



Sustainable Food and Farming Strategy: Updated Regional Indicator Analysis, 2007

Alan Hopkins and Matt Lobley

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For further information, please contact Dr Matt Lobley, Centre for Rural Policy Research,
Department of Politics, University of Exeter, Rennes Drive, Exeter, EX4 4RJ.
Tel: 01392 264539. E-Mail: m.lobley@exeter.ac.uk

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Introduction

This project is a development of a 2003 analysis¹ of baseline data for a range of indicators used to judge the impact in the South West Region of the Sustainable Food and Farming Strategy (SFFS). This analysis builds on the Centre for Rural Policy's long-standing interest in the sustainability of the farming sector and analysis of policy impacts. Although Defra originally published a list of core indicators to monitor the regionally implemented SFFS, there is no means for regular monitoring at the regional level.

The structure of the report broadly follows that of the 2003 analysis. Where available, data have been collected at regional and sub-regional levels for indicators that were identified as "priority indicators" by SWCORE. In addition, data for other indicators have been included where these were readily available. For many indicators data proved relatively easy to obtain from web searches and other sources or reference to personal contacts, but some others required special requests, including Freedom of Information Act requests.

The data included in the report vary in terms of their quality and reliability, and the confidence that can be attributed to them. Comments are included on our assessment of data quality and the caution needed in interpreting any apparent changes observed in the period since 2003, or for individual years where a time-series data are given.

As with our 2003 report, many of the national indicators are not available regionally, and those that are are unlikely to be available at a sub-regional scale or as consistent and reliable time-series data.

The structure of this report follows that of the 2003 report. Chapter One presents a brief overview of farming in the South West, drawing on census data to describe trends in land use, livestock numbers, farming structures and agri-environmental requirements. Chapters Two, Three and Four present data on economic, environmental and social indicators respectively, and include some commentary on the data. Chapter Five presents some concluding comments. Additional data, including maps and tables, are included in an appendix.

¹ M Lobley and D Barr (2003) *Sustainable food and farming strategy indicator report*. University of Exeter Centre for Rural Research, 76 pp.

Chapter One: an overview of farming and farmland in the South West

The South West region contains a diversity of farm types but has a predominance of farms based on grassland supporting ruminant livestock. The region supports *ca.* 41,000 registered holdings and has some 1.77 million hectares of enclosed agricultural land. It is one of the UK's main areas for both dairy farming and beef production. Despite its national importance for milk production, the proportion of holdings that are specialist dairy farms continues to decline: from 5919 in 1996 to 4210 in 2005 - a fall of 29%, of which 5% were between 2004 and 2005. However, this rate of decline is less than which has occurred in England and Wales as a whole. The number of dairy farms in England and Wales in 2005 had fallen by 47% from the 1996 total of 28,093 holdings (MDC, Dairy statistics: an insiders guide, pocketbook <http://www.mdcdatum.org.uk/Publications/dairystatistics.html>.)

Dairy farming in the South West remains well distributed throughout the region, but is concentrated on land where climate, soil and topography enable the relatively intensive exploitation of forage resources that are a feature of the region. Producers in much of the South West have a number of inherent advantages, mainly associated with the region's climate and soils. Relatively mild temperatures in spring and autumn, combined with a relatively low incidence of summer drought stress (clay and heavy loam soils that have a high available water capacity are widespread) result in many parts of the region having a greater number of grass-growing days per year (over 300 days in some localities) than in most parts of the UK except west Wales. And where local soil drainage conditions allow grazing in spring and autumn, there is also the potential for a long grazing season, thus enabling farmers to utilize permanent grassland and sown grass or grass-clover leys by the cheapest means, i.e. grazing. A number of farmers in the region have been very pro-active in adopting extended-season grazing by cattle, including dairy cows; an option not available to cattle farmers in most of eastern and northern Britain. The climate of much of the south west region in spring and summer is also well suited, in most years, for the growing of good crops of grass and clovers for silage (over the long term regarded as the cheapest means of providing high quality winter feed for housed livestock) and also, where soil conditions allow timely cultivation and harvesting, for the growing of high-yielding crops of maize for silage. However, as has been the case throughout the UK and Europe, the dairy sector faces continuing difficulties associated with very tight financial margins; and most of the region's dairy farmers are rooted in commodity production supplying the liquid milk market or creameries that produce commodity dairy products. A growing number of farmer-controlled businesses are seeking to gain advantage from adding value or marketing to niche markets or on the basis of a regional or other identity, and the region's position as a major tourist destination, and one with a clean and green environment, fits with such a strategy.

Despite some overall regional advantages for dairying, there are many areas of the South West that are not well suited to dairy farming. On upland and upland-fringe areas such as Dartmoor, Exmoor and Bodmin Moor, dairy farms are few indeed, and the forage resources of agriculturally improved permanent grassland and unimproved or semi-natural rough grazing are more likely to support suckler-beef herds, store cattle feeding, or sheep and lamb production. These areas have in the past benefited

from payments under the Less Favoured Areas designation and in some cases the headage-based farm subsidy payments have tended to encourage overgrazing in the past. CAP reform and the introduction of an area-payment based system (the Single Payment Scheme) may lead to a more stable balance between stocking densities and carrying capacity. Beef and sheep farming, in various forms including the fattening of lambs brought in from outside the region, cattle rearing and fattening for beef, is the predominant agricultural activity over most of the western part of the region. Further east, in much of Wiltshire, Dorset and Gloucestershire, where many areas have soils derived from chalk or limestone, large areas have been brought under arable production, though sheep production remains important in parts of what was formerly one of England's wealthiest farming areas (when wool was the most valuable farm product). There are also localised areas elsewhere in the region where arable farming, or mixed grass-arable farming, is widespread.

Determining time-series trends in the numbers of holdings classified by farm type is beset with some difficulty due to the large number classed as either 'mixed' or as 'other' in recent years. This trend, slightly greater than the national trend, partly reflects the growing number of part-time and lifestyle farmers and also a more rigorous approach to bio-security, which has seen Defra issuing more holding numbers. Also of note is the relative stability in the numbers of beef cattle and sheep farms, numbers of which have remained almost constant over the past *ca.* 5 years (Table 1.1).

Table 1.2 confirms the grass-based character of the region with *ca.* 65% of the agricultural area returned in the June census² as being under permanent grass, temporary grass or 'rough grazing in sole rights'. The entry of land on June census returns as 'rough grazing' has largely been at the farmer's interpretation, and in many instances parcels of rough grazing on one farm may be virtually identical to parcels of permanent grass on another. The decline in rough grazing between 1970 and 1980 (Table 1.2) was, however, likely to have resulted mainly from agricultural 'improvement,' particularly of lowland wet grassland and of upland grazings and lowland heath, through subsidies under the Farm and Horticultural Development Scheme.

² Now known as the June Agricultural Survey and based on a large sample rather than a complete census. The next agricultural census will take place in 2010.

Table 1.1 Dominant farm types in the South West region and England as a whole: classification of holdings¹ by farm type in England and the South West region (as %) 1990-2005

(This table updates Table 1.1 in the 2003 report of Lobley and Barr)

	1990	1995	2001	2002	2005
England					
Cereals	13.4	13.7	12.5	11.3	11.6
General Cropping	9.5	8.8	5.9	4.9	4.6
Horticulture	7.0	5.9	5.7	5.1	4.9
Pigs & Poultry	3.7	3.2	3.6	3.7	4.6
Dairy	15.1	13.4	9.1	7.6	6.6
Cattle and Sheep (LFA)	7.5	7.2	6.0	6.3	5.7
Cattle and Sheep (lowland)	20.1	21.2	19.6	18.0	18.1
Mixed	7.9	7.8	6.5	5.5	5.9
Other ²	15.8	18.8	31.1	37.7	38.0
Total holdings	100.0	100.0	100.0	100.0	100.0
South West region					
Cereals	5.7	6.5	6.2	5.6	6.1
General Cropping	2.3	2.2	1.3	1.1	1.3
Horticulture	4.8	4.3	5.2	4.7	5.0
Pigs & Poultry	3.0	2.6	3.1	3.2	4.1
Dairy	23.2	20.3	13.0	11.0	9.6
Cattle and Sheep (LFA)	7.0	6.4	4.3	4.4	4.2
Cattle and Sheep (lowland)	28.5	29.4	25.8	23.8	23.4
Mixed	7.5	7.4	6.5	5.4	4.2
Other	18.0	20.9	34.6	40.8	42.0
Total holdings	100.0	100.0	100.0	100.0	100.0

Source: Defra June Census data

¹ It should be noted that whilst Defra data refer to 'holdings', a farm may consist of one or more holdings. Although attempts have been made to correct for multiple holdings it is still likely that the number of holdings exceeded the number of farms.

² "Other" holdings are those that do not fit well with mainstream agriculture, such as specialist horses, specialist set-aside, specialist grass and forage and non-classifiable holdings.

The areas occupied by cereals appear to show a small decline since 2000, possibly associated with low or erratic cereal prices in 2002-05. Current economic conditions would suggest this may have been a temporary blip, and current grain prices are likely to encourage more use of land for cereal growing. While some areas of the region possess soil and topographical conditions well suited to the cultivation and harvesting of cereals (e.g. parts of Wiltshire and Gloucestershire) the economics and agronomic practicalities of cereal growing in much of the region are marginal, and financial margins will generally be lower than on farms in, e.g., the eastern counties of England. However, if cereal prices remain at the relatively high levels reached in 2007, it can be expected that the areas sown to cereals in the region will increase. The reality for many farmers in the region, particularly those lacking the more modern larger types of machinery for cultivations, is that periods available for the cultivation and preparation of land for cereal growing are limited by a combination of soil type and weather, making cereal growing risky and therefore likely to be confined to relatively small proportions of their farmland.

Table 1.2 Land use summary for the South West Region, 1970 to 2006

(This table updates Table 1.2 in the 2003 report of Lobley and Barr)

	1970	1980	1990	2000	2005	2006
Proportions of total farmed area (as %)						
<i>Arable</i>						
Cereals	20.8	21.7	20.9	19.7	16.1	15.7
Potatoes	0.5	0.5	0.5	0.4	0.3	0.4
Horticultural	0.9	0.6	0.6	0.6	0.7	0.6
Other crops and fallow	2.8	2.3	4.2	7.5	9.3	8.8
Total crops and fallow	25.0	25.1	26.2	28.2	26.4	25.5
Temporary grass	20.6	16.9	14.4	11.9	11.0	10.4
Set-aside			0.6	3.6	3.4	3.1
	45.6	42.0	41.3	43.7	40.8	39.0
<i>Permanent grass & rough grazing(sole rights)</i>						
Permanent grass	45.5	49.0	49.1	46.2	48.8	50.1
Rough grazing	11.9	5.6	5.5	4.9	4.9	4.8
	57.5	54.6	54.6	51.1	53.7	54.9
<i>Other land</i>						
Woodland	0.9	2.0	2.6	3.3	3.6	3.7
All other land	0.5	1.3	1.6	1.9	1.8	1.6

Source: Defra (or MAFF before 2002) June Census returns

The popular perception of the region as one with many small farms is supported by the data in Table 1.3. The relatively smaller number of farms in the >100 ha category partly reflects the predominance of lowland livestock-based holdings, which (nationally) tend to be smaller than arable farms. The apparent (albeit small) increase in 2006 cf. 2002 in the proportion of smaller holdings may also reflect the situation of farming new entrants. Some of these may be ‘lifestyle farmers’ who have bought an attractive farmhouse and retained some acres without the farm necessarily being their sole or main income, while other new entrants are likely to include those trying to build up a farm (or perhaps farm-cum-agri-food / agri-tourism business) with limited resources. The natural environment of much of the region is likely to be attractive to both these categories of new entrant.

Table 1.3 Distribution of farm holdings by size, all England, and South West region, 2006 census (with 2002 values in brackets)

(This table updates Table 1.3 in the 2003 report of Lobley and Barr)

	England	South West
	% of holdings	
Less than 5ha	42.2 (40.6)	43.8 (42.1)
5ha to less than 20ha	19.8 (19.5)	20.5 (20.0)
20ha to less than 50ha	13.8 (15.2)	14.3 (15.7)
50ha to less than 100ha	10.9 (12.4)	11.1 (12.4)
100ha and over	13.3 (12.3)	10.3 (9.7)

Source: Defra census data

NB. These figures include minor holdings

The progressive outflow of salaried farm labour is evident from Table 1.4, with a *ca.* 25% reduction in worker numbers since 2000. Changes in definitions used and the categories of different data sets can make comparisons over time a little difficult. However, it is apparent that the total number classed as ‘farmers’ remains relatively constant, although there appears the likelihood that in some cases family members previously classified as ‘family workers’ may now be classed as farmers, perhaps as partners in a family business. Also of note is the increase in ‘part-time’ farmers; presumably these are frequently occupying some of the region’s smallest holdings. Importantly, however, the region’s farm labour force still account for nearly 80,000 people (with others engaged as contractors etc not included here).

Table 1.4 Changes in agricultural labour in the South West region, decadal 1970 to 2000, and in 2005-06

(This table updates Table 1.4 in the 2003 report of Lobley and Barr)

	1970	1980	1990	2000	2005	2006
Full time hired & family workers	31535	23062	16727	10311	8420	7720
Part time hired & family workers	9696	8345	8420	6578	6557	3909
Total regular workers	41231	31407	25147	16889	14977	11629
Casual and seasonal workers	8,984	12440	11626	8740	6950	6983
Total workers	50215	43847	36773	25629	21927	18612
Farmers ¹ full time	29464	31631	27840	25975	24834	24486
Farmers ¹ part time	7316	9635	11704	29631	32261	32792
Spouses ²		10884	11573			
Total farmers		52150	51117	55606	57095	57278
Total labour force		95997	87890	81235	79022	75890

Source: Defra data

¹ Includes 'managers', includes 'spouses' from 2000

² Not recorded until 1980, included in 'farmers' from 2000

Tables 1.5 and 1.6 summarize trend data since 2000 for changes in numbers of dairy herds and of livestock numbers in the south west. The decline in dairy herds, by about 20% over the past five years, and of dairy cows by about 12% over the same period, are part of a longer term trend in the region as well as nationally (the proportion of English dairy herds that are in the south west has remained fairly constant). That said, it is important to recognise that the reduction in cow numbers has been accompanied by a progressive increase in milk yield (as litres per cow) as farmers seek to reduce cow overheads and costs per litre by breeding or purchasing cows of high genetic merit. This has allowed the total volume of milk produced to remain relatively constant. One drawback of dairying based on high yielding cows is that home-grown forage-based diets are unable to fully meet the cows' metabolic requirements for production. This leaves the system exposed if concentrate feeds rise in price. In environmental terms there are advantages and disadvantages associated with intensively reared high-yielding dairy herds. Emissions of methane per cow are relatively constant and therefore would be lower on a per litre basis from the high-yielding cow. Highly capitalised herds may also be well placed to maintain good control of slurry and silage effluents. However, the concentration of dairying into fewer intensive herds can lead to potential 'hot-spots' for emissions of nitrate and ammonia and other pollution events.

Table 1.5. Changes in the number of dairy herds in South West England (*and for England as a whole*) since 2000

	2000	2001	2002	2003	2004	2005	2006
South west region	6877	6345	5882	5564	5405	5163	5060
<i>England</i>	<i>20094</i>	<i>18125</i>	<i>16897</i>	<i>16027</i>	<i>15554</i>	<i>14980</i>	<i>14772</i>
% of English dairy herds in SW	34.2	35.0	34.8	34.7	34.7	34.5	34.3

Source: Defra data

Table 1.6. Changes in the numbers of livestock in South West England, 2002-2006

	2001	2002	2003	2004	2005	2006
Dairy cattle	543,343	527,194	517,681	495,493	471,714	464,180
Beef cattle	185,796	173,892	185,914	195,007	202,379	200,110
Sheep (inc lambs)	3439,853	3234,933	3286,312	3304,557	3272,961	3256,412
Pigs	576,699	526,362	454,729	472,650	440,066	487,877

Source: Defra data

Beef cow numbers have been in decline since the 1990s, with reductions in 2001-2 as a consequence of the foot-and-mouth (FMD) epidemic following closely on the problems associated with BSE. The apparent increase in beef cattle numbers since 2002 suggests that there may be some confidence in beef production, or that farms that have ceased dairy production are switching to beef production as a low-cost system that utilizes existing land and other on-farm resources. This is an important point often overlooked in the somewhat fevered debate over the ‘loss’ of dairy farms in the region. As we have seen, when a dairy enterprise closes much of the capacity is replaced elsewhere in the system. In addition, the reduction in the number of dairy enterprises cannot simply be equated with a reduction in the number of farms as most switch to a mix of beef and sheep production and other enterprises.

The numbers of sheep have remained fairly constant over the past 5 years, following a period of significant decline. The recent changes in farm support might be expected to discourage overgrazing on marginal land, but the suitability of sheep to be reared to slaughter on a forage-based diet might also be expected to improve the relative cost advantage of sheep-meat production compared with livestock that rely on feed grains. This is in contrast to pigs, numbers of which and profitability follow traditional cyclical trends. The decline in the pig sector in the south west has been evident for about a decade and recent (2006-07) rises in feed grain prices are likely to exacerbate the situation further.

Management of agricultural land in the south west region is also affected by environmental policies. Priority Biodiversity Action Plan (BAP) habitats are well represented in the region including lowland semi-natural grassland, (widely distributed, but highly fragmented and greatly reduced in recent decades). Some other examples: the region also holds the largest areas of chalk grassland in Europe (Salisbury Plain and Porton Down in Wiltshire), the largest lowland grazing marsh in

Britain (the Somerset Levels and Moors) and which is of international importance for its breeding and migratory birds, and significant proportions of the UK's total area of lowland heathland (in Dorset and Cornwall). These habitats are dependent upon continued agricultural management involving appropriate management (i.e. low intensity grazing and/or of cutting, usually for hay in late summer). Abandonment of agricultural exploitation would result in succession to scrub or woodland, whereas intensive agriculture would result in the loss of their biodiversity value. The introduction in 1987 of Environmentally Sensitive Areas (ESAs) led to the eventual designation of seven ESAs in the region, providing management agreements for farmers to manage land in their care according to defined prescriptions. The ESA scheme has been replaced by Environmental Stewardship Schemes, although ESA agreements already in place remain for their agreed duration. These schemes have had relatively little impact on the dairy farming sector where management inputs are generally perceived as being incompatible with biodiversity. The environmental focus on the dairy sector has instead been more regulatory, e.g. through limits on nutrient emissions to protect water quality.

Chapter Two: Economic Outcome Core Indicators

Farming productivity

Under Pillar One (economic sustainability) of the SFFS there are three core economic outcomes. Outcome 1 concerns farming productivity: *a farming sector focused on the market, successfully producing food and non-food crops in a more efficient way to help enhance the incomes of competitive farm businesses*. Defra have identified a range of indicators for this core outcome, of which those considered in this report are listed in Table 2.1. As this table shows, reliable regional data is not available for all the indicators requested.

Table 2.1. Economic Indicators Summary showing availability of data. (Requested ‘Priority indicators’ are shown in bold type in column 1)

(This table corresponds to Table 2.1 in the 2003 report of Lobley and Barr)

	Data definitely available	Data may be available	Data not available	Table in this report
Total Factor Productivity			√	
Summary measures of production and income account for agriculture	√			2.2
Total Income from Farming per FTE	√			Fig. 2.1
TIF per person		√		
Trends in Net Farm Income	√			2.3
Distribution of NFI		√ *		
Changes in Net farm Income	√			2.4
Diversified Activities: number	√			2.5/ 2.6
Diversified Activities: value	√			2.7
Non-farming activities (as %)	√			2.5/ 2.7
Farm businesses engaged in valued added activities		√		--
Income from off-farm employment	√			2.7
Farmers’ share of consumer expenditure on food			√	
Share of commodities sold through co-ops	√			2.8
Visits to demonstration farms			√	--
Skill levels			√	--
Innovation, technical progress			√	--
Farmers’ attitude to farming	√			2.9, 2.10, 2.11

* The Farm Business Survey website notes that distribution data by NFI bands is limited by small sample sizes at regional scale in recent years.

Defra’s annual publication Agriculture in the UK defines Total Income from Farming (TIFF) as “business profits plus income to farmers, partners and directors and those with an entrepreneurial interest in the business and is constructed in accordance with internationally agreed national accounting principles”. The relative greater significance of agriculture to the region’s economy is demonstrated in Table 2.2, which shows that agriculture generates just under 1% of the region’s gross added value compared to the national average of 0.5%. It is also apparent that SW agriculture generates just under 14% of national total income from farming. In terms of employment, agriculture accounts for twice as much of the region’s employment as it does nationally.

Table 2.2 Summary measures of the production and income account for agriculture by region in 2006

	Gross output	Intermediate consumption	Gross value added at basic prices	Total income from farming	Agriculture's share of total regional gross value added at basic prices ^{1,2}	Agriculture's share of total regional employment
	£million	£million	£million	£million	%	%
North East	335	182	153	115	0.3%	1.0%
North West	1 068	637	432	85	0.4%	1.1%
Yorkshire and Humberside	1 321	759	563	339	0.7%	1.5%
East Midlands	1 611	1 027	585	291	0.8%	1.9%
West Midlands	1 254	712	542	190	0.6%	1.8%
East of England	2 058	1 257	801	462	0.8%	1.8%
South East & London	1 330	765	564	110	0.2%	0.7%
South West	1 916	1 131	784	251	0.8%	3.0%
England total	10 894	6 471	4 423	1 844	0.5%	1.4%

Source: Defra, special request

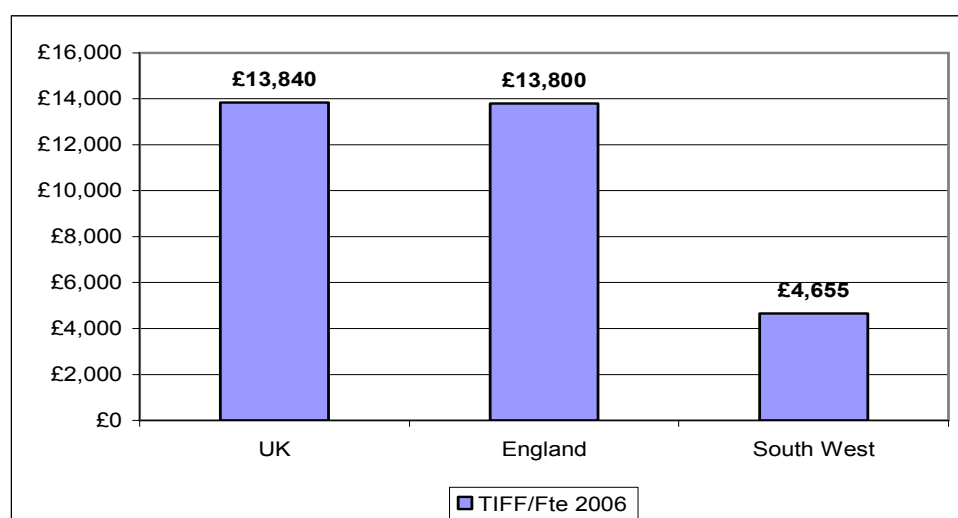
¹ Total regional GVA is not yet available for 2006 so data for 2005 are shown for illustration.

² The apparent fall in agriculture's share of total regional GVA at basic prices is due to the introduction of the Single Payment Scheme, which is not included in output (as it is decoupled from production) and therefore does not appear in gross value added.

Indicator: Total income from farming per full-time equivalent

In terms of TIFF per FTE (Full Time Equivalent), it is clear from Figure 2.1 that the region continues to perform less well than the UK and England as a whole.

Figure 2.1 Total income from farming per FTE



Source: Defra data

Indicator: Net Farm Income by farm type

This section draws on the findings of the Farm Business Survey conducted annually by the Duchy College and the Centre for Rural Policy Research for Defra. Table 2.3 summarizes Defra's currently preferred measure of income at farm level³, Net Farm Income (NFI), for the four most recent years for which data are available. Net Farm Income is the return to the principal farmer and spouse for their manual and managerial labour and on the tenant-type capital of the business. Thus the profitability of farms of different tenure can be compared. NFI for different farm types in the South West, and for England as a whole, are summarized in Table 2.3, and percentage changes in Table 2.4. From 2002-2005 there was an improvement in NFI for dairy farms, but there are expectations of some reversal in this trend due to higher feed prices in 2006-07. There has been a worsening situation for beef and sheep farms, both in lowland areas and the LFAs, and this is not expected to show a significant improvement in 2006-7. Changes in cereal prices due to production fluctuations (e.g. reduced grain production in mainland Europe in 2003 due to drought affecting harvest yields), but higher prices in 2006 and 2007 are likely to benefit the NFI of cereal producers. It should also be noted that from 2005 onwards, the redistributive effects of the Single Payment Scheme will have had an impact on farms of different types and sizes.

³ A new measure, *Farm Business Income*, will be introduced from 2008 and will replace NFI as Defra's preferred measure of farm income. However, NFI data will continue to be available for some time to allow for time series analysis.

Table 2.3 Trends in net farm income (NFI) by farm type, and for all farms, in South West England (with NFI for England as a whole given in italics in brackets)

Farm type	2002	2003	2004	2005
Dairy	19,500 <i>(16,400)</i>	27,100 <i>(23,500)</i>	31,000 <i>(26,400)</i>	30,800 <i>(27,100)</i>
LFA cattle and sheep	15,400 <i>(17,700)</i>	10,200 <i>(15,000)</i>	9,800 <i>(13,400)</i>	8,800 <i>(11,800)</i>
Lowland cattle and sheep	6,100 <i>(6,400)</i>	5,000 <i>(7,100)</i>	3,400 <i>(5,400)</i>	3,400 <i>(5,300)</i>
Cereals	10,700 <i>(13,200)</i>	21,300 <i>(36,400)</i>	16,500 <i>(15,600)</i>	24,000 <i>(14,100)</i>
Mixed	13,200 <i>(11,400)</i>	19,800 <i>(24,400)</i>	14,100 <i>(16,400)</i>	15,600 <i>(17,400)</i>
All farms	15,100 <i>(16,600)</i>	21,500 <i>(29,500)</i>	17,100 <i>(21,200)</i>	17,800 <i>(21,100)</i>

Source: FBS website, accessed 21 Sept 2007. Expressed to nearest £100

Table 2.4 Changes in net farm income in South West England, 2003-04 and 2004-05

(This table corresponds to Table 2.4 in the 2003 report of Lobley and Barr)

Farm type	NFI 2003 £/farm	NFI 2004 £/farm	2003-04 % change	NFI 2005 £/farm	2004-05 % change
Dairy	27,100	31,000	+14%	30,800	-0.6%
LFA cattle and sheep	10,200	9,800	-4%	8,800	-10%
Lowland cattle & sheep	5,000	3,400	-32%	3,400	-
Cereals	21,300	16,500	-22%	24,000	+45%
Mixed	19,800	14,100	-29%	15,600	+10.6%
All farms	21,500	17,100	-20%	17,800	+4%

Source: FBS, accessed 21 Sept 2007. NFI values expressed to nearest £100

The data presented in Table 2.3 can be compared to UK data showing trends in NFI included as a table in the appendix to this report. Reviewing the changes in NFI in Tables 2.3 and 2.4, the following points can be noted: there is a wide distribution of farm incomes, between and within the main farming types; for the “all farms” level the South West shows an average lower NFI than England, which is probably a reflection of the fact that there is a low NFI for beef and sheep farms, a category which is predominant in the region. For the dairy and cereal farms categories, the South West shows higher NFI than for England as a whole.

Indicator: Diversified activities

Diversification is widely held to offer considerable scope for improving the economic viability of farm businesses. It can be thought of as the entrepreneurial use of farm resources for a non-agricultural purpose for commercial gain. There are some obvious

activities that are included as diversification, such as tourism, sport, recreation and food processing and retailing, while others that are not included are the production of specialized crops for niche markets, which while possibly reflecting a change in focus and entrepreneurial activity by the farmer, remain agricultural activities. (In this context, off-farm employment or investment income are not regarded as diversified activities as they do not utilize farm resources, and are considered separately.)

A key source of evidence about developments in diversification activity is Defra's annual publication based on data from the Farm Business Survey. The 2005-06 survey indicates that, for England as a whole, some 50% of larger farms have some form of diversified activity and the total income from diversification was £420 million, (up by 21% on 2004/05); and diversified enterprises generated 22% of the total income of farm businesses in 2005/06 and accounted for all of the annual increase in farm income. While diversification may not be the panacea for farming's problems that it is sometimes presented as, these figures nevertheless demonstrate that diversification is playing a major role in the survival of farm businesses.

Table 2.5 Regional incidence of diversified activity and off-farm employment, 2005-06 (with corresponding 2004-5 values shown italicized in brackets)

	All England	South West	West Midlands	South East
No. of farm businesses with at least 0.5 SLR ¹	61,700 <i>(60,800)</i>	11,700 <i>(12,400)</i>	6,600 <i>(6,000)</i>	8,300 <i>(7,600)</i>
% which have a diversified enterprise	50 <i>(46)</i>	45 <i>(40)</i>	37 <i>(38)</i>	73 <i>(67)</i>
% having farmer or spouse with off-farm or other self-employment	31 <i>(30)</i>	32 <i>(31)</i>	30 <i>(28)</i>	23 <i>(26)</i>
% with none of the above	34 <i>(37)</i>	37 <i>(39)</i>	43 <i>(32)</i>	20 <i>(26)</i>

Source: Farm Business Survey

¹ N.B. Holdings below 0.5 of SLR (Standard Labour Requirement) are excluded; their total diversification activity may also be considerable
<http://statistics.Defra.gov.uk/esg/statnot/Diver06.pdf>
<http://statistics.Defra.gov.uk/esg/statnot/Diver05.pdf>
www.statistics.Defra.gov.uk/esg/publications/diversification.asp

Despite some limitations on the quality of data for this indicator, and the smaller sample sizes associated with regional-scale analysis, Table 2.5 indicates the continued and increasing significance of diversification in the South West, with the proportion of larger farms having a diversified enterprise being only slightly below the England average (the West Midlands and the South East being the regions with the lowest and highest proportions, respectively, of farms with farm diversification enterprises, and shown for comparison). As Table 2.6 indicates, the type of diversified activity found in the SW is broadly similar to that occurring nationally, although the letting of buildings for non-farm use is less prevalent in the region.

Table 2.6 England and South West region, proportions of farms with diversified activities and types of activity, 2005-06

	England	SW
% of farms with diversified enterprises	50%	45%
% of (all) farms which have :		
Buildings let for non-farm use	38%	30%
Processing/ retailing of farm produce	8%	7%
Sport and recreation	10%	9%
Tourist accommodation and catering	4%	5%
Other diversified enterprises	8%	7%

Source: FBS

Table 2.7 shows the position of the South West relative to other English regions in terms of the proportion of farm income derived from diversification, an amount which is similar to additional off-farm income from employment or other self-employment. However, these data need to be treated with caution: the confidence intervals for diversified income at a regional scale are lower than for national data, and the exclusion of small farms from the sample is also likely to lead to an underestimate of the total value of diversification in the south west.

Table 2.7 Farm income (£million) for farms of ≥ 0.5 SLR*, England regions, 2005-06, summarizing value and proportions of income derived from diversification

Region	NW	NE	EM	WM	EE	SE	SW
Total farm business income	168	216	259	170	529	279	284
Income from diversified enterprises	32	40	45	15	100	128	57
Farmer / spouse off-farm income from employment and self-employment	36	37	28	32	57	38	54
% of farm income from diversification	19%	19%	17%	9%	19%	46%	20%

Source: Farm Business Survey

* Holdings below 0.5 of SLR are excluded; their total diversification activity may be considerable
www.statistics.Defra.gov.uk/esg/publications/diversification.asp

Indicator: Non-farming activities and income from off-farm employment

A trend that has been evident in recent years has been the rise in the level of off-farm income, including that from off-farm employment or from non-farming self-employment. As Table 2.7 shows, off-farm income in the South West is relatively high, compared with other regions in England, and represents an additional average amount of about 20% of the income derived from farming.

Indicator: Share of commodities sold through co-operatives

In the 2003 report by Lobley and Barr the data requirements for this indicator were partly met by information supplied by the Plunkett Foundation. That data set indicated at that time that farmer-controlled marketing businesses in the South West had an estimated annual turnover of £442 million and it was imputed that this represented about 22.5% of the region's agricultural output by value. The Plunkett Foundation no longer collects data to enable those calculations to be updated, but they anticipated an upward trend in the share sold through farmer-controlled businesses. English Farming and Food Partnerships (EFFP) now collect equivalent data.

EFFP's mission is to strengthen the profitability, competitiveness and sustainability of England's farming, food and related farm-based industries through the growth of market-focused and professionally run Farmer-Controlled Businesses (FCBs) and by developing co-operation and partnership activities, not only between farmers but also between farmers and the existing cooperatives, and vertically between farmers and the food chain.

Information has been supplied by EFFP (South West) for commodities under three groupings: crops, red meat, dairy (Table 2.8). Of particular note is the high proportion of dairy output sold through co-operatives in the region, which at 70% of the aggregate output for the sector in the region is worth some £514 million. However, this figure includes the added value produced through milk processing. At farm-gate levels the output through FCBs is close to 53% (£388 million) of aggregate regional output for the dairy sector.

The low proportion of red meat marketed through co-operatives stands in stark comparison. In view of the many inherent advantages that the region possesses in terms of potential to link the attributes of meat products to pasture and regional distinctiveness, and the continuing low NIF from beef and sheep farms as noted in Tables 2.3 and 2.4, this suggests that there is scope for increasing this share.

Table 2.8. Share of commodities sold through farmer-controlled businesses (FCB) in the South West

<i>Sector</i>	<i>Output 2005-06¹</i>	<i>Current FCB contribution</i>
Crops	£ 204 million	33%
Red meat	£ 338 million	6%
Dairy	£ 734 million ²	70%
Total	£ 1,276 million	47%

Source: English Farming and Food Partnerships (SW) and FBS data

¹ The figures for the value of total output were derived using SW FBS data and regional data supplied by Defra. The figures exclude the smallest farms (< 20ha) and exclude any form of subsidy payments, horticultural crops and forage crops, pigs and poultry products. The gross value of all agricultural value in the region is some £1, 916 million.

² Includes the added value from processing through FCBs in the region

Indicator: Farmers' attitude to farming

Attitude towards farming can be an important indicator of future behaviour. Information on this indicator has been obtained from two sources: the ADAS Farmers Voice Survey from two sampling dates, 2002 and 2006, and from an (as yet) unpublished survey conducted by the Centre for Rural Policy Research in December 2006. Although this latter data source cannot be compared to national figures, the regional figures are derived from a much larger sample than the Farmers Voice survey.

In the 2002 Farmers Voice Survey (Table 2.9) responses from farmers in the South West were similar to those for the whole-England sample, except that there fewer South West farmers responding that they were “happy to stay in farming as I am now and for the foreseeable future.” The 2006 sample was not made available on a regional basis (sample size may be too small to make regional comparisons with confidence) except for questions relating to family succession into the farming business. The overall England sample reflected an attitude of concern about the future and reluctance to expand, but paradoxically also an increased proportion of farmers “happy to stay in farming”. The responses to questions on family succession show little change between the 2002 and 2006 samplings, both for England and the south west, with only about 20% of family members considered to be likely or definitely following into farming.

Table 2.9 Farmers' attitude to farming and expectations of family members following into family farming business

(This table corresponds to Table 2.11 in the 2003 report of Lobley and Barr)

	2002		2006	
	SW	England	SW	England
1. Farming has no future - I intend to give it up	11.3	10.5	*	7
2. Farming has a limited future - I need to diversify	28.4	24.2	*	24
3. I see my future in farming and I want to increase the size of my farm business	11.4	12.0	*	8
4. I am happy to stay in farming as I am now and for the foreseeable future	7.6	12.2	*	18
5. I am worried about my future in farming but I don't know what else I can do	19.1	20.0	*	21
6. I see my future in farming but I expect that I will have to change my farming practice	21.9	20.1	*	20
Not stated	0.3	1.0		4
<i>Number of respondents</i>	<i>302</i>	<i>1220</i>		<i>1861</i>
7. Family member definitely / very likely to follow into farming business	14	20	15	18
8. Family member possibly will follow into farming business	39	33	32	31
9. Family member unlikely / will definitely not follow into farming business	46	45	51	46
10. Likelihood of family succession not stated	1	2	2	4
<i>Number of respondents</i>	<i>317</i>	<i>1220</i>	<i>366</i>	<i>1861</i>

Source: ADAS, Farmers' Voice Survey

¹ Results weighted by farm type and size

* SW data not given in 2006 report.

In late 2006, a postal survey of 3,777 farmers in the South West GOR was undertaken in order to collect data on rates and patterns of succession; the impact of CAP reform on farm business performance and future plans. Given the sampling framework, a random sample drawn from Yellow Pages and Thomson Local directory, it was necessary to make adjustments to account for farmers no longer farming or deceased as well as postal errors. As such, the final population of the SW sample was 3,604, of which 1855 (51.5%) returned useable questionnaires representing 13.3% of the total area farmed in the region. Compared to the Farmers' Voice survey, the Exeter data (Tables 2.10 and 2.11) presents a more positive outlook on the future of farming in the region. This is perhaps most notable in terms of the number of respondents to have or who have a firm expectation of a successor. Very few farmers (6%) expect to leave farming in the next five years and whilst close to a third (28%) plan to continue as they are, significant portions indicated that they plan to either diversify or intensify and/or expand their farming activities.

Table 2.10 The plans of farmers in the SW over the next five years

	Avon	Cornwall & the Isles of Scilly	Devon	Dorset	Glos	Somerset	Wilts	SW Total
Exiting farming	6	8	7	4	5	6	4	6
Diversifying from farming	31	25	21	28	31	24	30	25
Expanding/intensifying farming business	13	12	14	16	16	14	20	15
Continue farming in present form	20	29	32	28	26	25	22	28
Reduce farming/semi-retire from farming	20	20	20	17	17	26	20	20
Unsure about exact future direction of farming	6	4	3	2	3	2	1	3
Not stated	4	2	3	4	3	2	3	3
	100%	100%	100%	100%	100%	100%	100%	100%
Number of Respondents	124	323	598	159	179	310	161	1854

Source: CRPR, unpublished data

Table 2.11 Farmer's succession plans

	Avon	Cornwall & the Isles of Scilly	Devon	Dorset	Glos.	Somerset	Wills.	SW Total
Family member definitely/very likely to follow into farming business	29	30	30	26	26	32	34	30
Family member will possibly follow into farming business	23	25	25	26	30	23	27	25
Family member unlikely/will definitely not follow into farming business	45	43	41	42	38	39	37	41
Likelihood of family succession not stated	2	2	4	5	5	5	2	4
	100%	100%	100%	100%	100%	100%	100%	100%
Number of Respondents	124	323	598	159	179	310	161	1854

Source: CRPR, unpublished data

Total Food Chain Efficiency

Under Pillar One of the SFFS, Outcome 2 of the three core economic outcomes is *greater efficiency in the total food chain*. As with Outcome 1 Defra have identified a range of indicators for this core outcome (Table 2.12). However, there are currently few data available at the South West regional scale for indicators under this outcome.

Table 2.12. Data availability for indicators of greater efficiency in the total food chain. (Requested ‘priority indicators’ are shown in bold type in column 1)

(This table corresponds to Table 2.12 in the 2003 report of Lobley and Barr)

	Data definitely available	Data may be available	Data not available	Table in this report
Productivity of food chain beyond the farm gate			√	
Real food prices			√	
Gross value add per person for food for food chain beyond the farm gate			√	
Overseas trade (exports of value added products)		√		
Benchmarking across food chains			√	
Capital stock per worker in food and drink processing		√*		
Indicator of innovation and technical progress			√	

Indicator: overseas trade (exports of value added products)

Information in the South West Competitiveness Operational Programme notes that for 2004 the food and drink sector generated 12.3% by value of the region’s total exports (i.e. ca. £1.2 billion of a total of 12.3 billion)⁴.

Burden on the Taxpayer

Under Pillar One of the SFFS, Outcome 3 of the three core economic outcomes is *reduced burden on the taxpayer and the rest of the economy*. As with Outcomes 1 and 2, Defra have identified a range of indicators for this outcome (Table 2.13) and these relate primarily to the costs of disease outbreaks. The priority indicator required for this report relates to the incidence of bovine tuberculosis.

⁴ Source: <http://download.southwestrda.org.uk/file.asp?File=/policy-and-partnership/policy-and-partnership/Competitiveness%20OP%20-%20Negotiation%20Draft%20V1%200.pdf>

Table 2.13. Data availability for indicator of ‘reduced burden on the taxpayers and the rest of the economy’ (Requested ‘priority indicators’ are shown in bold type in column 1)

(This table corresponds to Table 2.13 in the 2003 report of Lobley and Barr)

	Data definitely available	Data may be available	Data not available	Table in this report
Cost of animal and plant disease outbreaks			√	
Illegal imports of meat			√	*
Costs of removing pesticides and fertilizers from drinking water		√		*
Cost of recovery of CTS, disease levy control			√	*
Bovine TB incidence	√			2.14 2.15
Production subsidies	√			*

* data on these indicators were not requested for inclusion in this report

Indicator: Bovine TB incidence

The position of the South West as a disease hotspot for bovine TB increased significantly in the 1990s and has continued since 2000 (Table 2.14). Approximately two-thirds of herds under movement restriction in England are within the region (Table 2.15). However, within the region it is the counties of Gloucestershire, Devon and Cornwall where most of the incidence occurs, a situation that has remained over the period of the past 15 years during which this problem has existed. A notable feature has been that confirmed cases of the disease are now much more prevalent outside the region (parts of the West Midlands and west Wales being other hot spots) so that the proportion of total GB cases that are in the south west has fallen and is now around half the national total of cases (Table 2.14).

Table 2.14 Bovine TB confirmed herd incidence, by county, since 1992

	1992- 1996	1997- 2001	2002- 2006	2002	2003	2004	2005	2006	% of SW total in 2002- 2006
Avon	109	112	245	57	47	46	45	50	5.0
Cornwall	416	573	1102	268	188	213	251	182	22.3
Devon	310	600	1827	284	293	400	445	405	37.0
Dorset	40	63	158	39	23	22	41	33	3.2
Gloucestershire	251	580	847	216	157	135	183	156	17.2
Somerset	55	181	361	80	64	72	68	77	7.3
Wiltshire	99	211	394	103	85	70	68	68	8.0
South West	1280	2320	4934	1047	857	958	1101	971	100.0
Great Britain	1420	3653	9437	1907	1657	1766	2083	2024	
SW as % of GB total	9	64	52	55	52	54	53	48	

Source: DEFRA website

Table 2.15 Bovine TB: herds under movement restrictions, by county, 2000-2006.

	2000	2001	2002	2003	2004	2005	2006
Avon	74	50	136	171	149	133	137
Cornwall	339	237	560	678	634	670	624
Devon	381	248	648	912	979	1227	1192
Dorset	52	31	105	140	115	127	134
Gloucestershire	335	182	213	470	374	407	367
Somerset	135	86	392	294	262	228	242
Wiltshire	125	85	196	245	210	189	181
South West	1441	919	2250	2910	2723	2981	2877
England total	1997	1325	3273	4287	4053	4432	4526
SW as % England total	72.2	69.4	68.7	67.9	67.2	67.3	63.6

Chapter Three: Environmental Indicators

Outcome 4: Reduced environmental cost of the food chain

Outcome 4 of the Defra SFFS Indicators is Reduced Environmental Cost of the Food Chain. The headline indicators under this outcome concern river water quality and gaseous emissions. Defra have identified a number of core indicators, and those for which information has been requested for this report are summarized in Table 3.1.

Table 3.1 Data availability for indicators of ‘Reduced environmental cost of the food chain’ (Requested priority indicators are shown in bold type in column 1)

(This table corresponds to Table 3.1 in the 2003 report of Lobley and Barr)

	Data definitely available	Data may be available	Data not available	Table in this report
Biological river quality	√			3.2 3.3
Pesticide use	√			3.4
Active ingredients of pesticides used and sprayed area	√			3.4
Manure management			√	
Ammonia emissions	√			Map in Appendix
Emissions of methane and nitrous oxides from agriculture	√*			Fig 3.1 Maps in Appendix
Water pollution incidents caused by agriculture		√		
Eutrophication status of water	√			
Waste produced from agriculture and food	√			
Waste produced in food processing and retail			√	

* Data on methane and nitrous oxide from all sources, with inferences on the contributions from agriculture

Indicator: Biological River Quality

Around 6,500 km of rivers and canals are monitored to assess river water quality in the South West (of a total of 44,000 km monitored in England and Wales). Monitored rivers are well distributed throughout the region, with over one-third in Devon. Biological quality is associated with chemical quality and also with other factors including sediment loads, flow irregularities and management of river banks.

The South West showed an overall net improvement of 25% for biological river water quality in 2004 compared with the situation in 1990 (Table 3.2). The number of rivers of good or fair biological quality has been consistently above 97% since 1990, although those of good quality fell by over 9% between 2003 and 2004. The region has very few rivers of poor or bad biological quality with just over 1% in 2004, showing a small improvement of 2% since 1990 but very little change since 1995 (Environment Agency, 2005).

In 2004, biological river water of good or fair quality was above the English average (94.9%) in all of the South West's counties. In Devon, Dorset and Somerset 100% of rivers were of good or fair quality. Although still very small, only Cornwall and the Isles of Scilly recorded the region's only record of bad quality with 2.9%, whilst with 3.2% Gloucestershire had the highest percentage of rivers with poor water quality (Environment Agency, 2005).

Table 3.2 Biological quality of monitored rivers and canals (1990-2004) in South West England (as km and proportions of river lengths) with proportions compared with the values for England and Wales in brackets

Year	Good		Fair		Poor	Bad	Total	Good	Fair	Poor or Bad
	A	B	C	D	E	F				
								As % of total (with England & Wales % in brackets)		
1990	2,348	2,223	655	154	107	59	5,547	82 (60)	15 (30)	3 (11)
1995	3,346	1,959	485	80	47	19	5,935	89 (66)	10 (27)	1 (6)
2000	3,426	1,833	384	174	58	8	5,883	89 (67)	9 (27)	1 (6)
2002	3,559	1,713	361	146	45	12	5,836	90 (68)	9 (27)	1 (5)
2003	3,641	1,662	342	109	55	11	5,820	91 (69)	8 (26)	1 (5)
2004	3,641	1,647	401	72	26	27	5,814	91 (70)	8 (25)	1 (5)

Source: EA website

Table 3.3. Rivers of good chemical quality in England and Wales, 1995 to 2005 as percentage of length with GQA (Grades A & B)

Region	Year						
	1995	2000	2001	2002	2003	2004	2005
Anglian	17.4	39.2	49.3	57.8	54.4	44.2	42.0
Midlands	34.9	45.0	59.4	63.2	63.1	58.1	55.8
North East	57.8	62.4	66.6	65.1	67.5	68.1	70.4
North West	41.7	54.2	61.3	60.9	62.1	61.0	61.7
Southern	43.5	56.2	59.9	58.3	43.6	35.1	40.1
South West	64.2	75.6	81.9	82.0	83.2	80.5	79.8
Thames	36.1	48.3	66.1	67.8	67.8	64.3	63.8
Wales	86.3	93.2	93.4	92.5	92.2	92.5	94.4
England & Wales	47.8	59.6	67.6	69.0	68.4	65.2	65.3

Source: EA website

Biological quality is associated in part with chemical quality and the evidence of chemical quality improvements is summarized in Table 3.3. The chemical quality of river water in the South West has been consistently good and continues to improve. There was a 33% net improvement in quality in 2004 compared with the situation in 1990. Rivers of *good quality* increased by 16% between 1990 and 2004 (from 61.46% to 77.92%). Cornwall and the Isles of Scilly had the highest proportion of rivers with good chemical quality (91.4%).

Just 3% of all rivers in the region had water of *poor or bad* quality in 2004, a decline of almost 7% since 1990. In 2004, river water of *good or fair* chemical quality was above the English average (92.8%) in all of the South West's counties with the exception of Somerset (91.8%). Though still low, Somerset and Wiltshire had the highest number of rivers of *poor and bad* quality with 8.2% and 4.3% respectively. (Environment Agency, 2005).

Indicator: Pesticide use, and Active ingredients of pesticides used and areas sprayed

The Central Science Laboratory keeps detailed regional information on areas treated with individual pesticides, and by different categories of pesticides, for different crops in each case. Data for the period 1990-2005 show a number of trends. In 2005, pesticide applications were made on approximately 5.5 million hectares of land in the South West (though actual areas treated will be lower than this as many crops are sprayed more than once in a season); the figure is a 24% increase since 1990. However, the amount of pesticides (in kg of active ingredient) applied actually fell by about 10% over the same period (from 2.03 m kg to 1.82 m kg).

Some key indications are:

- The total area receiving insecticides is now lower than in the early 1990s.
- The total area receiving herbicides increased during the 1990s then levelled off.
- The area receiving growth regulators has shown an increase.
- The areas receiving molluscicides varies between years so no clear time-series trend can be discerned.
- The area of grassland treated with pesticides (most of which will have been herbicides) has fallen since the late 1990s.

Table 3.4 Changes in pesticide use on farmland in SW England since 1990

	1990		1995		2005	
	'000 ha	'000 kg	'000 ha	'000 kg	'000 ha	'000 kg
Herbicides	1,491	1,145	1,570	1,049	2,087	1,119
Fungicides	2,087	502	1,873	347	2,494	380
Growth regulators	258	253	232	198	459	248
Insecticides	686	62	344	61	539	25
Molluscicides	22	5	139	46	60	14
All pesticides*	4,544	2,029	4,163	1,818	5,640	1,821
All pesticides on grassland	212	197	246	238	143	81
All pesticides on cereal land	3,749	1,460	3,091	1,032	4,212	1,215

* Values for specific active compounds are given on the CSL website
<http://pusstats.csl.gov.uk/myresults.cfm>

Changes in the areas and amounts of different categories of pesticides used are summarized in Table 3.4. In considering changes in pesticide use since 1995 the following points should be noted. Many modern pesticide formulations have a lower dose rate of active ingredient per unit area than products in use in the 1990s, which will have contributed to the finding of an apparent reduction in total amounts applied. Furthermore, advances in precision application technology have also enabled farmers and contractors to reduce dose rates while maintaining an effective activity of the product. Thirdly, the data on areas treated are actually for 'areas x treatments'; e.g. an area of 100 ha cereals that was treated with a herbicide after emergence and then with two applications of a fungicide will be recorded as 300 ha of sprayed land. The data do, however, give a good indication of pesticide usage and time-series trends.

Indicator: Manure management

Information exists on initiatives to improve manure management through farmer training⁵ but not quantitative evidence on outcomes of improvement, particularly that can be interpreted at a regional scale. In time, data may be available on the uptake of manure management plans under Environmental Stewardship.

Indicator: Ammonia emissions

Agriculture accounts for *ca.* 80% of the UK's national emission of ammonia (NH₃). With its high concentration of livestock the South West is an important area for the origin of ammonia. Emissions originate from livestock housing, the storage, treatment and application of all types of animal manures and the use of inorganic fertilisers. Deposition of NH₃ can lead to terrestrial and aquatic eutrophication and acidification. An accurate inventory for NH₃ emission from agriculture for annual submission to the EU is required to determine compliance with the agreed national target for the UK of 297 kt NH₃ per year by 2010, and to provide a base from which to accurately predict reductions in NH₃ emission as a result of implementing abatement practices. Research

⁵ e.g. <http://www.netregs.gov.uk/netregs/sectors/1736703/1736798/1743248/?version=1&lang=e>

outputs on the Defra science website (project AM0101: National ammonia reduction strategy evaluation system: NARSES) includes mapped information for 1996 and a modelled map based on a 20% reduction. An update of emissions to 1999 was provided (Defra project AM0108) whose data would appear to enable a South West regional NH₃ emission total from agriculture to be derived. Recent / on-going research is updating this information (see Defra website on projects AM0108 /09).

The UK National Ammonia Monitoring Network (NAMN) was established in September 1996, to explore spatial and temporal patterns, compare results with dispersion models, and contribute to national N deposition estimates. Monitoring is on a monthly timescale, which provides sufficient data to explore seasonality, while being cost-effective in providing concentrations fields and long-term trends in NH₃ (and NH₄⁺). The measurements confirm the high spatial variability of NH₃ (0.05-15 µg m⁻³), consistent with it being a primary pollutant emitted from ground-level sources, and seasonal variation with peaks in summer for all the major sources of emissions (livestock, as well as general background). Data are collected from 91 sites in the UK⁶. A UK map of ammonia emissions is reproduced in the Appendix, and this shows the relatively high rates of ammonia emissions in the South West, with about one-third the area identified as having emission rates of >2 kg NH₃ per km², and most of the rest (excepting coastal and moorland areas) being in the 1-2 kg range. Overall, this is comparable to the situation in two other major livestock farming regions, Northern Ireland and the north-west Midlands of England, and also for parts of East Anglia, and exceeds the typical values for ammonia emissions for most of England as well as Wales and Scotland.

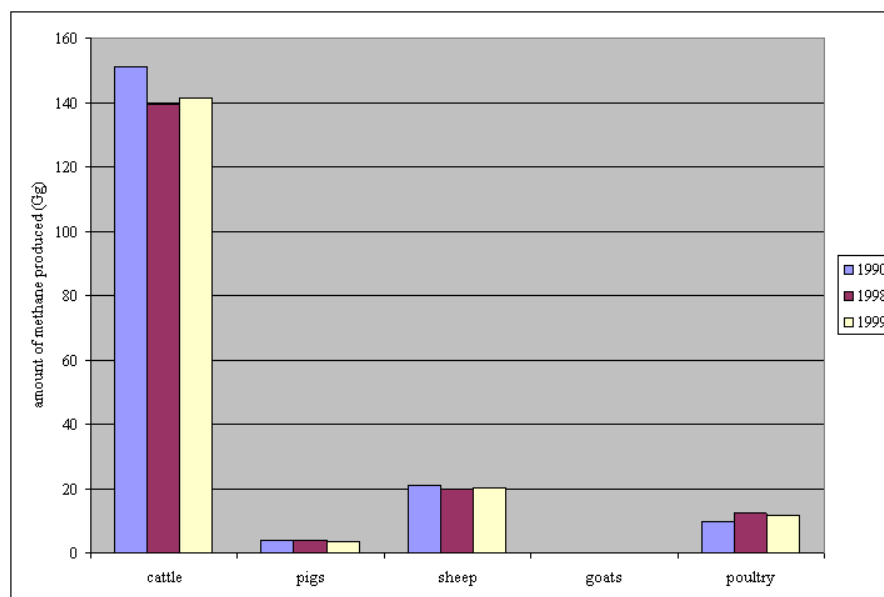
Indicator: Emissions of methane and nitrous oxides from agriculture

Agriculture is a significant contributor to total UK emissions of the greenhouse gases, methane and nitrous oxide, whose global warming potential values are 23 and *ca.* 300 times greater than that of carbon dioxide. Agricultural sources comprise 40% of UK methane emissions and 70% of nitrous oxide emissions; together they account for 8% of all the UK's greenhouse gas emissions.

⁶ Tang Y.S., Love L., van Dijk N., Fowler D. & Sutton M.A. (2005) UK National Ammonia Monitoring Network: spatial and temporal results. In: *Monitoring of ammonia concentrations in the United Kingdom*, Presentation summaries from the site operators meeting, March 2005. Contract: EPG 1/3/136

http://www.cara.ceh.ac.uk/documents/PresentationSummaries_NAMN_Mar05.doc

Fig. 3.1 South West region. Emissions of methane from livestock 1990-99 (IGER data reproduced on the SW Observatory website)



Methane: Since the early 1990s total UK emissions of methane have decreased by around 50% but agriculture's share of that total has decreased by only about 10% over the same period⁷. The presence of large numbers of livestock in the South West implies that methane reduction in total in the region will have fallen less than in regions where other sources of methane emission (such as former coal mines and landfill sites) are more important. DEFRA-supported research by IGER North Wyke on the methane emissions associated with livestock has been used to derive methane emission values for the region (Fig 3.1). The small reduction over the period 1990-99 is likely to be mainly due to reductions in the numbers of cattle (particularly with fewer, though higher milk-yielding, dairy cows), and although there has been increased understanding of potential for manure management and dietary adjustments that might help reduce the total emissions, there is little evidence of this knowledge being applied in practice for this specific objective. A UK map of methane emissions from all sources is given in the Appendix.

Nitrous oxide. Agricultural soils are the largest source of nitrous oxide emissions (N₂O) contributing *ca.* 64% (91 kt N₂O) of the total annual emissions. Grasslands are the largest soil-source of N₂O (in the UK) and together with manure from housed and grazed animals returned to grassland estimated annual emissions are 74 kt N₂O (Source: Centre for Ecology and Hydrology). Per unit area grassland emissions are larger than from fertilised arable land, because a) grasslands receive larger rates of mineral fertiliser and manure, b) grasslands occur in high rainfall regions, c) grazed grasslands have compacted soils. Such conditions are all favourable for N₂O production. The location of intensively managed grasslands in the western wetter part of Great Britain, including south west England, is therefore reflected by the higher N₂O emission rates (see map in the Appendix; this indicates that over much of the region, particularly in Devon, Somerset and Gloucestershire, N₂O emission rates are

⁷ National Atmospheric Emissions Inventory: <http://www.naei.org.uk/pollutantdetail.php>

above 6 kg N per ha per year; in less intensively farmed areas such as Dartmoor, Exmoor and parts of Cornwall, and coastal areas subject to a dilution effect from proximity to the sea, rates are typically < 2 kg N per ha per year).⁸

However, as there has been reduced use of nitrogenous fertilizers nationally over the past 10-15 years, there is a likelihood of a reduction in nitrous oxide emissions from agriculture, and that the same trends would apply in the South West. Modelling approaches have been applied to farms in South West England to determine nitrous oxide emissions at the farm scale, but there is a level of uncertainty which would prevent this approach being applied at a regional scale. Ongoing research at IGER, funded by Defra, is seeking to determine N₂O and methane emissions from agricultural land under different managements and soils from which there would be the potential to derive more accurate inventories of agricultural emissions and extrapolate to regional scales.⁹

Indicator: Water pollution incidents caused by agriculture

The Environment Agency holds information on recorded major pollution incidents and their cause where this can be established. In the South West region there are about 3,500 incidents each year of which about 100 are in the most serious categories (1 and 2). About 9% of incidents are attributed to agricultural premises (although around 35% of all serious incidents are not attributed to a known cause, it is possible that this figure is an underestimate) and the proportion of category 1 and 2 incidents attributed to agriculture is about 20%.¹⁰

Indicator: Eutrophication status of freshwaters and marine water

The release of compounds containing nitrogen, phosphorus or organic matter can lead to eutrophication of lakes, rivers and coastal marine waters, resulting algal growth and depletion of oxygen in the water, with consequences for aquatic fauna. It is not possible simply by reference to numeric chemical data, such as a threshold value for phosphorus, to declare a water body as being eutrophic. For the purposes of implementing the Urban Waste Water Treatment Directive and the Nitrates Directive, the UK established a suite of criteria on which to assess the presence or potential for eutrophication in waters. These vary according to the type of water body under observation, but include indicators of chlorophyll and dissolved oxygen concentrations, water clarity and rate of exchange, the presence and duration of algal blooms and the presence and severity of changes to life forms in the water.

⁸ Air Pollution Information System: http://www.apis.ac.uk/overview/pollutants/overview_N2O.htm

⁹ see:

http://www2.Defra.gov.uk/research/project_data/More.asp?I=AC0101&M=KWS&V=greenhouse+gas&SUBMIT1=Search&SCOPE=0

¹⁰ http://www.swenvo.org.uk/environment/pollution_statistics.asp#sw_cat1_4_2002_2005

Table 3.5 Percentage of total river length with average phosphate concentrations greater than 0.1 mgP/ litre¹

	1990	1995	2000	2001	2002	2003	2004	2005
Anglian	89.6	79.0	82.1	81.9	81.4	80.2	79.2	77.12
Midlands	87.0	73.8	78.4	78.8	78.4	78.3	77.3	75.5
North East	59.4	38.4	47.5	47.7	47.4	46	42.6	38.6
North West	41.0	36.8	40.1	40.0	40.0	38.4	40.8	40.7
Southern	74.0	60.4	57.8	57.6	56.9	56.1	55.5	56.2
South West	51.9	44.1	41.5	42.4	44.0	45.6	43.8	43
Thames	83.4	82.9	86.0	80.3	78.2	77	76.1	75.6
Wales	26.1	10.2	7.6	7.2	6.7	7.7	7.7	9.1
England & Wales	63.8	50.3	54.5	54.1	53.8	53.4	52.5	51.5

Source: Environment Agency

¹ These concentrations equate to the threshold above which the concentrations are graded as 'high', 'very high' or 'excessively high'.

The phosphate and nitrate data presented in Tables 3.5 and 3.6 can be taken as an indication, rather than a consistent measure of eutrophication status. Also the data is for Environment Agency regions, which are not exactly the same as the Government Office regions in that South West does not cover Gloucestershire and the eastern part of Wiltshire. Also, it is not possible to identify the extent to which agriculture is responsible for phosphate and nitrate in rivers.

Table 3.6 Percentage of total river length with mean nitrate concentrations > 30 mg NO₃/litre

	1995	2000	2001	2002	2003	2004	2005
Anglian	76.7	81.2	76.1	71.7	64.3	70.6	66.9
Midlands	48.7	52.9	50.9	49.3	46.0	45.8	44.5
North East	17.9	19.9	17.2	15.5	14.0	14.4	14.7
North West	10.4	10.5	9.5	9.3	9.2	9.6	9.8
Southern	16.1	14.4	16.4	17.0	19.5	19.5	19.6
South West	15.4	17.7	15.5	15.1	15.6	17.9	18.3
Thames	53.8	55.3	50.3	51.7	54.1	55.7	55.5
Wales	0.5	1.5	0.2	0.0	0.0	0.0	0.4
England & Wales	29.9	32.4	29.9	28.7	27.4	28.7	28.3

Source: Environment Agency

Table 3.7 Rivers quality compliance in England and Wales, 1995 to 2005, as percentage of length meeting compliance (2006 target is 91%)

	1995	2000	2001	2002	2003	2004	2005
Anglian	82.0	88.4	90.8	88.7	85.3	83.7	85.3
Midlands	85.9	92.5	92.0	88.6	86.7	88.2	92.5
North East	81.5	84.6	87.4	91.1	90.2	88.2	87.4
North West	81.6	92.4	93.2	93.1	91.8	91.2	91.9
Southern	79.4	86.5	80.0	68.3	74.8	79.9	86.5
South West	89.8	91.1	92.0	92.6	91.2	91.2	92.1
Thames	90.3	96.8	97.0	95.1	94.3	94.8	95.0
Wales	96.1	93.3	93.7	94.5	96.7	96.8	93.3
England & Wales	86.1	91.7	91.6	89.4	89.3	90.1	91.7

Source: Environment Agency

Indicator: Waste produced from agriculture and food

Statistics on the Defra website indicate that agriculture nationally accounts for <1% of all (a total of 335 m tones) waste. Food waste will additionally occur within the household and commercial sectors. Statistics from the Defra farm practices survey on farm wastes include used oils, tyres, scrap metal and machinery, plastics, cardboard and paper packaging, as well as veterinary waste such as syringes and unused products and surplus agricultural chemicals.¹¹

Nationally, Defra report that there has been a fall in the numbers of farmers reusing or recycling farm waste (from 88% in 2001 to 77% in 2004) for all categories of farm waste except card and paper packaging, which shows an increase of one-third. Information on veterinary waste is not yet available. South-west time series data for 2001 cf. 2004 may be available but confidence in changes since 2001 are likely to be limited by sample size; however, 2004 data for the South west compared with England as whole indicate the following: In the South West there are lower recycling rates and greater rates of reuse of used oils, tyres and plastics (and also higher rates of stockpiling of plastics) but the disposal of scrap metals and cardboard is similar to the national situation.

¹¹ National statistics for this indicator are given on Defra website (http://statistics.Defra.gov.uk/esg/indicators/d405_data.htm) and information derived from the South West's subset has been provided by special request.

Table 3.8 Proportion of farm holdings (as %) that reuse, recycle or otherwise dispose of different classes of agricultural waste products, for the South West region and for England as a whole, based on Defra Farm Practices Survey 2004

Farm waste items	Used Oils (lubricating and hydraulic)		Tyres		Scrap metal and used machinery	
	*South West	*England	South West	England	South West	England
Stockpiled no disposal plan	11.0	9.6	22.6	23.5	13.4	12.5
Re-used	39.6	32.6	31.7	22.9	21.1	17.7
Burned for heating	6.8	8.7	0.7	0.4		
Burned in the open	7.5	6.0	5.7	2.7		
Burned in a drum incinerator	4.1	6.5	0.4	1.1		
Buried	0.8	0.9	1.9	1.1	2.1	0.8
Landfill	1.3	1.0	3.9	2.7	1.7	1.7
Dustbin	0.0	0.1	0.0	0.5	0.9	0.8
Recycled	19.8	25.0	19.7	26.9	67.3	66.7
Not applicable	17.7	18.0	20.6	23.7	10.0	12.4

Farm waste items	Plastic silage wrap		Plastic crop cover		Fertiliser bags	
	South West	England	South West	England	South West	England
Stockpiled no disposal plan	11.3	5.8	0.4	1.1	6.9	3.9
Re-used	9.9	5.4	0.9	2.0	14.1	9.9
Burned for heating	1.2	2.5	0.0	0.6	0.4	1.4
Burned in the open	24.6	19.2	2.9	3.0	31.8	30.5
Burned in a drum incinerator	15.3	14.4	2.1	2.8	17.6	21.2
Buried	5.9	3.2	0.3	0.4	2.8	1.7
Landfill	5.2	5.7	0.3	1.3	5.9	4.2
Dustbin	4.4	5.1	1.0	0.6	2.1	2.5
Recycled	9.5	8.1	0.9	2.1	7.6	6.9
Not applicable	27.4	39.2	91.2	85.3	19.7	23.7

Limited information on food waste arising from domestic sources is available at a regional level. In the South West the household recycling and composting rate of 31.4% is above the England average of 26.7% and only just below the two English regions with the highest rates of 34.1%¹². (These figures will include non-food organic waste but give an indication of the region's position vis-à-vis other regions.)

¹² Source: <http://Defra.gov.uk/environment/statistics/waste>

Table 3.8 continued

Farm waste items	Plastic packaging		Cardboard	
	South West	England	South West	England
Stockpiled no disposal plan	0.5	0.8	0.8	0.4
Re-used	5.1	3.2	3.6	2.3
Burned for heating	1.8	2.1	5.8	5.5
Burned in the open	20.9	17.0	39.4	36.5
Burned in a drum incinerator	13.5	17.5	19.3	21.6
Buried	1.0	0.7	0.8	0.4
Landfill	5.8	3.7	2.3	1.5
Dustbin	13.0	12.5	7.4	8.8
Recycled	8.9	7.4	21.9	20.6
Not applicable	34.8	38.0	8.6	11.5

Source: Defra data

*Based on sample sizes of 356 holdings in the South West and 1434 in England as a whole, and results are therefore subject to sampling error.

Indicator: Waste produced in food processing and retail

This would appear to be not available at a regional scale but such information may become available in the future. Nationally, the food industry generates about 10 million tonnes of waste, accounting for about 10% of the industrial and commercial waste stream. It therefore has an important role to play in reducing adverse impacts of waste generation. The EA holds survey data from 1998/99 and 2002/03. The 2002/03 data was published in 2005 and sampled around 4,500 commercial and industrial businesses of which 579 were food and drink manufacturers, compared with a population of nearly 8,000 in this sector. Of the 7.2 million tonnes of waste identified in the survey as being attributable to the food and drink-manufacturing sector, 4.1 million tonnes was identified as food waste. It is uncertain as to whether any regional subsets of these data could be sufficiently robust to interpret for the South West region. There is a further complication in that since the EA surveys were conducted, European Court of Justice rulings relating to EU legislation mean that much of what was previously regarded as waste is now considered to be by-product. The change in interpretation is likely to have led to a substantial reduction in the overall amount of food waste and it is not feasible to split the EA data into what is now regarded as waste and non-waste. Even without allowing for the change in interpretation, there will also be inaccuracies in the EA data due to sample size, even at a national level. The Food Industry Sustainability Strategy (FISS), published in April 2006, aims to improve the food industry's environmental, social and economic performance by encouraging the widespread adoption of best practice by the industry. Amongst other things, it challenges the food industry "to reduce the amount of food and packaging waste that is produced each year, both by the industry itself and by consumers of their products, without compromising food safety; and to recycle or otherwise gain value from the waste that does arise."

The industry-led FISS Champions' Group on Waste has considered this challenge in the light of the FISS action point to contribute to sustainable waste management through: i). continuing to play its full part in the domestic packaging regime; and ii.) contributing constructively to Defra's and WRAP's work with retailers and the food industry in relation to consumer information and behaviour, supermarket recycling, and product and packaging design. In addition, the Group has considered the issues of data availability and monitoring. Overall, the Group has developed twenty-four recommendations on how the food industry might contribute to reducing its waste, in collaboration with Government, best practice organizations and other stakeholders. Taking these recommendations into account, the Group considers that a realistic target for the food manufacturing industry to adopt is to reduce its food and packaging wastes by 3% a year over 5 years from a 2006 baseline.¹³

¹³ Source: http://Defra.gov.uk/farm/policy/sustain/fiss_pdf/progress-report-2007.pdf

Outcome 5: Better use of Natural Resources

Outcome 5 of the Defra SFFS is Better use of Natural Resources. Defra's core indicators under this outcome are mainly concerned with soil and non-food crops. Indicators for which information has been requested for this report are summarized in Table 3.9. This remains an outcome for which very little data are available, especially at a regional scale.

Table 3.9 Data availability for indicators of 'Better use of Natural Resources (Priority indicators are shown in bold type in column 1)

(This table corresponds to Table 3.7 in the 2003 report of Lobley and Barr)

	Data definitely available	Data may be available	Data not available	Table in this report
Energy use direct	√			
Energy use indirect			√	
Energy derived from agricultural biomass	√			3.10
Packaging per tonne of product			√	
Non-food crops (uptake of energy crops scheme)		√		

Indicator: Energy use direct

Direct energy use in the agricultural sector can be estimated with reference to estimates of CO₂ emissions, for which sectoral x regional data have been calculated by Defra. These give, for 2004, a CO₂ emissions value for the south west of 653 kt. This represents 15.6% of the UK total for agriculture (or 26.4% of the England total). Values for the South West region and other UK regions are given in the Appendix.

Indicator: Energy derived from agricultural biomass

UK data on capacity for generation of renewable electricity and heat generation by combustion is provided by the dti DUKES database on renewables. This includes trends and a category of biomass derived from farm waste etc (aggregated for poultry litter, meat and bone waste, straw and energy crops).

Table 3.10 Installed renewable electricity capacity from waste treatment and heat capacity derived from thermal biomass, South West England, by county

	<i>Installed renewable electricity capacity sourced from advanced treatment of waste (in MW)</i>	<i>Installed renewable heat capacity derived from thermal biomass (in MW)</i>
Avon	0.23	0.92
Cornwall & Scilly	2.70	4.49
Devon	0	2.22
Dorset	0	0
Gloucestershire	0	0.43
Somerset	0	1.75
Wiltshire	0	0.27
South West total in MW (and % region's renewables derived from this source)	2.93 (2.1)	10.07 (36.2)

Data compiled by RegenSW includes generation of different categories of renewables at a county level within the region including for advanced treatment of waste and for biomass crops (Table 3.10). The South West has a good track record in renewable energy generally, including the first UK scheme to harness electricity from fermented farm and food waste. There are currently almost 100 grid-connected renewable energy projects in the South West producing approximately 3% of the region's electricity consumption (though much of this is derived from wind generation and biogas harnessed from landfill sites).

Outcome 6: Improved Landscape and Biodiversity

Outcome 6 of the Defra SFFS Indicators is improved landscape and biodiversity. The headline indicators under this outcome are concerned with important wildlife sites and the status of farmland birds. Defra's core indicators include species and habitats, and uptake of agri-environmental schemes. There is a reasonable amount of good quality data for these indicators and those for which information has been requested for this report are summarized in Table 3.11.

Table 3.11 Data availability for indicators of 'Improved landscape and biodiversity' (Requested priority indicators are shown in bold type in column 1)

(This table corresponds to Table 3.10 in the 2003 report of Lobley and Barr)

	Data definitely available	Data may be available	Data not available	Table in this report
FWPS cumulative plantings	√*			
Land under commitment to environmental conservation	√			3.12
Numbers of farms in higher tier schemes	√			3.12
Area of land in higher tier schemes	√**			3.12
Farmland birds	√			3.13 + Fig. 3.2
Land use and livestock numbers	√			3.14

* limited information provided, see below

**information on land areas in higher tier ESA schemes is incomplete

Indicator: Farm Woodland Premium Scheme cumulative plantings

Administration of this scheme and information held on agreements was transferred from Natural England to the Forestry Commission in February 2007. Detailed information on agreements and plantings is held but at the time of compiling this report some information was temporarily unavailable (due to compatibility problems with the Natural England and Forestry Commission computing systems). The Forestry Commission were able to advise that the South West had a total of 1954 agreements (cumulative plantings from 1992 to the present). As most agreements cover only a few hectares this implies that the total area constitutes a very small proportion of the region's farmland.

Indicator: Land under commitment to environmental conservation

With respect to agricultural land (i.e. excluding sites such as nature reserves, which in many cases need to use grazing animals as part of the management) there are several schemes operational that would fall under the heading of commitment to environmental conservation. These are (i) Natural England SSSI designations; (ii) the Environmentally Sensitive Areas (ESA) scheme; (iii) Countryside Stewardship (CSS); and (iv) the Environmental Stewardship Schemes (Entry Level Stewardship and Higher Level Stewardship). Both the CSS and ESA schemes have been replaced by ES from 2006, but farmers holding agreements under the old schemes may retain

these for the agreed period of the previous management agreement, after which many (but not all) are likely to roll over into the new schemes. In addition, there are other means of commitment to conservation, e.g. through signing up to a LEAF (Linking Environment and Farming) agreement and farm management audit, and most (if not all) registered organic producers would consider that their farming system carried a commitment to conservation (and Soil Association rules would require this). With these various measures of commitments to conservation it is not possible produce an aggregate figure; rather to present information separately for the various initiatives mentioned above.

In August 2007 there were 6,890 ELS agreements in the region and 268 HLS agreements; these covered *ca.* 664,000 ha¹⁴. An additional 185,000 ha remained under previous agreed ESA schemes and 73,000 ha under CSS, giving a total of 920,000 ha for the region (Table 3.12). Designated SSSIs in the South West amount to some 15,000 ha, though a significant proportion of this total will not be under agricultural management (woodlands, coasts).

Table 3.12 Farmland under ESA and Countryside Stewardship agreements in 2007 (based on agri-environmental schemes that pre-dated ELS/HLS) and of land under ELS and HLS up to August 2007

	Nos of Agreements (and Higher Tier ESA agreements in brackets)	Hectares under agreement
Blackdown Hills ESA	241 (31)	7,679
Cotswolds ESA	500 (146)	32,939
Dartmoor ESA	553 (47)	52,198
Exmoor ESA	546 (15)	48,514
Somerset Levels & Moors	994 (379)	17,275
South Wessex Downs ESA	151 (82)	19,163
West Penwith ESA	106 (5)	5,951
SW total for ESAs	3,181 (705)	183, 719
SW total for Countryside Stewardship agreements	3,352	72,919
SW total for ELS	6,890	647,801
SW total for OELS	53	5,147
SW total for HLS	268	15,888
<i>SW total for all land under an agri-environmental agreement</i>	<i>13,744</i>	<i>925,474</i>

Source: Natural England (Freedom of Information Act, special request)

¹⁴ By October 2007, the number of HLS agreements had increased to 289, covering an area of 18,733 ha.

Indicators: Numbers of farms in higher tier scheme, and area of land in higher tier schemes

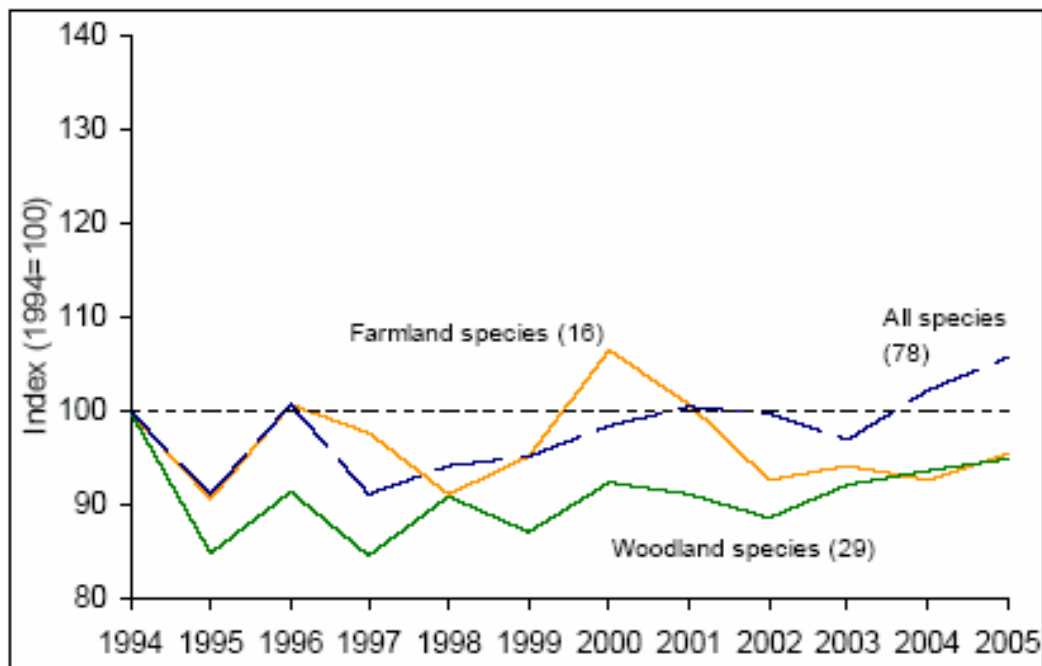
As at August 2007 there were 705 ESA schemes that were at Tier 2 or above, and 268 agreements under Higher Level Stewardship (Table 3.12). The Higher Tier ESA schemes represented 22% of all remaining ESA scheme agreements but the proportion was greater in three ESAs: South Wessex Downs, Somerset Levels and Moors, and the Cotswolds; these three ESAs accounting for 86% of all the higher tier ESA scheme agreements in the region.

The number of HLS agreements, as a proportion of all farms that have an ELS agreement is, at 4%, relatively few, and represents only 2.5% of the land area in ELS. The area under HLS is *ca.* 16,000 hectares. However, as this scheme is still new and has brought eligibility to many farms previously not covered by the earlier schemes, there is the possibility for numbers to increase in the future

Indicator: Farmland birds

Changes in wild bird populations are a headline indicator and considered to be a good indicator of the broad state of wildlife and countryside because they occupy a wide range of habitats, they tend to be near or at the top of the food chain, and long-term data on bird populations have been collected. For the south west of England the decline in farmland bird species (measured by the Farmland Bird Index of 16 species in the region*) showed a decline of 55% between 1970 and the mid-1990s. This loosely mirrored the national trend over the same period (for a slightly larger list of 19 species).

Figure 3.2 South West wild bird indicators 1994-2005



However, from 1994 to 2005, the South West, in common with most English regions (except the West Midlands and South East where populations fell, resulting in an overall England decrease of 6 per cent over the same period.) showed no significant change in farmland bird populations. A small decline in woodland bird species (measured by the Woodland Bird Index of 33 species) over the 1994-2005 period closely mirrors the national trend (though in contrast to some regions of northern England where there was a marked increase in woodland birds over this period).

Table 3.13 Percentage changes in farmland and woodland bird populations 1994-2005 (showing the percentage change and number (and percentage) of declining and increasing species (+/- 10 %) over this period) for England and South West England

	Bird species groups surveyed	% Change in indicators	No. of spps declining (% of total)	No. of spps increasing (% of total)	Total number of species
South West	All native bird species	6	18 (23)	36 (46)	78
All England		6	27 (28)	49 (51)	96
South West	Woodland birds	-5	8 (28)	10 (34)	29
All England		-3	10 (30)	16 (48)	33
South West ¹	Farmland birds	-5	3 (19)	6 (38)	16
All England		-6	8 (42)	7 (37)	19

Source: Defra (2007) Wild bird indicators for the English regions: 1994 – 2005, Regional version of the national indicator of sustainable development.

<http://www.Defra.gov.uk/environment/statistics/wildlife/index.htm>

¹ The recorded list of farmland birds in the South West comprises: Corn Bunting, Goldfinch, Greenfinch, Grey Partridge, Jackdaw, Kestrel, Lapwing, Linnet, Reed Bunting, Rook, Skylark, Starling, Stock Dove, Whitethroat, Woodpigeon, Yellowhammer.

The region has also been prominent in a number of farmland bird species recovery projects. Notable has been the successful Cirl Bunting programme; as few as 120 pairs of this once-widespread bird remained nationally in 1989 and all were confined to south Devon. By 1998 recovery had reached 453 pairs (almost all were on Countryside Stewardship Agreement land) rising to 697 pairs by 2003. Although more numerous, the Corn Bunting has also experienced an 80% decline in the past 25 years, and in the South West it is largely restricted to some 30 breeding territories in north Cornwall where a species recovery programme began in 2006. Other examples include the Wessex Stone Curlew Recovery Project on the chalk downland of Salisbury Plain in Wiltshire where its breeding success has contributed greatly to meeting the UK BAP target for this species. In the same area a Great Bustard reintroduction project began in 2004-05 (Source: RSPB).

Indicator: Land use and livestock numbers

Table 3.14 summarises agricultural land use and numbers of livestock in the South West using data taken from the Defra June agricultural census/surveys for the period from 2003-2006. The increase in permanent grassland, and decrease in temporary grassland, would suggest a reduction in reseeded as sown leys are left down longer

and become classed as permanent grassland within the definition of the census. Of note is the reduction in the cereal area, a trend which may be reversed if the recent rise in grain prices is maintained. The changes in livestock numbers have been commented on in Chapter 1 of this report, where additional data over longer time frames are also included (Tables 1.2 and 1.6).

Table 3.14. Land use and livestock numbers in South West England, 2002-2006

	2003	2004	2005	2006
Land use	Area in '000 ha			
Cereals	313	321	298	294
Potatoes	7	7	6	7
Horticulture	13	12	13	12
All Crops and fallow	471	482	487	481
Other crops and fallow*	138	142	170	168
Temporary Grass	208	221	204	194
Set-aside	76	65	62	58
Permanent grass	864	856	901	955
Rough grazing	92	95	90	91
Woodland	60	63	67	70
All other land	31	28	33	30
Livestock	Numbers			
Dairy cattle	517,681	495,493	471,714	464,180
Beef cattle	185,914	195,007	202,379	200,110
Sheep (inc lambs)	3286,312	3304,557	3272,961	3256,412
Pigs	454,729	472,650	440,066	487,877

Source: Defra website, June Census summaries

* i.e. all crops and fallow excluding cereals, potatoes and horticulture

Chapter Four: Social Outcome Core Indicators

Outcome 7: Public Health and Outcome 8: Animal Welfare

Outcome 7 of the Defra SFFS Indicators is Better Public Health. The headline indicator under this outcome concerns diet (vegetable and fruit consumption) and a number of core indicators have been identified including dietary health, food-borne illness and farmer suicide rates. Those for which information has been requested for this report are summarized in Table 4.1.

Table 4.1 Data availability for social indicators of better public health (requested priority indicators are shown in bold type in column 1)

(This table corresponds to Table 4.1 in the 2003 report of Lobley and Barr)

	Data definitely available	Data may be available	Data not available	Table in this report
<i>Indicators of better public health</i>				
Levels of obesity	√*	√*		4.2
Food-borne illness	√			4.3
BSE cases	√			4.4
Relative incidence of stress-related illness			√	
Suicide rate of farmers and agricultural workers	√			4.5
<i>Indicators of higher animal welfare</i>				
Indicator of farm animal health		√		
% of food sold under assurance schemes		√		

* Childhood obesity data included. Adult obesity data may be available also.

Indicator: Levels of obesity

Every year around 16,000 adults and 4,000 children in England, representative of the whole population, are interviewed. As part of this process, height and weight measurements are collected which enables a Body Mass Index (BMI) figure to be calculated for each informant. Data for childhood obesity are given here.

Table 4.2 Obesity prevalence among children, broken down by Government Office region (Data from 2001 and 2002. based on children aged 2-10 with valid Body Mass Index)

Region	NW	NE	YH	EM	WM	EE	Lond	SE	SW
% obese	15.0	18.3	11.4	14.5	15.8	14.1	18.2	13.4	14.0

Source: D. Jotangia et al. (2006) Obesity among children under 11. National Centre for Social Research, Royal Free and University College Hospital Medical Schools. 31 pp. Online at: www.dh.gov.uk/prod_consum_dh/idcplg?IdcService=GET_FILE&dID=115483&Rendition=Web

Nationally, the proportion of children who were overweight (including obese children) has tended to increase since 1995. From 1995 to 2003, the prevalence of overweight rose from 22.7% to 27.7%. The prevalence of obesity followed the same pattern, increasing from 9.9% in 1995, to 15.5% in 2002 and was 13.7% in 2003.

Data are analysed according to a range of demographic factors and also by regional difference and Table 4.2 shows levels of obesity by Government Office Region. Obesity prevalence was lowest in Yorkshire and the Humber (11.4%) and the South East (13.4%) and highest in the North East (18.3%) and London (18.2%). Childhood obesity in the South West (14.0%) was close to the national average (14.8%).

Indicator: Food-borne illness

Table 4.3 clearly charts the rise in notifications of food-borne illness as well as the relative worsening of the region's position in this respect. Some caution needs to be attached to these data; a great many cases of food-related gastric illness may go unreported and some instances of reported gastric illness may be associated with exposure to organisms or toxins from non-food sources (e.g. bathing water).

Table 4.3 Food poisoning notifications, annual since 1991 for the South West and all England

	Actual notifications		Notifications per 10,000 of population		SW rate vs. England
	SW	England	SW	England	
1991	4,752	49,158	10.1	10.2	99%
1992	5,570	59,757	11.7	12.4	95%
1993	6,489	63,509	13.6	13.1	104%
1994	7,455	75,670	15.5	15.5	100%
1995	8,183	75,501	17.0	15.4	110%
1996	8,813	77,571	18.2	15.8	115%
1997	10,320	87,740	21.2	17.8	119%
1998	10,873	87,986	22.2	17.8	125%
1999	10,303	81,351	20.9	16.4	128%
2000	10,593	81,812	21.3	16.4	130%
2001	9,812	80,626	19.9	16.4	121%
2002	8,825	68,878	17.9	14.0	128%
2003	8,619	67,548	17.5	13.7	128%
2004	8,395	66,671	17.0	13.6	125%
2005	8,564	66,474	17.4	13.5	129%
2006	8,224	66,630	16.7	13.6	123%

Source: Public Health Laboratory Service, Notifications of Infectious Diseases

Indicator: BSE cases

Table 4.4 shows that the South West's share of new BSE cases since the outbreak of the disease is 42.3% overall, remaining at around 29% in the periods 1/7/01 to 10/1/03, and from 2003 to 2007. To date there have been over 154,000 cases of BSE in England since 1986 (181,000 in GB) of which over 60% have been in dairy cattle. BSE cases reached a peak in 1992, when 36,680 cases were confirmed in Great Britain, and since then has shown a steady decline. Numbers since 2004 have been ca.

100-300 per year, with a large year-on-year reduction since 2000. Table 4.4 summarises the annualised data for the region.

Table 4.4 BSE cases, from active surveillance, recent (2003-2007) and cumulative (2001-2007 for active surveillance and 1986-2007 for passive surveillance)

	Active surveillance cases confirmed from 1/7/01 to 29/6/07. (Cases from Jan 2003-July 2007 are given italicised in brackets)		Passive surveillance cases from 1986 to Sept 2007
	<i>By county, as cases</i>	<i>By county, as %</i>	<i>By county, as cases</i>
Avon	14 (<i>8</i>)	1.1 (<i>1.2</i>)	3,500
Cornwall & Scilly	61 (<i>35</i>)	4.6 (<i>5.1</i>)	10,772
Devon	80 (<i>38</i>)	6.1 (<i>5.5</i>)	15,379
Dorset	56 (<i>32</i>)	4.3 (<i>4.7</i>)	10,475
Gloucestershire	37 (<i>18</i>)	2.8 (<i>2.6</i>)	3,613
Somerset	84 (<i>51</i>)	6.4 (<i>7.4</i>)	13,980
Wiltshire	49 (<i>21</i>)	3.7 (<i>3.1</i>)	7,658
S. West Region	381 (<i>203</i>)	29.0 (<i>29.6</i>)	65,377
England	1314 (<i>685</i>)	100 (<i>100</i>)	154,383

Source: Defra web site

Indicator: Relative incidence of stress-related illness

There is no data on this indicator that is regularly collected at a regional scale. The University of Exeter's CRPR hope to publish data on farmer 'well-being' later in 2007/08.

Indicator: Suicide rate of farmers and farm workers

It is well known that farmers have one of the highest suicide rates of any occupational group and a number of factors including stress, isolation and loneliness and access to means of committing suicide (e.g. firearms) have been implicated. A study based on data from the 1980s and 1990s noted little geographical variation in suicide rates among farmers but did note a higher than average incidence in Devon¹⁵. Data from 1998-2000 (from ONS) suggested higher suicide rates in the SW than for England and Wales. However, more recent data from ONS (special request) indicate that from 2001-2006 the proportions of deaths in farmers and farm workers caused by suicide was no greater than for England and Wales, being higher in some years and lower in others, when compared with the England and Wales values.

¹⁵ See Hawton, K., Fagg, J., Simkin, S., Harriss, L., Malmberg, A., Smith, D. (1999) The geographical distribution of suicides by farmers in England and Wales. *Social Psychiatry and Psychiatric Epidemiology*, 34, 122-7.; and <http://cebmh.warne.ox.ac.uk/csr/resfarmers.html>

Table 4.5 Suicide rates of farmers and farm workers

Year	South West	England and Wales
1998 ¹	3.5	2.3
1999 ¹	3.6	2.2
2000 ¹	3.9	2.3
2001 ²	2.5	2.5
2002 ²	1.7	2.2
2003 ²	1.6	2.7
2004 ²	3.7	3.0
2005 ²	2.4	2.1
2006 ²	2.6	3.0

Source: Office of National Statistics, special requests (2001-2006 data supplied September 2007).

¹ 1998-2000 based on Standard Occupational Classification (SOC90) and therefore exclude part-time farmers with a different main occupation.

² From 2001 based on SOC2000 and include these categories: 1211 (farm managers), 5111 (farmers), 8223 (farm workers) and 9111 (agricultural drivers).

Chapter Five: Summary and Conclusions

In compiling this report we have focused on a narrower range of core indicators for monitoring the SFFS than were covered in the 2003 SFFS report compiled by Lobley and Barr. However, the sources reported on do provide an update on the 2003 study and indicate some important trends and key characteristics of farming in the region including:

- the relatively high share of agriculture in the region's total regional employment, which at 3% is twice the England average and greater than in any other England region;
- the continuing low level of TIFF per FTE compared with England as a whole;
- the low farm incomes being obtained from beef and sheep farming and the consequences for large areas of the region where this type of farming is the main farming type;
- a decline in the number of farms engaged in dairying, similar to the national trend;
- the high incidence, and in places worsening situation, of bovine TB hotspots;
- a range of attitudes among farmers to their futures, with evidence of positive expectations regarding business diversification and family succession;
- a relatively high proportion of income being derived from off-farm employment (or non-farming self-employment) by farmers/spouses when compared with other regions;
- evidence of an increasing proportion of farm produce, particularly in the dairy sector, being marketed through farmer-controlled businesses;
- a mixed situation on the impact of farming in the region on the environment.

The relationship between farming activity and the South West's environment is a particularly important issue given the importance of the region as a major food producing area and as one that derives significant income from tourism. Many of the qualities of the region are associated with landscapes that have in part been created and maintained by farming, and farming co-exists with some nationally important habitats.

There are a number of positive environmental and social attributes associated with farming in the region, including

- a good uptake of agri-environmental scheme agreements, although with the recent introduction of ELS/ HLS to replace the previous ESA/CSS schemes this situation will need to be reappraised as the new scheme becomes fully in place;
- relatively good situations in terms of river quality, with improvements in recent years in biological quality and maintenance of the relatively good position (compared with other English regions) on chemical quality of river waters;

- indications of progress in renewable energy including energy crops, although information on this indicator is limited;
- the decline in the numbers of livestock testing positive for BSE.

There are some causes for continuing environmental and social concern, including:

- Relatively high emissions of ammonia and nitrous oxide over parts of the region, particularly where intensive livestock farming occurs;
- An on-going situation in the decline of farmland birds generally, although there are some success stories with localised actions to manage land to encourage breeding success on some locally threatened bird species.
- A continuing greater-than-average incidence in reported cases of food-borne illness

There remain a number of gaps in the availability of good quality data particularly in relation to efficiency in the food chain as well as on some aspects of farm management practices that do not lead to robust quantitative data being produced.

There are a number of recent changes affecting the global economy that have potential to influence SFFS outcomes in the next few years at a UK and regional/ sub-regional scale. These include the impact of fossil fuel prices remaining at their historic high levels and increasing further; pressure on global food supplies, particularly meat and grain associated with population growth and urbanization combined with reduced yields in traditional food exporting regions being linked to climate change; growth in demands for non-food crops competing with land for food production. There are also growing environmental pressures and consumer awareness of concepts such as food miles and of regionally distinctive food products and the links of food quality to its production system, with opportunities for niche producers to develop added value to food products including meat and dairy produce. Climate change itself poses a number of issues in terms of resilience of farm businesses to erratic weather conditions and implications for the environment, e.g. of water quality during periods of low flow.

Appendices

Defra SFFS Indicators

In the relatively short period of time since the commissioning of this report by SWCORE and submission of the final report, Defra have published a new, revised set of SFFS indicators.

Overview of Framework of the Strategy and Headline indicators

Source: <http://statistics.Defra.gov.uk/esg/indicators/overview.htm>

Pillar one – economic sustainability

Outcome 1

A farming sector focussed on the market, successfully producing food and non-food crops in a more efficient way to help enhance the incomes of competitive farm businesses.

To enable farmers to enhance value added and to help sustain higher levels of income, resulting in enhanced self-reliance, greater international competitiveness, less dependence on subsidy and more focus on consumers' requirements.

Headline Indicator

Gross Value Added per person excluding support payments (compared with EU15 average and adjusted to remove exchange rate effects)

Core indicators:

- 1.01 Farm incomes
- 1.02 Value added activities
- 1.03 Collaboration
- 1.04 Commodity yields
- 1.05 Demonstration farms
- 1.06 Benchmarking
- 1.07 Farm assurance schemes
- 1.08 Organic farming
- 1.09 Skills and training
- 1.10 Financial risk
- 1.11 Farming's response to climate change
- 1.12 Cost to farming of regulations

Outcome 2

Greater competitiveness of the total food chain:

Resulting in greater efficiency of the food chain than would otherwise obtain, particularly through improved effectiveness of the supply chain linkages between farming and the rest of the chain.

Headline Indicator

Labour productivity of the food industry

Core indicators

- 2.01 Capital investment
- 2.02 Investment in research and development
- 2.03 Food chain centre website
- 2.04 Skills and training

Outcome 3

Reduced burden on taxpayers and the rest of the economy.

To produce a higher rate of growth of productivity of the national economy than would otherwise obtain, resulting from a lower negative impact of the CAP upon food prices and upon taxpayers and a lower risk of economic losses from animal disease outbreaks. This also links to Social (better public health) and Environmental (reduced environmental cost of the food chain) outcomes as these will lead to reduced costs of poor nutrition and lower costs to the economy from pollution from farming and the food chain.

Headline Indicator

Cost of production linked support

Core indicators

- 3.01 Costs of animal diseases
- 3.02 Value of direct CAP payments

Pillar two – environmental sustainability

Outcome 4

Reduced environmental cost of food chain

Reduced pollution from food and farming, reflecting the true costs and benefits to society and the environment.

Headline Indicators

River water quality – phosphate and nitrate levels;

Core indicators

- 4.01 Fertiliser use
- 4.02 River water quality
- 4.03 Pesticide use
- 4.04 Pollution incidents
- 4.05 Waste

- 4.06 Good agricultural and environmental condition
- 4.07 Energy use
- 4.08 Whole farm approach
- 4.09 Entry Level Stewardship
- 4.10 Food transport

Outcome 5

Better use of natural resources

Sustainable use of natural resources by the food and farming industries to reflect the true value to society, both today and in the future, of the capacity of the environment to support life, biodiversity and economic activity.

Headline Indicator

Organic matter content of agricultural topsoils

Core indicators

- 5.01 Soil quality
- 5.02 Water use for irrigation
- 5.03 Non-food crops

Pillar three – social sustainability

Outcome 6

Improved landscape and biodiversity:

Improved provision of “countryside public goods” (managed landscapes, habitats with their associated wildlife, and natural and man-made historic features) which reflect the full costs and benefits to society (today and in the future) of their provision and of public access to them.

Headline Indicators

Favourable condition of nationally important wildlife sites on farmland;
Farmland bird populations

Core indicators

- 6.01 Species & biodiversity
- 6.02 Habitats
- 6.03 Landscape value
- 6.04 Access to the countryside
- 6.05 Higher Level Stewardship
- 6.06 Genetic diversity
- 6.07 Invasive species

Outcome 7

Better public health, in particular through improved nutrition and workplace health and safety

Reduced levels of heart disease and other dietary related illness through the adoption by consumers of healthier diets; reduced levels of food-borne illnesses; and higher levels of safety and welfare at work in agriculture.

Headline Indicator

Fruit and vegetable consumption

Core indicators

- 7.01 Levels of obesity
- 7.02 Dietary health
- 7.03 Food-borne illness
- 7.04 Farmer suicide rates
- 7.05 Workplace safety

Outcome 8

Higher animal welfare:

Greater adoption of production systems which at least meet the statutory farm animal welfare codes, protecting animals from unnecessary suffering and promoting fitness and a sense of well-being.

Headline Indicator

To be developed in parallel with the Animal Health and Welfare

Core indicators

- 8.01 Farm health plans
- 8.02 Skills and training

Outcome 9

More cohesive and productive rural communities:

Improved economic performance and prosperity in rural areas, by reducing the gap in productivity between the less well performing quartile of rural areas and the English median. This outcome also includes an enhanced contribution to socially inclusive rural communities through improved accessibility of services for rural people.

Headline Indicator

Gap in productivity between the less well performing quartile of rural areas and the English median

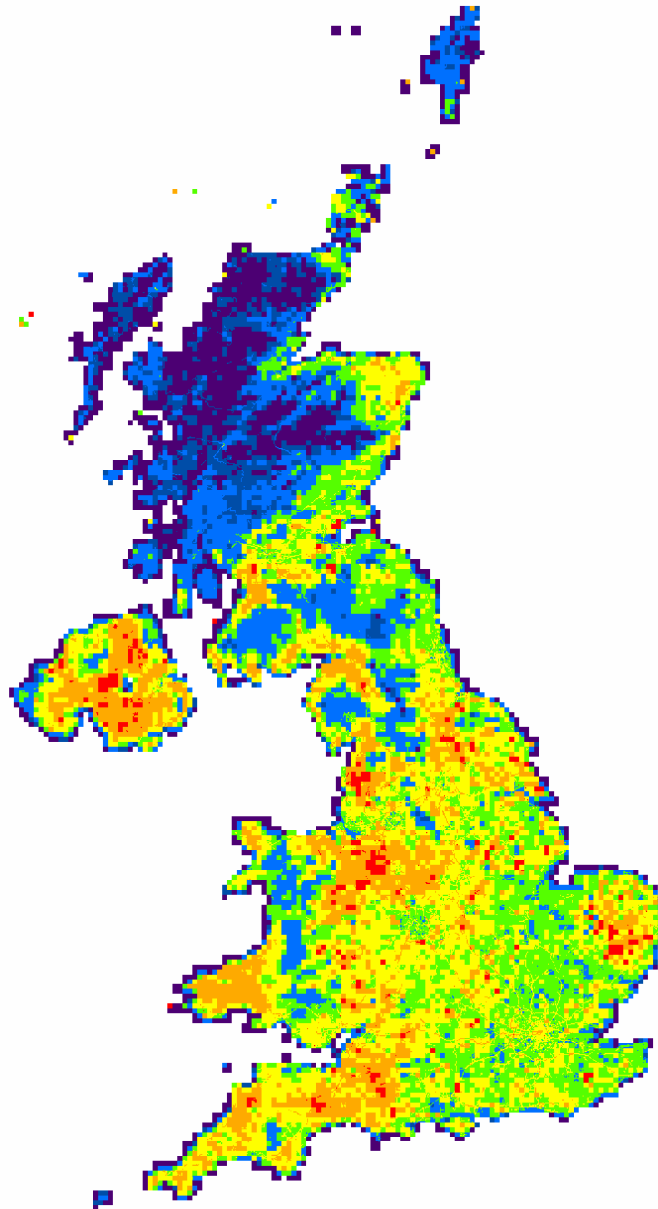
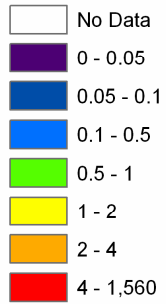
Core indicators

- 9.01 Rural economy
- 9.02 Access to services
- 9.03 Rural business
- 9.04 Labour

Ammonia emissions

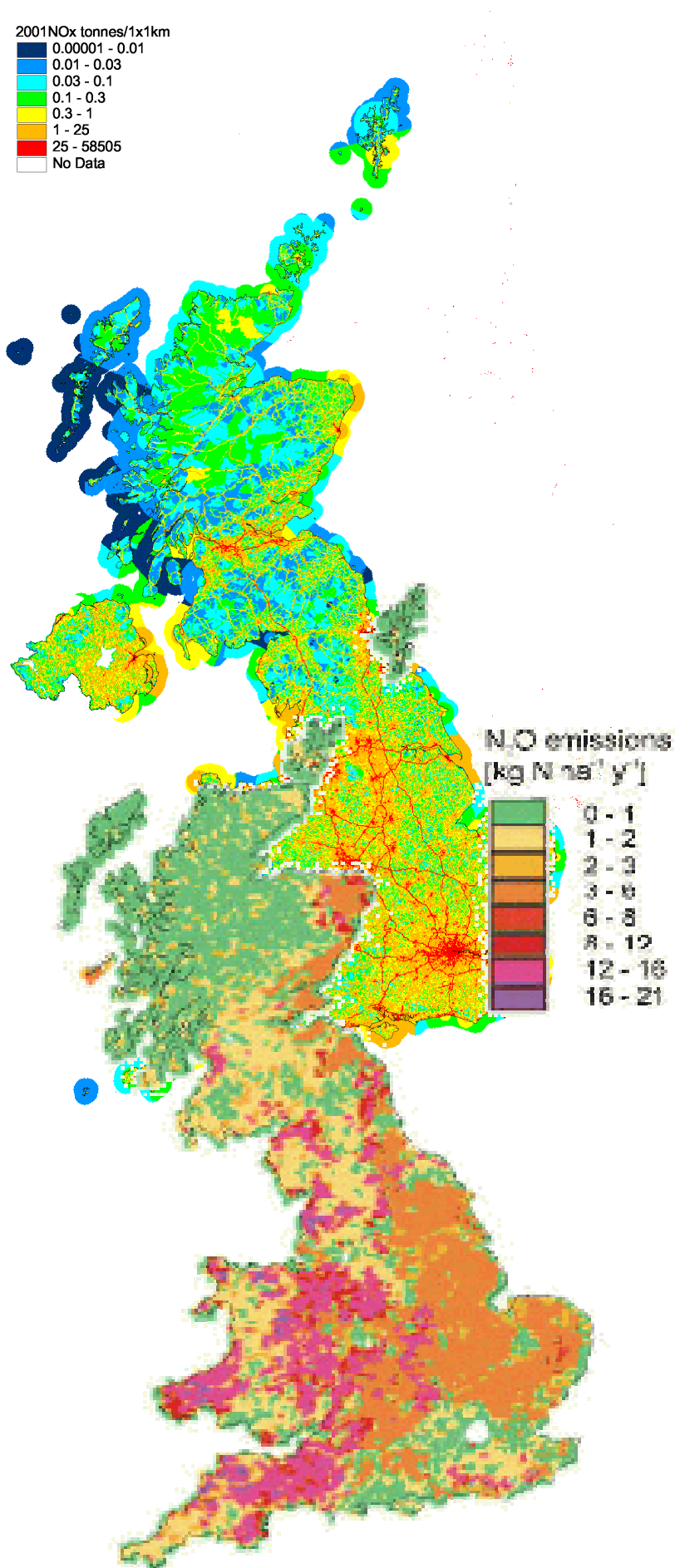
www.naei.org.uk/mapping/mapping_2003.php?f_poll=21 -

UK Emissions Map of Ammonia 2003 kg/1x1km



Nitrous oxide emissions (all sources)

http://www.naei.org.uk/mapping/mapping_2001.php



Methane emissions (all sources)

Source: http://www.apis.ac.uk/overview/pollutants/overview_CH4.htm

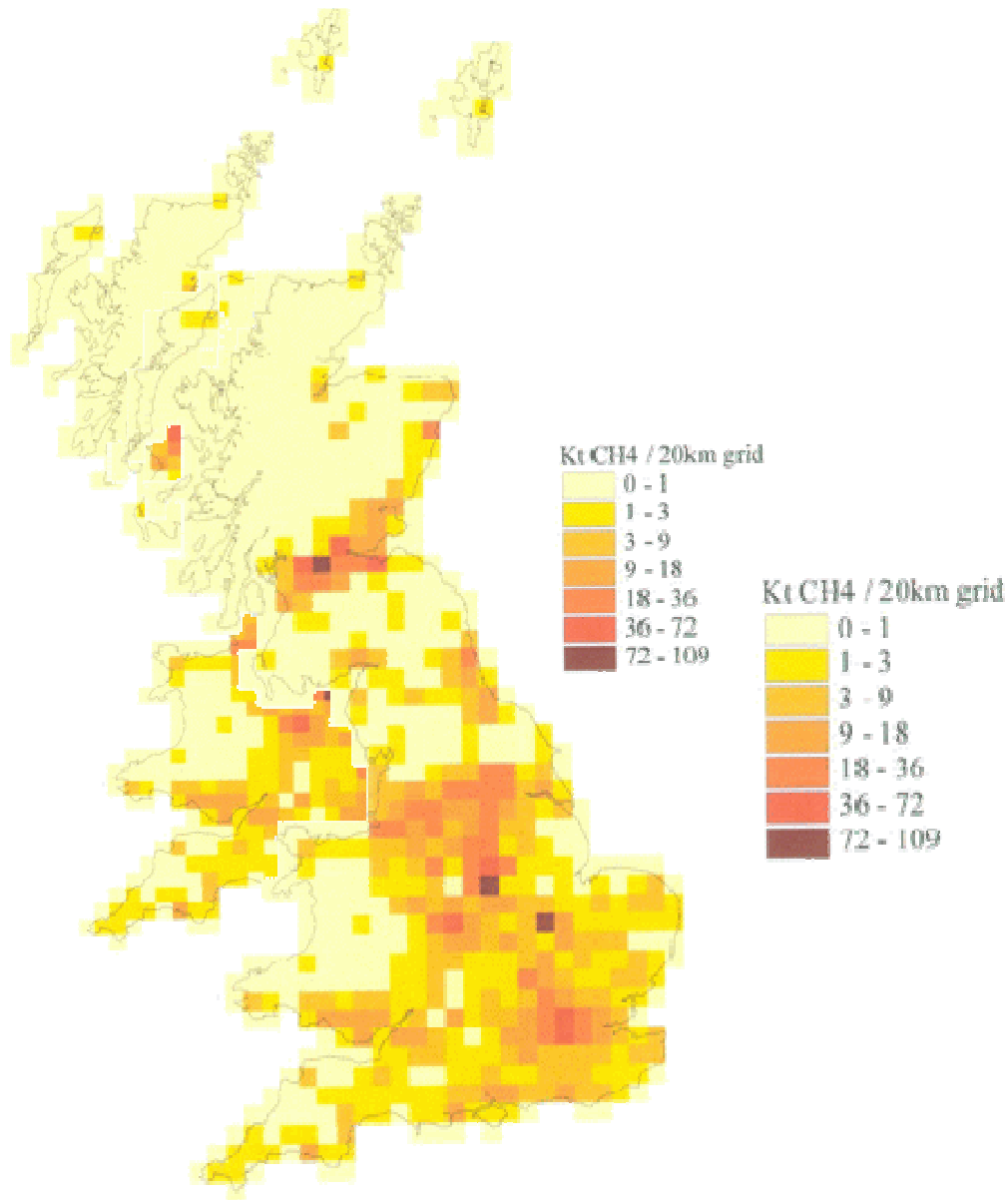


Table A1 CO₂ emissions by government region for agriculture sector (including electricity use) and derived carbon consumption equivalent as a measure of energy use direct

NUTS4 Area and Government Office Region	CO ₂ emissions (kt) *	C Equivalent (kt) **
TOTAL WALES (2)	507	190
TOTAL SCOTLAND (2)	745	279
TOTAL NORTH EAST	143	54
TOTAL NORTH WEST	326	122
TOTAL YORKSHIRE & HUMBER	238	89
TOTAL EAST MIDLANDS	258	97
TOTAL WEST MIDLANDS	303	114
TOTAL EAST OF ENGLAND	212	80
TOTAL GREATER LONDON	9	3
TOTAL SOUTH EAST	335	126
TOTAL SOUTH WEST	653	245
TOTAL N IRELAND	460	173
UK TOTAL	4186	1570

Source: Defra data supplied by RDA

** based on 1 t CO₂ being the chemical equivalent to 0.375 t of carbon consumed. In practice this would be an underestimate as this ratio assumes complete combustion and no carbon particulates or other hydrocarbon by-products. Actual C consumption values in this column are likely to be approximately 10% below the values given.

Table A.2 Trends in net farm income in the United Kingdom, by type of farm: Average net farm income per farm (£/farm)

	1999/00	2000/01 (a)	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07 (provisional)
<i>At current prices</i>								
Dairy	9,500	12,400	28,200	14,200	21,100	23,700	24,500	19,700
Cattle and sheep (LFA)	2,000	3,800	5,800	13,000	14,300	13,000	9,300	9,300
Cattle and sheep (lowland)	600	-100	1,300	6,700	7,100	5,300	4,100	7,700
Cereals	13,100	6,800	5,000	11,000	33,500	13,600	12,700	27,900
General cropping	7,800	18,800	14,200	11,700	50,800	26,400	22,500	49,300
Specialist pigs	-10,900	37,600	20,000	23,500	32,100	25,100	29,000	24,500
Specialist poultry	5,000	26,300	22,100	83,500	49,000	89,700	97,500	77,200
Mixed	5,700	8,800	5,300	10,400	2,600	14,800	15,600	20,800
All types (including horticulture)	6,600	8,700	13,000	13,700	23,900	17,900	17,100	21,300
<i>In real terms (at 2005/06 prices)</i>								
Dairy	10,800	13,900	31,300	15,500	22,300	24,300	24,500	19,100
Cattle and sheep (LFA)	2,300	4,300	6,400	14,200	15,100	13,400	9,300	9,000
Cattle and sheep (lowland)	700	-200	1,400	7,300	7,500	5,400	4,100	7,500
Cereals	14,900	7,700	5,500	12,000	35,500	14,000	12,700	27,000
General cropping	8,900	21,000	15,800	12,700	53,800	27,100	22,500	47,700
Specialist pigs	-12,500	42,000	22,200	25,600	34,000	25,800	29,000	23,700
Specialist poultry	5,700	29,400	24,500	90,900	52,800	92,100	97,500	74,700
Mixed	6,500	9,800	5,900	11,300	23,900	15,200	15,600	20,100
All types (including horticulture)	7,500	9,700	14,400	14,900	25,300	18,400	17,100	20,600

(a) Excluding farms subjected to compulsory foot and mouth disease cull.

Source: *Agriculture in the United Kingdom, 2006* (and previous years), DEFRA.



Centre for Rural Policy Research
Department of Politics
Amory Building
Rennes Drive
Exeter EX4 4RJ

Telephone: +44(0)1392 263836

www.exeter.ac.uk/crpr