

Appendix 6:
Drivers of Countryside Change
(Work Package 3.5)

**Analysis of MAFF June Census Data at Local Authority Level for
England and Wales (1988-1997)**

**Caroline Kiddle,
University of Cambridge**

1. Introduction

This report aims to provide an overview of how farming in England has changed at the regional level over the decade 1988-97, using data from the MAFF June Census, one of the main sources for agricultural data in the UK. The focus will be on describing changes that may have an impact on quality and quantity of land cover. This report will then be linked to another study examining agricultural trends over time using data from the Farm Business Survey. These two reports, together with other research in the same module, will then provide a context in which to interpret the environmental changes observed in CS2000.

The report is structured as follows. Firstly methodological issues are discussed, including information availability from the June Census (JC), the statistical issues surrounding working with district-level data. Also included is a description of other data sets that can be used to understand rural change at the district and regional level, including ONS socio-economic clusters, and a description of how the data is mapped. Secondly the main body of the report will set out the broad structure of agriculture in the English Standard Statistical Regions (SSRs)¹ and how this has changed over the decade. There are six sections here, (a) changes in land area and holding number and mean size, (b) changes in the numbers and proportions of each holding type, (c) changes in land use, (d) changes in cropping, (e) changes in livestock, and (f) agricultural labour changes. Also included is a section which then compares changes in LFA and non-LFA areas. Tables and maps are provided where appropriate. Finally, an attempt is made to draw conclusions from these changes, with respect to possible environmental impacts.

2. Methodology

2.1 Data from the June Census

The basic statistics on agricultural holdings in the UK are gathered by MAFF in the annual June Census (JC), held on the first weekday in June. The agricultural holding is the basic unit of enumeration, and there are around a quarter of a million (244,000 in 1994) major agricultural holdings in the UK, that is, holdings above a specified threshold for inclusion in the Census. Minor holdings² are periodically included in the Census.

Regional and county results are published yearly, giving a summary of land use, cropping, livestock numbers, tenure of land, seasonal use of land and the number of main holdings included in the Census. Also included is a summary of labour force

¹ Aggregated data for these regions is published each year by MAFF, although in 1997 there is a change to Government Office Region for the published data. County totals have therefore been used for 1997 and aggregated up to the appropriate SSR.

² Minor Holding - a holding that satisfies all of the following conditions

- total area of the holding less than 6 hectares
- no regular whole time farmer or worker on the holding
- annual labour requirement less than 100 standard man days, i.e. 8 hours of productive work by an adult worker under average conditions.
- glasshouse area less than 100 square metres
- the occupier does not farm another holding. (MAFF 1994).

data, including family workers (farmers, spouses and regular hired family labour, other regular hired labour, seasonal and casual labour and trainees on Government Schemes, e.g. YTS).³ Listed below are breakdowns of the categories used in this report.

LAND USE

Agricultural land use is divided between the following categories; arable (crops, fallow and temporary grassland under 5yrs old), permanent grassland (over 5 years old), rough grazing (sole rights), woodland on holdings and all other land. This last category includes the set-aside element (except for 1988 figures), as well as land taken up by farm buildings, tracks; in other words, land that is not in mainstream agricultural production other than woodland. The total agricultural area excludes common rough grazing land, but includes sole rights rough grazing.

CROPPING, HORTICULTURE AND GRASSLAND

Here the *cereals area* is the total hectareage of cereals grown for threshing (wheat, barley, oats, mixed corn, rye and triticale). The area for *other crops* is the total hectareage for all crops, minus the cereals and horticulture totals. It includes potatoes (early and maincrop), crops for stockfeeding, sugarbeet (other than for stockfeeding) hops, rape for oilseed and all other crops except grasses. The *horticulture area* comprises the total hectareage of vegetables grown in the open for human consumption, orchards (commercial and non-commercial), small fruit (including wine grapes), hardy nursery stock, bulbs and flowers grown in the open and all areas under glass and plastic structures; areas for mushroom growing are excluded. The *grassland area* (temporary and permanent) includes hectareage for clover, sainfoin and lucerne, but excludes all rough grazing. Temporary grassland includes leys under five years old, while permanent grassland refers to grasses five years old and over.

LIVESTOCK

Total cattle numbers refers to the total breeding herd (dairy and beef), plus heifers in calf (dairy and beef), bulls in service and all other cattle over two years old and calves under two years old. *Total pig numbers* includes the total breeding herd, barren sows for fattening and all other pigs. *Total sheep and lambs* includes the breeding flock over one year old, other sheep over one year old and lambs under one year old. Numbers are also available for poultry, goats, horses and ponies and farmed deer, but the amount of land taken up by these enterprises is small. Holdings where pig or poultry are the main enterprise only account for around 3% of all holdings, for example, and tend to be small or very small, i.e under 8ESU.

CLASSIFICATION OF HOLDING TYPES

Holdings are classified into 72 holding types in the EC system, according to how the Standard Gross Margins (SGMs) are distributed among the enterprises. Simplification of these has resulted in nine robust types, identified by the crop or livestock (or group of crops or livestock) enterprise making up usually more than two thirds of the total SGM for the holding. Where both crops and livestock comprise more than one third, but less than two thirds, of total SGM, the holding is classified to a mixed category.

³ Data for seasonal and casual workers reflects numbers in work in June, and thus will not include those working at other times, e.g. for seasonal vegetable picking and processing, Christmas poultry preparation, etc.

The nine robust types are Cereals, General cropping, Horticulture, Pigs and poultry, Dairy, LFA cattle and sheep, Cattle and sheep (lowland), Mixed and Other. This last category includes holdings which do not fit well with mainstream agriculture such as specialist mushroom growing enterprises, goat or equine enterprises, or those which are of limited economic importance, such as specialist set-aside, specialist grass and forage (only grass or rough grazing, with no livestock held) or non-classifiable holdings (fallow or buildings and other areas only; no SGM coefficients calculated). Such holdings may thus be indicators of diversification. Holdings are also classified according to the amount of tillage and grass area they have, and these are divided into 5 categories.⁴

Listed below are the nine robust types and the five tillage and grass categories together with the variable names used in the tables.

Type	Variable name
Cereals	CEREAL
General cropping	GENCRO
Horticulture	HORT
Pigs and poultry	P & P
Dairy	DAIRY
Cattle and sheep (LFA)	LFACS
Cattle and sheep (lowland)	LOWCS
Mixed	MIXED
Other	OTHER
0<5 ha	TILGR1
5<20 ha	TILGR2
20<50 ha	TILGR3
50<100 ha	TILGR4
100+ ha	TILGR5

2.2 Statistical issues concerning district-level data.

To prevent disclosure of individual holdings, data are suppressed by MAFF where there are less than five holdings in an area, or where a particular question in the JC is answered by fewer than five holdings in an area. While the impact of this is minimal at regional level, it can lead to more significant undercounting at district level. An example of this is the disaggregation of farm labour by sex, which leads to a loss of information particularly about numbers of female farm workers. Another example is with the breakdown by holding type. For instance, a districts may have fewer than five horticultural holdings, but these may employ a significant proportion of the local agricultural labour force, especially if the district is dominated by larger Cereals holdings

2.3 Other useful data sets

The *EC Farm Structures Survey (FSS)* provides more detailed information about farm labour, in particular about the uptake of other gainful activities (OGAs). When farm incomes are falling it becomes necessary for some farm families to supplement this with income from other sources. As a result farmers may choose to change the type of farming carried out on the holding to leave more time available for OGAs. For

⁴ Further information about the classifications and other definitions can be found in MAFF's annual Digest of Agricultural Census Statistics: United Kingdom, published by The Stationary Office (formerly HMSO).

example, a change from dairying to extensive beef rearing, or from livestock to arable farming could mean less time is needed for routine farm work. The FSS provides a breakdown of the time spent on farm work (by quartiles as a proportion of the previous twelve months) for holders, spouses and other family members. In addition, it records time spent on OGAs, with a major OGA being classified as one where more time is spent on it than on farm work on the holding, and minor OGAs where less time is spent. This type of information would be most useful at local authority district level, where it could be used with other district-level data to look for patterns of change that might correlate with local economic factors. However the FSS sample is not drawn with district-level disaggregation in mind, and the sample size means breakdown to this level would also lead to severe treatment for disclosure.

There are several other data sets that give useful information on local labour market conditions. The *Annual Employment Survey* (formerly the Census of Employment) measures the total number of employee jobs annually. It is workplace-based, and gives the numbers and percentages of employees in employment by sex, full-time/part-time and 1992 Standard Industrial Classification.

The *Labour Force Survey* measures the number of people in employment. It is a quarterly sample survey of approximately 60,000 households in the UK which provides information on economic activity rates, percentage by age in employment (full and part-time), percentage of economically inactive, percentages employed by industry and occupation, and information on people in job-related training. It is also a source of information on self-employed people. The LFS also measures International Labour Organisation (ILO) unemployment rates. *JUVOS* (the Employment Service's Joint Unemployment and Vacancy Operating Systems) is another source of unemployment details. The *New Earning Survey* gives information on earnings and hours of employees by sex, age, type of work (manual, non-manual) and industry division.

Another useful analytical tool for studying local labour markets is the *ONS classification of local authority districts*. This uses the technique of cluster analysis on selected variables from the 1991 Census to provide a straightforward socio-economic indicator of the similarities and differences between areas which allows other data to be analysed in relation to the classification framework (Wallace and Denham 1996).

The classification is based wholly on data from the 1991 Census Small Area Statistics and Local Base Statistics. Initially 71 variables were used, including those representing the main dimensions of Census data (demographic, employment, socio-economic, household composition and housing), and these were reduced to 37 by identification and removal of strongly correlated variables. These final variables were then standardised using the range standardisation technique. Each variable was regarded as being of the same importance, and was not weighted, and the areas were not weighted by their population.

The choice of variables was guided by the desire to represent the main areas of demography, socio-economics, employment, housing and household composition, and to use variables used in the earlier 1971 and 1981 OPCS area classifications (or their near equivalents) together with new variables from the 1991 Census, such as ethnic group and limiting long term illness, which might be significant for area classification.

Using cluster analysis, the dataset was used to produce, for each district, a cluster of up to four corresponding districts. Then for all districts, a set of groupings was produced with similar characteristics, and these were then further arranged into broad families. This produced 6 broad families, 12 intermediate groups and 34 clusters, each being allocated a suitable descriptive name. A list of the names is given on the next page.

ONS cluster analysis of Local Authority Districts, from Wallace and Denham (1996)

FAMILY	GROUP	CLUSTER	
1 Rural Areas	A Scotland	1 Highlands & Islands	
		2 Uplands & Agriculture	
		3 Remote England & Wales	
	B Coast & Country	4 Heritage Coast	
		5 Accessible Amenity	
		6 Towns in Country	
	C Mixed Urban & Rural	7 Industrial Margins	
		8 Satellite Towns	
		9 Growth Corridors	
	2 Prospering Areas	D Growth Areas	10 Areas with Transient populations
			11 Metropolitan overspill
			12 Market Towns
E Most Prosperous		13 Concentrations of Prosperity	
		14 Established High Status	
		15 University Towns	
3 Maturer Areas	F Services & Education	16 Suburbs	
		17 Traditional Seaside Towns	
	G Resort & Retirement	18 Smaller Seaside Towns	
4 Urban Centres	H Mixed Economics	19 Established Service Centres	
		20 Scottish Towns	
		21 New & Expanding Towns	
	J Manufacturing	22 Pennine Towns	
		23 Areas with large ethnic minorities	
		24 Areas with inner city characteristics	
5 Mining & Industrial Areas	K Ports & Industry	25 Coastal Industry	
		26 Glasgow & Dundee	
	L Coalfields	27 Concentrations of public sector housing	
		28 Mining & Industry, England	
		29 Mining & Services, Wales	
		30 Former mining areas, Wales & Durham	
		31 Cosmopolitan Outer Boroughs	
6 Inner London	M Inner London	32 Central London	
		33 Inner City Boroughs	
		34 Newnham & Tower Hamlets	

Combining information from sources such as these with district-level agricultural data would allow a better picture to be built of the interaction of farm families with the wider local economy. This would facilitate the identification of ways in which the two could mutually interact. However, at present the JC, and to a lesser extent the FSS are still primarily set up to provide information on what farmers are (traditionally) doing on their holdings.

Combining information from sources such as these with district-level agricultural data would allow a better picture to be built of the interaction of farm families with the wider local economy. Such analysis could then be used to identify ways in which to promote mutual interaction. However, at present the JC (and to a lesser extent the FSS) is still primarily set up to report on how farmers farm the land.

2.4 Mapping

Map borders for the country outlines of England, Scotland and Wales, and the English Census Regions are downloadable from UKBORDERS, an on-line retrieval system for accessing digital boundary datasets. The software used for mapping is MapInfo, a GIS and mapping package, and tables of data are geocoded to the appropriate borders. This enables maps to be created using information from the JC.

The digitised boundary outline data has been generalised (this reduces the file size by systematically discarding data points according to a type of moving average), and although this results in some loss of precision, the maps are sufficiently accurate for the thematic mapping purposes used in this project.

Information was not readily available for the proportions of holding types for England Wales and Scotland in 1988, so the comparison is between 1991 and 1997 instead. Also, the statistics were presented differently for the three countries, so the country and region pie charts differ as follows

Countries	Regions
Dairy	Dairy
Cattle & sheep	LFA cattle & sheep
	Lowland cattle & sheep
Cropping	General cropping
Pigs & poultry	Pigs and Poultry
Horticulture	Horticulture
Unclassified (mixed and other)	Mixed
	Other

For the land use maps, each land use is given as a proportion of the total area on holdings. Livestock units are per 100ha of grass and rough grazing. Cereals are given as a proportion of total crops, and holding types as a proportion of all holdings.

3. Regional agricultural change, 1988-97

3.1 Land area and holdings

Land in agricultural use, including woodland on agricultural holdings, comprises over 70% of the English landscape. This section reviews changes in the percentage of agricultural land in each region, in each region's share of the national total of holdings and agricultural area and within each region in the holdings area, numbers of holdings and mean holding size.

All regions have lost some land from agricultural holdings over the decade, but this has happened at different rates in different regions (Table 1). The North West, South West and South East are losing agricultural land (as measured in the June Census) at higher rates than the national average, while in the North and Yorkshire and Humberside the rate of loss is less steep.

Table 1: The percentage of regional area in agriculture

Region	% area in agriculture 1988	% area in agriculture 1990	% area in agriculture 1993	% area in agriculture 1997	Change 88-97
North West	62.35	61.81	61.55	59.26	-3.09
South East	67.05	66.46	65.70	64.16	-2.90
South West	78.24	76.82	77.21	75.84	-2.40
West Midlands	75.43	75.14	74.79	73.53	-1.90
East Anglia	80.60	80.73	81.57	78.98	-1.62
East Midlands	80.04	79.38	80.16	78.82	-1.22
Yorks & Humberside	72.06	71.59	72.26	71.32	-0.73
North	68.29	67.89	68.11	67.59	-0.70
All England	73.35	72.73	72.89	71.48	-1.86

Source:NERC and MAFF

Table 2 shows each region's percentage of the national total of holdings and agricultural area. Throughout England the number of holdings has fallen by 7%, while the agricultural area has fallen by just over 2%. What we cannot tell from the data is how many holdings have fallen out of the main Census by becoming minor holdings, and how many have changed ownership and been incorporated into other, larger holdings to facilitate economies of scale. The percentage changes are very small and may be within the error of the Census, or may be accounted for by holdings merging, splitting or falling below the threshold for inclusion as a major holding.

Table 2: Regional holdings numbers and agricultural area as a percentage of national totals, 1988 and 1997.

Region	year	Nat. % of holdings	Nat. % of area
	1988	7.72	11.17
	1997	7.92	11.32
	% change	2.59	1.31
North West	1988	8.25	4.77
	1997	7.76	4.64
	% change	-5.68	-2.69
Yorks & Humberside	1988	11.32	11.79
	1997	11.14	11.94
	% change	-1.53	1.32
East Midlands	1988	11.20	13.28
	1997	10.97	13.38
	% change	-1.98	0.80
West Midlands	1988	12.85	10.22
	1997	13.11	10.20
	% change	2.03	-0.23
South West	1988	23.66	19.57
	1997	24.73	19.65
	% change	4.54	0.40
East Anglia	1988	8.38	10.75
	1997	7.93	10.78
	% change	-5.38	0.30
South East	1988	17.60	18.44
	1997	17.00	18.07
	% change	-3.42	-2.00
Total		100.00	100.00

Just under quarter of all the holdings recorded in the June Census are located in the South West and these account for just under 20% of the total national hectare of agricultural land. The North, North West and East Anglia have the smallest

percentages, just under 8% by 1997. By the end of the decade, the South West, West Midlands and the North have slightly increased their share of the total holdings, while all other regions had less.

East Anglia, while decreasing its share of holdings by over 5%, retains its share of the nation's agricultural land, suggesting that here the mean holding size has increased; this is confirmed in Table 3. A similar pattern occurs also in Yorkshire and Humberside. The South East and North West appear to be losing land to agriculture, as their share has fallen by 2% and 2.69% respectively and their share of holdings has also decreased. Some of this may be due to change of land use, and data compiled by the CPRE (1993) suggests that in the South East and the South West more land is being converted from rural to urban use. But the table above also suggests that agricultural holdings are becoming more concentrated in the South West, together with the North and West Midlands.

Table 3: Regional changes in the area, number and mean size of holdings in the June Census, 1988-97

Region	Total area of holdings in JC			Total number of holdings in JC			Mean holding size		
	1997	Change 88-97	% change	1997	Change 88-97	% change	1997	Change 88-97	% change
North	1038383	-10784	-1.03	11398	-576	-4.81	87.62	3.48	3.97
North West	425419	-22063	-4.93	11177	-1619	-12.65	34.97	3.09	8.84
Yorks & H'side	1095544	-11277	-1.02	16042	-1516	-8.63	63.04	5.25	8.34
East Midlands	1227769	-18966	-1.52	15799	-1572	-9.05	71.77	5.94	8.28
West Midlands	935525	-24273	-2.53	18871	-1063	-5.33	48.15	1.43	2.96
South West	1802425	-35166	-1.91	35603	-1101	-3.00	50.07	0.56	1.12
East Anglia	989034	-20318	-2.01	11421	-1588	-12.21	77.59	9.01	11.61
South East	1657757	-73731	-4.26	24466	-2835	-10.38	63.42	4.34	6.84
All England	9173853	-216569	-2.31	143955	-11194	-7.21	60.53	3.20	5.29

There has been a loss of *holdings area* in all regions (Table 3), but with the greatest percentage loss in the North West (down nearly 5%) and the South East (over 4%), which also had the greatest loss of hectareage. These correspond with the losses of national share in Table 2.

The South East has lost the greatest *number of holdings* (over 2,800) while North has lost the fewest (just over 570). The greatest percentage losses occurred in the North West (down over 12.5%) and East Anglia (down 12.21%). Again, this is born out in the figures from Table 2.

In 1988 the North had the largest *mean holding size*. This remains the case in spite of changing little over the decade in comparison to East Anglia, which had the largest increase (as suggested also in Table 2). Mean average size of holdings has changed least in the South West. The North West, Yorkshire and Humberside and the East Midlands all show increases of over 8% in mean holding size, and this together with the fall in numbers of holdings, suggests some incorporation of smaller holdings into larger ones, to benefit from economies of scale.

3.2 Changes in numbers and proportions of EC farm types

Table 4: National changes in holdings types⁵

Holding type		1988	1997	change	% change
Pigs and poultry	no.	6887	4733	-2154	-31.28%
	Nat. %	4.45%	3.33%	-1.12%	
Horticulture	no.	11061	8032	-3029	-27.38%
	Nat. %	7.14%	5.65%	-1.49%	
Dairy	no.	24150	17785	-6365	-26.36%
	Nat. %	15.59%	12.50%	-3.09%	
General cropping	no.	15413	11367	-4046	-26.25%
	Nat. %	9.95%	7.99%	-1.96%	
Mixed	no.	12905	11096	-1809	-14.02%
	Nat. %	8.33%	7.80%	-0.53%	
LFACS	no.	11190	9633	-1557	-13.91%
	Nat. %	7.22%	6.77%	-0.45%	
LOWCS	no.	29638	30698	1060	3.58%
	Nat. %	19.14%	21.58%	2.45%	
Cereal	no.	20338	20889	551	2.71%
	Nat. %	13.13%	14.69%	1.56%	
Other	no.	23305	27994	4689	20.12%
	Nat. %	15.05%	19.68%	4.64%	
All holdings	no.	154887	142227	-12660	-8.17%
	Nat. %	100.00%	100.00%		

The picture here is one of a decline in the what can be regarded as the more labour intensive farm types and a rise in those where, theoretically, there will be more time available for OGAs. Hence Pigs and Poultry, Dairy, Horticulture and Mixed holdings have seen the greatest percentage decline, Cereal, LOWCS and Other holdings are increasing in number.

In terms of the national balance of holding types, Dairy holdings have seen their share fall by three percentage points while Other holdings have increased their share by nearly five points. This again suggests more opportunities for diversification and taking on OGAs if farmers are changing to less labour-intensive types of farming.

⁵ The total numbers of holdings and the total percentage change varies slightly from those in Table3. This may be due to suppression of numbers. However, both show a decline in the number of holdings overall by between seven and eight percent.

Table 5: Regional changes in numbers and proportions of EC farm types.

Reg		CEREAL	GENCRO	HORT	P&P	DAIRY	LFA CS	LOW CS	MIXED	OTHER	ALL TYPES
N	1997	1012	112	71	157	1902	3205	2390	760	1518	11127
	Change 88-97	35	-89	-106	-80	-617	-350	427	-187	272	-695
	% change	3.58	-44.28	-59.89	-33.76	-24.49	-9.85	21.75	-19.75	21.83	-5.88
NW	1997	477	637	792	433	2636	1021	1954	419	2621	10990
	Change 88-97	26	-313	-268	-307	-815	-28	-79	-148	286	-1646
	% change	5.76	-32.95	-25.28	-41.49	-23.62	-2.67	-3.89	-26.10	12.25	-13.03
Y&H	1997	2839	1799	518	815	1640	1879	2338	1501	2478	15807
	Change 88-97	-102	-492	-194	-315	-599	-274	114	-271	425	-1504
	% change	-3.47	-21.48	-27.25	-27.88	-26.75	-12.73	5.13	-15.29	20.70	-20.70
EM	1997	3926	2212	773	450	1310	642	2646	1319	2324	15602
	Change 88-97	164	-1068	-188	-234	-563	-81	172	-147	318	-1627
	% change	4.36	-32.56	-19.56	-34.21	-30.06	-11.20	6.95	-10.03	15.85	-9.44
WM	1997	1738	1303	980	525	2680	1000	5094	1761	3587	18668
	Change 88-97	192	-255	-222	-185	-879	-171	-11	-349	727	-1153
	% change	12.42	-16.37	-18.47	-26.06	-24.70	-14.60	-0.22	-16.54	25.42	-5.82
SW	1997	2584	610	1463	1002	6521	1886	10524	2751	7901	35242
	Change 88-97	365	-224	-331	-276	-2200	-653	791	-273	1583	-1218
	% change	16.45	-26.86	-18.45	-21.60	-25.23	-25.72	8.13	-9.03	25.06	-3.34
EA	1997	3019	3568	825	582	110	0	784	807	1519	11214
	Change 88-97	-208	-1049	-432	-277	-81	0	73	-36	327	-1683
	% change	-6.45	-22.72	-34.37	-32.25	-42.41	0.00	10.27	-4.27	27.43	-13.05
SE	1997	5294	1126	2610	769	986	0	4968	1778	6046	23577
	Change 88-97	79	-556	-1288	-480	-611	0	-427	-398	751	-2930
	% change	1.51	-33.06	-33.04	-38.43	-38.26	0.00	-7.91	-18.29	14.18	-11.05
ENG	1997	20889	11367	8032	4733	17785	9633	30698	11096	27994	142227
	Change 88-97	551	-4046	-3029	-2154	-6365	-1557	1060	-1809	4689	-12660
	% change	2.71	-26.25	-27.38	-31.28	-26.36	-13.91	3.58	-14.02	20.12	-8.17

All regions have experienced the decline in Dairy, Pig and Poultry, Horticulture and Mixed holdings and the rise in Other holdings noted above. There are now fewer holdings relying mainly on livestock with the exception of lowland cattle and sheep (LOWCS) holdings, which one could argue are less labour intensive than Dairy or LFA cattle and sheep (LFACS) holdings. The decline in Mixed and General cropping holdings also implies a move towards specialization, where labour requirements may be easier to predict and control, which may in turn leave time for OGAs where necessary. Increases have occurred in the types of holdings where diversification and off-farm enterprises may be more easily taken up. For example, numbers of Cereal holdings, where activity tends to come in short intense bursts during the year, have increased in all but two regions, East Anglia and Yorkshire and Humberside. Changes in LOWCS holdings have varied between a rise of over 20% in the North to a fall of nearly 8% in the South East. Where there have been rises in the numbers, these may reflect a change of enterprise from dairy to beef. For example, in East Anglia the fall in numbers of Dairy holdings (down by 81) is similar to the rise in the numbers of LOWCS holdings (up by 73). (This also ties in with the substitution of beef for dairy cattle; see the section on livestock changes) In other areas, though, the fall in Dairy holdings is well in excess of any rise in LOCASH and, where applicable, LFACASH holdings.

3.3 Changes in holdings by tillage and grass area.

Here holdings are categorised according to the size of their arable area. There has been a decline in all groups except the 5-20ha group (Table 6). This seems surprising, perhaps especially the decline in the numbers of holdings with the largest hectareage of tillage and grass. Bearing in mind that these are numbers of holdings, and not farms, one explanation may be associated with the way in which holdings are defined on farm amalgamation or alternatively even that this represents pre-emptive action against the possible limits placed on the total of support payments per 'farm'.

Table 6 : Regional changes in tillage and grass holdings, 1988-97

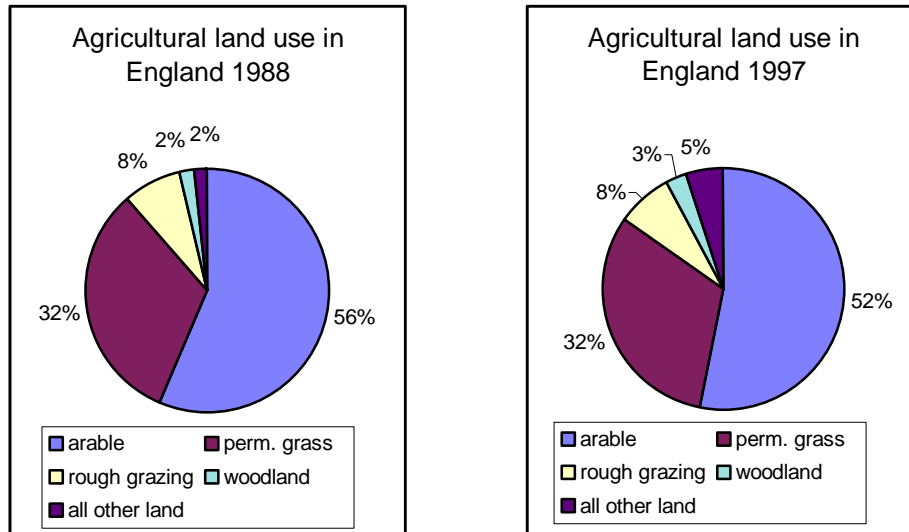
Region	Year/ change	TILGR1 0-5ha	TILGR2 5-20ha	TILGR3 20-50ha	TILGR4 50-100ha	TILGR5 100+ha
North	1997	1683	2172	2630	2686	2191
	change 88-97	59	-11	-529	-194	114
	change	3.63	-0.50	-16.75	-6.74	5.49
North West	1997	2598	3197	2862	1705	618
	change 88-97	-735	-239	-465	-112	11
	change	-22.05	-6.96	-13.98	-6.16	1.81
Yorks & H'side	1997	3200	3728	3472	2868	2637
	change 88-97	-640	-146	-433	-319	-103
	change	-16.67	-3.77	-11.09	-10.01	-3.76
East Midlands	1997	2544	3888	3487	2580	3236
	change 88-97	-681	4	-406	-351	-143
	change	-21.12	0.10	-10.43	-11.98	-4.23
West Midlands	1997	3742	5284	4157	3137	2452
	change 88-97	-536	96	-283	-203	-161
	change	-12.53	1.85	-6.37	-6.08	-6.16
South West	1997	6933	9808	8571	6125	4051
	change 88-97	-403	631	-909	-370	-35
	change	-5.49	6.88	-9.59	-5.70	-0.86
East Anglia	1997	2683	2244	2134	1681	2661
	change 88-97	-540	-171	-574	-168	-138
	change	-16.75	-7.08	-21.20	-9.09	-4.93
South East	1997	6424	6202	4204	2797	4189
	change 88-97	-1558	52	-399	-427	-504
	change	-19.52	0.85	-8.67	-13.24	-10.74
All England	1997	29807	36523	31517	23579	22035
	change 88-97	-5034	216	-3998	-2144	-959
	change	14.45	-0.59	11.26	8.33	4.17

The South West continues to have the greatest numbers in all groups except TILGR5, where the South East has marginally more, and lost comparatively few over the decade, especially TILGR5 holdings.

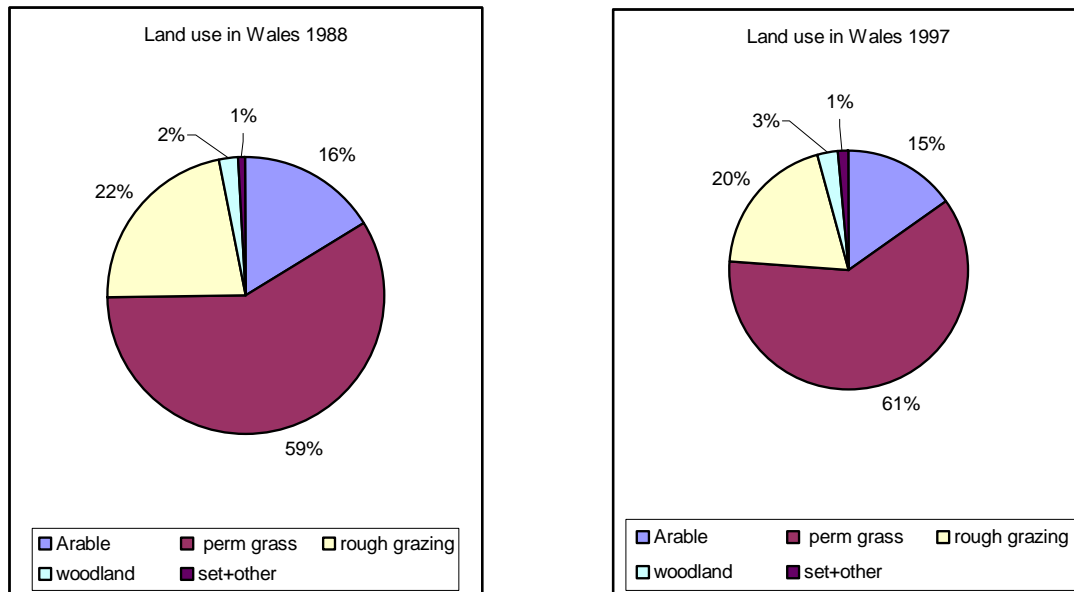
The biggest fall in TILGR5 holdings occurred in the South East, where they fell by 10.74%, whereas in the North and North West numbers increased slightly. At the other end of the scale, the greatest losses in TILGR1 holdings occurred in the North West (down 22.05%), the South East (down 19.52%) and East Anglia (down 16.75%).

3.4 Changes in land use and agricultural outputs

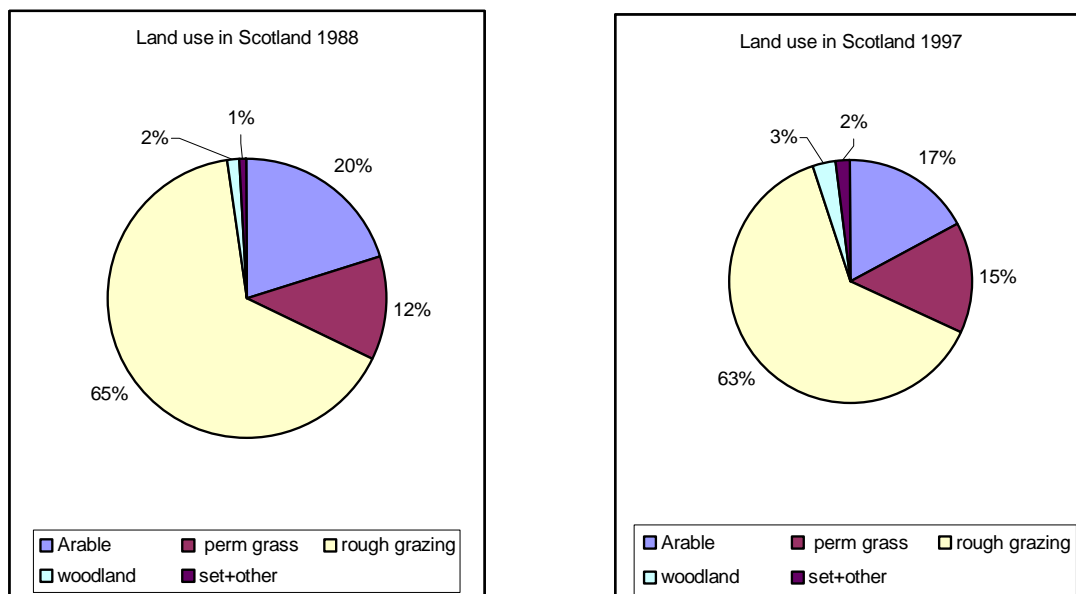
Diagram 1: Agricultural land use in England, 1988 and 1997



The biggest changes in agricultural land use in England appear to have resulted from the introduction of set-aside and the various Farm Woodland Schemes (Diagram 1). The proportion of arable land in England has decreased by 4% while woodland and all other land (which includes the set-aside element) have increased by 1% and 3% respectively. Overall, though, there has been no change in the proportion of agricultural land used for rough grazing and permanent pasture.

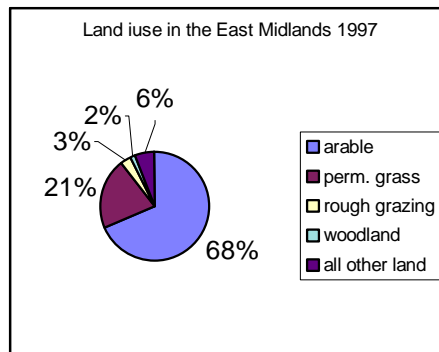
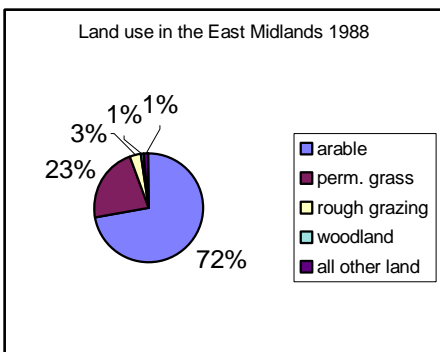
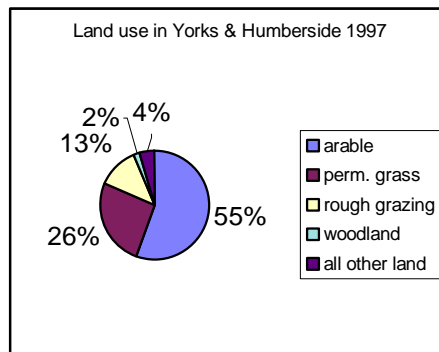
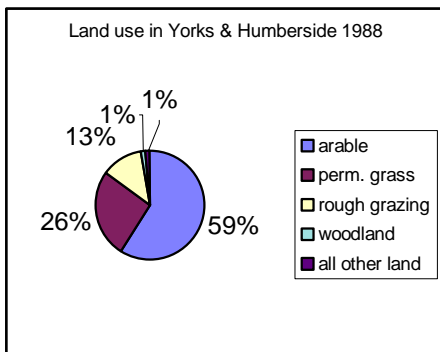
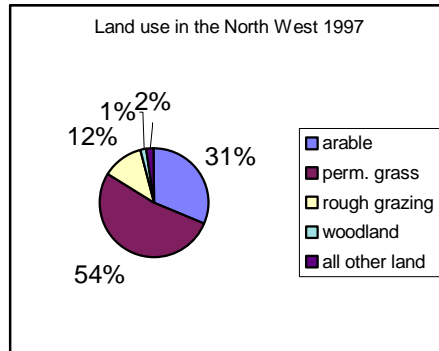
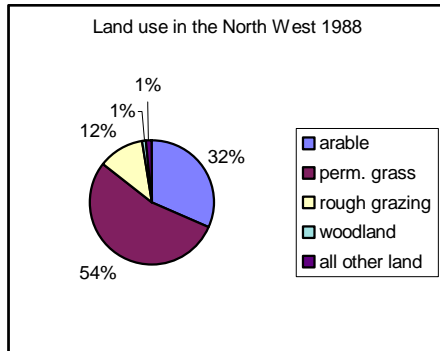
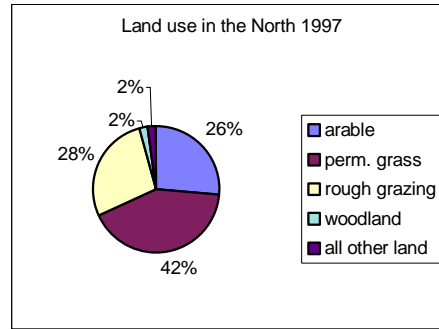
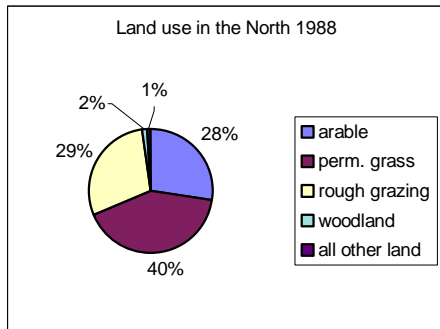
Diagram 2: Agricultural land use in Wales 1988-97

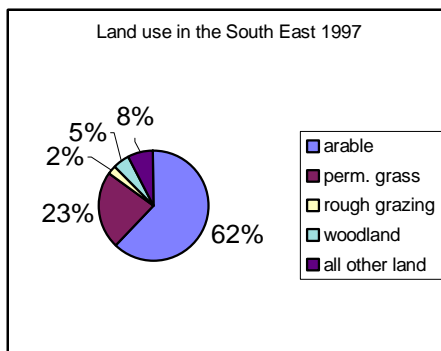
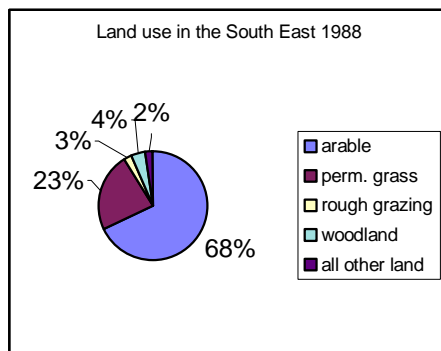
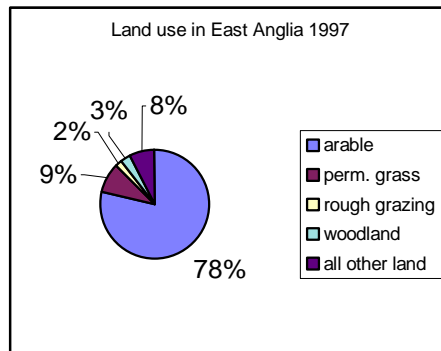
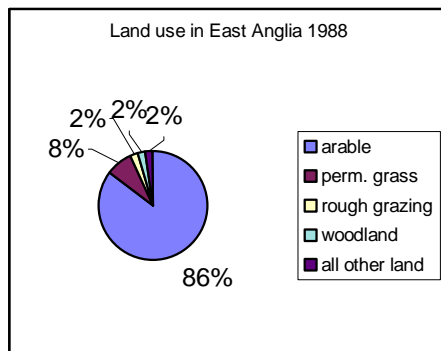
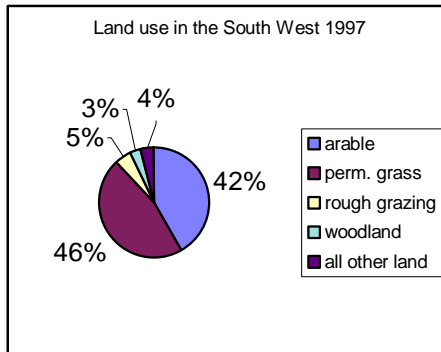
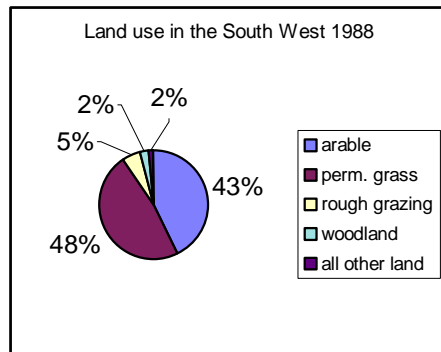
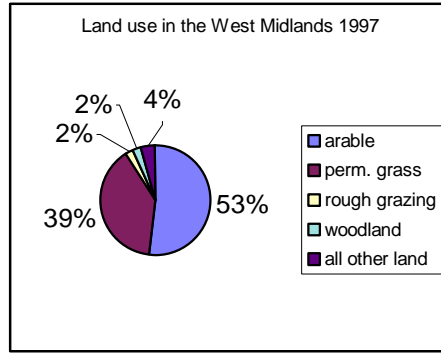
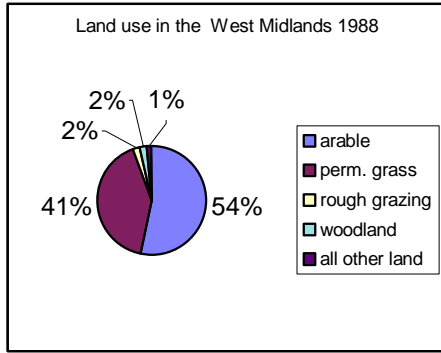
The amount of arable land has also decreased in Wales, but Diagram 2 above also shows an increase in permanent pasture and woodland, while the introduction of set-aside has had relatively little impact here compared to England. There has also been a decrease in the proportion of rough grazing.

Diagram 3: Agricultural land use in Scotland 1988-97

Scotland has seen a bigger decrease in the proportion of arable land than in Wales and more appears to have been put into set-aside. Again, as with Wales, the proportion of permanent pasture has increased and there has been a reduction in rough grazing and an increased in farm woodland (Diagram 3).

Diagram 4: Land use in the English regions, 1988-97





Within the regions of England there are variations due mainly, it would appear, to the existing balance of land use in each region (Diagram 4).

ARABLE

On the whole, the larger the proportion of arable land in a region, the greater has been the decrease in that proportion over the decade, and the larger the subsequent rise in other land. Regions with between a quarter to half their agricultural land in arable (North, North West and South West) in 1988 have seen this reduced by around 1-2%. Regions with between half to two-thirds (West Midlands, Yorkshire and Humberside and East Midlands) have varied more in the amount of decrease, ranging from 1% in the West Midlands to 6% in the South East. The remaining regions (South East and East Anglia) with the largest arable proportions have lost between 4 to 6% over the decade.

PERMANENT PASTURE

Here the proportions have remained relatively steady in all regions with changes of around 1-2% over the decade. The pattern of change is less clear than with arable land; the North West, which has the greatest proportion, has remained steady, while the South East, with the next greatest proportion, has decreased by 2%. Other regions now have a greater proportion of permanent pasture, especially the North (up 2% to 42%) and East Anglia (up 1% to 9%).

Nationally there was a continuing decline in the total area of permanent pasture of some 5.6%. While the rise in the North may be expected given the increase in sheep numbers it is less easy to account for in East Anglia, where cattle and sheep numbers have fallen. However, pig numbers have risen here, and it may be a combination of the rise in beef numbers, an increase in outdoor pig production and possibly pasture for horses (for which we have no data) that accounts for the rise here. The introduction of environmental schemes might also be a factor.

ROUGH GRAZING (SOLE RIGHTS)

Rough grazing accounts for around 7.5% of all agricultural land recorded in the June Census, and this is found mainly in the north of the country. The North has the greatest proportion of its agricultural land as rough grazing (just under 30%), followed by the North West and Yorkshire and Humberside with around 12%, and then the other regions have only 5% or less. The proportions of rough grazing land has remained relatively steady, with only slight falls in the North and the South West.

WOODLAND

Although only accounting for below 3% of farm land in the June Census, farm woodland area has increased in all regions over the decade, probably due to the implementation of various woodland planting schemes. The South East has the greatest proportion of farm land in woodland, and increased this from 4 to 5% over the decade.

ALL OTHER LAND

The main cause of the increased hectareage in this category over the decade is the introduction of set-aside, especially the scheme under the reform of the CAP in 1993. This is included in the category in the June Census figures, hence the increase from under 2% of all agricultural land in 1988 to nearly 5% by 1997. This is reflected also in the proportional changes, with the an increase from one to five percent in the East Midlands and from two to eight per cent in East Anglia and the South East, which correspond with the fall in arable proportions.

Because of the influence of the introduction of set aside, change here may be better assessed by using data from 1993 (Table 7); even so the increases may reflect participation in the earlier voluntary set-aside scheme. Even so, while the proportion of land defined as 'other' is small, some areas have seen large rates of increase.

Table 7: Changes in 'other' land by region, 1993-97

Region	Area of other land 1993	Area of other land 1997	Change 1993-7	% change
North West	6738	9991	3253	48.28%
South West	40199	67590	27391	68.14%
South East	68232	122223	53991	79.13%
North	11573	22397	10824	93.53%
East Anglia	36478	74499	38021	104.23%
West Midlands	18710	39248	20538	109.77%
Yorks & H'side	18217	48187	29970	164.52%
East Midlands	25438	67983	42545	167.25%
All England	225585	452118	226533	100.42%

The change in hectareage is very uneven between the regions; the North West had the smallest area (9991ha in 1997), and made the smallest percentage gain (48.28%), while the South East had a large initial area (122,223ha. in 1997) and increased its hectareage by 79.13%. The highest percentage gains were in the East Midlands and Yorkshire and Humberside, with increases in excess of 150% followed by the West Midlands and East Anglia, with increases of just over 100%.

3.5 Changes in cropping, horticulture and grassland

CEREALS

Table 8: Changes in cereals hectarage

Region	Cereals as % of ag. area 88	Total cereals area 97 (ha)	Change in area 88-97	% change in area 88-97
South West	23.26%	362149	-65319	-15.28%
North West	14.57%	55425	-9772	-14.99%
South East	43.52%	647032	-106428	-14.13%
East Midlands	46.22%	531424	-44800	-7.77%
West Midlands	30.58%	271408	-22102	-7.53%
Yorks & H'side	39.02%	403768	-28126	-6.51%
East Anglia	53.78%	509147	-33725	-6.21%
North	15.21%	153617	-5951	-3.73%
<i>All England</i>	34.62%	2933971	-316223	-9.73%

As might be expected with the introduction of set-aside, cereals hectarage has decreased in all regions over the decade (Table 8). But while the East Midlands and the South East had the largest share of the national hectarage in 1988, the South East lost a much greater area (down 106428ha, or 14.13%) compared to the East Midlands (down 44800, or 7.77%). As a result, the East Midlands now has the largest share of total cereals hectarage. In contrast, the North, with only 15% of its agricultural area in cereals, changed little with a decrease of 4%.

TEMPORARY AND PERMANENT GRASSLAND

Table 9: Changes in grassland hectarage

Region	Grassland as % of ag. area 88	Total grassland area 97 (ha)	Change in area 88-97	% change in area 88-97
South East	31.75%	475705	-73968	-13.46%
East Midlands	27.97%	314985	-33732	-9.67%
West Midlands	54.09%	475502	-43662	-8.41%
South West	62.58%	1067074	-82876	-7.21%
North West	66.14%	277807	-18176	-6.14%
Yorks & H'side	32.46%	343335	-15911	-4.43%
North	50.01%	516187	-8511	-1.62%
East Anglia	10.40%	106138	1175	1.12%
All England	41.07%	3576731	-278985	-7.24%

Grassland area (excluding rough grazing) has declined in all areas except East Anglia, which saw a slight rise of 1175ha (1.12%) over the decade (Table 9). The greatest loss of hectareage was in the South West (down 82876 ha, or 7.21%), while the greatest percentage loss was in the South East (13.46%, or 73968ha). However the South West still has ten times the hectareage of grassland than East Anglia.

OTHER CROPS

Table 10: Changes in other crops hectareage

Region	Other crops as % of ag. area 88	Total other crops area 97 (ha)	Change in area 88-97	% change in area 88-97
Yorks & H'side	11.73%	126671	-3124	-2.41%
North	3.09%	35034	2623	8.09%
East Midlands	16.19%	219518	17613	8.72%
South East	11.90%	246949	40858	19.83%
West Midlands	9.22%	106136	17685	19.99%
North West	4.18%	23365	4665	24.95%
East Anglia	23.64%	307868	69220	29.01%
South West	3.87%	144592	73545	103.52%
<i>All England</i>	10.51%	1140132	153066	15.51%

Again, changes here are affected by the introduction of set-aside Only one region, Yorkshire and Humberside, showed a slight decline in hectareage. The doubling of hectareage of other crops in the South West reflects perhaps the fact that they only accounted for 4% of all crops at the start of the period, although other regions with similar proportions and smaller starting hectareages have not seen such an increase (Table 10)..

HORTICULTURE

Table 11: Changes in horticulture hectareage

Region	Hort. crops as % of ag. area 88	Total hort. crops area 97 (ha)	Change in area 88-97	% change in area 88-97
South East	2.66%	36323	-9790	-21.23%
North West	2.03%	7354	-1733	-19.07%
East Anglia	4.73%	38692	-9055	-18.96%
North	0.12%	1037	-203	-16.37%
East Midlands	3.40%	37367	-5051	-11.91%
West Midlands	1.57%	13652	-1413	-9.38%
South West	0.58%	10670	1	0.01%
Yorks & H'side	1.43%	18738	2910	18.39%
All England	2.00%	163832	-24336	-12.93%

In 1988 2% of total agricultural area in England was in horticultural crops, and this declined to 1.79% by 1997 (Table 11). Horticulture is concentrated in East Anglia, the East Midlands and the South East, and all three experienced declining hectarages over the decade. However, the East Midlands only lost around half the area of the other two (5,051ha., compared to 9,055 for East Anglia and 9,790ha. for the South East). The only region to gain hectarage was Yorkshire and Humberside, up 2,910ha, or 18.39%, but it still remains in fourth place in terms of total horticultural hectarage.

3.6 Changes in livestock numbers and stocking densities

There are great differences in livestock changes between England, Wales and Scotland (Table 12). England has seen much greater percentage losses in cattle numbers than Scotland and Wales, where fall have been modest. On the other hand pig and sheep numbers have remained almost unchanged in England, while Wales has lost 20% of its pig herd over the decade and in contrast Scotland has increased its pig numbers by 38%. Both Wales and Scotland have seen modest gains in their sheep numbers.

Table 12: Changes in livestock numbers

	total cattle nos 97	change 88-97	% change
England	6449490	-540092	-8.37%
Wales	1323,000	-18,700	-1.39%
Scotland	2078,900	28,300	1.38%

	total pig nos 97	change 88-97	% change
England	6617092	-118233	-1.76%
Wales	98,600	-26,300	-21.06
Scotland	644,900	177,500	37.98

	total sheep nos 97	change 88-97	% change
England	19221664	-57614	-0.30%
Wales	10915,100	618,600	6.01
Scotland	9563,200	313,700	3.39

As the changes in cattle numbers could be affected by the BSE crisis, changes throughout the decade are detailed in the following three tables.

Table 13: Changes in total cattle numbers

	cattle nos 88	%change 88-90	%change 90-93	% change 93-95	%change 95-97	%change 88-97	cattle nos 1997
North	896292	0.67	-2.43	0.48	-1.59	-2.87	870534
North West	590480	1.84	-0.50	0.06	-1.25	0.00	590509
Yorks & H'side	675051	-0.44	-3.93	0.01	-2.46	-6.60	630518
East Midlands	655687	0.39	-5.50	0.37	-4.89	-9.52	593282
West Midlands	963129	0.71	-5.03	-1.15	-3.45	-8.72	879150
South West	2156283	1.83	-4.53	0.75	-4.08	-6.04	2025973
East Anglia	215491	2.13	-9.25	-0.82	-7.45	-14.93	183315
South East	837169	-1.14	-11.08	5.03	-12.51	-19.23	676209
All England	6989582	0.82	-4.94	-0.04	-3.70	-7.73	6449490

Over the decade as a whole total cattle numbers have fallen in all regions except the North West, where they have remained essentially stable (Table 13). The biggest fall in both numbers and percentage occurred in the South East, down 160,960 or 19.23%. There was also an overall decline in the size of the dairy sector, ranging from a fall of 11.33% in the North West to over 29% in East Anglia and the South East. However, there was an increase in all regions in the size of the beef sector.

What is interesting here is that while East Anglia and the North West have the lowest regional cattle totals, East Anglia has nearly 15% fewer cattle by 1997, whereas the North West has retained its cattle numbers. This may reflect the fact that farmers in East Anglia have more options in terms of a change of farming regime. The breakdown in the table above also shows that the changes are uneven throughout the decade, with little change in 1988-90, falls in all regions between 1990 and 1993, patchy changes between 1993 and 1995, and again falls in all regions between 1995 and 1997 when the BSE crisis was a major issue.

However, concentrating on total cattle numbers alone masks any changes in the balance between dairy and beef numbers in the regions.

Table 14: Changes in Dairy numbers

	Dairy nos 88	%change 88-90	%change 90-93	% change 93-95	%change 95-97	%change 88-97	dairy nos 1997
North	186162	-2.11	-6.32	-1.19	-3.64	-12.96	162033
North West	256538	-0.48	-3.34	-3.46	-4.52	-11.33	227465
Yorks & H'side	164243	-2.28	-5.70	-3.46	-4.65	-15.18	139315
East Midlands	158009	-0.74	-8.14	-4.13	-7.14	-18.82	128265
West Midlands	286206	-1.25	-5.13	-2.80	-5.73	-14.16	245673
South West	718767	-1.96	-6.26	-1.67	-6.81	-15.79	605263
East Anglia	42581	-2.81	-14.82	-4.84	-10.95	-29.85	29870
South East	230022	-6.92	-13.77	-5.21	-7.22	-29.41	162366
All England	2042530	-2.20	-6.82	-2.80	-6.03	-16.76	1700250

There has been a continuous decline in numbers of dairy cattle in all regions and throughout the decade (Table 14). East Anglia and the South East experienced the greatest percentage decline in dairy numbers, each losing around 30% of their dairy herd. The North and North West both lost over 10%, while the East and West Midlands and Yorkshire and Humberside were nearer the national average loss, between 14 and 16% lower. In spite of the impact of BSE between 1995 and 1997, not all regions had their greatest declines during that time; East Anglia and the South East

in particular saw greater percentage losses between 1990 and 1993 than in the later period.

Table 15: Changes in Beef numbers

North	Beef nos 1988	%change 88-90	%change 90-93	% change 93-95	%change 95-97	%change 88-97	beef nos 1997
North	134438	11.82	4.20	1.75	0.02	18.58	159421
North West	25315	26.00	11.95	2.70	-0.29	44.44	36566
Yorks & H'side	60835	24.03	14.57	3.30	2.70	50.77	91718
East Midlands	47884	26.06	17.87	6.86	2.02	61.99	77565
West Midlands	63564	28.76	12.52	6.20	-0.34	53.35	97474
South West	134375	26.34	8.93	7.42	0.33	48.32	199302
East Anglia	22536	27.13	14.50	4.61	1.15	54.01	34707
South East	59562	33.03	10.42	6.85	-0.26	56.54	93240
All England	548509	23.52	10.29	5.13	0.55	44.03	789993

In contrast to the decline in dairy numbers there was an increase in the size of the beef sector in all regions over the decade (Table 15).

In the North, the East Midlands and East Anglia the fall in the numbers of dairy cattle is almost exactly matched by the rise in the numbers of beef cattle. In Yorkshire and Humberside the loss of dairy cattle coincided with a rise of around 25% more beef cattle while in the remaining regions the rise in beef numbers was less than the fall in dairy numbers.

The most rapid increases in beef numbers occurred between 1988 and 1990, with all regions except the North showing rises of between a quarter and a third. In subsequent periods all regions show a declining rate of increase, so that by 1995-1997 the situation was nearly stable. The effect overall was that regional increases ranged from 44% to 62%, except in the north where the increase was only 19% over the decade.

Table 16: Changes in pig numbers

Region	pig nos 97	change 88-97	% change
North West	287159	-94390	-24.74%
South East	754247	-225595	-23.02%
West Midlands	431207	-50951	-10.57%
South West	858971	-83776	-8.89%
North	178147	-4358	-2.39%
East Midlands	651688	-837	-0.13%
Yorks & H'side	1952284	187990	10.66%
East Anglia	1503389	153684	11.39%
<i>All England</i>	6617092	-118233	-1.76%

Nationally the pig herd numbers changed little over the decade, but again there are substantial variations between the regions (Table 16). Pig numbers fell everywhere except the two regions with the greatest numbers to begin with, Yorkshire and Humberside and East Anglia. Losses were least in the East Midlands and the North

while the North West and the South East lost nearly a quarter of their pigs over the decade. This points to a concentration of pig production into two main regions, Yorkshire and Humberside and East Anglia.

Table 17: Changes in sheep numbers

Region	sheep nos 97	change 88- 97	% change
South East	1888681	-341998	-15.33%
East Anglia	267169	-18820	-6.58%
East Midlands	1572077	-90453	-5.44%
South West	3945120	-175694	-4.26%
West Midlands	2767088	-48948	-1.74%
Yorks & H'side	2554856	53100	2.12%
North	5126792	452203	9.67%
North West	1099881	112996	11.45%
All England	19221664	-57614	-0.30%

As with pig numbers, there has been little change in sheep numbers nationally, but generally there has been a rise in numbers in the northern regions (e.g. 11% in the North West) and a fall in the south of the country (e.g. 15% in the South East) (Table 17). East Anglia has the smallest share of the national flock, and this is declining, while the North, which has the largest share of the national flock, is growing, indicating, as in the case also of pig production, a concentration of sheep farming in certain regions.

By matching change in livestock numbers to area of grassland and rough grazing, it is possible to give a picture of the stocking density and, by implication, the pressure on grassland. This is done by looking at the change in livestock units per 100 ha. of grassland and rough grazing⁶. The idea of a livestock unit is based on the relative metabolic energy requirements of different types of livestock in a yearly period. If a dairy cow represents one unit, then a beef animal represents 0.75 units, all other cattle represent 0.5 units and sheep represent approximately 0.15 units (Nix 1993) Using these figures, it is possible to calculate the approximate livestock units per 100ha. of grass and rough grazing for each region.

Table 18: Livestock units per 100ha grass and rough grazing: England, Wales and Scotland

Region	livestock units per 100ha grass and rough grazing, 1988	livestock units per 100ha grass and rough grazing, 1997	change 88-97	% change
England	165	168	3	1.82%
Wales	178	206	28	15.73%
Scotland	58	63	5	8.62%

⁶ This includes temporary grassland under 5 years, permanent grassland over 5 years and sole rights rough grazing.

Table 18 shows that livestock intensity has increased in all three countries. While livestock intensity has changes little in England over the decade, Wales has seen an increase of 16% in livestock units per 100ha of grassland. This is probable due to the 6% increase in sheep numbers over the decade. Scotland has also seen an increase but this is only half as great as the increase in Wales despite also seeing an increase in sheep numbers.

England has lost numbers of both cattle and sheep and seen a reduction of 7% in total grazing, while Wales has lower cattle numbers, more sheep and an increase of 6% in total grazing land and Scotland has more cattle and sheep and essentially the same amount of grazing land than in 1988.

Table 19: Regional livestock units per 100ha. of grass and rough grazing

	Units per 100ha 88	Units per 100ha 90	Change 88-90	Units per 100ha 93	Change 90-93	Units per 100ha 95	Change 93-95	Units per 100ha 97	Change 95-97	Change 88-97	% change
EA	141	140	-1	132	-8	131	-1	124	-7	-17	-12.05%
SW	167	170	3	167	-3	171	4	169	-2	2	1.20%
EM	171	177	6	174	-3	176	2	174	-2	3	1.75%
Y&H	162	166	4	164	-2	165	1	165	0	3	1.85%
SE	148	148	0	141	-7	143	2	145	2	3	2.02%
WM	195	199	4	202	3	202	0	201	-1	6	3.07%
N	154	161	7	163	2	162	-1	165	3	11	7.14%
NW	165	170	5	172	2	174	2	177	3	12	7.27%
Eng	165	169	4	167	-2	168	1	168	0	3	1.82%

The figures in Table 19 suggest a slight intensification of livestock production over the decade except in East Anglia, where extensification appears to be happening. This may in part be due to the substitution of beef for dairy cattle, and sheep for cattle, which will affect the calculations. Intensification appears to be greatest in the North and North West.

Again, breaking down the changes over the decade reveals an increase in livestock intensity in all regions except the East Anglia and the South East at the start of the period. Except for a slight decline in the North between 1993 and 1995, this increase continues in the north of the country throughout the decade. For the rest of the country, except for the West Midlands, the period 1990-1993 saw a fall in livestock intensity, especially in East Anglia and the South East. This decline continues in East Anglia for the rest of the decade, especially in the last time period between 1995 and 1997. For the rest of the country, 1993-1995 is a time of relatively little change. The last period between 1995 and 1997 sees the North, North West and South East increasing in intensity, while other regions except Yorkshire and Humberside see a reduction in intensity, with East Anglia again experiencing the greatest decline.

4. Labour changes on holdings

The categories used in the following analysis are listed below:

Total labour units per holding	F/t and p/t FPDs FPDs + spouses + f/t and p/t hired +seasonal and casual
Total regular labour units	F/t and p/t regular family and hired workers (no seasonal and casual)
Total family units	F/t and p/t FPDs + spouses + f/t and p/t family workers
Total hired units	F/t and p/t hire workers (no seasonal and casual)
Full-time family units	Male and female f/t reg family workers
Part-time family units	Male and female p/t reg family workers
Full-time hired units	Male and female f/t reg hired workers
Part-time hired units	Male and female p/t reg hired workers

Table 20: Total labour units and regular labour units per holding, England, Wales and Scotland

		total labour units per holding	reg labour units per holding
England	1997	2.71	0.84
	change	-0.21	-0.15
	% change	-7.27%	-15.05%
Wales	1997	2.26	0.35
	change	0.10	0.01
	% change	4.41%	2.91%
Scotland	1997	2.07	0.48
	change	0.08	-0.15
	% change	4.03%	-24.16%

Tables 20 to 23 show some remarkable differences between the three countries in terms of labour changes per holding. There has been a decrease in total labour units including seasonal and casual workers England but a slight rise of 4% in Wales and Scotland (Table 20). However, looking at regular labour units only without the seasonal and casual workers, the fall has been much greater in England and Scotland, although Wales is still showing a slight increase.

Table 21: Full-time and part-time family labour, England, Wales and Scotland

		fam wk per holding	ft fam per holding	pt fam per holding
England	1997	1.60	0.10	0.07
	change	-0.04	-0.03	0.00
	% change	-2.17%	-21.35%	0.82%
Wales	1997	1.81	0.08	0.09
	change	0.10	-0.02	0.02
	% change	5.91%	-17.04%	35.26%
Scotland	1997	1.67	0.12	0.07
	change	0.19	-0.04	0.01
	% change	13.17%	-27.13%	20.06%

In England as a whole there has been a slight fall in working family members per holding, whereas there has been a rise in both Wales and Scotland. All three countries have seen a steep decline in full-time family workers per holding, but whereas this has been matched by a rise in part-time family workers in Wales and Scotland, the rise in England is barely noticeable (Table 21).

Table 22: Full-time and part-time hired labour, England, Wales and Scotland

		all hired wk per holding	ft hired per holding	pt hired per holding
England	1997	0.56	0.46	0.21
	change	-0.10	-0.11	-0.01
	% change	-14.83%	-18.91%	-6.76%
Wales	1997	0.18	0.10	0.08
	change	0.00	-0.02	0.02
	% change	1.97%	-14.07%	32.26%
Scotland	1997	0.30	0.23	0.06
	change	-0.12	-0.11	-0.01
	% change	-29.17%	-32.38%	-14.21%

Full-time hired labour units per holding have fallen in all three countries, whereas part-time labour units per holding have only risen in Wales (Table 22). Overall, the use of hired labour units per holding has remained steady in Wales but has fallen in both England and Scotland.

Table 23: Regional changes in total labour units and regular labour units per holding

Region	Year\change	total labour units per holding	reg lab (ft & pt) per holding
North	1997	2.38	0.58
	change	-0.07	-0.07
	% change	-3.04%	-11.23%
North West	1997	2.70	0.83
	change	0.13	0.04
	% change	5.17%	5.32%
Yorks & Humberside	1997	2.47	0.78
	change	-0.36	-0.18
	% change	-12.85%	-19.02%
East Midlands	1997	2.85	0.95
	change	-0.13	-0.14
	% change	-4.37%	-13.17%
West Midlands	1997	2.56	0.68
	change	-0.14	-0.09
	% change	-5.36%	-11.88%
South West	1997	2.33	0.62
	change	-0.13	-0.11
	% change	-5.39%	-15.09%
East Anglia	1997	3.37	1.27
	change	-0.39	-0.24
	% change	-10.38%	-15.60%
South East	1997	3.24	1.16
	change	-0.33	-0.24
	% change	-9.22%	-17.00%

As in Table 21 it is the North West that stands out, as it is the only region not to experience a fall in regular labour units over the decade (Table 23). All other regions have seen a fall in total labour units and regular labour units over the decade, with the biggest decline occurring in Yorkshire and Humberside regular labour units.

Table 24: Family labour per holding, regions

		fam wk per holding	ft fam per holding	pt fam per holding
North	1997	1.74	0.12	0.08
	change	0.00	-0.04	0.01
	% change	-0.09%	-24.81%	16.85%
North West	1997	1.68	0.13	0.08
	change	0.03	-0.03	0.00
	% change	1.69%	-17.92%	4.15%
Yorks & Humberside	1997	1.53	0.11	0.07
	change	-0.16	-0.03	0.00
	% change	-9.43%	-21.43%	-2.46%
East Midlands	1997	1.65	0.11	0.08
	change	0.01	-0.03	0.01
	% change	0.80%	-18.60%	10.37%
West Midlands	1997	1.60	0.10	0.07
	change	-0.02	-0.03	0.00
	% change	-1.17%	-22.29%	1.46%
South West	1997	1.56	0.09	0.07
	change	-0.03	-0.03	0.00
	% change	-1.70%	-25.70%	-0.73%
East Anglia	1997	1.58	0.11	0.06
	change	-0.02	-0.01	0.00
	% change	-1.35%	-9.31%	-2.11%
South East	1997	1.51	0.09	0.08
	change	-0.02	-0.02	0.00
	% change	-1.56%	-19.36%	-5.07%

Yorkshire and Humberside has also experienced the greatest percentage decline in family labour units per holding, with a fall of 9% over the decade, compared to changes of plus 2% to minus 2% in the other regions (table 24). There are fewer full-time family workers per holding in all regions, but the picture is less clear cut in the case of part-time family workers. Some regions have seen increases, notable the North and East Midlands, while others have seen decreases.

Table 25: Hired labour per holding, regions

		all hired wk per holding	ft hired per holding	pt hired per holding
North	1997	0.38	0.27	0.11
	change	-0.05	-0.06	0.02
	% change	-10.70%	-19.15%	18.53%
North West	1997	0.62	0.41	0.21
	change	0.07	0.02	0.05
	% change	12.02%	4.09%	32.05%
Yorks & Humberside	1997	0.59	0.45	0.14
	change	-0.15	-0.08	-0.07
	% change	-20.26%	-15.16%	-33.34%
East Midlands	1997	0.75	0.54	0.21
	change	-0.13	-0.11	-0.02
	% change	-14.32%	-16.34%	-8.56%
West Midlands	1997	0.50	0.34	0.16
	change	-0.06	-0.07	0.01
	% change	-11.28%	-17.49%	5.32%
South West	1997	0.46	0.29	0.17
	change	-0.08	-0.08	0.00
	% change	-14.56%	-21.75%	1.83%
East Anglia	1997	1.10	0.83	0.27
	change	-0.22	-0.17	-0.05
	% change	-16.82%	-17.46%	-14.81%
South East	1997	0.99	0.65	0.34
	change	-0.21	-0.18	-0.03
	% change	-17.59%	-21.60%	-8.62%

Again it is the North West that stands out as the only region to see an increase in hired workers per holding, although the increase here has been mainly in part-time hired labour (Table 25). While some regions have seen a fall in full-time labour units and a rise in part-time (the North, West Midlands and South West) others have seen a fall in both categories (Yorkshire and Humberside, East Midlands, East Anglia and South East).

5. Summary of regional changes.

The analysis above has shown that while some changes, such as the fall in numbers of dairy cattle have been experienced by all regions, other changes exhibit more regional variations. These are now summarised for each region.

THE NORTH

Here there has been relatively little change in agricultural area, numbers of holdings or mean holding size. The greatest proportion of holdings are livestock holdings, but while Dairy and LFACS holdings have declined in number, LOWCS numbers have risen. Despite an increasing proportion of land being in permanent pasture, the increase in sheep and beef numbers has led to a rise in livestock units per 100ha, suggesting an increased pressure on grazing land. The total labour units per holding have decreased, but there has been an increased use of part-time hired and family workers.

THE NORTH WEST

Again, there has been little change in agricultural area, but holdings numbers are down by 13% and mean size is up by 9%, suggesting there are fewer and larger holdings overall than a decade ago. There are fewer livestock holdings now, as this region seen falls in Dairy, LFACS and LOWCS holding numbers. There was also a slight rise in Cereal holdings, but the main increase has been in the numbers of Other holdings. The proportion of permanent grassland in the region remained steady, and cattle numbers overall were unchanged, despite the rise in beef numbers. The greatest percentage rise came in the numbers of sheep, and this region saw the greatest rise in livestock units per 100ha. This region was the only one also to see a rise in regular labour units per holding, and this was mostly an increase in hired workers; there were fewer full-time family workers per holding than a decade ago.

YORKSHIRE AND HUMBERSIDE

Here there was a loss of holding numbers and increase in mean holding size. The three largest proportions of holdings are Cereals, LOWCS and Other, and while Cereal holdings numbers declined slightly, LOWCS holdings increased slightly and Other holding numbers rose by 20%. This region was one of only two to see a rise in Horticulture holdings, and the fall of 3,100ha in other crops hectareage was almost equal to the rise of 2900 in horticultural hectareage. There was a fall in all types of labour units per holding.

EAST MIDLANDS

Here again there was an increase in mean holding size over the decade. The region consist mainly of Cereals holdings, and numbers remained relatively stable, whereas there were bigger increases in LOWCS (the next largest group) and Other holdings. of grassland and overall hectareage loss of grassland and decrease in the proportion of grassland in the region, meant that despite livestock losses there was a small increase in livestock units per 100ha. Again in this region there was an overall loss of farm workers per holding, but a rise in the use of hired workers per holding.

WEST MIDLANDS

This region experienced a loss of holding numbers and rise in mean holding size below the country averages. The main type of holding here is the LOCS, and numbers have changes little over the decade. LFACS holdings numbers, however, have fallen by 15%. Despite a fall in cereals hectareage the number of Cereal holdings rose by 12%, indicating specialisation in this area. There was a fall of two percentage points in the proportion of permanent grassland in the region, so that despite an overall decline in livestock numbers there was slight upward pressure on the remaining pastureland. There were also falls in all labour units, but especially in part-time workers per holding, both family and hired.

EAST ANGLIA

There were relatively few livestock in the region at the beginning of the period, but there has been an increase in pig numbers. Also, this region has seen the substitution of beef numbers for dairy numbers, although the total cattle numbers have fallen. The increase in both temporary and permanent grassland has led to lower livestock units per 100ha of grassland, making this the only region to appear to have extensified livestock production. There has been an increase in LOWCS holdings together with the inevitable fall in Dairy holdings, but despite the pig increases there has been a fall in Pig and Poultry holdings, suggesting specialisation again. There have also been falls in all categories of labour units per holding.

SOUTH EAST

This region has the second largest proportion of the country's agricultural holdings after the South West, but while the South West's proportion increased by four percentage points, the South East saw an equivalent fall; mean holding size also increased by 7%. At the start of the decade there was an almost equal number of Cereal and Other holdings, now Other holdings form the largest group in the region. This mirrors the largest change in land use proportions, which has been the increase in other land (which includes set-aside.) Cereals and grassland hectareage both fell by around 14%. The South East saw the largest percentage falls in total cattle numbers, the second largest % fall in pig numbers, and by far the greatest percentage fall in sheep numbers. However, livestock units per 100ha of grassland still increased, due to the fall in grassland hectareage. The region has the lowest average family workers per holding at 1.51 per holding, and the highest average number of part-time hired labour units per holding, at 0.34 per holding.

6. Comparison of changes in LFA and non-LFA districts

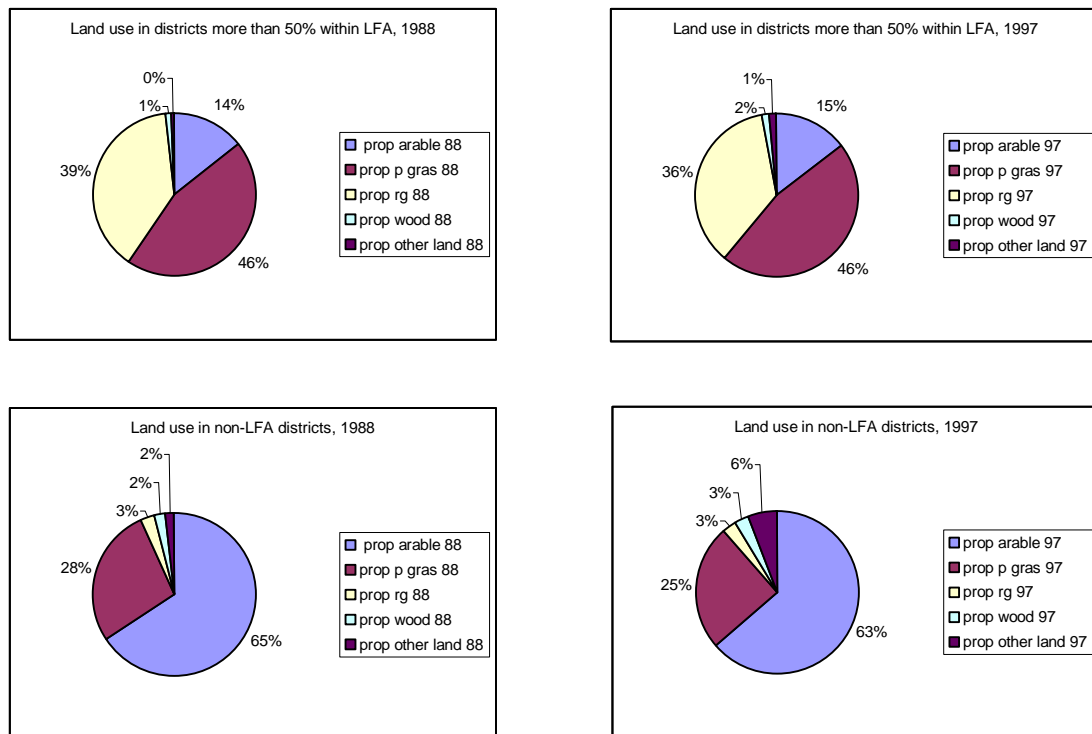
LFA areas designated by the EC allow special measures to assist farming. There are two classifications - area A (severely disadvantaged), and B (disadvantaged). LFA B areas are less disadvantaged in terms of farming handicaps such as soil type, gradient, aspect or climate, and although farmers obtain similar treatment in terms of compensation and payment premiums, B areas receive lower rates of compensation than A areas.

The geographical differences between LFA and non-LFA areas means different types of farming will be practised in each, with more reliance on grazing livestock in the LFA areas. This section will look at differences between the two areas and how each has changed over the decade.

Most LFA areas are in Wales, the North and North West and South West of the country. 86% of districts in England have less than 10% of their area covered by LFA A status, while 5% have more than 50% LFA A coverage. 90% of districts have less than 10% LFA B coverage, and only 1% (3 districts) have over 50% LFA B coverage. We will therefore look at LFA A areas with regard to changes in part-time farming.

For this analysis the JC district-level data is used, and districts are aggregated up into non-LFA districts (264 valid cases) and districts with more than 50% of their area within LFA status (16 valid cases). Where data has been suppressed it has been set to zero, except in the case of numbers of holdings where it has been set to one, since suppressed districts will have more than zero holdings, but fewer than five.

Diagram: Differences in land use proportions between LFA and non-LFA district



While non-LFA districts have seen a decrease in the proportion of land in arable use, the opposite has happened in LFA districts and there has been a rise of one percentage point in the proportion of arable land over the decade. Another difference is in the amount of woodland and other land; In LFA districts this accounted for 3% of agricultural land in 1997, whereas in the non-LFA districts these two categories accounted for 9%. This shows that there is proportionately less of this type of habitat for wildlife in LFA areas. However, LFA areas do contain a much greater proportion of rough grazing land and permanent pasture. Rough grazing occupies a lesser proportion of the agricultural area in LFA districts than it did 10 years ago, although the proportion of permanent pasture has remained steady.

*Changes in holding types***Table: Changes in the proportions of each holding type, 1988-97**

Holding type	LFA districts			Non-LFA districts		
	Prop. in 1988	Prop. in 1997	change	Prop. in 1988	Prop. in 1997	change
Prop. CEREAL	0.02	0.03	0.01	0.16	0.18	0.02
Prop. GENCROP	0.01	0.01	0.00	0.13	0.10	-0.02
Prop. HORT	0.01	0.00	0.00	0.09	0.07	-0.02
Prop. P&P	0.03	0.02	-0.01	0.05	0.04	-0.01
Prop. DAIRY	0.21	0.16	-0.04	0.13	0.11	-0.03
Prop. LFACS	0.41	0.38	-0.03	0.0	0.00	0.00
Prop. LOWCS	0.14	0.19	0.05	0.18	0.20	0.02
Prop. MIXED	0.05	0.04	0.00	0.09	0.08	0.00
Prop. OTHER	0.13	0.17	0.04	0.15	0.20	0.05

LFACS and DAIRY holdings accounted for nearly two thirds of all holdings in LFA districts in 1988 but by 1997 this had fallen to just over a half. While LFACS holdings remain the most common type, by 1997 there was a greater proportion of LOWCS holdings and Other holdings. LOWCS, Cereal and Other holdings predominate in non-LFA districts in 1998, and by 1997 these account for around 60% of all holdings.

Changes in livestock numbers and stocking densities

While total cattle numbers have fallen by 10% in non-LFA districts, they have barely changed in LFA districts. However, there has been a much bigger percentage increase in beef numbers in non-LFA districts. Pig numbers have fallen in both districts, but the percentage fall is greater in the LFA districts. Sheep numbers have increased in LFA districts, and fallen in non-LFA districts.

Table: Changes in livestock numbers, 1988-97

District type		Dairy	Beef	Total cattle	Total pigs	Total sheep
>50% LFA	1988	163184	120682	726112	191141	4861685
	1997	140792	139374	713512	167843	5251684
	change	-22392	18692	-12600	-23298	389999
	% change	-13.72%	15.49%	-1.74%	-12.19%	8.02%
non-LFA	1988	1351172	268615	4383785	5243383	8748986
	1997	1103056	420563	3930683	5167337	8155132
	change	-248116	151948	-453102	-76046	-593854
	% change	-18.36%	56.57%	-10.34%	-1.45%	-6.79%

Table: Changes in livestock units per 100ha grass and rough grazing, 1988-97

District type	livestock units per 100ha 88	livestock units per 100ha 97	change	% change
>50% LFA	141.51	150.78	9.27	6.55%
non-LFA	159.21	166.42	7.21	4.53%

The combination of the lower proportion of rough grazing and the increase in sheep numbers has meant a greater increase in pressure on grazing land in the Lfa districts than the non-LFA districts.

Labour changes

Table: Changes in the proportions of part-time FPDs in LFA and non-LFA districts, 1988-97

District type	prop ptFPD 88	prop ptFPD 97	change	% change
>50% LFA	0.25	0.33	0.07	28.22%
non-LFA	0.30	0.36	0.06	20.24%

In terms of labour changes, non-LFA districts had a greater proportion of part-time FPDs in 1988, but this has not increased as much as in the LFA districts over the decade.

7. Conclusions

This paper has reviewed the regional structural changes in agriculture over the last decade, using data available from the MAFF June Census. While some changes, such as the decline in the dairy sector, have been experienced in all regions, other changes have exhibited more regional variations. Certain regions such as the South West and the North appear to be becoming more 'agricultural' in terms of an increase in the national share of holdings, although the South West is also losing more rural land to urban use. The decline in the types of holdings associated with more labour intensive farming is compatible with the rise in part-time farmers, and part-time workers in general. This might also suggest that holdings are being farmed less intensively, but in terms of livestock units per 100ha of grassland, this only appears to be happening in East Anglia. The effect of set-aside and aid for farm woodlands has increased the proportion of woodland and non-productive (in the mainstream agricultural sense) land on holdings, which has environmental implications. However, some of the types of changes that might be associated with part-time farming, such as less labour-intensive types of farming, do not appear to have had an impact on the intensity of grassland use by grazing livestock use, or a change from arable to more pastureland, that might have wider environmental benefits. Also, there appear to be increased specialisation in cereal growing in some regions that might increase environmental pressure on the hectares involved.

With respect of LFA areas, the pressure on grazing land appears to be increasing, as stocking densities rise and, in particular, numbers of sheep appear to be concentrating into areas with more rough grazing land, while the proportion of rough grazing land is falling. This can lead to increased environmental pressure on these areas. The impact of set-aside, as is to be expected, is minimal in LFA areas. On the other hand, permanent pasture has retained its proportion of all agricultural land in LFA areas,

whereas it has decreased in the non-LFA districts. This points to a different set of environmental pressures, or different degrees of pressure, in LFA and non-LFA areas.