Drink	U-Wood	U-Mach	U-OtherMan	U-Energy	U-Const	U-Distr	U-Hotels	U-Trans	U-Fin	U-Pub	U-OtherServ	R-CerFarmS	R-CerFarmL	R-LiveFarmS	R-LiveFarmL	R-OtherFarmS	R-OtherFarmL	R-Forest	R-Fish	R-Oil	R-Mining	Sub-total
U-CerFarmS																																			0.000
U-CerFarmL																																			0.000
U-LiveFarmS																																			0.000
U-LiveFarmL																																			0.000
U-OtherFarmS																																			0.000
U-OtherFarmL																																			0.000
U-Forest																																			0.000
U-Fish																																			0.000
U-Oil																																			0.000
U-Mining																																			0.000
U-FFproc																																			0.000
U-OtherFood																																			0.000
U-Drink																																			0.000
U-Wood																																			0.000
U-Mach																																			0.000
U-OtherMan																																			0.000
U-Energy																																			0.000
U-Const																																			0.000
U-Distr																																			0.000
U-Hotels																																			0.000
U-Trans																																			0.000
U-Fin																																			0.000
U-Pub																																			0.000
U-OtherServ																																			0.000
R-CerFarmS																																			0.000
R-CerFarmL																																			0.000
R-LiveFarmS																																			0.000
R-LiveFarmL																																			0.000
R-OtherFarmS																																			0.000
R-OtherFarmL																																			0.000
R-Forest																																			0.000
R-Fish																																			0.000
R-Oil																																			0.000
R-Mining																																			0.000
R-FFproc																																			0.000
R-OtherFood																																			0.000
R-Drink																																			0.000
R-Wood																																			0.000
R-Mach																																			0.000
R-OtherMan																																			0.000
R-Energy																																			0.000
R-Const																																			0.000
R-Distr																																			0.000
R-Hotels																																			0.000
R-Trans																																			0.000
R-Fin																																			0.000
R-Pub																																			0.000
R-OtherServ																																			0.000
C-Crop	0.141	0.139	0.127	0.142	0.079	0.088	0.014				17.964		0.027			0.561	0.007	0.377	3.463	7.575	0.024		0.627	0.402	1.846	1.884	0.778	0.979	0.697	0.842	0.510				39.293
C-Lives	0.026	0.023	0.519	0.630	0.084	0.102						13.054				1.635			0.802	1.778	0.006		0.143	0.090	1.488	1.357	27.508	37.472	3.225	4.228					94.169
C-Forest							0.219			0.003				1.319				0.267					0.027								7.927			0.008	9.770
C-Fish								0.367			3.475								0.011	0.845	0.020		0.018									7.021			11.756
C-Oil									108.455							80.195	4.229																13.269		206.147
C-Mining										1.787	0.018	0.006		0.912		7.025	0.992	8.331	0.260	0.080	0.985	0.001	0.203	0.516	0.007	0.006			0.001	0.002				4.590	25.722
C-FFproc	0.006	0.004	0.007	0.004	0.002	0.002			0.725	0.002	14.097	0.657	0.010	0.003	0.012	0.051	0.008	0.015	1.090	1.047	0.456	0.183	1.410	2.470	0.305	0.255	0.006	0.008	0.064	0.069	0.001		0.089	0.005	23.066
C-OtherFo	0.024	0.025	0.421	0.732	0.096	0.103		1.511	3.363	0.009	2.433	12.809	0.393	1.223	0.056	3.114	0.039	0.110	13.365	12.430	1.705	0.714	5.617	11.669	0.943	0.998	7.746	15.144	2.541	2.973	0.005	28.946	0.409	0.023	131.688
C-Drink	0.001		0.001					0.087	0.002			0.056	0.418			0.123		0.042	0.943	25.478	0.870	0.258	0.589	5.413	0.061	0.051	0.001	0.002	0.013	0.014		1.667			36.092
C-Wood	0.021	0.014	0.024	0.016	0.009	0.009	0.011	0.031	0.408	0.088	2.968	3.122	0.146	31.523	1.200	23.819	0.037	11.060	2.315	0.385	0.834	1.382	12.964	10.722	1.099	0.918	0.023	0.030	0.230	0.248	0.397	0.599	0.050	0.225	106.927
C-Mach	0.005	0.003	0.006	0.004	0.002	0.002		0.005	61.522	1.036	0.472	0.475	0.031	1.470	26.164	13.106	0.305	4.867	1.818	0.006	0.588	0.068	1.898	3.102	0.270	0.225	0.006	0.007	0.056	0.061	0.033	0.091	7.545	2.660	127.911
C-OtherM	0.247	0.201	0.279	0.367	0.114	0.159	0.036	1.509	171.408	3.132	2.460	4.825	0.694	9.312	71.639	412.094	2.685	66.644	45.281	5.141	83.493	12.194	251.186	133.934	9.716	8.180	5.130	7.591	3.026	4.581	1.314	28.917	20.953	8.046	1376.487
C-Energy	0.032	0.020	0.036	0.024	0.013	0.013	0.002	0.017	34.309	0.988	2.348	2.078	0.160	9.023	5.984	38.810	13.534	0.736	5.802	1.051	5.257	1.397	16.325	13.488	1.640	1.371	0.034	0.045	0.343	0.370	0.087	0.320	4.195	2.538	162.392
C-Const	0.041	0.026	0.046	0.030	0.017	0.016	0.017		433.250	0.207	0.077	0.103	0.006	0.573	0.395	6.648	0.513	136.350	4.801	0.676	12.513	5.992	39.045	83.518	2.095	1.751	0.044	0.058	0.438	0.473	0.605		52.650	0.532	783.504
C-Distr	0.006	0.004	0.007	0.005	0.003	0.003	0.012	0.066	13.540	0.009	0.101	0.041		0.092	0.212	1.251	0.043	2.478	7.381	0.741	10.777	2.570	5.106	11.923	0.320	0.268	0.007	0.009	0.067	0.072	0.451	1.263	1.656	0.023	60.504
C-Hotels	0.008	0.005	0.009	0.006	0.003	0.003	0.002	0.021	25.512	0.041	0.135	0.071	0.001	0.316	0.578	2.625	0.092	0.901	12.556	0.964	5.210	2.265	14.476	13.635	0.431	0.360	0.009	0.012	0.090	0.097	0.058	0.398	3.111	0.105	84.106
C-Trans	0.068	0.043	0.077	0.050	0.028	0.027	0.024	0.501	196.121	2.419	2.463	1.045	0.055	6.870	5.672	31.662	0.282	3.279	79.775	5.286	216.282	38.654	52.609	113.002	3.495	2.922	0.073	0.096	0.730	0.789	0.876	9.589	23.991	6.213	805.068
C-Fin	0.064	0.040	0.072	0.047	0.026	0.026	0.004	0.562	117.367	0.682	1.803	0.993	0.141	2.406	6.152	24.317	0.693	3.826	22.274	3.882	18.492	50.637	30.918	187.662	3.278	2.741	0.069	0.090	0.685	0.740	0.152	10.771	14.352	1.752	507.717
C-Pub	0.027	0.017	0.031	0.020	0.011	0.011	0.007	0.057	20.827	0.032	0.134	0.090	0.001	0.377	1.332	4.343	0.106	1.072	2.401	0.891	10.411	5.142	126.817	87.927	1.405	1.175	0.029	0.039	0.294	0.317	0.258	1.096	2.528	0.081	269.307
C-OtherSe	0.164	0.103	0.184	0.121	0.066	0.066	0.030	0.184	565.321	0.906	3.151	2.050	0.350	5.292	11.450	55.270	1.256	50.583	135.300	14.303	118.340	74.942	185.632	876.555	8.382	7.007	0.175	0.231	1.752	1.891	1.071	3.526	69.185	2.328	2197.163
F-LabSK	0.095	0.109	0.247	0.683	0.083	0.154	0.148	0.500	468.795	3.805	15.488	9.930	0.690	18.072	62.068	239.103	2.575	126.390	204.272	74.261	204.742	58.200	852.858	837.817	3.725	4.441	4.546	14.125	2.208	4.435	5.347	9.576	57.478	9.773	3296.740
F-LabUSK	0.020	0.023	0.052	0.143	0.017	0.032	0.031	0.104	67.023	0.545	4.628	2.967	0.206	5.400	18.544	71.391	0.770	19.486	119.933	54.949	104.423	2.447	111.706	112.020	0.778	0.928	0.950	2.951	0.461	0.927	1.117	2.000	8.229	1.399	716.598
F-Cap	0.527	0.280	0.041	0.067	0.048	0.202	0.041	2.030	53.794	1.665	4.918	2.957	1.247	11.799	25.386	140.810	6.996	98.744	172.368	57.975	139.457	75.038	163.207	1017.585	1.163	5.419	3.050	1.747	1.374	3.066	1.230	38.887	6.590	4.278	2043.984
F-Land	0.058	0.312	0.002	0.007	0.144	0.020	0.031																		9.335	4.518	3.634	2.020	4.051	3.633	1.353				29.117
U-Hh																																			0.000
R-Hh																																			0.000
F-HhS																																			0.000
F-HhL																																			0.000
NPISH																																			0.000
Tourist																																			0.000
ATAX	-0.297	-0.190	-0.790	-0.823	-0.215	-0.253	0.004	0.059	7.354	0.281	0.531	0.302	0.039	0.970	1.951	8.588	0.786	2.021	25.138	6.824	6.384	2.629	0.349	15.863	-17.898	-15.071	-11.042	-12.049	-5.657	-6.634	0.112	1.137	0.905	0.721	12.030
STAX																																			0.000
YTAX																																			0.000
Gov																																			0.000
S-I																																			0.000
ROW																																			0.000
TOTAL	1.285	1.202	1.395	2.275	0.630	0.784	0.634	7.612	2349.095	17.635	79.662	57.634	4.617	106.951	238.793	1166.542	35.948	537.578	861.345	276.567	941.271	334.714	1873.730	3539.310	33.884	31.702	42.777	70.607	16.690	23.192	22.906	145.805	287.183	45.298	13157.257

Table 4.3: North East Scotland SAM , 2005 (Cont.)

	R-FFproc	R-OtherFo	R-Drink	R-Wood	R-Mach	R-OtherM	R-Energy	R-Const	R-Distr	R-Hotels	R-Trans	R-Fin	R-Pub	R-OtherSe	C-Crop	C-Lives	C-Forest	C-Fish	C-Oil	C-Mining	C-FFproc	C-OtherFo	C-Drink	C-Wood	C-Mach	C-OtherM	C-Energy	C-Const	C-Distr	C-Hotels	C-Trans	C-Fin	C-Pub	C-OtherSe	Sub-total
U-CerFarmS															1.025	0.167	0.003				0.022	0.008	0.003					0.004	0.005	0.022	0.005			0.021	1.285
U-CerFarmL															0.995	0.164	0.001				0.010	0.004	0.001					0.002	0.003	0.010	0.003			0.009	1.202
U-LiveFarmS															0.124	1.219	0.002				0.016	0.005	0.002					0.002	0.004	0.014	0.003			0.002	1.395
U-LiveFarmL															0.127	2.116	0.002				0.011	0.003	0.001					0.002	0.003	0.009	0.002				2.275
U-OtherFarmS															0.218	0.397					0.005	0.002						0.001	0.001	0.005	0.001				0.630
U-OtherFarmL															0.278	0.490					0.005	0.002						0.001	0.001	0.005	0.001				0.784
U-Forest																	0.447			0.005				0.006				0.042						0.133	0.634
U-Fish																		7.432			0.114								0.028		0.014			0.023	7.612
U-Oil																			2241.075										21.171		31.189			55.660	2349.095
U-Mining																				16.094						0.595			0.245	0.466		0.236				17.635
U-FFproc																					73.546									6.117						79.662
U-OtherFood																						56.172	0.382							1.080						57.634
U-Drink																							4.185							0.022	0.411					4.618
U-Wood																								102.687		2.396			0.849	1.019						106.951
U-Mach																									208.872	29.922										238.794
U-OtherMan																				0.532				0.545	16.674	1039.678			29.834	25.081	7.027			47.171	1166.542
U-Energy																											34.315	0.421	0.264		0.297			0.651	35.948
U-Const																												529.912	2.416		0.119		0.035	5.097	537.578
U-Distr															11.396	15.330	1.271	4.548		4.973	13.742	82.980	80.218	27.433	11.629	577.568			12.769	0.456	0.023		0.019	16.989	861.345
U-Hotels																												0.943		272.110				3.514	276.567
U-Trans																												8.237		10.231	905.914		0.008	16.881	941.271
U-Fin																													1.421			306.706		26.587	334.714
U-Pub																												1.332	0.576			1869.387	2.435	1873.730
U-OtherServ																										0.174		15.156	17.039	15.137	2.118		5.628	3484.058	3539.310
R-CerFarmS															27.140	4.409	0.076				0.575	0.186	0.060				0.012	0.091	0.137	0.564	0.109			0.525	33.884
R-CerFarmL															26.374	4.328	0.033				0.252	0.081	0.027				0.006	0.040	0.060	0.245	0.047			0.208	31.702
R-LiveFarmS															3.243	38.275	0.062				0.414	0.117	0.044				0.008	0.047	0.103	0.346	0.052			0.067	42.777
R-LiveFarmL															3.317	66.488	0.042				0.274	0.075	0.030				0.006	0.028	0.069	0.219	0.031			0.028	70.607
R-OtherFarmS															5.780	10.513	0.017				0.122	0.036	0.013				0.003	0.016	0.030	0.107	0.018			0.035	16.690
R-OtherFarmL															7.302	15.475	0.019				0.130	0.038	0.014				0.003	0.016	0.032	0.113	0.019			0.031	23.192
R-Forest																	16.176			0.174				0.199				1.485						4.872	22.906
R-Fish																		142.483			2.189								0.530		0.239			0.364	145.805
R-Oil																			273.976										2.588		3.814			6.806	287.183
R-Mining																				41.343						1.528			0.627	1.196		0.605				45.299
R-FFproc																					218.059									18.135						236.194
R-OtherFood																						182.072	1.066							3.019						186.157
R-Drink																							53.180							0.275	5.219					58.674
R-Wood																								192.775		4.496			1.593	1.913						200.778
R-Mach																									188.614	27.020										215.634
R-OtherMan																				0.340				0.349	10.651	664.110			19.057	16.021	4.489			30.133	745.150
R-Energy																											161.860	1.981	1.245		1.394			3.052	169.532
R-Const																												638.698	2.911		0.143		0.042	6.142	647.936
R-Distr															8.211	11.045	0.915	3.277		3.583	9.901	59.786	57.797	19.766	8.379	416.129			9.200	0.329	0.017		0.015	12.242	620.591
R-Hotels																													0.438		126.239				1.633	128.310
R-Trans																													3.430		4.260	377.116		0.005	7.031	391.841
R-Fin																														0.621			133.995		11.618	146.234
R-Pub																													0.614	0.266			861.796	1.116	863.791
R-OtherServ																										0.059			4.767	5.359	4.760	0.667		1.772	1095.720	1113.104
C-Crop	53.244		0.340			0.359	0.031	0.227	2.497	3.516	0.010		0.290	0.127																						60.641
C-Lives		72.979				1.056		0.158	0.582	0.828	0.003		0.068	0.030																						75.704
C-Forest				2.477				0.322					0.012																						2.811
C-Fish	10.302								0.008	0.392	0.008		0.008																						10.718
C-Oil						51.219	19.943																												71.162
C-Mining	0.054	0.016	0.003	1.711		4.489	4.676	10.041	0.187	0.037	0.410		0.094	0.162																						21.880
C-FFproc	41.795	1.669	0.124	0.005	0.011	0.033	0.040	0.018	0.786	0.486	0.190	0.080	0.652	0.778																						46.665
C-OtherFo	7.218	32.522	5.000	2.296	0.050	1.986	0.182	0.133	9.621	5.763	0.708	0.312	2.584	3.640																						72.016
C-Drink		0.141	5.315			0.079		0.051	0.679	11.819	0.362	0.113	0.272	1.699																						20.530
C-Wood	8.801	7.926	1.860	59.177	1.084	15.216	0.175	13.331	1.668	0.179	0.347	0.604	5.985	3.373																						119.726
C-Mach	1.400	1.207	0.395	2.759	23.627	8.375	1.440	5.866	1.310	0.003	0.245	0.030	0.877	0.977																						48.509
C-OtherM	7.297	12.251	8.822	17.482	64.689	263.153	12.665	80.336	32.616	2.384	34.743	5.327	115.875	42.040																						699.681
C-Energy	6.964	5.276	2.039	16.939	5.404	24.786	63.830	0.887	4.179	0.488	2.188	0.610	7.532	4.236																						145.356
C-Const	0.228	0.263	0.080	1.076	0.357	4.240	2.419	164.410	3.456	0.313	5.199	2.616	17.961	26.037																						228.654
C-Distr	0.298	0.103	0.007	0.172	0.191	0.799	0.205	2.987	5.317	0.344	4.485	1.123	2.356	3.745																						22.132
C-Hotels	0.399	0.181	0.017	0.594	0.522	1.676	0.432	1.086	9.041	0.447	2.166	0.989	6.670	4.267																						28.487
C-Trans	7.305	2.654	0.700	12.897	5.121	20.222	1.329	3.952	57.467	2.452	90.014	16.887	24.277	35.502																						280.780
C-Fin	5.346	2.522	1.786	4.517	5.555	15.529	3.269	4.611	16.045	1.801	7.696	22.122	14.265	58.932																						163.997
C-Pub	0.397	0.229	0.015	0.708	1.203	2.769	0.498	1.293	1.728	0.413	4.324	2.245	58.303	27.377																						101.502
C-OtherSe	9.344	5.204	4.451	9.935	10.340	35.304	5.923	60.969	97.473	6.635	49.257	32.740	85.682	275.595																						688.853
F-LabSK	45.924	25.207	8.764	33.925	56.049	152.781	12.144	152.328	147.192	34.454	85.263	25.431	392.879	263.907																						1436.247
F-LabUSK	13.721	7.531	2.619	10.136	16.746	45.631	3.629	23.483	86.434	25.496	43.503	1.069	51.642	35.341																						366.982
F-Cap	14.584	7.509	15.842	22.150	22.924	89.956	32.995	119.012	124.185	26.894	58.058	32.787	75.346	320.318																						962.561
F-Land																																				0.000
U-Hh																																				0.000
R-Hh																																				0.000
F-HhS																																				0.000
F-HhL																																				0.000
NPISH																																				0.000
Tourist																																				0.000
ATAX	1.574	0.766	0.495	1.821	1.762	5.492	3.706	2.436	18.121	3.167	2.661	1.149	0.161	5.017																						48.329
STAX															-13.439	-7.809	-0.417	0.089	0.201	3.130	5.142	12.070	45.639	14.115	7.523	589.338	8.815	66.134	21.050	92.507	21.165	12.042	10.000	198.865	1086.160
YTAX																																				0.000
Gov																																				0.000
S-I																																				0.000
ROW															141.479	63.435	6.060	11.870	257.031	37.140	109.558	489.461	121.703	229.195	240.016	3292.373	404.352	297.086	117.660	398.137	454.082	1005.275	737.210	1170.133	9583.258
TOTAL	236.193	186.156	58.674	200.777	215.634	745.150	169.532	647.936	620.591	128.310	391.841	146.234	863.791	1113.104	223.570	226.041	24.709	169.700	2772.283	107.313	434.088	883.099	364.365	587.071	692.357	6645.386	609.380	1574.242	299.698	972.559	1810.960	1458.018	3485.915	6209.852	35274.528

Table 4.3: North East Scotland SAM , 2005 (Cont.)

	F-LabSK	F-LabUSK	F-Cap	F-Land	U-Hh	R-Hh	F-HhS	F-HhL	NPISH	Tourist	ATAX	STAX	YTAX	Gov	S-I	ROW	Overall Total
U-CerFarmS																	1.285
U-CerFarmL																	1.202
U-LiveFarmS																	1.395
U-LiveFarmL																	2.275
U-OtherFarmS																	0.630
U-OtherFarmL																	0.784
U-Forest																	0.634
U-Fish																	7.612
U-Oil																	2349.095
U-Mining																	17.635
U-FFproc																	79.662
U-OtherFood																	57.634
U-Drink																	4.618
U-Wood																	106.951
U-Mach																	238.794
U-OtherMan																	1166.542
U-Energy																	35.948
U-Const																	537.578
U-Distr																	861.345
U-Hotels																	276.567
U-Trans																	941.271
U-Fin																	334.714
U-Pub																	1873.730
U-OtherServ																	3539.310
R-CerFarmS																	33.884
R-CerFarmL																	31.702
R-LiveFarmS																	42.777
R-LiveFarmL																	70.607
R-OtherFarmS																	16.690
R-OtherFarmL																	23.192
R-Forest																	22.906
R-Fish																	145.805
R-Oil																	287.183
R-Mining																	45.299
R-FFproc																	236.194
R-OtherFood																	186.157
R-Drink																	58.674
R-Wood																	200.778
R-Mach																	215.634
R-OtherMan																	745.150
R-Energy																	169.532
R-Const																	647.936
R-Distr																	620.591
R-Hotels																	128.310
R-Trans																	391.841
R-Fin																	146.234
R-Pub																	863.791
R-OtherServ																	1113.104
C-Crop					36.411	30.928	0.766	0.390		1.322						53.820	223.570
C-Lives					8.733	7.504	0.181	0.092		0.310					5.969	33.378	226.041
C-Forest					0.636	0.540	0.012	0.006							0.072	10.863	24.710
C-Fish					0.608	0.516	0.011	0.006		0.084					0.159	145.840	169.700
C-Oil															2.223	2492.749	2772.282
C-Mining					0.894	0.759	0.017	0.009		0.058					4.110	53.862	107.310
C-FFproc					32.342	27.443	0.607	0.309		0.546					1.073	302.037	434.088
C-OtherFood					174.035	147.329	3.217	1.637		5.249					5.053	342.874	883.099
C-Drink					74.332	63.024	1.388	0.706		5.372					-2.373	165.282	364.354
C-Wood					20.743	17.594	0.388	0.198		1.062					1.289	319.145	587.071
C-Mach					6.601	5.601	0.124	0.063							84.885	418.662	692.356
C-OtherMan					972.843	824.829	18.157	9.241		70.417					304.371	2369.360	6645.386
C-Energy					65.791	55.786	1.229	0.625								178.205	609.384
C-Const					18.275	15.473	0.338	0.172							526.748	1.078	1574.242
C-Distr					49.251	41.764	0.920	0.468		0.997					0.306	123.355	299.697
C-Hotels					273.763	231.980	5.087	2.589		149.954					0.000	196.593	972.559
C-Trans					168.149	142.590	3.143	1.600		16.911					7.620	385.099	1810.960
C-Fin					184.918	156.791	3.454	1.758	1.882	7.728					0.231	429.544	1458.018
C-Pub					76.871	65.072	1.417	0.721	153.088	2.303				2021.012	7.787	786.836	3485.915
C-OtherServ					496.885	421.411	9.295	4.731	43.511	33.688				78.382	168.832	2067.101	6209.852
F-labSK																	4732.987
F-LabUSK																	1083.580
F-Cap																	3006.545
F-Land																	29.117
U-Hh	1741.177	476.336	966.671	0.352										591.435			3775.972
R-Hh	1791.438	478.872	494.306											532.558			3297.173
F-HhS	1.921	0.507	15.983	17.206										36.808			72.425
F-HhL	0.293	0.077	20.466	10.505										5.522			36.862
NPISH					82.568	74.574								41.340			198.481
Tourist																296.000	296.000
ATAX																	60.359
STAX																	1086.160
YTAX					539.264	506.892	11.000	5.598									1062.754
Gov	629.845	112.669									60.360	1086.160	1062.754			88.434	3040.223
S-I					492.059	458.774	11.675	5.942						-266.835		416.748	1118.363
ROW	568.314	15.120	1509.119	1.055													11676.866
TOTAL	4732.987	1083.580	3006.545	29.117	3775.972	3297.173	72.425	36.862	198.481	296.000	60.360	1086.160	1062.754	3040.223	1118.355	11676.866	

4.3 Core regional Analysis

4.3.1 Key performance indicators

Gross Regional Domestic Product (GRDP) is a measure of the total economic activity within a region, and corresponds to GDP at national level. It represents the sum of all value added earned by the production of goods and services within a certain territory over a certain period of time, where value added is defined as income less intermediate costs. Per capita GRDP is often used as an indicator of economic welfare of a region, with comparisons of GRDP across regions indicating different living standards. GRDP is measured in the SAM at basic prices (that is, net of taxes on expenditure less subsidies); it is thus equivalent to the Gross Regional Value Added measures of economic performance produced on a regional basis by the Office for National Statistics (ONS) in the UK.

Table 4.4 presents the estimation of North East Scotland GRDP derived from the 2005 regional SAM. Since the total resident population of the North East Scotland on 30 June 2005 was 439,340 (General Register Office for Scotland, 2010), GDRP per head in that year is estimated at £20,149.

Table 4.4 North East Scotland Gross Regional Domestic Product, 2005

Income Approach		**£m**
Income from skilled employment	row sum	4,733
Income from unskilled employment	row sum	1,084
Income from land	row sum	29
Gross profits and other trading income	row sum	3,007
= GRDP at factor cost		**8,852**
		£
GRDP per head	(population 439,340)	20,149

Table 4.5 also presents GRDP but in this case indicates the proportion of the total generated in the rural and urban parts of the region. The urban area generates two-thirds of total GRDP, the rural part of the region the remaining third. Per capita GRDP (by place of residence) is shown to be far lower in the rural than urban part of the region. However, due to high levels of rural to urban commuting within the region, this is not a good indicator of the relative welfare levels of rural and urban residents.

Table 4.5 Spatial distribution of Gross Regional Domestic Product, North East Scotland, 2005

	GRDP (£m)	%	Per Capita GRDP (£)
Rural	2996.5	33.9	12,836.8
Urban	5855.7	66.1	28,438.1
Total	8852.2	100	20,148.9

An alternative indicator of economic welfare (or standard of living) is the Gross Regional Domestic Expenditure (GRDE) measure. Whilst GRDP focuses on the value of economic activity within the region, GRDE is a measure of the value of expenditure of domestic residents, regardless of the source of goods and services. Table 4.6 indicates that the 2005 North East Scotland SAM estimate of GRDE is £7.263.8 million or £16,533 per capita. This is lower than per capita GRDP, reflecting the substantial trade surplus of the region (underpinned largely by exports from the oil sector). Given that commodities in the SAM are not spatiality differentiated, it is not possible to show this measure on a rural-urban basis.

Table 4.6 North East Scotland Gross Regional Domestic Expenditure, 2005.

	£m
GRDP	8,852.2
+ imports	9,583.3
- exports	10,875.7
- tourist expenditure	296.0
GRDE	7,263.8
Population	439,340
GRDE per capita (£)	16,533

4.3.2 Household analysis

Tables 4.7a and 4.7b show the income and expenditure of the four household types in the SAM. While Table 4.7a shows the values in the SAM (to indicate the general significance of each type in the regional economy), Table 4.7b presents the same variables on an average per household basis, using data on number of households from the General Register of Scotland (GROS, 2010)

Table 4.7a Household income and expenditure, £m, 2005 (Total values)

	Urban Households		Rural Households		Households small farms		Households large farms	
Income	(£m)	%	(£m)	%	(£m)	%	(£m)	%
Skilled labour income	1741.2	46.1	1791.4	54.3	1.9	2.7	0.3	0.8
Unskilled labour income	476.3	12.6	478.9	14.5	0.5	0.7	0.1	0.2
Capital and profit*	966.7	25.6	494.3	15.0	16.0	22.1	20.5	55.5
Rent from land	0.4	0.0	0.0	0.0	17.2	23.8	10.5	28.5
Government transfers	591.4	15.7	532.6	16.2	36.8	50.8	5.5	15.0
Total income	3776.0	100.0	3297.2	100.0	72.4	100.0	36.9	100.0
Expenditure	(£m)	%	(£m)	%	(£m)	%	(£m)	%
Commodities	2662.1	70.5	2256.9	68.5	49.8	68.7	25.3	68.7
Payments to NPISH	82.6	2.2	74.6	2.3	0.0	0.0	0.0	0.0
Income tax	539.3	14.3	506.9	15.4	11.0	15.2	5.6	15.2
Savings	492.1	13.0	458.8	13.9	11.7	16.1	5.9	16.1
Total	3776.0	100.0	3297.2	100.0	72.4	100.0	36.9	100.0

*Includes self employment income

Table 4.7b Household income and expenditure, 2005 (average per household)

	Urban Households		Rural Households		Households small farms		Households large farms	
Income	(£'000)	%	(£'000)	%	(£'000)	%	(£'000)	%
Skilled labour income	17,652.7	46.1	20,230.1	54.3	314.6	2.7	312.2	0.8
Unskilled labour income	4,829.3	12.6	5,407.7	14.5	83.0	0.7	81.9	0.2
Capital and profit*	9,800.5	25.6	5,582.0	15.0	2,617.2	22.1	21,840.9	55.5
Rent from land	3.6	0.0	0.0	0.0	2,817.4	23.8	11,210.1	28.5
Government transfers	5,996.2	15.7	6,014.0	16.2	6,027.3	50.8	5,893.3	15.0
Total income	38,282.1	100.0	37,233.9	100.0	11,859.4	100.0	39,338.4	100.0
Expenditure	(£'000)	%	(£'000)	%	(£'000)	%	(£'000)	%
Commodities	26,989.1	70.5	25,486.8	68.5	8,146.5	68.7	27,023.2	68.7
Payments to NPISH	837.1	2.2	842.1	2.3	0.0	0.0	0.0	0.0
Income tax	5,467.2	14.3	5,724.2	15.4	1,801.2	15.2	5,974.0	15.2
Savings	4,988.7	13.0	5,180.8	13.9	1,911.7	16.1	6,341.2	16.1
Total	38,282.1	100.0	37,233.9	100.0	11,859.4	100.0	39,338.4	100.0

*Includes self employment income

The Urban household group has the largest total income of all domestic household categories, with the total income of the two farm household categories very small in comparison. However, large farm households have the highest average income, over three times higher average income than that estimated for household with small farms. Included in these estimates are imputed returns to managerial and labour input as well as, in the case of owner-occupiers, imputed rents. As expected, the two farm households have very limited income from paid employment, this coming from either payments to household members for work on the farm or from off farm employment. For the two non-farm household types, average income levels are very similar with that of urban households marginally higher.

The expenditure patterns of each household type are far more similar than their sources of income. Farm households are estimated to make lower payments to NPISH but have higher savings rates than non-farm households. The identical expenditure patterns by farm size are a result of the construction process: there was no information available on farm household private expenditures by size of farm, and therefore they were assumed identical, as reflected in the figures in the SAM.

4.3.3 Sectoral analysis

Both the absolute and relative importance of different production sectors in the North East economy is considered in relation to three aspects:

- The contribution the sector makes to the total value of output generated in North East Scotland
- The number of FTE employees in the sector
- The contribution the sector makes to value-added in the region, or GRDP.

Output

Table 4.8 shows the total value of output generated by each sector in 2005, differentiating according to whether the sector is located in the rural or urban part of the region.

Table 4.8 Output value by sector, North East Scotland, 2005 (£m)

	Urban sectors		Rural sectors	
	Output value (£m)	%	Output value (£m)	%
Agriculture	7.57	0.06	218.85	3.40
Forestry	0.63	0.01	22.91	0.36
Fishing	7.61	0.06	145.80	2.26
Oil extraction	2349.10	18.89	287.18	4.46
Mining	17.64	0.14	45.30	0.70
Fruit & fish processing	79.66	0.64	236.19	3.67
Other Food	57.63	0.46	186.16	2.89
Drink	4.62	0.04	58.67	0.91
Wood	106.95	0.86	200.78	3.12
Machinery	238.79	1.92	215.63	3.35
Other manufacturing	1166.54	9.38	745.15	11.56
Energy	35.95	0.29	169.53	2.63
Construction	537.58	4.32	647.94	10.05
Distribution	861.35	6.93	620.59	9.63
Hotels & catering	276.57	2.22	128.31	1.99
Transport	941.27	7.57	391.84	6.08
Finance	334.71	2.69	146.23	2.27
Public sector	1873.73	15.07	863.79	13.40
Other services	3539.31	28.46	1113.10	17.27
Total	12437.21	100.00	6443.97	100.00

Overall, urban sectors generate almost twice as much output value as sectors based in rural Aberdeenshire. Table 4.8 also shows that the relative importance of sectors varies between the two sub-areas. While the "Other services" sector generates the largest value of output in both areas, Oil extraction accounts for nearly a fifth of total value in the urban area. The construction sector is larger both in absolute and relative importance in the rural area. Agriculture, as expected, is far bigger in the rural part of the region, generating nearly £219m output compared to only £7.6m in the urban area. Table 4.9 breaks these figures down further, showing the contribution of each farm type to the overall totals.

Table 4.9 Disaggregation of agricultural output by farm type , North East Scotland, 2005

	Urban farm sector		Rural farm sector	
	Output value (£m)	% of total in sub-area	Output value (£m)	% of total in sub-area
Cereal Farms Small	1.29	17.0	33.88	15.5
Cereal Farms Large	1.20	15.9	31.70	14.5
Livestock Farms Small	1.40	18.4	42.78	19.5
Livestock Farms Large	2.28	30.0	70.61	32.3
Other Farms Small	0.63	8.3	16.69	7.6
Other Farms Large	0.78	10.3	23.19	10.6
Total	7.57	100.0	218.85	100.0

Large livestock farms are the dominant farm type in the region in terms of the value of output generated. The value of output generated on Livestock farms (both large and small, rural and urban) is 1.7 times larger than that of all cereals farms (£117.1m compared to £68.1m). The relative contribution of small cereal and "other" farms in the urban area is marginally higher than that in the rural area but the differences in contributions of the farms to overall output value are not significant.

Employment

Table 4.10 indicates the importance of each sector in terms of FTE employees. Differences in the relative contributions of sectors to total employment in Table 4.10 compared to Table 4.8 (total output value) are due to differences in labour intensity by sector.

Table 4.10 Employment by sector, North East Scotland, 2005 (FTEs)

	Urban sectors		Rural sectors	
	FTEs	%	FTEs	%
Agriculture	27	0.0	713	0.8
Forestry	7	0.0	253	0.3
Fishing	58	0.0	1111	1.3
Oil extraction	20139	11.4	2462	2.9
Mining	102	0.1	262	0.3
Fruit & fish processing	656	0.4	1945	2.3
Other Food	473	0.3	1322	1.5
Drink	17	0.0	216	0.3
Wood	766	0.4	1438	1.7
Machinery	2423	1.4	2188	2.5
Other manufacturing	7718	4.4	4930	5.7
Energy	81	0.0	382	0.4
Construction	6430	3.7	7750	9.0
Distribution	20890	11.9	15051	17.5
Hotels & catering	11799	6.7	5474	6.4
Transport	9431	5.4	3926	4.6
Finance	1957	1.1	855	1.0
Public sector	44443	25.2	20488	23.8
Other services	48743	27.7	15329	17.8
Total	176160	100.0	86095	100.0

Agriculture, along with the other primary sectors in the region, is shown to have very few employees. In contrast, the public sector, distribution and hotels and catering are far more important in terms of their share of employment than they are in relation to their contribution to total output value.

Table 4.11 shows how the agricultural FTE totals are split by farm type. The large farm types, as expected, are the major employers, with large livestock farms in rural North East Scotland accounting for half of total paid employment in the region. It can be noted that the distribution of employment between farm types is identical across rural and urban areas. This (like the farm household expenditure patterns discussed above) is due to decisions in the SAM construction process whereby, with no information to suggest otherwise, it was assumed employment intensity does not vary according to the location of the farm.

Table 4.11 Disaggregation of agricultural employment by farm type (paid employees only)

	Urban farm sector		Rural farm sector	
	Output value (£m)	% of total in sub-area	Output value (£m)	% of total in sub-area
Cereal Farms Small	1.98	7.3	52.23	7.3
Cereal Farms Large	5.83	21.6	154.06	21.6
Livestock Farms Small	0.30	1.1	7.92	1.1
Livestock Farms Large	13.85	51.3	365.67	51.3
Other Farms Small	0.01	0.0	0.17	0.0
Other Farms Large	5.03	18.6	132.96	18.6
Total	27.00	100.0	713.00	100.0

Value added

In addition to output and employment, the contribution a sector makes to value added in the region (GRDP) is also critical. Table 4.12 shows the contribution of each sector to the total GRDP reported above. Again the relative importance of sectors to value added is not always consistent with their contribution to output value or employment. However, the key role of oil extraction, public sector and other services in the urban area, and distribution, public sector and other services in the rural areas is apparent. The relatively low contribution of hotels and catering to value added, despite the high number of employees in the sector, reflects the high labour intensity required to provide such services and the low wage levels paid to employees in this sector.

Table 4.12 Value-added by sector, North East Scotland, 2005 (£m)

	Urban sectors		Rural sectors	
	Value-added (£m)	%	Value-added (£m)	%
Agriculture	3.4	0.1	83.5	2.8
Forestry	0.3	0.0	9.0	0.3
Fishing	2.6	0.0	50.5	1.7
Oil extraction	589.6	10.1	72.3	2.4
Mining	6.0	0.1	15.5	0.5
Fruit & fish proc.	25.0	0.4	74.2	2.5
Other Food	15.9	0.3	40.2	1.3
Drink	2.1	0.0	27.2	0.9
Wood	35.3	0.6	66.2	2.2
Machinery	106.0	1.8	95.7	3.2
Other Manufact.	451.3	7.7	288.4	9.6
Energy	10.3	0.2	48.8	1.6
Construction	244.6	4.2	294.8	9.8
Distribution	496.6	8.5	357.8	11.9
Hotels & catering	187.2	3.2	86.8	2.9
Transport	448.6	7.7	186.8	6.2
Finance	135.7	2.3	59.3	2.0
Public sector	1127.8	19.3	519.9	17.3
Other Services	1967.4	33.6	619.6	20.7
Total	5855.7	100.0	2996.5	100.0

Table 4.13 again focuses on the contribution of the agriculture sector, in total accounting for only 2.8% of GRDP, showing the importance of different farm types in generating this value. Cereal farms are shown to generate a higher proportion of value added than their employment or output contributions would suggest. However, large livestock farms are still the most important farm type in terms of this variable.

Table 4.13 Disaggregation of the agriculture sector's contribution to regional GRDP

	Urban farm sector		Rural farm sector	
	Value-added (£m)	% of total in sub-area	Value-added (£m)	% of total in sub-area
Cereal Farms Small	0.70	20.8	15.00	18.0
Cereal Farms Large	0.72	21.5	15.31	18.3
Livestock Farms Small	0.34	10.2	12.18	14.6
Livestock Farms Large	0.90	26.8	20.84	25.0
Other Farms Small	0.29	8.7	8.09	9.7
Other Farms Large	0.41	12.1	12.06	14.4
Total	3.36	100.0	83.48	100.0

4.3 Multiplier analysis

As discussed in Section 4.2, a key aim of the SAM analysis is to show how important the North East Scotland farm sector is for the regional economy. For this purpose, in addition to assessing the contribution of each sector to total output value, income, and employment as presented above, Leontief multipliers can be calculated which show the potential impact on the regional economy of a marginal change in an exogenous account, usually final demand for output. Sectors with high multiplier values are conventionally classified as "key sectors" as they have the potential to generate high levels of income and employment in the economy as a whole.

Various different types of multipliers can be estimated from the North East Scotland SAM. This report focuses on the more conventional multipliers, defining each before presenting findings and discussing the implications of the results from the perspective of the CAP-IRE project.

4.4.1 Output multipliers

Two types of "output" multipliers are shown in Table 4.14. The first, "Type 1 input-output" multipliers show the total change in the value of output in the economy due to a unit increase in final demand for a particular sector's output. Only the production accounts (activities and commodities) are treated as endogenous in this case, i.e. the behaviour of households are treated as exogenous and independent of production levels. These multipliers include the direct and indirect effects but not the induced effects (associated with household consumption). The second type of multipliers shown, "SAM multipliers", also show the total change in the value of output in the economy due to a unit increase in final demand for a

particular sector's output but in this case the factor accounts and household groups are treated as endogenous in the system. Thus, the SAM multiplier effects allow for the distribution of income in the economy and induced feedbacks as spending of additional earned income occurs, as well as the direct and indirect effects arising from inter-industry dependencies in the region.

In addition to contrasting the two different types of multiplier values, Table 4.14 also contrasts the magnitude of multipliers for sectors based in the rural and urban parts of the region.

Table 4.14 Comparison of Type 1 and SAM output multipliers: North East Scotland

		Type 1 Input-output				SAM Multipliers			
		Urban sectors	*rank*	Rural sectors	*rank*	Urban sectors	*rank*	Rural sectors	*Rank*
1	Cereal Farms S	1.5711	9	1.9377	3	1.8960	8	2.3806	2
2	Cereal Farms L	1.4529	18	1.8568	4	1.8385	11	2.2631	4
3	Livestock Farm S	2.2728	1	2.1390	1	2.6393	1	2.4938	1
4	Livestock Farm L	1.9037	2	1.9903	2	2.2702	2	2.3231	3
5	Other Farms S	1.7739	4	1.7959	6	2.1755	3	2.2102	5
6	Other Farms L	1.7013	5	1.7080	8	2.0599	4	2.1031	7
7	Forestry	1.6644	7	1.6666	9	1.9935	6	1.9988	9
8	Fishing	1.4922	16	1.4923	17	1.7123	20	1.7123	20
9	Oil extraction	1.7755	3	1.7746	7	2.0547	5	2.0540	8
10	Mining	1.5344	13	1.5345	14	1.7937	15	1.7937	15
11	Fruit & fish proc.	1.6288	8	1.6288	10	1.8958	9	1.8958	10
12	Other Food	1.6915	6	1.8476	5	1.9502	7	2.1082	6
13	Drink	1.3916	21	1.3916	21	1.6560	23	1.6561	23
14	Wood	1.5520	10	1.5520	11	1.8006	14	1.8006	14
15	Machinery	1.3981	20	1.3981	20	1.6844	22	1.6844	22
16	Other Manufact.	1.4836	17	1.4835	18	1.7496	16	1.7496	16
17	Energy	1.5357	12	1.5357	13	1.7321	18	1.7321	18
18	Construction	1.5401	11	1.5404	12	1.8436	10	1.8438	11
19	Distribution	1.3744	22	1.3744	22	1.7141	19	1.7141	19
20	Hotels &catering	1.2505	24	1.2505	24	1.6154	24	1.6154	24
21	Transport	1.5079	15	1.5077	16	1.8336	12	1.8335	12
22	Finance	1.5282	14	1.5282	15	1.8018	13	1.8018	13
23	Public sector	1.3491	23	1.3491	23	1.7093	21	1.7092	21
24	Other services	1.4296	19	1.4288	19	1.7492	17	1.7486	17

Concentrating first on the Type 1 multipliers, the various farm types are shown to give rise to relatively high multiplier effects for the wider region with livestock farms in particular having high multiplier values. This suggests that an increase in final demand for agricultural commodities would generate large knock-on effects for other sectors in the regional economy. The "other food" processing sector also has a high multiplier, reflecting the reliance of food processors on local farm output. The hotels and catering sector has the lowest Type 1 multiplier value in both the rural and urban areas (1.2505). This is due to the fact that the sector is not heavily reliant on inputs from other local sectors and thus an increase in tourist demand would not generate large "knock-on" benefits for the wider economy. Having

said this, the sector has a high labour intensity and thus is much more significant in terms of its potential for generating income and employment effects, as shown below.

While most sectors have very similar multipliers in terms of magnitude and rank positions in the urban versus rural parts of the region, there are some noticeable exceptions. In particular, cereals farms generate larger multiplier effects in the rural part of North East Scotland than in the urban part, while the oil extraction sector has the third highest multiplier in the urban part of the region, and the 7th highest in the rural area. These reflect, amongst other things, differences in the input-expenditure (direct) relative importance of these sectors in both areas.

As anticipated, the SAM multipliers are larger than their equivalent Type 1 input-output multipliers due to the fact that additional feedback effects are incorporated in the former. Again, Livestock farms (2.4938 – rural, small; 2.3231 – rural, large) and the other food processing sector (2.1082 – rural) stand out as having high potential for generating additional activity in the region. The downside of this is that, since multiplier effects are symmetric, a reduction in demand for output from these sectors will give rise to significant negative effects for other sectors in the economy: the negative stimulus will be amplified. Again, while much higher in magnitude than the Type 1 multipliers, hotels and catering have the lowest of all SAM output multipliers (1.6560 – urban, 1.6561 – rural).

4.4.2 Spillover effects

While Table 4.14 shows the total regional multiplier effects associated with a particular sector based either in the urban or rural part of North East Scotland, it does not indicate where those effects are generated. A rural-based sector may generate multiplier effects that are contained within the rural area (benefitting only other rural sectors), or it might generate multiplier effects which accrue mainly to the urban part of the region. The distribution of effects within a region is of importance to rural development agencies: Where rural-urban linkages are strong, a regional approach to development may be optimal. Where they are weak, rural areas may require more targeted development initiatives.

The strength of linkages between rural and urban areas can be determined by measuring the effects of a change in economic activity in one region on the level of economic activity in the other – so-called spillover effects. Tables 4.15a and 4.15b decompose the total SAM multipliers given above to show the distribution of effects across rural-urban space. First, Table 4.15a shows the spatial distribution of rural output multipliers, and then Table 4.15b shows the distribution of urban sector output multipliers.

Table 4.15a Spatial distribution of rural sector output multipliers

	RURAL SECTORS	Multplier effect on urban sectors	%	Mutliplier effect on rural sectors	%	Total Regional multiplier	%
1	Cereal Farms S	0.8383	*35*	1.5423	*65*	2.3806	*100*
2	Cereal Farms L	0.7618	*34*	1.5012	*66*	2.2631	*100*
3	Livestock Farm S	0.5308	*21*	1.9630	*79*	2.4937	*100*
4	Livestock Farm L	0.4834	*21*	1.8397	*79*	2.3231	*100*
5	Other Farms S	0.6174	*28*	1.5928	*72*	2.2102	*100*
6	Other Farms L	0.5603	*27*	1.5428	*73*	2.1031	*100*
7	Forestry	0.4338	*22*	1.5651	*78*	1.9988	*100*
8	Fishing	0.3918	*23*	1.3205	*77*	1.7123	*100*
9	Oil extraction	0.6780	*33*	1.3760	*67*	2.0540	*100*
10	Mining	0.4800	*27*	1.3137	*73*	1.7937	*100*
11	Fruit & fish proc.	0.4127	*22*	1.4831	*78*	1.8958	*100*
12	Other Food	0.4278	*20*	1.6804	*80*	2.1082	*100*
13	Drink	0.3834	*23*	1.2727	*77*	1.6561	*100*
14	Wood	0.4365	*24*	1.3641	*76*	1.8006	*100*
15	Machinery	0.4241	*25*	1.2603	*75*	1.6844	*100*
16	Other Manufact.	0.4810	*27*	1.2685	*73*	1.7496	*100*
17	Energy	0.4268	*25*	1.3053	*75*	1.7321	*100*
18	Construction	0.4931	*27*	1.3507	*73*	1.8438	*100*
19	Distribution	0.4678	*27*	1.2463	*73*	1.7141	*100*
20	Hotels & catering	0.3623	*22*	1.2532	*78*	1.6154	*100*
21	Transport	0.5533	*30*	1.2801	*70*	1.8335	*100*
22	Finance	0.5402	*30*	1.2616	*70*	1.8018	*100*
23	Public sector	0.4555	*27*	1.2537	*73*	1.7092	*100*
24	Other services	0.4992	*29*	1.2494	*71*	1.7486	*100*

Table 4.15b Spatial distribution of urban sector output multipliers

	URBAN SECTORS	Multplier effect on urban sectors	%	Mutliplier effect on rural sectors	%	Total Regional multiplier	%
1	Cereal Farms S	1.5292	81	0.3668	19	1.8960	*100*
2	Cereal Farms L	1.4893	81	0.3492	19	1.8385	*100*
3	Livestock Farm S	1.7482	66	0.8911	34	2.6393	*100*
4	Livestock Farm L	1.5690	69	0.7012	31	2.2702	*100*
5	Other Farms S	1.6106	74	0.5649	26	2.1755	*100*
6	Other Farms L	1.5456	75	0.5143	25	2.0599	*100*
7	Forestry	1.4308	72	0.5627	28	1.9935	*100*
8	Fishing	1.3918	81	0.3205	19	1.7123	*100*
9	Oil extraction	1.6782	82	0.3765	18	2.0547	*100*
10	Mining	1.4800	83	0.3137	17	1.7937	*100*
11	Fruit & fish proc.	1.4127	75	0.4831	25	1.8958	*100*
12	Other Food	1.4122	72	0.5380	28	1.9502	*100*
13	Drink	1.3833	84	0.2727	16	1.6560	*100*
14	Wood	1.4365	80	0.3641	20	1.8006	*100*
15	Machinery	1.4241	85	0.2603	15	1.6844	*100*
16	Other Manufact.	1.4811	85	0.2685	15	1.7496	*100*
17	Energy	1.4267	82	0.3053	18	1.7321	*100*
18	Construction	1.4931	81	0.3505	19	1.8436	*100*
19	Distribution	1.4678	86	0.2463	14	1.7141	*100*
20	Hotels & catering	1.3623	84	0.2532	16	1.6154	*100*
21	Transport	1.5534	85	0.2802	15	1.8336	*100*
22	Finance	1.5402	85	0.2616	15	1.8018	*100*
23	Public sector	1.4555	85	0.2537	15	1.7093	*100*
24	Other services	1.4996	86	0.2496	14	1.7492	*100*

The results suggest that, overall, the rural part of North East Scotland leaks more benefits to the urban part than *vice versa*. This was to be anticipated to the extent that the urban part of the region has a broader spread of sectors and accounts for the largest portion of regional GDP (see Table 4.5 above). However, there are differences between sectors, with 80% of the total multiplier effects associated with the rural "Other food" processing sector remaining in the rural part of the region as compared to only 65% of the total small cereals farm multiplier. The service sectors in the urban area have particularly low spill-over effects and, as such, expansion of these sectors will have very limited impact on rural activities.

4.4.3 Income effects (SAM)

Often, development agencies are more interested in the income- and employment-generating potential of sectors. Table 4.16 shows the so-called income effects of production sectors in North East Scotland. Income effects are defined as the total change in value-added in the economy due to a unit increase in final demand for a particular sector's output (Miller and Blair, 2009). As the underlying Leontief model in this case is based on a SAM as opposed to

input-output table, the effects include induced feedbacks, as well as the direct and indirect effects arising from inter-industry dependencies in the region.

Table 4.16 Income effects

		Sector based in urban area		Sector based in rural area	
		Income effect	*rank*	Income effect	*rank*
1	Cereal Farms S	0.9747	5	1.1069	1
2	Cereal Farms L	1.0042	3	1.0895	2
3	Livestock Farm S	0.9724	6	0.9152	9
4	Livestock Farm L	0.9536	8	0.8548	12
5	Other Farms S	1.0070	2	1.0375	3
6	Other Farms L	1.0077	1	1.0228	4
7	Forestry	0.8529	13	0.8547	13
8	Fishing	0.6676	23	0.6675	23
9	Oil extraction	0.7586	17	0.7590	17
10	Mining	0.7097	20	0.7097	20
11	Fruit & fish proc.	0.7108	19	0.7108	19
12	Other Food	0.6835	22	0.6860	21
13	Drink	0.7748	15	0.7747	15
14	Wood	0.6838	21	0.6838	22
15	Machinery	0.7683	16	0.7683	16
16	Other Manufact.	0.7269	18	0.7270	18
17	Energy	0.5845	24	0.5845	24
18	Construction	0.8580	12	0.8581	11
19	Distribution	0.9294	10	0.9294	8
20	Hotels &catering	0.9764	4	0.9765	5
21	Transport	0.8850	11	0.8851	10
22	Finance	0.8035	14	0.8035	14
23	Public sector	0.9548	7	0.9547	6
24	Other services	0.9337	9	0.9341	7

The rank positions of sectors in terms of their potential for generating income in the region is similar but not identical to their potential for generating output value. Differences are due to differences in sectoral dependence on local factors as well as differing wage rates between sectors.

Farm sectors, particularly other farms in the urban area and cereals farms in the rural area, have high potential for generating additional income in the region – much higher than their general importance in the economy (in terms of GDP, employment) would suggest. The oil extraction sector is shown to be relatively less critical in terms of income-generating effect than it is in generating regional output value. This is due in part to the leakage of factor income to outside the region. In contrast, the service sectors, in particular hotels and catering, have greater potential for stimulating the wider regional economy based on this measure. In particular, the figures from Table 4.16 suggest that a £1 million increase in output from the urban oil extraction sector would, after taking into account all the feedback effects, generate an addition £75,860 income in the economy. In contrast, a £1 million increase in output from the rural hotels and catering sector would generate an addition £97,640 income in North East Scotland.

4.4.4 Employment effects (SAM)

The employment effects arising from a policy change or stimulus to an economy are often considered critical. Tables 4.17a and 4.17b presents various measures associated with employment. The first column of figures in each table, 'employment coefficients', measure the amount of employment (measured in full-time equivalents, FTEs) required per unit output of each sector. As shown, in the rural area, the highest value is given by hotels and catering, with 42.7 FTE jobs required per £1m of own "output". This is followed by the distribution and public sectors. The farm sectors have amongst the lowest employment coefficients.

Perhaps more interestingly, *employment effects* measure the amount of employment generated in the whole economy as a result of a unit increase in demand for output from a particular sector. These exceed the values of the employment coefficients, since inter-industry links and other economy-feedback effects are taken into account. For example, the Other food processing sector has an employment effect of 18.64, indicating that a £1 million increase in final demand for other food output leads to a total increase in North East Scotland employment of 18.64 FTEs, some of which will be in the other food processing sector, and others elsewhere in the economy. Arguably, employment effects are the most useful measures from a policy perspective in assessing the potential of a sector to generate knock-on benefits in the economy as a whole.

Table 4.17a Rural sector employment coefficient and effects, North East Scotland, 2005.

		Rural			
		emp coeff	*rank*	emp effect	*rank*
1	Cereal Farms S	1.5417	*22*	19.2352	10
2	Cereal Farms L	4.8628	*19*	21.0074	8
3	Livestock Farm S	0.1853	*23*	15.3308	20
4	Livestock Farm L	5.1825	*18*	18.8698	13
5	Other Farms S	0.0101	*24*	14.5425	22
6	Other Farms L	5.7380	*17*	18.9775	12
7	Forestry	11.0450	*6*	24.0156	5
8	Fishing	7.6198	*11*	16.5444	16
9	Oil extraction	8.5729	*9*	22.0779	7
10	Mining	5.7838	*16*	15.2700	21
11	Fruit & fish proc.	8.2348	*10*	18.3318	15
12	Other food	7.1015	*13*	18.6449	14
13	Drink	3.6813	*20*	12.3788	23
14	Wood	7.1621	*12*	16.4866	17
15	Machinery	10.1468	*7*	18.9989	11
16	Other Manufact.	6.6161	*14*	16.0190	19
17	Energy	2.2533	*21*	9.7631	24
18	Construction	11.9608	*5*	22.9156	6
19	Distribution	24.2525	*2*	33.8305	3
20	Hotels & catering	42.6622	*1*	51.1638	1
21	Transport	10.0193	*8*	20.7540	9
22	Finance	5.8468	*15*	16.2217	18
23	Public sector	23.7185	*3*	33.8900	2
24	Other services	13.7713	*4*	24.0182	4

Table 4.17b Urban sector employment coefficient and effects, North East Scotland, 2005.

		Urban			
		emp coeff	*rank*	emp effect	*rank*
1	Cereal Farms S	1.5377	*22*	12.9533	22
2	Cereal Farms L	4.8548	*19*	15.6281	19
3	Livestock Farm S	0.2152	*23*	18.7654	12
4	Livestock Farm L	6.0942	*16*	20.6665	9
5	Other Farms S	0.0102	*24*	14.2593	21
6	Other Farms L	6.4313	*15*	19.2166	10
7	Forestry	11.0450	*6*	23.9463	5
8	Fishing	7.6198	*12*	16.5441	15
9	Oil extraction	8.5728	*9*	22.0874	7
10	Mining	5.7838	*18*	15.2699	20
11	Fruit & fish proc.	8.2348	*10*	18.3318	14
12	Other food	8.2070	*11*	18.7467	13
13	Drink	3.6813	*20*	12.3789	23
14	Wood	7.1621	*13*	16.4866	16
15	Machinery	10.1468	*7*	18.9989	11
16	Other manufact.	6.6160	*14*	16.0195	18
17	Energy	2.2533	*21*	9.7629	24
18	Construction	11.9608	*5*	22.9132	6
19	Distribution	24.2525	*2*	33.8312	3
20	Hotels &catering	42.6621	*1*	51.1639	1
21	Transport	10.0193	*8*	20.7557	8
22	Finance	5.8468	*17*	16.2223	17
23	Public sector	23.7184	*3*	33.8927	2
24	Other services	13.7712	*4*	24.0280	4

4.4.5 Final market analysis

Economic activity within the North East Scotland region is stimulated by sales of goods and services to so-called "final demand categories" and/or flows of transfer income into the region. Within the SAM model, there are four sources of final demand and income flows: sales to government (both local and central government); sales which add to capital stocks (GFCF), sales to tourists and finally exports to other regions (the rest of Scotland, rest of UK and rest of world). Using standard multiplier techniques, it is possible to assess the relative importance of each of these different sources in terms of generating local economic activity.

Table 4.18 indicates the extent to which each source stimulated output, factor income and employment in North East Scotland in 2005. The totals presented in the table are consistent with those in the SAM. The results indicate the importance of export markets for the economy. Taking into account the various inter-sectoral and household linkages in the economy, the export market is responsible for generating 71% of the value of output produced in the economy, 68% of total factor income and 56% of total household income. The second most important stimulus in terms of output value and income is government expenditure (including transfer payments direct to households).

Table 4.18 Source of North East Scotland economic activity by final market, 2005

	Government	GFCF	Tourists	Exports	**TOTAL**
Output	3845	1334	263	13439	18881
%	*20*	*7*	*1*	*71*	*100*
Factor income	2089	634	139	5990	8852
%	24	7	2	68	100
Household income	2621	421	95	4046	7182
%	36	6	1	56	100

Table 4.19 looks in more depth at the drivers of agricultural activity in the region. Here, the importance of export markets is even more noticeable, accounting for 77% of livestock and other farm sector output value, 78% of cereal farm output. Government expenditure is less important for the farm sector as the main injection from government comes in the form of transfer payment to local households and the implications for farms are less than many other sectors as most farm output is not sold direct to consumers but is further processed. There is very little difference between farm types in the importance of the four final demand categories.

Table 4.19 Source of North East Scotland agricultural activity by final market, 2005. Output value (£m)

	Government	GFCF	Tourists	Exports	TOTAL
Cereals	11	2	1	53	*68*
%	*16*	*4*	*2*	*78*	*100*
Livestock	17	8	2	90	*117*
%	*15*	*7*	*2*	*77*	*100*
Other farm types	6	2	1	32	*41*
%	*15*	*6*	*2*	*77*	*100*

4.4.6 Household multipliers

The SAM household multipliers shown in Table 4.20 measure the total effect of a unit change in income of a particular household group (rather than change in demand for sectoral output as in the previous section) on the incomes of all households in the economy. This effect might be brought about by, for example, a change in the income tax regime, or a change in value of transfer earnings (social security payments, pensions, etc.) from outside the region. One interpretation of these multipliers is that they measure the "trickle-down" effect of changed income or wealth in one group on society in general.

The magnitude of household multipliers is very similar across the four household categories in the SAM, varying from 1.2162 (urban households) to 1.2099 (rural non-farm households). Both small and large farm households are estimated to have identical income-generating potential (due to the assumptions made in the construction process, discussed in section 2.2.3 above). In particular, the table suggests that a £1 million increase in income of either small or large farm households in the region will eventually increase total household income in the economy by an additional £21,070 over and above the injection. Of this "extra" income generated (due to interregional feedbacks), urban households take the lion's share of £11,230, with rural non farm households benefiting by £9,500. The remainder is spread between the farm households. The magnitude of household multipliers is generally low, reflecting the fact

that a high proportion of injections to households is directly leaked due to household purchases on imports and other leakages such as savings.

Table 4.20 SAM household multipliers, North East Scotland 2005

	Injection to:			
Impact on:	Urban households	Rural households	Small farm households	Large farm households
Urban households	1.1153	0.1119	0.1123	0.1123
Rural households	0.0975	1.0947	0.0950	0.0950
Small farm households	0.0019	0.0018	1.0019	0.0019
Large farm households	0.0016	0.0015	0.0015	1.0015
Total multiplier	**1.2162**	**1.2099**	**1.2107**	**1.2107**

4.4 Policy simulations

This section uses the SAM multiplier model to investigate the impacts arising from four specific CAP policy scenarios. The key aim is to assess the economy-wide impact of each policy scenario in terms of regional performance indicators (output value, GRDP, employment and household income). Not only the magnitude of impact but the distribution of effects across rural-urban space and between production sectors is of interest. First, the Policy scenarios and the way they were implemented in the SAM model are described, before moving onto the results from the policy shocks.

4.4.1 CAP-IRE Policy Scenarios

The policy scenarios are based on those developed in WP8 of the CAP-IRE project and are summarised in Table 4.21 below. Two of the scenarios - Baseline and No Cap - are identical to those used in Survey A of the project. In particular, the baseline scenario is that the CAP continues in its current form to 2010 while the No CAP scenario is that all CAP support is completely abolished with immediate effect. The two remaining scenarios – Regionalisation and Environment - are described in detail in WP8 of the project but, in brief, are variants on a reduced budget CAP.

Table 4.21 Definition and implementation of Policy scenarios

Scenario	**Description**	**Reduction in Farm activity**
Baseline	CAP continues in current form	Based on responses to Survey A
No Cap	CAP abolished	Based on responses to Survey A
Regionalisation	Budget reduces by 50%; relative importance of Pillar 1 and Pillar 2 as in baseline	Baseline number of exits plus additional 50% of difference between exits under baseline and No Cap scenario
Environment	Budget reduced by 50%; switch to Pillar 2 expenditures	Baseline exits plus exits of large specialist farms as in No CAP scenario; rest as in Baseline scenario

A key stage in SAM Leontief modelling is the translation of policy scenarios into injections into the model. A limitation of this form of linear model, as compared to a Computable General Equilibrium (CGE) model, is that the policy shock needs to be translated into a change in final demand, as this is the only exogenous component in the modelling framework with relative prices fixed and supply assumed unconstrained (Partridge and Rickman, 1998). In this particular case, the key information available to guide this stage were the results from the farm household Survey A which asked farmers in the North East Scotland case study area (as well as other CAP-IRE study areas) whether or not, under the Baseline and No CAP scenarios, they would remain in the sector.

The results from this question in the North East Scotland study area have been reproduced elsewhere but, for convenience, are shown again in Table 4.22.

Table 4.22 Responses to the Baseline and No CAP scenario from Survey A.

Key:
Observations (Bold)
Row percentage (italics)
Column percentage (italics)

		No CAP Scenario			
		Yes	No	Don't Know	Total
Base line Scenario	Yes	**75**	**22**	**46**	**143**
		52	*15*	*32*	*100*
		100	*63*	*79*	*85*
	No	**0**	**10**	**1**	**11**
		0	*91*	*9*	*100*
		0	*29*	*2*	*7*
	Don't Know	**0**	**3**	**11**	**14**
		0	*21*	*79*	*100*
		0	*9*	*19*	*8*
	Total	**75**	**35**	**58**	**168**
		45	*21*	*35*	*100*
		100	*100*	*100*	*100*

Eleven (7%) of the 168 respondents to Survey A in the region said that, even under the Baseline scenario, they would exit the sector. This is important in terms of the interpretation of the results below. The baseline scenario in this case does not represent a "No change" situation to the 2005 situation but instead is a scenario in its own right, with the result interpreted as the impact on the regional economy of the ongoing decline of the sector, regardless of any additional changes in the CAP after post-2013 reforms. As would be expected, the number of farm households that would exit the sector is far higher under the extreme No CAP scenario, at 35 (21% of total respondents). These figures underpinned the implementation of the Baseline and No CAP shocks to the SAM model. The other two scenarios were assumed to be variations on the No CAP responses, with the number of exits in the Regionalisation scenario assumed to be same as under the baseline plus half that of the additional No CAP exits (based on the fact the budget is reduced by 50% but the nature of support remains the same) while under the Environment scenario it was assumed that, apart form those that would exit under the baseline, all the extra small and mixed farms that said they would exit under the No CAP scenario would remain in the sector due to the switch to Pillar 2 support, while the large specialist farm exits would be as in the No CAP case.

It should be noted that the large number of "Don't knows" recorded in relation to the question in Survey A, particularly under the No CAP scenario, were not taken into account, and therefore, to the extent that these respondents may exit, the results below might be interpreted as lower-bound estimates on the impact of the CAP policy changes (although the underlying assumptions of the model and exclusion of price and supply-side adjustments will counterbalance any overestimation).

The figures above were analysed in terms of farm type and size, converted from sample to population levels (based on the assumption that the Survey A sample was representative of the sector), and then estimates of the reduction in value of output associated with the farm exits were generated. These were fed into the Leontief model as reductions in commodities, the majority of which were in terms of crop and livestock commodities but with some other commodities affected due to secondary production (that is, farm production of non-farm outputs).

4.4.2 Results

The overall results (in terms of changes from 2005 levels) from the policy simulations are show in Table 4.23.

Table 4.23 Aggregate impacts of the CAP-IRE policy scenarios on the North East Scotland economy.

	Policy Scenario			
	Baseline	No CAP	Regional-isation	Environment
Output (£m)	-21.47	-60.53	-41.00	-52.06
% change	*-0.11*	*-0.32*	*-0.22*	*-0.28*
GRDP (£m)	-9.22	-25.48	-17.35	-21.87
% change	*-0.10*	*-0.29*	*-0.20*	*-0.25*
Household income (£m)	-6.63	-18.34	-12.48	-15.75
% change	*-0.09*	*-0.26*	*-0.17*	*-0.22*

Due to the exits from the sector, even if the CAP is maintained in its existing form (baseline scenario), output value is predicted to decrease in the region by £21.47m. This includes the reductions in output from the farm sector itself plus reductions in output of all other sectors in the region brought about by either inter-industry interdependencies or reductions in local household spend. The reduction in total output value under the No CAP scenario is far higher (£60.53m) but even this reduction, at a regional economy level, is very small (0.32%). Of the two other scenarios, it is the Environment scenario which is estimated to produce the largest negative impact on the economy. This is due to the larger output impact of large specialist farms leaving the sector. The Regionalisation results in terms of output (and indeed the other variables) lies midway between the No CAP and baseline scenarios as would be expected given how this shock is defined and the linear nature of the model.

The percentage changes in regional GRDP and household income shown in Table 4.23 are smaller than the percentage changes in output value, again reflecting the relative small direct contribution the sector makes to the economy. Comparing across the columns of the table, the relative magnitude of each policy scenario is the same as the impact on output values, with the Environmental scenario giving rise to a greater reduction in GRDP and income than the regionalisation scenario.

Table 4.24 shows the distribution of output effects across the region while Tables 4.25a and 4.25b shows the impact on the farm sector, first by farm type, then farm size.

Table 4.24 Distribution of output effects across the region: Percentage changes in gross output values from 2005 levels

	Policy Scenario			
	Baseline	No CAP	Regional-isation	Environment
Urban Output (£m)	-6.75	-18.28	-12.52	-15.66
Rural Output (£m)	-14.72	-42.25	-28.48	-36.40
Total Output effect	-21.47	-60.53	-41.00	-52.06

As expected, given that the farm sectors are those directly impacted, the majority of total effects are felt in rural parts of the region. There is only a very limited difference in terms of spatial impact between the scenarios, with the rural impact ranging from 68.55% of the total (under the Baseline scenario) to 69.92% (under the Environment scenario). The fact that the urban impact is around 30% of the total in each case is due to the location of more non-farm activity there than the presence of a limited urban agriculture sector. In other words, the urban impact of the shock is associated mainly with the knock-on rather than the direct impacts of the policy shocks.

From Tables 4.25a and 4.25b, the output of livestock farms is more affected than other farm types, while output of large farms falls more than that of small farms (in absolute and percentage terms from 2005 levels).

Table 4.25a Distribution of output effects across farm types

	Policy Scenario			
	Baseline	No CAP	Regional-isation	Environment
Cereal farms	-2.13	-4.26	-3.20	-3.51
% change	*-3.13*	*-6.26*	*-4.70*	*-5.16*
Livestock farms	-6.80	-21.80	-14.30	-18.98
% change	*-5.81*	*-18.62*	*-12.22*	*-16.22*
Other farms	-2.03	-5.95	-3.99	-5.13
% change	*-4.91*	*-14.40*	*-9.65*	*-12.43*

Table 4.25b Distribution of output effects across farm size

	Policy Scenario			
	Baseline	No CAP	Regional-isation	Environment
Small farms	-4.43	-12.60	-8.51	-10.85
% change	*-4.58*	*-13.03*	*-8.81*	*-11.22*
Large farms	-6.53	-19.41	-12.97	-16.78
% change	*-5.03*	*-14.96*	*-10.00*	*-12.93*

Finally, Table 4.26 illustrates the impact of each policy scenario across selected sectors in the economy. While all sectors would be affected to some extent due to the inter-linkages and feedbacks in the region, the distribution and other services sectors have the highest percentage reductions in output value. Again the relative magnitude of impacts across the scenarios is as previous tables, reflecting the linearity of the Leontief model: The effects of No CAP are largest, with the environmental scenario giving rise to larger impacts than the regionalisation scenario.

Table 4.26 Output effects on selected non-farm sectors

	Policy Scenario			
	Baseline	No CAP	Regional-isation	Environment
Fruit and fish processing	-0.16	-0.39	-0.27	-0.37
% change	*-0.04*	*-0.10*	*-0.07*	*-0.10*
Other food processing	-0.62	-1.87	-1.24	-1.95
% change	*-0.11*	*-0.33*	*-0.22*	*-0.35*
Other manufacturing	-1.25	-3.41	-2.33	-2.92
% change	*-0.41*	*-1.11*	*-0.76*	*-0.55*
Distribution	-3.33	-9.41	-6.37	-8.09
% change	*-0.22*	*-0.63*	*-0.43*	*-0.55*
Other services	-2.35	-6.12	-4.24	-5.23
% change	*-0.05*	*-0.13*	*-0.09*	*-0.11*

4.5 Discussion

This chapter has focused on the nature of links between farm households and the wider regional economy, focusing in particular on the North East Scotland study area. A SAM was

presented and used to assess the contribution of the farm sector in terms of output, income and employment.

The results show that in this particular study area, agriculture is relatively unimportant, generating less than 3% of GRDP and employing very few people apart from farm operators themselves. Consistent with this, farm households are relatively few in number and thus farm household consumption expenditure does little to sustain wider economic activity at the regional level. However, the multiplier analysis presented in Section 4.4 suggested that standard economic indicators (such as GRDP) under-represents the importance of farm households to the wider regional economy. In particular, the output and income potential of the farm sector is relatively high compared to that of other sectors. The results also showed that different farm types have different degrees of integration, with small livestock farms most integrated and thus having high multipliers, and cereal farms having higher leakages and thus lower multipliers.

The final section used the SAM multipliers to assess the impacts of various CAP-related policy simulations. The Leontief model which underlies this analysis is restrictive in several ways. In particular, it assumes fixed input proportions in production and a unitary income elasticity of demand for all commodities. There are no price-quantity feedback effects or supply-side constraints. As a consequence, the results should only be interpreted as indicative of potential impacts associated with CAP reform.

The results suggest that at regional level, CAP reform in North East Scotland would have relatively small impact, primarily because the sector in the base year, 2005, is already relatively small in magnitude. However, and importantly, the results suggest that the Environment policy scenario, which combines a reduction in the budget with a switch in support from Pillar 1 to Pillar 2, while reducing the number of farm exits, may still lead to larger economy-wide impacts if as a result more large specialist farms exit. This is because the latter contribute to the bulk of output value and thus sustain more production-related linkages.

The following chapter turns attention from the regional level to linkages between farm households and their local economy.

Chapter 5: Findings from the spatial tracking survey

5.1 Introduction

This element of WP5 seeks to understand the extent to which farm households are integrated into their local economy, focusing on first-stage economic links. Key questions are:

- What proportion of farm household transactions occur within the locality, and how does this differ by
  - nature of transaction (eg. input purchases, output sales, off-farm work)?
  - between CSAs?
- To what extent are the direct links influenced by
  - Farm characteristics?
  - Farm household characteristics?
  - Local context?
- How are the economic links changing over time?

The chapter begins with a brief description and comparison of the four CAP-IRE CSAs used in the spatial tracking analysis – Podlaskie (PL), North East Scotland (UK), Centre (FR1), and Midi-Pyrénées (FR2). It then presents (in Section 5.3) some characteristics of the sample of farm households from each of the CSAs. The next section (5.4) reports the average distances over which various different farm household transactions take place and considers the extent to which these vary by farm type or farm size.

Given differences in the geographic and socio-economic contexts of the CSAs, the comparison of distances gives only limited insights into the integration of farm households within a locality. A farm household in one CSA may purchase groceries much further from the farm than a household in another CSA, but, if the former is buying from the nearest source, then the household is still "buying locally". Therefore, the following section (Section 5.5) moves on to consider the proportion of transactions of different types that are local. As discussed in Chapter 2, an important issue is the definition of 'local' used in the analysis. The USDA approach of defining local as within market reach of the nearest settlement (town or city) of a certain size is adopted in this case, as it provides a means of comparison between the CSAs, where economies and populations have different spatial characteristics. The section also uses probit analysis to explore whether there are systemic characteristics of farm households that explain one particular input (fertilizer) purchasing patterns, and, in particular, whether fertilizer is purchased locally or not.

Section 5.6 highlights differences in the spatial concentration of agri-business activity between the Polish and UK study region. An understanding of such differences is critical in considering the implications of CAP reform. Section 5.7 reports farm household perceptions of the importance of agriculture to the local economy while Section 5.8 concludes.

5.2 Context

Full descriptions of the CSAs involved in the spatial tracking analysis can be found in Deliverables 2.1.4 (PL), 2.1.5 (UK) 2.1.8 (FR1) and 2.1.9 (FR2). This section provides a précis of their characteristics.

5.2.1 Podlaskie CSA, Poland

The Polish CSA (PL) is the Podlaskie region, located in the North-Eastern part of the country. It comprises 6.5% of Poland's area. Sixty percent of the population live in urban areas in the region, the remaining 40% in rural areas. The urban/rural split of the area is 4.6%/95.4% and by population it is 60% urban and 40% rural. Agriculture accounts for 10.7% of GRDP and is one of the region's main industries. GDP per capita for the year 2002 is only 77% of the national average. The 'drivers' of the region's development are urban centres (Bialystok, Lomza, Suwałki) surrounded by much less advanced areas. Bialystok, the only city, with a population of more than 291 thousand, accounts for nearly 37% of the region's economic potential and 45.8% of the employment in Podlaskie (Zioło & Ślęzak, 2003, p.188).

More than half the land area is utilised for agriculture. Natural conditions for farming are diversified. Three main types of areas can be distinguished:

a. very good, heavy soils suitable for all types of agricultural production, with milk and cattle dominating in production structure;

b. medium-quality soils, with less intensive agriculture, mainly consisting of mixed farms (mix of crops, cattle and pigs);

c. poor, sandy soils, frequently threatened by droughts.

In 2008, 7,546 farms were receiving agri-environmental support, while roughly 80 thousand received direct payments. 32% of the land area was under some form of environmental protection (NUTS2 statistics).

Family farms predominate in the region – in the past state or collective farms owned a very small percentage of the agricultural land. Average farm size (11.5 ha) is relatively high for Poland, and has been increasing noticeably recently. Farmers in the region are quite dynamic and milk production has developed very strongly. There are 3 main dairies in the region, which belong to the most important group of dairies in Poland.

5.2.2 North East Scotland CSA, UK

The North East of Scotland Case Study Area (NUTS 3 area UKM50) comprises the two unitary authorities of Aberdeen City and Aberdeenshire. Nearly half the region's c450,000 population lives in the region's one city, Aberdeen (GROS, revised 2007). The region is economically buoyant, driven by activity within the Oil & Gas sector, with annual rates of growth of around 2.4% per annum and the third highest Gross Value Added in the UK. The region's dependence on the Oil & Gas sector is a concern, given the inevitable decline in North Sea production.

Historically, the CSA is an important agricultural region, that has had an international impact (for example, it is the home of the Aberdeen-Angus cattle breed, and seed potatoes are exported globally). The majority of farms are owner-occupied and family-run. In line with national and international trends, the number of farms and employment within agriculture has declined significantly. However, part-time employment and part-time farms have increased in significance.

Farms are predominantly of the mixed type. Beef production remains important, with 1,217 farms raising and breeding 58,529 beef cows. In sharp contrast to Podlaskie (PL), only 100 farms are involved in dairy production, and there is only one major dairy in the region. Cereal production in the area has supported an important pig and poultry industry, and helps to supply Scotland's very significant whisky industry with malting barley. Although food and drink production remains an important sector in some rural areas, concentration and consolidation of activity in the industries up-stream and down-stream of agriculture – the input supply and product-processing industries – has reduced the local economic importance of agriculture.

5.2.3 Centre (FR1), France

The Centre NUTS2 region is made of six NUTS3 regions, and is the fourth biggest NUTS2 region in France. The region has only two cities (i.e. Tours and Orléans, the NUTS2 capital city) of more than 100,000 inhabitants, but none more than 300,000 inhabitants.

Although a leading crop farming production areas within Europe, Centre is also a huge forestry area with nearly 1,000,000 forested hectares. The region is crossed from east to west by the longest French river (La Loire) along which vineyards, orchards and market-gardens can be found. The climate is mild, heavily influenced by the Atlantic Ocean.

While the northern part of the region consists of vast plains suitable for crop farming (mainly wheat and rapeseed), central and southern parts are dominated by mixed and livestock farming. Centre is France's leading grain grower, and is sometimes referred to as the "grain loft of France", accounting for some 14% of the total national production. The region produces the highest share of France's wheat and oilseed and the second highest share of France's barley. Intensive, large-scale production on large modern holdings began in Beauce and north-eastern area (Berry), and has spread rapidly to other districts.

5.2.4 Midi-Pyrénées (FR2), France

Midi-Pyrénées, located in the south-western part of France, is the largest NUTS2 region of France, covering about 8% of the national territory and encompassing 8 NUTS3 regions. The region is of varied topography, consisting of plains, hills and mountains of differing height. Midi-Pyrénées is bounded by two mountainous massifs: the Massif Central in the north-eastern part, and the Pyrénées in its southern part (making a natural border with Spain). Between these areas, on either side of the Garonne River valley, is a plain. The region is sparsely inhabited and the population not evenly distributed. The only major city of the region, Toulouse, and its conurbation, have a population of more than 750,000 inhabitants (30% of total population). In contrast, the region also has vast rural areas with a sparse, ageing population, and traditional and limited economic activity.

Agriculture is very important, with production equally divided between livestock and crops. Livestock, primarily sheep, are mainly in the foothills of the Massif Central and the Pyrénées, and crops in the plains. Permanent fruit crops (plums, apples, peaches) are concentrated in the north-western part of the region, along the Garonne River valley. A number of high-quality food and drink products originate in the region: Roquefort cheese; Armagnac brandy; Madiran, Fronton, Gaillac and Cahors wines; "foie gras".

5.3 Sample characteristics

This section provides an overview of the sample of farm households used in the Spatial tracking analysis. As explained in Chapter 2, the farm households in the French and Polish CSAs are the same as those that completed Survey A, while the North East Scotland sample was drawn from the same sampling framework but in such a way as to ensure that no household was sampled twice. Also, while the Polish and UK farm households completed a full spatial tracking survey, the French data are based on responses to additional questions asked as part of Survey A. This explains why the reporting of characteristics and results varies between the CSAs.

5.3.1 Farm household characteristics

Table 5.1 indicates the distribution of household size in each of the four samples used in the spatial tracking analysis.

Table 5.1 Household size

Number of household members	Podlaskie (PL) (n=244)	North East Scotland (UK) (n=224)	Centre Region (FR1) (n=140)	Midi-Pyrénées (FR2) (n=155)
1	2.0	5.8	17.9	6.4
2	5.7	46.7	30.0	18.7
3	14.7	20.0	20.7	21.9
4	31.1	18.7	21.4	34.2
5	25.8	5.8	7.9	17.4
6	13.5	1.8	1.4	1.3
7	5.7	0.4	0.7	0
8	1.2	0	0	0
9	0	0.4	0	0
Missing	0	0.4	0	0
Mean	4.4	2.8	3.4	3.5
Total	100	100	100	100

Respondents from the Centre region (FR1) have the largest number of single-person farm households. This may be explained in part by the fact that sampling in this area was biased towards younger, incoming farmers (see Raggi *et al.*, 2010). The mean size of farm household was largest in Podlaskie (PL), a region that has a high number of children per household (Kondratiuk-Nierodzińska *et al.*, 2007). It is smallest in North East Scotland (UK), where there is a large number of two-person households and where the aging demographic of farmers is seen as a key problem (ADAS, 2004).

Table 5.2 compares the average distance of farm households in each CSA to key locations, such as where they do most their household shopping, local services and conurbations. It provides the underlying spatial information on which much of the subsequent locality analysis is based.

Table 5.2 Average distance from household to principal locations for household inputs (km)

	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Groceries	4.1	11.0	13.3	14.9
Major household items	16.8	27.7	23.7	25.5
Local primary school	4.4	4.6	3.6	3.8
Local secondary school	17.6	11.3	9.2	10.9
Nearest hospital	20.4	19.4	23.1	28.9
Nearest town >3,000	10.8	13.2	15.3	18.2
Nearest city >50,000	24.5	44.9	43.2	65.6

The results suggest very different economic geographies in each regions. For all four CSAs, the distances to elementary/primary school or hospital are relatively similar, or at least within the same order of magnitude. However, the average distance to where the household does its grocery shopping is far lower in Podlaskie and, importantly, much closer than the nearest town with a minimum of 3,000 inhabitants. In contrast, the average distance to a city with more than 50,000 population is lowest in Podlaskie, and highest in the Midi-Pyrénées CSA (FR2). With the exception of distance to city, the economic geography of the UK and two French CSAs appear similar, while that of the Polish CSA seems distinct. In all cases, distances travelled for major household items are further than for groceries, and the distances to the services included in the table (primary schools, secondary schools and hospital) all follow the expected pattern consistent with central place theory and the existence of an urban settlement hierarchy.

5.3.2 Farm characteristics

Table 5.3 shows the distribution of farm types in each of the four CSA samples.

Table 5.3 Farm types by CSA

	Podlaskie (PL)		North East Scotland (UK)		Centre Region (FR1)		Midi-Pyrénées (FR2)	
	n	%	n	%	n	%	n	%
Cattle	37	15.2	135	60.3	24	17.1	46	29.7
Crops	54	22.1	48	21.4	76	54.3	57	36.8
Dairy	98	40.2	3	1.3	13	9.3	10	6.5
Mixed	24	9.8	34	15.2	25	17.9	38	24.5
Granivores	31	12.7	4	1.8	2	1.4	4	2.6
Total	244	100	224	100	140	100	155	100

The distribution of farms across farm types in each of the CSAs is consistent with background information on agriculture in each region. In particular, dairy farms predominate in the Podlaskie sample, cattle farms in North East Scotland, and crop farms in the Centre region, whereas farm types in Midi-Pyrénées CSA are more evenly distributed across the five categories distinguished in the table.

There are very few pig and poultry farms in the UK or two French samples. In the UK this reflects the degree of specialism in this sector. Similarly there were only three dairy farms included in the North East Scotland sample. As a consequence, results for these categories of farm types are suppressed in subsequent tables as they may not be representative.

Table 5.4 Mean farm sizes by farm type (hectares)

	Podlaskie (PL) n=244	North East Scotland (UK) n=224	Centre Region (FR1) n=140	Midi-Pyrénées (FR2) n=155
Cattle/sheep	24	193	156	91
Crops	9	179	179	159
Dairy	39	n/a	159	88
Mixed	17	183	206	149
Granivores	13	n/a	n/a	n/a

Table 5.4 above shows the mean farm sizes by farm type for each CSA. The data reported is farmed area and thus includes land rented in as well as owned land, after having allowed for any area rented out to other users.

It is clear that the Polaskie CSA has much smaller farm sizes than any of the three other CSAs involved in the analysis, particularly the UK CSA, indicating that the structure of the farming industry in Podlaskie is very different. The two French CSAs are shown to be quite different in terms of farm structure, with farms in the Midi-Pyrénées region smaller than in the Centre region.

Differences in farm size are reflected strongly in the average level of SFP support received in each of the CSAs, as shown in Table 5.5 below.

Table 5.5 Average level of SFP support per farm, 2008 (Euros)

	Mean	Median
Podlaskie (PL)	2,651	2,000
North East Scotland (UK)	41,383	25,639
Centre (FR1)	41,876	39,750
Midi-Pyrénées (FR2)	20,550	15,000

Podlaskie has one other significant difference from the other three CSAs in that the percentage of produce that is used on-farm and not sold in the market is far higher. This difference in degree of formal market interaction underlies the locality analysis described below.

5.3.3 Off-farm work

Off-farm work is potentially an important element of local economic linkage for farm households. Table 5.6 shows the percentage of farm households with one or more members of the households working off-farm and the proportion of total household income from such

work. This information was not collected in Survey A and therefore information for the two French CSAs is not available.

Table 5.6 Percentage of farm households with off-farm work

	Podlaskie (PL)	North East Scotland (UK)
% of farms	27.5	45.5
Mean % of income	14	17.5

Farm households in the Podlaskie sample have a lower rate of off-farm work than those in North East Scotland, but even in this case more than a quarter of households had someone employed in another occupation. The survey responses also suggested less variety in types of job for household members working off the farm in Podlaskie than in the UK CSA. The overall mean percentage of farm household income from off-farm work in Podlaskie is also lower (14% compared to 17.5% on average). In the UK region, there is a small percentage of off-farm work that is earning significant amounts for the farm household, reflecting the local economic context, where there is a very low unemployment rate, and many opportunities for high-quality work with associated remuneration. In contrast, most of the jobs undertaken by off-farm workers in the Podlaskie CSA are less skilled, such as shop assistants, blue-collar workers, drivers or office clerks, although some teachers and bank staff were included in the sample.

Figures 5.1 and 5.2 suggest there are also gender differences in the income earned through off-farm working with more females earning lower incomes, more males in the higher income bands.

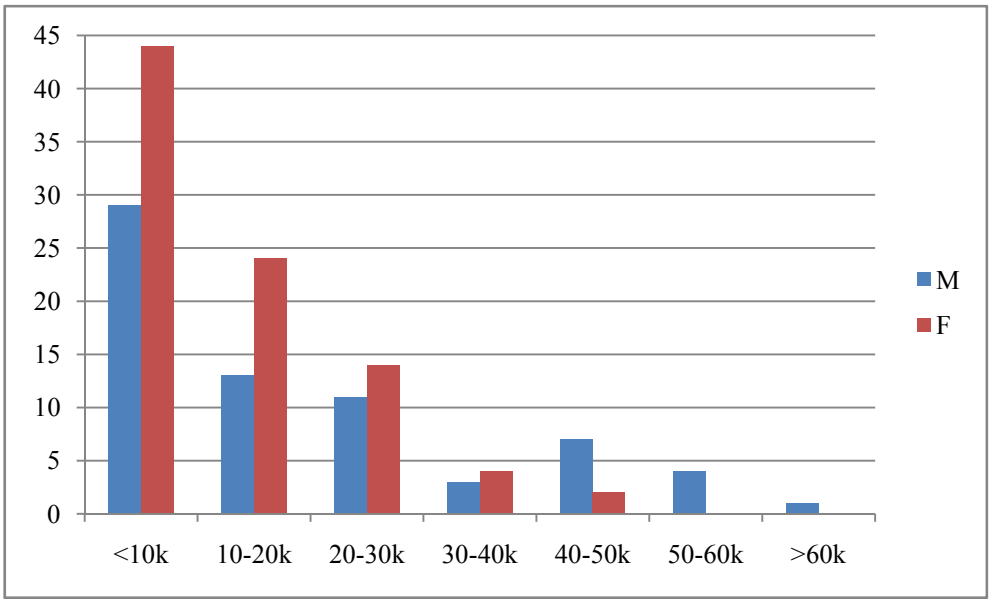


Figure 5.1 North East Scotland off-farm work by gender and income

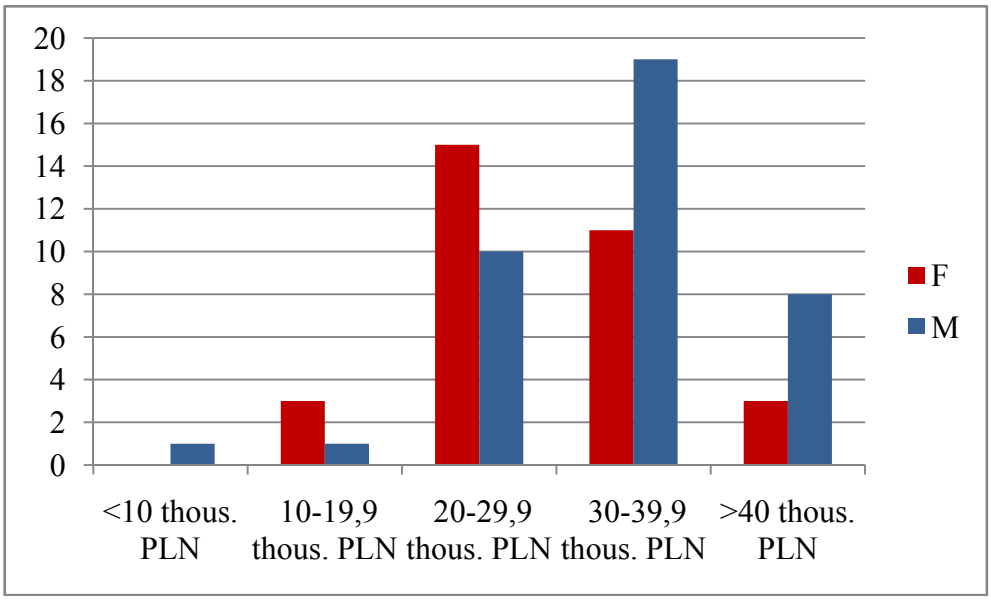


Figure 5.2 Podlaskie off-farm work by gender and income

5.3.4 Local attachment

On the basis that previous research has indicated that community attachment influences input purchasing behaviour (Foltz and Zeuli, 2005), respondents were asked to indicate the strength of their attachment to the local area on a Likert scale ranging from 0 ("Not at all") to 5 ("Highly attached"). Comparable data was not available for the French CSAs. The results are presented in Table 5.7 below.

Table 5.7 Sense of attachment for Podlaskie and North East Scotland

	Podlaskie (PL)	North East Scotland (UK)
0 (Not at all)	0	3.1
1	0	3.6
2	0	14.2
3	5.7	17.3
4	34.8	34.7
5 (Highly attached)	57.8	25.8
Missing	1.6	1.3
Total	**100.0**	**100**

The strength of attachment expressed by Polish farmers was extremely high, with 58% categorising themselves as highly attached compared to 26% in North East Scotland where farmers are more likely to categorise themselves attached at lower levels of attachment. Interestingly, some respondents in the UK CSA went so far as to categorise themselves as not at all attached to the local community. In Podlaskie, no-one selected the categories 2-0.

Contrary to expectations, cross-tabulations showed that high levels of attachment were not reflected in membership of community groups (farmer unions, nature groups, recreational groups) in both Podlaskie and North East Scotland. However, there are major differences between the CSAs in terms of membership of groups, especially between the UK and Polish CSAs. This can be seen in Table 5.8, which also draws on Survey A in order to compare with the two French CSAs. A possible explanation for this difference in membership of formal organisations could be cultural differences. Alternatively, joining organisations could be a substitute for more traditional forms of community cohesion that are still prevalent in Poland.

Table 5.8 Percentage of farm households with membership of organisations

%	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Sports club, recreation, etc.	0.4	37.3	63.6	69
Farmers' union, etc	7.8	53.3	72.1	63.2
Nature conservation/ environmental	0.4	10.2	7.1	10.3

5.4 Spatial Analysis

5.4.1 Average distance to source of inputs

Tables 5.9 and 5.10 report the average distance over which different agricultural inputs are sourced by CSA. The spatial tracking survey asked more details with respect to inputs than the additional questions answered by French households in Survey A, and this is reflected in

the two tables. For comparative purposes, the tables also show the average distance to towns of 3,000 or more residents for each sample (as given in Table 5.2 above).

Table 5.9 Average distance to input suppliers, Polish and UK study areas (km)

km	Podlaskie (PL)	North East Scotland (UK)
Distance to nearest town (>3000 population)	*10.8*	*13.2*
Fertilizer	7.20	49.28
Machinery	6.97	17.98
Seed	7.40	40.0
Chemicals	6.90	33.64
Feed	6.81	39.57
Fuel	6.70	23.51
Services	5.83	21.81

Table 5.10 Average distance to input suppliers, French study areas (km)

	Centre Region (FR1)	Midi-Pyrénées (FR2)
Distance to nearest town (>3000 population)	*13.3*	*14.9*
Fertilizer	12.83	13.94
Machinery	16.75	30.57
Other inputs	18.14	17.45
Credit	10.39	10.06

Table 5.9 shows that the mean distance to suppliers for all farm inputs in the Podlaskie (PL) CSA is much lower than for the other CSAs, and, importantly, less than than the mean distance to the nearest town with 3,000 or more population. In contrast, all inputs are sourced at average distances further than that to the nearest town in North East Scotland, the UK CSA. This suggests that the spatial structure of agri-businesses is quite different, with Podlaskie farm households having a much more localised agricultural economy in distance terms than the other CSAs, particularly the UK CSA. For North East Scotland, fertilizer in particular is sourced at a considerably greater distance than in any of the other three CSAs.

In Table 5.10, it can be seen that the two French CSAs are broadly similar in terms of input distances, with the exception of machinery, with farmers in the Centre region sourcing machinery at nearly half the distance of farmers in Midi-Pyrénées. Credit is sourced much closer to the farm than any of the other inputs categories distinguished. In general terms, purchasing patterns in the French CSAs appear to lie between the more extreme patterns observed in the Polish and UK CSAs.

Tables 5.11 and 5.12 explore whether the distances to source fertilizer and agricultural machinery vary in each CSA by farm type.

Table 5.11 Average distance to fertilizer supplier by farm type

	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Cattle	6.97	51.7	9.8	19.7
Crops	7.59	35.1	8.6	12.0
Dairy	7.94	n/a	13.5	10.7
Mixed	4.12	58.7	12.75	12.1
Granivores	6.97	n/a	n/a	n/a

Table 5.12 Average distance to machinery supplier by farm type

	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Cattle	6.57	18.3	22.1	32
Crops	7.61	15.9	15.1	33.8
Dairy	7.35	n/a	22.9	24.7
Mixed	5.14	21.4	12.3	26.9
Granivores	6.55	n/a	n/a	n/a

The distance to machinery inputs were very similar across all farm types in each of the four CSAs, and analysis revealed that there is no significant association between farm type and machinery purchasing patterns. In contrast, there is evidence in the UK and French CSAs that distance to fertilizer source does vary by farm type, with crop farms sourcing more locally than livestock farms. In the Podlaskie region, as noted above, the distance between the farms and source of fertilizer was much less, and no statistical difference between farm types was found.

5.4.2 Distance by farm size

Theory suggests that larger farms may choose to source inputs at further distances as they can offset higher transportation costs against the economies of scale of bulk-buying. Tables 5.13 to 5.16 explore the extent to which there is evidence that the distance to input suppliers varies by size of farm where the latter is defined in terms of land farmed. In particular, for the Podlaskie sample, farms with less than 15 hectares are categorised as small, those with between 15 and 40 hectares are categorised as medium-sized, and finally those with more than 40 hectares are categorised as large farms. The equivalent groups for the North East Scotland and the two French CSAs are less than 100 hectares, between 100 and 250 hectares and finally more than 250 hectares. The size thresholds were selected so as to have a minimum soze in each category while maintaining broad and, in the French and UK case, comparable, divisions.

Table 5.13 Distance to suppliers by farm size (area) in Podlaskie (PL) (km)

	Small (n=96)	Medium (n=115)	Large (n=33)
Nearest town	*10.9*	*11.0*	*10.1*
Seed	7.0	7.5	8.1
Fertilizer	6.8	7.3	8.0
Chemicals	6.7	6.8	7.8
Fuel	6.7	6.4	7.6
Feed	6.2	6.8	7.6
Machinery	6.8	6.8	7.8
Services	4.8	5.6	8.9

Table 5.14 Distance to suppliers by farm size (area) in North East Scotland (UK) (km)

	Small (n=60)	Medium (n=63)	Large (n=81)
Nearest town	*8.6*	*7.9*	*7.9*
Seed	26.8	16.6	25.0
Fertilizer	26.9	29.4	31.8
Chemicals	21.2	17.9	17.2
Fuel	13.7	15.9	13.8
Feed	20.8	26.2	18.9
Machinery	11.2	11.1	9.6
Services	15.0	11.1	14.1

Table 5.15 Distance to suppliers by farm size (area) in Centre Region (FR1) (km)

	Small (n=30)	Medium (n=83)	Large (n=37)
Nearest town	*14.2*	*13.7*	*21.7*
Fertilizer	24.0	9.1	11.8
Machinery	19.2	16.8	13.9
Credit	11.7	10.1	9.9
Other Inputs	22.0	15.0	23.3

Table 5.16 Distance to suppliers by farm size (area) in Midi-Pyrénées (FR2) (km)

	Small (n=73)	Medium (n=68)	Large (n=14)
Nearest town	*19.2*	*17.1*	*19.1*
Fertilizer	11.4	15.9	16.7
Machinery	36.7	25.6	22.9
Credit	10.2	9.0	14.3
Other Inputs	16.4	18.0	20.4

In Table 5.13, it can be seen that, in the case of the Podlaskie sample, there is some evidence of an increase in distance with increasing farm size. In contrast, in the North East of Scotland, with the exception of fertilizer, no such pattern emerges. The distance to feed suppliers is highest for medium-sized farms in the UK CSA, whilst the same size category seem to have the closest suppliers for seed, chemicals, feed and services. The results for the two French CSAs similarly show no clear relationship between farm size and sourcing patterns. Clearly, at this stage, only average values are presented, and the findings may be masking several other potential differences between farms households apart from just farm size. This is explored further in the probit analysis below.

5.4.2 Average distance to output purchasers

Table 5.17 shows the average distance to main purchaser by farm type.

Table 5.17 Average distance to main purchaser by farm type

	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Cattle	10.0	34.0	35.3	44.3
Crops	5.6	27.4	19.3	27.7
Dairy	21.7	n/a	35.8	96.7
Mixed	n/a	52.3	19.4	53.5
Granivores	6.3	n/a	n/a	n/a

The distances over which outputs are sold are much more diverse between farm types in all CSAs. The expectation was that buyers of output which is particularly dominant in a region (eg cereals in Centre region or cattle in North East Scotland), would tend to be more local than the buyers of less common outputs in that region, having allowed for the differences in nature of buyers (e.g. dairy processors versus cereal merchants). However, this does not always appear to be the case. The results appear to reflect context-specific downstream agribusiness consolidation in those sectors which are most dominant in a region. For cattle and crops, the distances are quite similar between UK, FR1 and FR2. For mixed farms, UK and FR2 appear to have much in common, but FR1 is more 'local'. The results for dairy farms contrast strongly between the two French CSAs, although it should be noted that the sample sizes for dairy farms in both Centre and Midi-Pyrénées regions are relatively small.

The spatial tracking survey also collected information on the destination of output as opposed to simply the location of output purchaser. In the UK CSA, very few farmers completed these questions, suggesting that they were not sure where their products were destined. In contrast, far more of farm households in the Polish study area were aware of the destination of their output, particularly the livestock sales where distances tended to be larger but still less than distance to purchaser in the other CSAs.

5.4.3 Distance to off-farm work

Table 5.18 shows the distance travelled to place of off-farm work in the Polish and UK CSAs, comparing the findings with the distance to the nearest town of more than 3,000 population. The results are presented on the basis on an individual rather than farm household basis (i.e. they do not take into account cases where more than one household member is participating in off farm work).

Table 5.18 Average distance to place of off-farm work

	Podlaskie (PL)	North East Scotland (UK)
Distance to nearest town (>3000 population)	*10.8*	*13.2*
Distance to place of work	10.2	25.4

As expected, the distance travelled to place of work is in the Podlaskie study area on average very similar to the distance to the nearest town. Off-farm workers in the North East Scotland travel further to their place of off-farm work, both in absolute terms and in relation to their local town. This finding reflects the more highly skilled types of jobs that household members were found to be involved in the North East Scotland CSA, as such jobs are likely to be located at a greater distance from the farm. However, another key finding emerging from Table 5.18 (as compared to previous analysis) is that, in Podlaskie, off-farm work tends to be more distant than agricultural–related transactions, while in North East Scotland, even allowing for the skilled nature of many jobs, off-farm work is closer than the distance over which most agricultural transactions take place.

While this section has highlighted several interesting findings in relation to purchasing, sales and off-farm work patterns, as noted in the introduction to this chapter, the comparison of distances ignores differences in the geographic and socio-economic contexts of the CSAs. The following section corrects for this by switching attention to the proportion of transactions of different types that can be categorised as local.

5.5 Locality Analysis

5.5.1 Within Region Analysis

Defining within the locality as being within the distance of the nearest town, Tables 5.19 and 5.20 below show the percentage of farm input purchases that are within this distance for each of the CSAs and for each input type.

Table 5.19 Percentage of local farm input purchases (defined as within distance to nearest town) for Polish and UK CSAs

%	Podlaskie (PL)	North East Scotland (UK)
Fertilizer	83.2	19.3
Chemicals	85.2	30.1
Seed	78.2	35.5
Feed	66.4	30.5
Machinery	84.4	56.1
Fuel	85.7	43.2
Services	77.9	53.9

Table 5.20 Percentage of local farm input purchases (defined as within distance to nearest town) for French CSAs

%	Centre Region (FR1)	Midi-Pyrénées (FR2)
Fertilizer	79.3	76.1
Machinery	55.7	40.7
Other inputs	61.4	68.4
Credit	85.0	93.6

The percentages of inputs sourced within the distance to the nearest town are higher for Podlaskie and the two French CSAs than for North East Scotland (UK). The proportion of farms sourcing fertilizer and agrichemicals locally in the UK CSA is particularly low. The results for services are also very low when compared with the other CSAs and with prior expectations. The percentage of local credit supply for both the French CSAs (the only CSAs where data was collected) are very high, and in line with the findings discussed in Section 5.4 above.

For fertilizer and machinery inputs, it is possible to explore whether there are differences in purchasing patterns between farm types in each of the four CSAs (see Tables 5.21 and 5.22).

Table 5.21 Percentage of farms purchasing fertilizer within locality (defined as within distance to nearest town) by farm type

	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Cattle	87.9	17.8	91.7	67.4
Crops	81.3	25.6	80.3	71.9
Dairy	88.5	n/a	76.9	80
Mixed	95.7	19.4	100	89.5
Granivores	93.3	n/a	n/a	n/a
Pearson chi^2	4.247	2.124	10.792	7.546
Pr	0.374	0.713	0.029	0.110

Table 5.21 shows that in the Centre (FR1) CSA, there are significant differences in the proportion of farms purchasing fertilizer locally according to farm type. In particular, in the Centre region, mixed and livestock farms are more likely to buy fertilizer locally than cropping or dairy farms. No statistically significant relationship between farm type and local purchasing was found in either the Podlaskie, North East Scotland (UK) or Midi-Pyrénées (FR2) CSAs.

Table 5.22 Percentage of farms purchasing machinery within locality (defined as within distance to nearest town) by farm type

	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Cattle	87.9	59.8	45.8	43.5
Crops	82.3	53.9	57.9	40.3
Dairy	88.6	n/a	46.1	50.0
Mixed	95.5	37.5	68.0	31.6
Granivores	93.5	n/a	n/a	n/a
Pearson chi^2	3.702	2.974	5.623	3.769
Pr	0.448	0.562	0.229	0.438

In relation to machinery purchasing patterns, Table 5.22 shows that for all CSAs there is no significant difference between farm types in terms of whether or not they purchase locally. It is noticeable, however, comparing across Tables 5.21 and 5.22, that while in the UK CSA the percentages of machinery purchases that are local are higher than for fertilizer, for the French CSAs this is reversed (fertilizer is more likely to be sourced locally than machinery). This suggests that different patterns of upstream agribusiness concentration have occurred between the countries. In Podlaskie, local purchasing is over 80% for both inputs across all farm types.

5.5.2 Outputs

Table 5.23 again considers the degree of integration of farm household transactions but in this case focuses on sales patterns and, in particular, what percentage of the main output produced on the farm was sold within the locality. The UK CSA and Midi-Pyrénées (FR2) in France have much lower overall percentages of their main output sold locally than Podlaskie or Centre region (FR1). Closer analysis (Table 5.24) revealed that this was largely due to the high level of local sales of output from crop and mixed farms in the Centre region, while crop, mixed and granivore farms in the Podlaskie region have a particularly high tendency to sell locally. Differences between farms types in the Midi-Pyrénées is significant at the 10% level, again with crop farms more likely to sell locally.

Table 5.23 Percentage of farms selling main farm output locally (defined as within distance to nearest town) for all farm types

%	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Main purchaser	78.9	25.9	58.6	33.6

Table 5.24 Percentage of farms selling their main output within locality (defined as within distance to nearest town) by farm type

	Podlaskie (PL)	North East Scotland (UK)	Centre Region (FR1)	Midi-Pyrénées (FR2)
Cattle	75.7	26.2	37.5	26.1
Crops	94.4	27.8	69.7	45.6
Dairy	66.7	n/a	23.1	10
Mixed	87.5	28.6	68.0	28.9
Granivores	87.1	n/a	n/a	n/a
Pearson chi^2	19.033	2.6234	18.7892	8.2048
Pr	0.001	0.623	0.001	0.084

5.5.3 Off-farm Work

Table 5.25 considers the proportion of off-farm employment which occurs within the locality. As Survey A did not ask explicitly about off-farm work patterns, the analysis is confined to the UK and Polish samples.

Table 5.25 Percentage of off-farm work within locality (defined as within distance to nearest town)

	Podlaskie (PL)	%	North East Scotland (UK)	%
Local	50	72	51	47
Non-Local	19	28	58	53
Total	69	100	109	100

Over half (58%) of off farm work in North East Scotland is further away than the nearest town, while in Podlaskie the equivalent proportion is only 28%. As with previous analyses, the results suggest that the degree of locality of farm households in the UK CSA is limited with, instead, the transactions of North East farm households occurring over a larger spatial scale.

5.5.4 Allowing for different economic geographies

The analysis to this point has used the same definition of locality for all CSAs. In particular, the local context has been defined in relation to the distance of the farm to the nearest town with population of 3,000 or more. As is apparent from Sections 5.2 and 5.3 and in particular Table 5.2, the economic geography of the CSAs is very different, with farm households in the Podlaskie CSAs having interactions within a smaller spatial scale than the other CSAs, and the North East Farm households in particular. Based on this, further analysis was conducted, changing the definition of local between the two "extreme" CSAs, North East Scotland and Podlaskie.

Table 5.26 below shows that, if one changes the definition of local to be within market reach of the nearest city, in order to adapt to the regional economic context, this brings the UK CSA more into line with the other CSAs. However, even with the definition of local expanded to cover a longer distance from the farm, two inputs (fertilizer and feed) still have a significant percentage of suppliers beyond the local city.

Table 5.26 Percentage of farms sourcing inputs within the distance to nearest city, North East Scotland (UK)

%	Local source (within city reach)
Fertilizer	71.8
Agro-chemicals	80.1
Feed	73.5
Seed	78.7
Machinery	90.0
Fuel	91.0
Other Services	95.5

For Podlaskie, local was redefined to mean within market reach of where farm households do their grocery shopping, which was nearer than the distance to the nearest town with a population over 3,000 (see Table 5.2). In other words, the spatial scale of the area defined as local was reduced. The results are shown in Table 5.27 below.

Table 5.27 Percentage of farms sourcing inputs within the distance to where household groceries are purchased, Podlaskie (PL)

%	Local source (within grocery reach)
Fertilizer	61.9
Agro-chemicals	64.3
Feed	51.2
Seed	n/a
Machinery	63.9
Fuel	64.7
Other Services	61.5

As anticipated, the proportion of local transactions falls but still remains high at over 60% for all but feed. Even at this spatial level, the Podlaskie farm households have strong local integration. Similar findings were found for sales patterns and off farm work. Given that they appear more meaningful, these new definitions of locality for the Polish and UK CSAs are used in the analysis from this point on.

4.5.5 Expenditure Leakage

From a rural development perspective, a key question related to the above analysis is the extent to which farm household transactions contribute to the local economy in monetary terms. Purchases of inputs from agents within the region will generate income in the local economy, whereas purchases from non local agents will represent a "leakage" from the farm household to the "rest of the world". The analysis of sales patterns also has rural development implications. Most agricultural outputs need to undergo further processing before being sold for final consumption. Thus, sales to agents outside the region therefore represent an opportunity forgone (in terms of generating additional value added), although, of course, they do result in income flowing into the region.

Concentrating on upstream links, instead of simply considering the percentage of transactions that take place outside the locality, Tables 5.28 amd 5.29 consider the average value of input expenditure that is leaked from the locality. The results are presented by farm size where in this case, instead of land area, turnover is used as a proxy of economic size. In particular, for the Podlaskie sample, farms with an annual turnover of less than 30,000 PLN are categorised as small, those with a turnover between 30,000 and 100,000 PLN are categorised as medium-sized, and finally those with a turnover of more than 100,000 PLN are categorised as large farms. The equivalent boundaries for the North East Scotland sample are chosen except that turnover in this case is defined in £ sterling. Only the UK and Polish CSAs are analysed, as the information required was not collected as part of Survey A. The definition of locality in this case is within city reach for the UK CSA, but within reach of where households do their grocery shopping for the Polish CSA.

Table 5.28 Average annual value of leakage (£) by farm size and input type for North East Scotland (UK)

	Annual leakage value (£)		
UK	Small (n=60)	Medium (n=63)	Large (n=81)
Fertilizer	7,209	16,369	44,952
Seed	1,450	2,540	8,104
Agrichemicals	12,500	5,190	17,664
Fuel	2,750	5,160	13,375
Feed	2,683	7,688	27,929
Machinery	700	5,750	17,500
Services	0	1,950	2,100

The higher expenditure levels of large farms means that in value terms there are significant differences in leakages between farm sizes, with large farm households leaking far more input expenditure than their smaller peers.

In North East Scotland, fertilizer purchases represent the highest expenditure leakage, with large farms spending an average of £44,952 on fertilizers from outside the locality. Expenditure on feed sourced non- locally is also high (£27,929 on average for large farms). The value of expenditure leakage by small farms on agrichemicals is high (higher than for medium size farms) at £12,500. The results for machinery increase significantly with farm size, and suggest that the more specialised and larger machines used by large farms are not

supplied by local dealerships. Table 5.29 presents similar information for the Podlaskie study area.

Table 5.29 Average value of leakage (PLN) by farm size and input type for Podlaskie (PL) CSA (Locality defined in terms of distance to where farm household sources groceries)

	Farm size		
	Small (n=96)	Medium (n=115)	Large (n=33)
Fertilizer	1382	2204	5748
Seed	406	981	3023
Agrichemicals	488	834	1700
Feul	4051	7147	21580
Feed	5569	9795	28500
Machinery	1547	2442	8200
Services	1894	3388	7280

The value of expenditure leakages, and hence local economic disbenefit, increase with farm size across all farm inputs in this CSA. Leakages on feed and fuel are particularly high. In contrast, leakages associated with seed and agrichemicals are relatively low.

5.5.6 Probit analysis

Section 5.5 indicated the extent to which farm household transactions in the CSAs were local or otherwise. This section takes the analysis further in that it investigates whether or not there are any farm or farm household characteristics which systematically explain whether a farm household purchases fertilizers locally or from elsewhere. The analysis is focused on fertilizer transactions, as this the input with the highest number of observations and where there are clear differences emerging within the CSAs in terms of purchasing behaviour.

As discussed in Roberts and Liu (2009), theory suggests that a combination of farm characteristics (size, farm type, legal status), farm household characteristics (age of head of household, stage in life cycle, education, attachment to local community) and local context (distance to towns) influences farm purchasing patterns. Based on this, a probit regression was estimated where the dependent variable was a dummy variable representing whether the farm household buys locally or not. The explanatory variables in the model were selected to represent the theoretical factors influencing behaviour as listed above. Number of children less than 17 and number of retirees in the households were included to represent the stage in the life cycle, and the natural logarithm of output values was included to represent farm size.

Table 5.30 presents the results for the North East Scotland region. In this case, cropping farms, low attachment and risk-averse farmers are the omitted dummy variables for farm type, attachment level and risk attitude respectively.

Table 5.30 Results from the Probit analysis, North East Scotland CSA (UK)
Dependent variable: Probability of purchasing fertilizer locally

	Coef.		Std. Err.
Livestock_LFA	-0.444		0.352
Livestock_non_LFA	-0.049		0.415
Other_farm_type	-0.334		0.432
LnOutput	0.045		0.124
No of Children	0.140		0.143
No. of Retired	-0.374	**	0.169
Med. Attachment	1.423	***	0.517
High attachment	0.859	*	0.474
Risk Neutral	-0.274		0.303
Risk Loving	-0.438		0.382
Nearest_city	0.076	***	0.015
Constant	-2.172	*	1.309

Number of obs = 156 Prob > chi2 = 0.0000
Pseudo R2 = 0.2700 LR chi2(12) = 49.59

In general, the model has a significant chi square indicating that the variables are jointly different from zero. However, contrary to expectations, the results suggest that the probability of buying fertilizers locally is not explained by farm characteristics, with neither the farm type or farm size variables being statistically significant. In contrast, the degree of attachment to the local economy are significant influences on purchasing patterns. In particular, compared to those with low attachment (the omitted category), those with medium and high attachment are both significantly more likely to purchases locally. The number of retired household members is negatively related to the probability of purchasing locally. This was contrary to initial expectations – it was expected that older farmers would be more likely to buy locally not less likely. However, it could be explained if the number of retired household members is not indicative of older decision makers (as would be the situation if by retirement, purchasing decisions have been passed to successors living within the household). Finally, local context, as reflected in distance to nearest city, has a positive and significant influence on purchasing behaviour.

Table 5.31 reports equivalent results for the Podlaskie CSA. Again the dependent variable is a dummy variable representing whether the farm household buys locally or not, where in this case locally is within reach of where the farm household purchase groceries. Again, the number of children less than 17 and number of retirees in the households was included to represent the stage in the life cycle, and the natural logarithm of output values was included to represent farm size. In this case, the excluded farm type category is pig farms.

Table 5.31 Results from the Probit analysis, Podlaskie CSA (PL)
Dependent variable: Probability of purchasing fertilizer locally

	Coef.	Std. Err.
Cattle farms	0.171	0.354
Mixed farms	0.821**	0.430
Dairy farms	0.160	0.397
Crop farms	-0.318	0.316
LnOutput	-0.006	0.124
Off farm work	0.472**	0.237
No of Children	0.012	0.088
No. of Retired	0.072	0.112
Med. Attachment	7.500***	1.352
High attachment	6.239***	1.243
Nearest_city	-0.007	0.006
Constant	05.939	
Number of obs = 227	Prob > chi2 =	0.039
Pseudo R2 = 0.07	LR chi2(12) =	20.51

As in the results for North East Scotland, farm size is found not to influence fertilizer buying patterns in Podlaskie, after having controlled for other farm characteristics. Similarly, the number of retirees or children in the household were not, in this model, significant influences on the probability of sourcing fertilizer locally. However, one of the farm type categories in the Podlaskie model, mixed farms, is significant, indicating that, compared to the excluded farm type category; mixed farmers are more likely to buy their fertilizer locally. The off-farm work dummy variable is also positive and significant, suggesting that those farm households with off-farm workers are more likely to buy fertilizer locally.

Importantly, the degree of attachment to the local economy is again shown to be a significant influence on purchasing patterns. In particular, compared to those with low attachment (the omitted category), those with medium and high attachment are both significantly more likely to purchase locally.

5.6 The spatial concentration of agribusinesses

As part of the spatial tracking survey, respondents were asked to identify by name locations where transactions took place. This means that, in addition to the distance-based analysis presented so far in this chapter, it is also possible to assess the extent ofspatial concentration of farm household transactions.

5.6.1 North East Scotland

Consistent with the long distances and low proportion of local transactions in the North East Scotland CSA, the results revealed that both upstream and downstream agribusinesses in the study area had become concentrated in certain towns in the region. In particular, there were only ten towns in the CSA which were either significant sources of inputs or significant destinations of agricultural output.

The spatial pull of two such towns – Turriff and Inverurie - are well demonstrated in map form; see Figures 4.3 and 4.4 below. Figure 4.3 concentrates on the spatial pattern of fertilizer transactions, Figure 4.4 on the spatial pattern of cattle sales. In both cases, the origin of the arrows represents the postcode sector of the farms involved in the transaction, and the end of the arrow where the transaction takes place, while the width of the arrows indicates the number of farms involved in the transaction.

Figure 4.3 The spatial pattern of fertilizer supplies: North East Scotland CSA (UK)

Figure 4.3 reveals that there are five towns which sell fertilizer to more than 10 farms in the region, but that Turriff dominates, being the source of fertilizers for 40% of farm households in the region. There are a noticeable number of distant farms purchasing their fertilizer from suppliers located in Turriff, bypassing more local sources.

Figure 4.4 demonstrates the same pull effect for a significant output in the UK CSA, i.e. cattle. Here, cattle sales can be seen to be heavily focused on Inverurie, the location of the major regional auction mart, with farms from throughout the region converging here to sell livestock. Inverurie was found to be the destination of 63% of cattle sales in the sample.

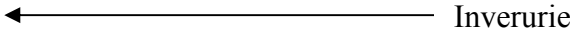


Figure 4.4 The spatial pattern of cattle sales: North East Scotland CSA (UK)

In contrast, apart from a degree of concentration at the larger population centres (reflecting job opportunities), off-farm work was found to be less spatially concentrated in the CSA. Figure 4.5 indicates the top five locations for off-farm work for the farmer and spouse in North East Scotland. It is important to note that the fourth most frequent 'off farm work' location was at home, shown by dots.

Figure 4.5 The spatial pattern of off-farm work: North East Scotland CSA (UK)

5.6.2 Podlaskie

The farm-related results above are not replicated in Podlaskie, which continues to have a more spatially diffuse agricultural economy. Inputs exchanged over considerably shorter distances in Podlaskie than in North East Scotland, and no spatial concentration of upstream agribusinesses is apparent. To illustrate, in Figure 4.6, the spatial pattern of fertilizer purchases in the region is shown. Most farm households source their fertilizer from within their postcode area: this is shown as a circle in the diagram. Only relatively few (shown by arrows) source from another postcode area, and, even so, these sources are still close to the farm. There is no evidence of any location dominating supply as in the North East Scotland region.

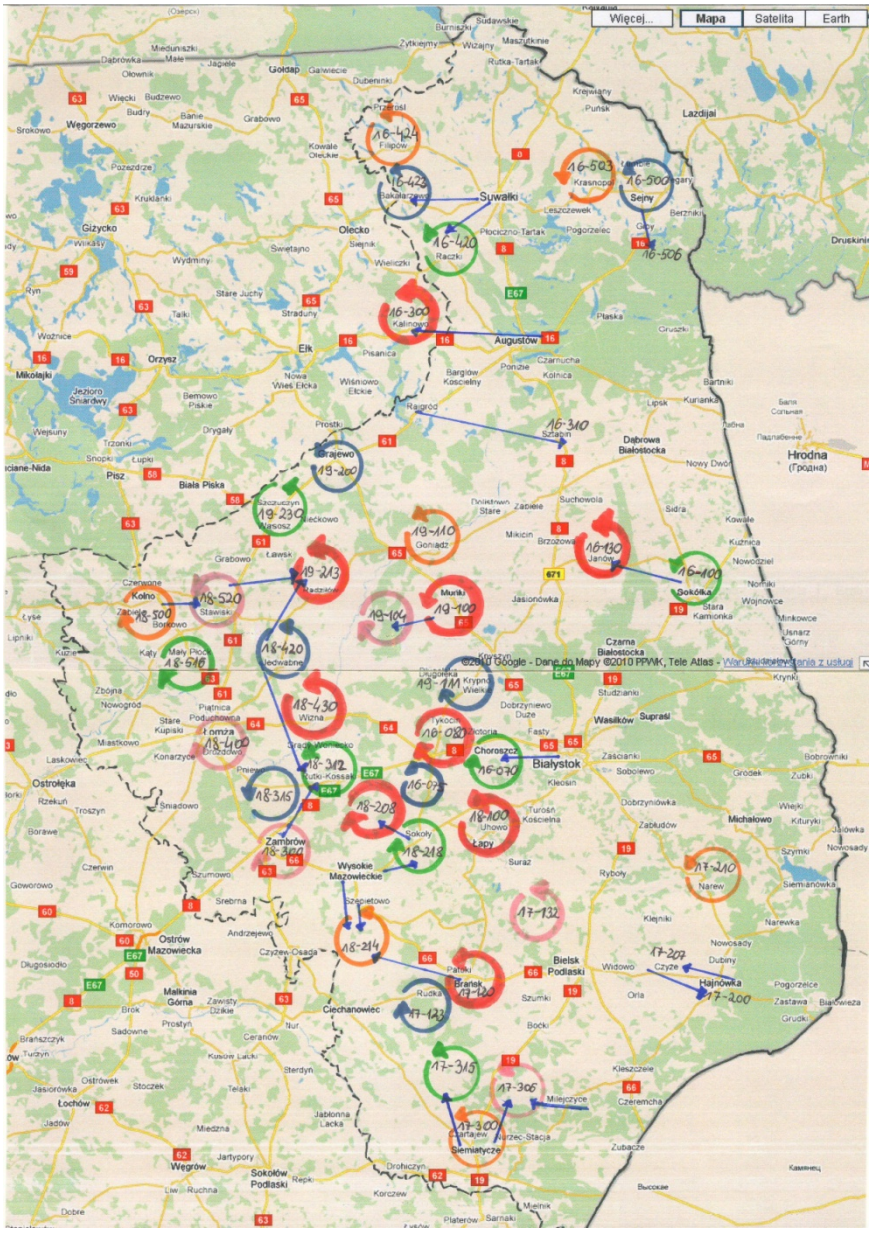


Figure 4.6 The spatial pattern of fertilizer supplies: Podlaskie (PL)

The pattern of output sales is also more dispersed in the Podlaskie region, with the exception of milk processing. In particular, the well-developed dairy industry in the region is exhibiting some of the same processor concentration trends that have historically been seen in the UK. There are large dairy processors in Grajewo, Piatnica and Wysokie Mazowieckie (see Figure 4.7 below). This has implications for the manner in which any changes to the CAP will impact on local economies.

Figure 4.7 Location of Diary processors, Podlaskie CSA (PL)

5.7 Perceptions of the local economic importance of CAP

This section reports findings from the qualitative elements of WP5. The first part presents the findings from the final section of the spatial tracking survey on farmer perceptions of their role within their local economies. The results relate only to the CSAs participating in the Spatial Tracking survey – North East Scotland and Podlaskie. The second part presents the insights gained from the survey of agribusinesses in North East Scotland, conducted as part of the SAM construction process (see Chapter 2).

5.7.1 Farmer perceptions

Table 5.32 shows the results for farmers' perceptions of the importance of agriculture to the local economy.

Table 5.32 Importance of agriculture to local economy

%	Poland n=244	UK n=224
Absolutely vital	28.3	51.1
Important	63.5	34.8
Less important than other sectors	7.4	6.7
Totally irrelevant	0	1.7
Don't know/blank	0.8	5.7
Total	100	100

Nearly all Podlaskie farms rated agriculture as Important (63.5%) or Vital (28.3%). This contrasts with North East Scotland where slightly more than half perceived agriculture to be vital (51.1%) to the local economy, and a third (34.8%) felt it to be important. A similar percentage as in the Polish CSA felt that it was of less importance than other sectors. The perceptions of North East Scotland farmers are interesting, as they do not 'match' the findings on localness in inputs and farm household purchasing habits. On the other hand, Podlaskie farm households have very 'local' lives in comparison, yet are less likely to regard agriculture as vital to their local economy.

Table 5.33 Reasons given for importance of agriculture to the local economy

Reason	Poland %	UK%
Agriculture is a main source of income or employment for local people	41%	47%
Agriculture supports the wider upstream and downstream agri-business sector	26%	34%
Supporting tax revenue	12%	-
Source of seasonal work	7%	-
Source of agricultural products/food	5%	24%
Contributes to the development of transport infrastructure	5%	-
Stimulates technological development	3%	-
Environmental and landscape preservation	-	10%
Preserving the rural way of life	-	3%

Table 5.33 above shows the explanations given by those who regarded agriculture as vital to the local economy. There were slight differences between North East Scotland and Podlaskie. The main reason in both the Polish and the UK CSAs was because they considered agriculture to be the main source of income or employment for local people. The second most cited reason was again the same in both Podlaskie and North East Scotland, that agriculture was a support for the wider agri-business sector through buying inputs (as well as supplying outputs). The differences occur in the other answers, where Podlaskie farmers gave many more reasons, such as agriculture's role in supporting tax revenue, as a source of seasonal work, a source of agricultural products and even contributing to the development of transport

In the UK CSA, however, agriculture as a source of food, which conceptually similar to 'agricultural products', was regarded as very important, with 24% citing this as a reason. There were two other reasons that were not mentioned in Poland: environmental and landscape preservation and preserving a rural way of life. It is also important to note that fuller comments were recorded for North East Scotland responses, and thus one answer could include several categories of reason. For this reason, the raw percentages are not directly comparable, as the Polish answers were precoded.

Table 5.34 shows the responses regarding the farmers' perceptions of change in importance of agriculture to the local economy.

Table 5.34 Change in importance of agriculture to local economy (%)

%	Poland n=244	UK n=224
Increased	44.67	15.11
Stayed the same	47.95	39.56
Decreased	4.51	36.00
Missing or don't know	2.87	8.00
Total	100	100

The majority of farmers in Podlaskie felt that agriculture had either remained the same or increased in importance. Certainly the localness of purchasing and selling in relation to farm households would suggest that agriculture is an important element of the local economy. In the UK CSA, however, comparatively few felt that it had increased in importance, and a much higher percentage (36%) felt that it had decreased in importance. This perception would be in line with the increasing influence of the oil and gas sector on the local economy of North East Scotland over recent decades.

Table 5.35 Has CAP affected local economic linkages?

	Poland n=244	UK n=224
Yes	33.61	37.95
No	51.23	26.34
Don't know	13.93	27.23
Missing	1.23	0
Total	100.00	100.00

Table 5.35 above shows the responses to the question "Do you think CAP has affected the extent of linkages between your farm and farm household and the local economy". It is possible that not all respondents interpreted the meaning of this question in the same way. However, the responses suggest that about half of Podlaskie farmers do not consider that CAP has affected their linkages with the local economy. Coupled with the relatively low value of the average CAP per holding, and given the very high percentages of Podlaskie farm households and businesses that are still circulating their output on farm, sourcing their inputs locally, and which are also selling locally in what should be considered a traditional manner, this response from individual farmers is not surprising. However, the North East Scotland results reveal many more respondents to be uncertain about the effect that the CAP has had

on their linkages with the local economy. However, a slightly higher percentage were positive that it had had an impact on local economic linkages than in the Polish CSA.

Table 5.36 Reasons given for impact of CAP on the local economy

Reason	Podlaskie (PL) %	North East Scotland (UK) %
EU programmes supporting the local economy	22	33
Milk quota regulating the development of the milk sector	21	0
CAP helps regulate prices of agricultural products	21	1
Better coordination of sales system	12	0
Supporting environmental protection	10	3
CAP funding supports input purchases	4	1
CAP funding contributes to demand for input purchases	4	1
Underpins improvement in agricultural practices	2	6
Impacts on creation of new businesses	1	0
Increases bureaucracy	1	4
Creates training and education opportunities for farmers	1	0
Contributes to globalisation and market distortion that weakens links	0	12
Farming as an element of rural community wouldn't survive without it	0	19
Has led to farm diversification	0	3
Other	1	17
Total	100	100

For those respondents who felt that CAP had influenced linkages, they were asked why. Responses are shown in Table 5.36. Responses in the Polish CSA were more diverse than for the importance of agriculture generally question. Three categories of response attracted about 20% of the responses each (thus accounting for 60% overall): EU programmes supporting the local economy; milk quotas regulating the development of the milk sector, and the CAP's influence on 'regulating' prices of agricultural products. The next two most prevalent answers were 'better coordination of sales system' (12%) and supporting environmental protection (10%). The other answers were wide-ranging, but not specific. In North East Scotland, there were relatively very few responses to this question (n=73). A high proportion of those (33%) felt that the CAP had supported or improved local economic linkages, but 12% felt the opposite and that it had contributed to market distortion. However, 19% felt that many farms could not survive without it, which implicitly suggests that CAP is involved in local economic linkages of farm households. Some of the answers from North East Scotland (17%) have been discounted as they were uncategorizable or not specific enough to be analysed.

Table 5.37 shows farmers' perceptions about the future importance of agriculture to the local economy.

Table 5.37 Future importance of agriculture to local economy

	Podlaskie (PL)	North East Scotland (UK)
Increasing	20.48	44.89
Staying the same	59.84	29.78
Decreasing	11.24	9.33
Don't know	4.42	7.56
Missing	4.02	8.44
Total	100.00	100.00

In Podlaskie, more than 80% feel that it will be the same or increasing. In the North East Scotland, only slightly fewer feel this way, but in different proportions, with nearly 45% believing that agriculture would increase in importance as a part of the local economy in future. There was slightly more uncertainty in North East Scotland than in Podlaskie, and fewer who thought it would definitely decrease in importance.

Those who thought it would decrease in importance were asked to explain why (see Table 5.38). Slightly more than half cited low profitability, particularly of small farms. Most of the rest highlighted an increase of businesses in other sectors, consequently providing a wider range of employment opportunities and/or a lack of employees for farms. In North East Scotland there were very few answers, but lack of succession and new entrants were most often mentioned, along with increased pressure on farming from diversification of the economy offering more alternative employment opportunities and demanding land for other uses. Lack of profitability, consolidation of farms and global competition also featured.

Table 5.38: Why will agriculture decrease in importance in the local economy? (Top answers)

Podlaskie (PL) (n=28)	**North East Scotland (UK) (n = 21)**
Low profitability in small farms (71%, n=20)	Lack of succession/new entrants (38%, n=8)
Development of non agricultural sectors - lack of employees (18%, n=5)	Low profits, consolidation of farms and increased global competition (33%, n=7)
Low profitability will resulted in decreasing number of farms (7%, n=2)	Increase of business and employment opportunities in other sectors (19%, n=4)

In contrast, 69% of those who thought that agriculture would increase in importance in Podlaskie ascribed this to modernization and improved competitiveness. In the North East Scotland, nearly 40% believed that farming would increase in importance because of a combination of an increased emphasis on food security, provenance and environmental factors, something which was not mentioned in the Polish CSA.

5.7.2 Agribusiness perceptions

An additional survey of agribusinesses was carried out as part of the SAM analysis in North East Scotland (see Chapter 2). The primary data collected consisted of turnover, sales levels and destination, input expenditure and source, capital transactions and profits. There were also some open-ended questions about the change in the industry and the role of the CAP in relation to up- and down-stream agribusinesses. This generated an opportunity to triangulate the farmers' perceptions.

The findings suggest that the structure of agribusiness in North East Scotland reflects global trends in structural concentration in both the upstream and downstream sectors. This is evident in all the business sectors of agri-business but geographical impacts are particularly marked for poultry and pig processing, which has been consolidated on plants outside the region. There was some indication that interviewees perceived that some of the knock-on effects on agricultural production had been more pronounced in North East Scotland than elsewhere in Scotland, as a result of this consolidation of pig and poultry processing capacity to plants outside the region.

Half of the interviewees reported that their sector had concentrated in terms of business locations and market share over the last decade, and more than half noted that ownership had been consolidated into fewer companies through mergers and acquisitions. These changes reflect a change in the market conditions for agricultural produce, which is becoming more consumer-led and dominated by supermarket and processor buying power. Interviewees in the processing sector noted that margins per unit of output had shrunk, and that supermarkets were increasingly dictating production systems and pricing. One noted that supermarkets had aggressively pursued a policy of reducing the number of suppliers in their livestock supply chain from an average of 15 to 3 each over the last ten years. Paradoxically, another noted that some of the pressures passed on by supermarkets derive from consumer pressure for more diversity and 'choice'.

Other pressures on farm businesses that are impacting also on agribusinesses are the increased demand for quality, traceability and provenance that have occurred as a way of accountability in regulating disease control but also as a consumer marketing point. Although two interviewees reported that their business strategy had involved moving into new markets, most have responded by becoming more focused on their core business strengths. One processor commented that increased need for continual improvement in mechanisation to maintain competitiveness had reduced their reliance on labour, which reduces one element of that business's integration with the local economy. Traceability, provenance and efficiency are also found in farm mechanisation developments, with GPS and other technologies enabling fine-scale computer-control of inputs that can be incorporated into record-keeping for crops. These machinery developments have challenged machinery suppliers to keep skills abreast of developments.

Comments relating to the relationship between agri-businesses and farmers noted that culturally the reputation of North East Scotland farmers for loyalty and doing business on the basis of personal trust was still important, but that there were changes coming through, particularly driven by changing communications technology, and also through younger farmers having different attitudes to business. Nevertheless, trust was still an important element of doing business in North East Scotland. Mobile telecommunications were singled out by many interviewees as enabling both supplier and farmer to be in contact at any time.

Whilst North East Scotland farmers have had a reputation for being conservative, interviewees noted that some changes can happen quickly. The example that was most often cited was the switch to mobile phones, which in the case of grain trading, previously based on personal farm visits, had happened almost overnight, as a result of movement restrictions imposed during the UK Foot and Mouth Disease outbreak in 2001 even though North East Scotland was not directly infected by the disease.

Role of CAP in supporting agribusinesses

Interviewees in North East Scotland were keenly aware of the importance of CAP in supporting their own sector, and most felt that they were vulnerable to CAP change, as without farm production neither upstream nor downstream companies have a business. However, there were also some negative views of the impact of CAP, particularly in relation to the non-production nature of the SFP. One or two interviewees held the view that this had reduced technological development in the sector, and there was a widespread view that the SFP design diminished the need for farmers to farm. Several upstream suppliers noted that the once-a-year timing of SFP payments had affected their cash flow. In relation to specifically local impacts, most interviewed felt that their sector had not changed farming in North East Scotland more than the rest of Scotland.

In summary, the qualitative material from agri-business interviews suggests that the CAP is important factor for agri-business viability in NE Scotland. Its role will be contextualised by a continuation of the key trend of concentration, in market share and business location, as well as further ownership consolidation and increased pressure on the agri-food supply chain from supermarkets. These trends were expressed across all parts of the agri-business system.

5.8 Discussion

This chapter has concentrated on the links between farm households and their surrounding local economy on the basis that understanding the extent of local integration is important for being able to predict the local development implications of a change in the CAP.

The results from the spatial analysis revealed strong differences across the CSAs involved in the analysis. Farm households in the UK and Polish CSAs had particularly strong differences in respect to their purchasing and sales patterns. While households in Podlaskie have many transactions within a short distance from the farm, farm households in North East Scotland were likely to trade with far more distant suppliers and purchasers. The two French CSAs, while lying between these extremes, also showed CSA-specific tendencies in relation to local integration.

Further consideration of the economic context of the CSA led to a redefinition of 'local' as a more flexible and pragmatic concept. In particular, in the case of North East Scotland it became clear that defining local as within market reach of the nearest town of over 3,000 people meant that farm businesses, and to a moderate extent farm households, appeared to be not integrated within their local economies. Essentially what is local in north east Scotland covers a larger area – nearly all farm inputs for example are obtained within market reach of the nearest city of over 50,000. Culturally, this is sensible as the north east of Scotland is a relatively small area, focused on one medium-sized city, albeit containing two local authority administrations. It is pragmatic, because global changes to the structure of agri-business have

seen consolidation of companies through acquisitions and mergers, with an associated spatial consolidation within the CSA which has reduced the opportunity for farm businesses to buy inputs closer to home. Within the UK, there have also been substantial changes to consumer retail markets, particularly associated with the rise of large supermarket chains, that have had a similar effect on opportunities for households to purchase more locally.

The economic geography of the Podlaskie region was very different. To reflect this, 'local' was redefined as within the distance of where the farm household does its grocery shopping. Even at this far more spatially focused scale, the majority of farm-related transactions were found to be local. It has been argued that there is over-employment in the Polish farm sector, reflected in the continuing high share of small farms and associated lack of economies of scale (Henningson, 2009; Chaplin *et al*., 2007). An associated argument is that the preponderance of small farms, while providing 'at home' livelihoods for a great many people, is constraining the development of the rural economy in the Podlaskie region (Kondratiuk-Nierodzińska *et al*., 2007). The policy implications of the findings are discussed further in the next chapter.

Chapter 6: Conclusions

This Deliverable has presented findings from WP5 on the analysis of farm household linkages with the wider rural economy.

Farm households have multiple economic linkages with other actors in the economy through

- production (output and input flows),
- labour markets (employees, off-farm work) and through
- household consumption.

Survey A of the CAP-IRE project (Raggi *et al*., 2010) indicated major differences between CSAs in terms of the strength of each type of linkage, and therefore validated further in-depth analysis, focussing on particular CSAs.

A mixed methods research strategy was adopted. First, a SAM-based analysis of North East Scotland was carried out to explore the role of farm households in sustaining the regional economy. Second, a statistical analysis of primary data on direct household transactions (input purchases, output sales, household consumption and off farm work), was conducted with the aim of increasing understanding of farm households integration in their local economies. The latter was conducted in four CSAs: North East Scotland (UK), Podlaskie (PL), the Centre Region (FR) and Midi Pyrénées,(FR). The two different approaches thus focussed on the farm household linkages at different spatial scales.

The SAM analysis showed clearly that standard economic indicators (such as GDP and employment) may under-represent the importance of farm households to the wider regional economy, with multiplier effects associated with the farm sector giving rise to disproportionately large knock-on effects at the regional level. Different farm types were found to have different degrees of integration (with small livestock farms most integrated, large cereals farms the least integrated). However, even having allowed for these multiplier effects, the policy simulations suggest that, at regional level, CAP reform in North East Scotland would have only a small impact on incomes and employment. The distribution of effects within the region was shown to be largely independent of the nature of the policy change, with approximately 70% of the impacts contained within the rural part of the region, 30% spilling over to urban areas.

The local linkage analysis revealed new insights into the contribution of farm households to local economies in EU. Strong differences in spatial patterns of farm-related transactions were found across the four CSAs. While farms in the Polish CSA region carried out almost all of their farm-related transactions very close to the location of the farm, farms in the other CSAs had more complex and generally less local transactions reflecting spatial concentration in the upstream and downstream businesses in the respective areas. Contrary to expectations, no significant differences in purchasing or sales patterns were found according to farm type of farm size, but the degree of farmer attachment to the local economy was found to significantly increase the probability of purchasing locally.

In terms of policy, the results suggest that any reform of the CAP which has production-related impacts will have very different spatial effects. For example, while in Podlaskie, the effects of CAP reform are likely to be spatially diffuse across rural areas, in North East

Scotland the impacts of CAP reform may not be large at the regional level (from the SAM analysis) but will be spatially concentrated in particular towns in the region. This in turn suggests that different types of policy assistance may be required in different EU regions should CAP reform lead to a reduction in agricultural support. More generally, the results suggest that there may be a case for extending the existing FADN survey by adding additional questions, similar to that included in the USDA Agricultural Resource Management Survey (ARMS) on farm household purchasing and sales patterns (USDA, 2010). This would provide a better basis for understanding the links between European farm households and their local economies and thus for evaluating the wider beneficiaries of CAP support.

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