AGRICULTURAL CHANGE & ENVIRONMENT OBSERVATORY PROGRAMME
YEAR 2 RESEARCH

ENVIRONMENTAL IMPACTS OF CAP REFORM – ASSESSMENT OF IMPLICATIONS OF FARM LEVEL CHANGE FOR ENVIRONMENTAL OUTCOMES

Final report December 2007

Report prepared for the Defra Agricultural Change and Environment Observatory programme by the Countryside and Community Research Institute and the Central Science Laboratory

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EXECUTIVE SUMMARY

Introduction
In May 2007 the Countryside and Community Research Institute (CCRI) and the Central Science Laboratory (CSL) were commissioned by the Defra Agricultural Change and Environment Observatory (the Observatory) to undertake a research project to investigate, at farm level, the potential environmental impacts of Common Agricultural Policy (CAP) reform and other drivers of agricultural change. This project forms part of an integrated three-year programme of research, which has been designed by the Observatory to monitor and predict the environmental impacts of agricultural change.

Project aims and objectives
The overall aim of the project was to provide an updated and enhanced assessment of the potential impacts on the environment resulting from CAP reform and other drivers of agricultural change by investigating current and predicted trends at farm level. More specifically, the project aimed to contribute to the work of the Observatory programme by building on the studies carried out in the first year.

The specific objectives of the project identified by the research brief were to:

- Assess the current picture in terms of the implementation of CAP reform, at farm level, in England;
- Building on previous research, continue to review existing literature on the environmental impacts of CAP reform (where possible, at farm level), provide up-to-date assessment of implications for the environment, identifying the trends and impacts both in the short term and longer term of the 2003 CAP reforms;
- Highlight specifically any recent or emerging data on the farming sector which has the potential to have significant implications for the environment;
- Provide an overall up to date assessment of the implications for a wide range of Defra’s environmental priorities, highlighting where the conclusions may differ from previous analysis and issues for further investigation.

Approach and methods
This project builds upon the OBS02 project carried out during the first year of the Observatory programme and has adopted the same approach. The approach uses an iterative process involving repeated comparison, synthesis and critical evaluation of data from six key sources: formal literature; informal literature; surveys; on-going research; internal Observatory research and interviews with key subject area specialists and practitioners.

Update on the implementation of CAP reform and the other drivers of change
Since the last report there have been changes in CAP policy, World Trade Organisation (WTO) policy, European Union (EU) mandates, regulations, markets, prices (product and input) as well as the occurrence of livestock disease.
CAP reform

Single Payment Scheme (SPS): Since the analysis for OBS02 in 2006 the move to a flat-rate payment, which is being implemented over an 8-year transition period ending in 2012, has advanced. Survey research suggests that the initial hesitancy in farm planning following the introduction of the SPS is starting to lift. However, a majority of farmers are using their SP to cross-subsidise farming enterprises. Farmer response to the implementation of the SPS is being strongly influenced by market conditions. The recent increase in cereal prices has lessened the pressure for business adjustment in the cereal sector in the short to medium term. In contrast, the pressure for business restructuring remained across the livestock rearing and breeding sectors in both the uplands and lowlands.

Modulation: Modulation rates have changed since the analysis for OBS02. In 2005 EU modulation was 3%, this rose to 4% in 2006 and 5% in 2007 and thereafter. The rate of voluntary modulation has also increased. In England, it is 12% for 2007, rising to 13% for 2008, and 14% for the years 2009-2012. It is estimated that total modulation deductions for English farmers will amount to £35/hectare in 2007 rising to £39/hectare in 2009.

Cross compliance changes: Cross compliance was phased in between 2005 and 2007 with Statutory Management Requirements (SMRs) 16, 17 and 18 on animal welfare introduced in 2007. A further change since 2005/6 has been that, in the new RDPE, Good Farming Practice requirements will be replaced by the same set of cross compliance requirements that currently apply to the SPS. There is concern that undergrazing is not currently included in the requirements of cross compliance and that there is a risk that undergrazing will occur as result of these changes.

Set-aside: In 2006 and 2007 in lowland England, the compulsory set-aside rate remained unchanged from 2005 at 8%. For 2008 the set-aside rate will be 0% which means that farmers are not required to manage any land as set-aside. It is anticipated that the EU Agriculture Commissioner will propose the ending of set-aside after 2009, as part of the 2008 CAP health check.

Sugar policy: A radical modification of the sugar policy was implemented from July 2006 to allow the EU to respect its WTO commitments and improve market access for developing countries. EU production is expected to fall by about 25% and EU exports will fall dramatically. A sharp reduction in the sugar price has occurred to prevent the EU being swamped with imports and a similar cut has been seen in the beet price paid to producers. This has meant that British producers have faced a significant reduction in price. As a response to reduced production, British Sugar has closed factories in Shropshire and Yorkshire. These closures have had the effect of releasing quotas and concentrating sugar beet production in the arable heartlands of the East of England.

Energy crop scheme: The EU Energy Aid Payment Scheme started in 2004 and enables aid to be claimed on a wide range of crops (cereals, oilseeds and biomass crops) grown for the production of energy for heat, electricity and transport fuels on land not in set-aside. The low level of payment available suggests that few farmers will be attracted to specifically grow bioenergy crops by this scheme, particularly given the alternative option of selling onto more profitable cereal and oilseed food and feed markets under current conditions.

Fruit, vegetables and potatoes: EU agriculture ministers have agreed that growers in England will no longer need fruit, vegetable and potato (FVP) authorisations when claiming payments under the single payment scheme. Defra has announced that FVP authorisations will be abolished from 2008. This means that growers will no longer have the administrative burden they previously experienced which presents
new opportunities for some present horticultural growers to expand and for all farmers to consider growing horticultural crops or to rent their land out to horticultural growers.

**Hill Farm Allowance (HFA):** The existing HFA scheme is likely to continue until 2009. HFA payments will be focused on producers in Severely Disadvantaged Areas (SDAs) only from 2008. Support for upland farmers will be incorporated into ELS in the form of a “specific uplands strand”, which will be in place no later than 2010. This Uplands ELS (ULES) will reward farmers for maintaining the upland landscape and environment and in particular encourage farmers to address the problems of both over-grazing and under-grazing in the hills.

**Agri-environment schemes (AES):** The budget for AES has increased since 2005/6 and £3.3 billion of modulation funds will go into Axis 2 of the RDPE towards agri-environment and other land management schemes. Nearly £3 billion of this will go towards Environmental Stewardship (ES) between 2007-13, compared with £1 billion on green farming schemes between 2000-06. By early September 2007 ELS agreements covered 58% of England’s farmland. Defra wants to increase this coverage to 70%, but higher wheat prices may discourage farmers from committing land to agreements which might compromise the possibility of achieving high yields.

**Other policy influences**

**Nitrate Vulnerable Zones regulations:** As part of the NVZ Action Programme the whole farm organic manure nitrogen loading limit in relation to non grass crops was lowered from 210kg per hectare to 170kg per hectare in December 2006. This is likely to have most impact on arable farmers. In August 2007 Defra began consultation on the revision of the Nitrate Vulnerable Zone (NVZ) regulations with a view to implementation from Spring 2008. It is anticipated that the livestock sector will have to bear the substantial costs of increased slurry storage requirements. The proposals will also increase costs for arable farmers due to restrictions on slurry and manure application and the regulation of cover crops.

**The EU Water Framework Directive (WFD):** Implementation of the WFD is ongoing, but the directive becomes ‘active’ in 2012. The main approach with respect to farming is to use existing Catchment Sensitive Farming (CSF), cross compliance and Environmental Stewardship schemes. The impact on farmers will not be clear until the ecological status for each water body is decided and the necessary programme of measures has been decided (before 2009).

**Draft Pesticides Directive:** The draft Pesticides Directive form part of the Environment Committee’s response to the European Commission’s planned new Sustainable Use Directive of the Thematic Strategy on Pesticides. This new Directive aims to establish a framework to promote ‘best practice’ in the storage, use and disposal of pesticides, their waste products and packaging. The sustainable use proposal includes new obligations in relation to the training of pesticide users.

**Biofuel targets:** The European Union has set a target of 10% of all transport fuel to be derived from biofuels by 2020. In the UK, the Renewable Transport Fuel Obligation (RTFO) sets a requirement for road transport fuel suppliers in the UK to ensure that by 2010, 5% by volume of all road vehicle fuel is supplied from sustainable sources. It is predicted that biofuel demand and production will increase in response to these mandates.

**Trade Policy Instruments and WTO:** The WTO is seeking to achieve liberalisation of agricultural trade through the multi-lateral negotiations initiated under the Doha Development Round (DDR). The objective of the negotiations is to seek the elimination of export subsidies and significant reductions in import tariffs and trade
distorting domestic support policies. In the long run the process of trade liberalisation, particularly through the WTO, and the process of CAP reform, will probably increase the UK’s exposure to the world market.

**Markets and prices**

*General producer prices:* The average producer price of agricultural products in the UK rose by 4.4% in 2006.

*Arable:* In 2006 the average price for cereals rose by 12%. Global shortages have resulted in a dramatic rise in cereal prices in 2007 with feed wheat and barely prices increasing by over 100% between September 06 and 07. This represents a dramatic change to 2005/06 when low wheat prices were predicted to lead to more fallowing, set-aside on marginal land and a look to alternative cropping. Now the incentive is for farmers to expand their wheat planting area. It is anticipated that high prices will be sustained for at least the next 2-3 years given the healthy forward contract prices being offered for 2009.

*Livestock:* In 2006 the average price for livestock and livestock products rose by 1.1%. In 2006 dairy farmers continued to suffer from erosion of the milk price and escalating costs leading to pressure on profits. The market situation for dairy farmers improved during 2007 due to a strong demand from European and World markets, reduced output and low stocks. It is predicted that these prices will be sustained until 2008/09. Market conditions for beef farmers improved during 2006 and the first half of 2007, helped by the lifting of the ban on older cattle in the food chain at the end of 2005 and the relaxation of EU restrictions on UK beef exports. However, markets have been affected by the recurrence of FMD which resulted in a fall back in prices. Markets for sheep farmers followed the general seasonal trend in 2006. In 2007 the seasonal peak for lambs was depressed due to market competition from New Zealand. The outbreak of FMD and subsequent export ban has resulted in a further fall in the price for lamb. In October 2007 finished lamb prices at auction fell to their lowest point since October 2000.

*Input prices:* In 2006 the average price of agricultural inputs rose by 3.5%. Since 2002 there has been a significant increase in the cost of energy and lubricants, along with fertilisers and soil improvers. In the long term, the increase in the price of fertilizers and energy is set to continue. High cereal prices are feeding through to increase the cost of animal feed. This will affect livestock farmers in all sectors.

*Profitability:* In 2006 Total Income from Farming rose by 7% in real terms overall, with the greatest improvement in profitability in the arable sector, on the back of significant grain price rises. In real terms, farm incomes for cereals and general cropping farm types are expected to have doubled in 2006/07, while incomes for dairy and specialist poultry farms are expected to have fallen by about 20%. For the livestock sector, profitability in the future will be determined by costs of production, ensuring competitiveness, environmental regulations and health of stock.

*Animal disease:* Since the last report, outbreaks of avian influenza in Norfolk in 2006, of FMD disease in Surrey 2007 and BTD in Suffolk 2007 have shaken the industry. These have had consequences for the specific sectors affected by the diseases in terms of lost sales due to poor consumer confidence and market access.
Current and potential changes to farm sectors and farm practice

The assessment of current and potential changes to farm sectors and farm practice is organised around the main farming sectors of arable, dairy, lowland and upland livestock.

Arable

The OBS02 report anticipated that, as the reduction in SP began to encourage change, in the more productive areas there would be a move to large-scale block cropping of wheat and rape and the introduction of simplified rotations in which fallows play a significant role replacing second wheats, barley and other cereals. In less productive arable areas it was anticipated that significant areas of cropland would be diverted into other uses, including persistent fallow, renewable energy crops, and grassland associated with non-agricultural use and perhaps more extensive beef and sheep enterprises. However, the recent rise in commodity prices and the announcement that the set-aside rate will be at 0% for the 2008 season has seen a dramatic change in prospect for the arable sector over the short term at least. The influence of decoupling on farm businesses has been reduced by the increase in prices.

The current market price upswing has triggered a significant shift in farmer attitude and confidence in arable farming and has reversed the declining trend in the area of wheat grown. The area of fallow has also declined continuously from 2005 to 2007. It is considered that the area of wheat grown may increase significantly in the 2007/08 season in response to high prices. A significant increase of area of OSR between 2006 and 2007 suggests that farmers are responding to the increased demand for biofuels. However, input costs, especially energy and fertilisers, continue to rise. Therefore, despite grain price increases, farmers will continue to seek ways to cut costs.

An expansion of sugar beet planting in the east of the country has occurred as farmers have bought cheap quota from farmers in Central England who have lost their processing capacity. However, long terms predictions of a decline in the area of sugar still hold.

Whilst the change in requirements for FVP for horticultural use may lead some horticultural businesses to expand their area through renting land, it is unlikely to attract cereal or beet growers into horticulture since this is a highly specialised and competitive business.

The OBS02 report anticipated that there would be some opportunities for beef and sheep enterprises to expand into lowland areas, in response to falling arable margins and cheap feed prices. However, such changes in land use are unlikely to take place as long as crop prices remain high.

Dairy

The evidence collected in the period since the OBS02 report largely supports its assessment of the dairy sector. Of the main farm sectors, dairying continued to undergo the most radical restructuring during 2006. Improved product prices during 2007 will not negate the pressures for restructuring and increasing input costs and costs associated with NVZ regulations and the WFD will continue to squeeze profits.

There is a continuing decline in dairy cow numbers. Between 2005-2006 the dairy herd fell by 1.6% and results for 2007 data point to a further 1.8% decline. Looking at
the regions the greatest percentage decline in dairy cow numbers between 2005 and 2006 occurred in Eastern England and the South East.

It is anticipated that there will be a continued expansion of production on farms remaining in the industry, involving measures to increase yields as well as increasing herd size and farm area. There is likely to be a geographical concentration in the South West and North West regions due to slower declines in these regions. Very little production will remain in the uplands (LFAs) unless supported by niche market processing. It is also predicted that land coming out of dairying will be used less intensively, with beef finishing being a popular alternative enterprise. Some farmers may decide against using their land for other livestock enterprises, due to low profitability, and manage it in accordance with GAEC 12 rules.

**Beef and sheep**

The evidence collected for the beef and sheep sectors to a large degree corroborates the findings of the OBS02 report. Since the production of that report, a number of the trends have deepened and there is more evidence on the ground of the nature and extent of the changes taking place. The changes in product prices in these sectors have been much smaller than the changes in the arable sector in the period since 2006 and costs have continued to rise. Thus the 2003 CAP reforms continue to be seen as a driver and magnifier of change, with the direction of change often pre-dating the impact of the reforms. In addition, the recent re-emergence of FMD and the outbreak of BTD could further shake confidence in the industry. Many beef and sheep enterprises were considered to be heavily dependent on cross-subsidisation from the SP. It was thought that the economic situation for all types of livestock producers would deteriorate in the medium term due to increasing costs and depressed product prices.

The OBS02 report identified a trend towards the extensification of beef production, with intensive beef finishing becoming increasingly unviable with the transition towards an area based SP. This trend is likely to be magnified and speeded up by the rise in feed prices. The OBS02 report also anticipated opportunities for the expansion of beef production in marginal arable areas as the move to an area-based SP makes cropping less viable. The resurgence of arable prices means that little evidence for this was found.

The national beef herd continues to decline. Between 2005 and 2006 the herd declined by 1.7% and results for 2007 show a further fall of 1.3%. In 2006, there was a further decline in numbers of heifers in calf and replacements which, although not as great as 2005, suggests a further reduction in beef numbers in 2007.

The OBS02 report anticipated that there would be a change in management strategies for common land and rough grazing involving the extensification of sheep production. This view is supported by the evidence collected which suggested that significant extensification was taking place and that it was likely to accelerate in response to rising input costs and low levels of profitability. The low profitability of hill sheep production, particularly on White Fell in the North West and Yorkshire and Humber regions, continues to threaten the continuation of traditional flock management practices. It was reported that in the North York Moors there are clear signs of super-extensification (i.e. virtual abandonment) on the least productive land. It was also reported that there were few signs of sheep farmers converting to organic production. Distance from markets and the ending of the derogation on organic feedstuffs were cited as contributing factors.

The extensification of sheep flocks as farms re-structure following the introduction of the SPS has continued. At an aggregate national level the total breeding flock fell by
1.3% between 2005 and 2006. Results for 2007 show that the breeding flock has declined by a further 3.4%. Since 2005 this decline has occurred mainly on LFA farms, although there is evidence of an increasing decline in numbers on lowland farms.

**Impacts of Agri-environment scheme changes**

The Agri-environment schemes are becoming an increasingly important mechanism for environmental protection and enhancement. As the full effects of the SPS are felt, farmers will be exposed to increasingly volatile markets. A potential impact of this would be that land management practices could be subject to rapid change. Entry into Agri-environmental schemes may be a potentially stabilising influence.

**Updating the environmental implications**

A large part of the evidence collected for this report supports the assessment made by OBS02 concerning the current and potential impacts of farm change on the environment. It was clear from the evidence collected that the long-term assessment of the likely environmental impacts of CAP reform remains essentially the same. However, a series of unanticipated market events has occurred since OBS02 which have had a significant impact upon farmers and their management decisions.

**Revised arable sector impacts**

*Cropping:* It is likely that there will be a significant increase in crop area, due to the return to cropping of land formerly in set-aside. This means the expected benefits for soil, water and air associated with increased fallow land will not arise. On previous set-aside/fallow land a return to cropping will increase soil erosion, nitrate leaching and the production of nitrous oxide. An increase in agro-chemical applications will increase potential sources of pollutants. The biodiversity benefits of set-aside will be reduced, possibly leading to a further decline in the Farmland Bird Index, and increased cultivation may threaten some forms of buried archaeology.

*Biofuels:* The increase in the cultivation of energy crops in the EU is predicted to boost fertiliser use. However, this contradicts studies that suggested that there would be little difference in the environmental impact of growing wheat and oilseed rape crops for biofuel instead of food, as there would be little difference in agronomic management. An increase in the recognition and use of carbon accredited biofuel feedstocks could influence crop management practices, encouraging a reduction in tillage cultivation and nitrogen use. Encouraging reductions in the intensity of soil cultivation should contribute to reducing nitrate leaching and the risk of soil erosion.

*Sugar beet inputs:* The mixed environmental implications of the anticipated reduction in area of sugar beet were discussed in OBS02 (beet tops are used by pink footed geese and by Skylarks and stone curlews when the land is sown, however the risk of soil damage is higher than under cereals). These are still anticipated although they will be delayed due to the short-term increase in beet planting reported for 2007/08.

*Livestock in arable areas:* It is unlikely that there will be significant growth of intensive or extensive livestock enterprises in arable areas. This will lessen the threat of localised soil compaction and poaching leading to soil erosion and nutrient loss. There will also be none of the environmental problems associated with the management of animal waste. However, there will also be none of the potential benefits for terrestrial biodiversity arising from greater habitat diversity and increased food resources associated with livestock and their waste products. This is of particular concern in those parts of Eastern England that have been planning
targeted arable reversion to re-create grazed marshes and other important semi-natural grazed habitats and landscapes.

**Revised livestock sector impacts**

*Replacement of beef by sheep:* The replacement of beef cattle with sheep is unlikely to be a significant trend over the medium-term and therefore the threat to biodiversity from a reduction in habitat quality is unlikely to materialise.

*Extensification on rough pasture:* In some upland areas there is potential for the abandonment of agricultural management on the high fell, moorland and/or commons. The environmental impacts would depend on the characteristics of the area concerned and the current grazing intensity. The complete withdrawal of grazing animals would eventually result in large-scale scrub formation, which could have a negative impact on habitat value for open moorland species if the habitat were not maintained by other methods such as controlled burning. However, some reduction in grazing pressure on currently heavily grazed sites is likely to be beneficial for many species, and limited scrub formation on such sites could have benefits for some species such as black grouse. Scrub growth will also result in a loss of visible archaeology and damage to buried archaeology through root penetration, where these occur. Uncontrolled scrub growth will also increase the risk of wild fires and these will pose a threat to both visible and buried archaeology.

**Implications for Defra’s environmental priorities**

The table provides an updated assessment of the implications of the 2003 CAP reforms for Defra’s environmental priorities.

<table>
<thead>
<tr>
<th>Defra environmental priority</th>
<th>Impact</th>
<th>Predicted changes as a result of CAP reform OBS02</th>
<th>Updated assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>Compaction</td>
<td>Increase due to larger more intensive dairy farms, variable pattern in arable areas - some increase with block cropping, some decrease due to more fallow/less risky crop types</td>
<td>A reduction in set-aside/fallow now likely in the medium term (3-5 years), which could increase soil damage. Some decrease in compaction where previous dairy land is put to less intensive alternative uses. Localised increase in compaction due to expansion of sheep crossbreeding and fattening</td>
</tr>
<tr>
<td>Erosion</td>
<td></td>
<td>Increase due to more maize in dairy areas, decreases from more fallow, lower stocking in hills and cross compliance effects from GAEC soil plans</td>
<td>Decrease in set-aside/fallow now likely in the medium term – implies more erosion risk in arable areas</td>
</tr>
<tr>
<td>Soil organic matter</td>
<td></td>
<td>Highly variable according to location and farm type</td>
<td>No change</td>
</tr>
<tr>
<td>Microbiology</td>
<td></td>
<td>Damage from more horse keeping, more concentrated large dairy farms, benefits from shifts out of beef into sheep in some areas</td>
<td>Shift out of beef into sheep less likely in the short term so benefits reduced</td>
</tr>
<tr>
<td>pH</td>
<td></td>
<td>Benefits from more extensive practices in many areas, but this also suggests reduced liming. Where stocking intensifies on upland in-byre, expect more liming here, too. Anticipate more acid grassland/vegetation on open moors</td>
<td>No change</td>
</tr>
<tr>
<td>Heavy Metals</td>
<td></td>
<td>Could see more of both of these - not a direct result of CAP reform, though: more driven by other factors</td>
<td>No change</td>
</tr>
<tr>
<td>Priority</td>
<td>Impact</td>
<td>Predicted changes</td>
<td>Updated assessment</td>
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<tr>
<td>Water</td>
<td>Nitrate pollution</td>
<td>Increased problems where cattle systems intensify, decreased where systems shift from dairy to extensive beef and sheep. Some benefits where more land is fallowed if winter cover exists, some potential benefits from more organic farming, horse keeping and crops grown for biofuels or niche markets</td>
<td>Decrease in set-aside/fallow now likely in the medium term. Decreased benefits for water quality in arable areas. Possibly reduced organic interest and reduced benefits. No benefits from more biofuels</td>
</tr>
<tr>
<td>Phosphate pollution</td>
<td>Similar pattern to that described for soil erosion. Also, any increase in outdoor pigs likely to have negative impacts</td>
<td>Decrease in set-aside/fallow now likely in the medium term. Decreased benefits in arable areas</td>
<td></td>
</tr>
<tr>
<td>Pesticide pollution</td>
<td>Arable areas likely to see some changes - balance of cost/benefit depends upon precise patterns of crop change. Less spring barley more wheat bad for fungicides, more peas bad, more fallow good but more glyphosate may be used as fallow management, which could then become a greater problem. Dairy to beef shifts and upland extensification generally good, but more sheep in some areas could increase sheep dip problems/issues</td>
<td>High prices mean wheat area likely to be maximised within rotational constraints; oilseed rape also likely to increase. Pesticide use likely to increase as crops replace set-aside.</td>
<td></td>
</tr>
<tr>
<td>Water levels</td>
<td>FVP prevents significant vegetable increases, so CAP unlikely to have direct effect in this way. Minor and highly variable impacts likely.</td>
<td>Localised expansion of vegetable production as FVPs removed. Potential increase in demand for irrigation water with negative impacts on environment</td>
<td></td>
</tr>
<tr>
<td>Organisms, fish and amphibians</td>
<td>Similar to comments on nitrogen and phosphorous</td>
<td>Decrease in set-aside/fallow now likely in the medium term. Decreased benefits</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>Ammonia</td>
<td>Fewer housed cattle/reduced stock numbers in many areas should bring benefits. Localised increased problems where intensive dairy and intensive beef develop/concentrate</td>
<td>Increase in intensive beef production less likely in the medium term. Fewer detrimental impacts</td>
</tr>
<tr>
<td>Nitrous oxide</td>
<td>Less money and incentive to maintain drainage, possible decrease in fertiliser use</td>
<td>Further price-driven reduction in fertiliser use in the medium term. Potential benefits.</td>
<td></td>
</tr>
<tr>
<td>Methane</td>
<td>Lower stock numbers should be beneficial</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td>Particulates</td>
<td>Decreased wind erosion likely due to less cropping and GAEC soil plans, possibly benefits from reduced machinery use to save costs.</td>
<td>More cropping now likely to take place in the medium term. Reduced benefits</td>
<td></td>
</tr>
<tr>
<td>Pesticides</td>
<td>See above. Potential increase in vineyards could cause localised increases (but minimal areas involved)</td>
<td>More cropping now likely to take place in the medium term. Reduced benefits</td>
<td></td>
</tr>
<tr>
<td>Biodiversity</td>
<td>Invertebrates</td>
<td>Increase in arable monocultures favouring increase in certain species, but reducing diversity. Less spring barley more wheat will increase use of fungicides impacting on some invertebrates. More precise targeting of pesticides will be beneficial. Increase in set-aside on marginal arable areas will provide ground cover and habitats for invertebrates. Conversion of cereals to energy crops on less productive arable land.</td>
<td>Increase in set-aside and conversion of cereals to energy crops unlikely to take place in the medium term. Reduction of set-aside could reduce habitat value for invertebrates and birds. High uptake of marginal options in ELS may partially compensate for the loss of set-aside.</td>
</tr>
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X
<table>
<thead>
<tr>
<th>Priority</th>
<th>Impact</th>
<th>Predicted changes</th>
<th>Updated assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invertebrates</td>
<td>Dispersal</td>
<td>Increased for some species where arable block cropping. Benefits from increased set-aside on marginal areas.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Negative implications for dispersal. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td></td>
<td>Survival</td>
<td>More targeting of pesticides and increase in minimum tillage to reduce costs will provide benefits. Reduction in water quality from dairy intensification will reduce survival. Increase in set-aside on marginal land will provide benefits.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. May affect availability of floral resources for bees, butterflies etc. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td>Birds</td>
<td>Survival</td>
<td>More targeting of pesticides will benefit invertebrate food source (see above). Increase in minimum tillage will improve crop residue and weed seed availability thus improving food supply. Increase in set-aside on marginal land benefits birds by providing nesting and feeding ground.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. May reduce over winter survival of some species. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td></td>
<td>Abundance</td>
<td>Increase in arable monocultures and block cropping will decrease abundance of particular birds.</td>
<td>Loss of set-aside likely to reduce populations of some species. High uptake of marginal options in ELS may partially compensate for the loss of set-aside.</td>
</tr>
<tr>
<td></td>
<td>Food sources</td>
<td>More targeting of pesticides will benefit invertebrate food source (see above). Increase in minimum tillage will improve crop residue and weed seed availability thus improving food supply, although less spring barley more wheat will reduce winter stubble availability and food availability. Increased arable monoculture will reduce diversity of food sources. Some benefits from more set-aside on marginal land, some potential benefits from more organic farming and horse keeping.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Loss of set-aside could affect bird populations through reduced food availability. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td></td>
<td>Shelter</td>
<td>Some benefits where more land is fallowed if winter cover exists. Increase in minimum tillage will improve cover for nesting. Livestock extensification will reduce trampling and improve cover for ground nesting birds</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td></td>
<td>Breeding</td>
<td>Increase in minimum tillage will improve cover for ground nesting birds. Less spring barley more wheat will reduce winter stubble cover</td>
<td>Loss of set-aside likely to reduce breeding densities of skylark and may reduce breeding success of other species. High uptake of marginal options in ELS may partially compensate for the loss of set-aside.</td>
</tr>
<tr>
<td>Priority</td>
<td>Impact</td>
<td>Predicted changes</td>
<td>Updated assessment</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mammals</td>
<td>Abundance</td>
<td>Variable pattern in arable areas - decrease due to arable monocultures, but increase due to more set-aside and fallow on marginal land. Better targeting of pesticides will be beneficial</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Potential for reduced mammal abundance in these areas. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food sources</td>
<td>Increase in set-aside on marginal areas will benefit</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Fewer food resources available. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
<td></td>
</tr>
<tr>
<td>Shelter</td>
<td>Maintenance of hedgerows will provide benefits. Increase in set-aside on marginal areas will benefit</td>
<td>Set-aside likely to disappear and fallow land likely to in the medium term. Reduced shelter. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
<td></td>
</tr>
<tr>
<td>Breeding</td>
<td>Concentration of intensive grass conservation production in some areas due to larger intensive dairy farms.</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td>Plants</td>
<td>Abundance</td>
<td>Decrease in arable areas due to reduction in grass as break crop as arable rotations simplified. Increase in minimum tillage and greater targeting of herbicides as costs are cut resulting in more perennial and annual weed species. Livestock extensification resulting in increased abundance on grasslands. Loss of beef cattle will be detrimental to grassland diversity.</td>
<td>High prices mean wheat area likely to be maximised within rotational constraints; oilseed rape also likely to increase. Loss of set-aside will reduce abundance of arable species. Maintenance of beef cattle herds will be beneficial in the short term</td>
</tr>
<tr>
<td>Diversity</td>
<td>Variable pattern in arable areas - increase in block cropping will reduce variety, whilst increase in non-cropped areas on marginal land will improve diversity. Replacement of fertilisers with animal slurries to cut costs may reduce diversity. Replacement of spring barley with winter wheat will reduce diversity.</td>
<td>Marginal land less likely to come out of cropping in the medium term.</td>
<td></td>
</tr>
<tr>
<td>Landscape &amp;</td>
<td>Hist. Env.</td>
<td>Increase in organic practices likely to add more local variety to landscape. Block cropping in arable areas will reduce landscape diversity. Zones of large pasture and forage conservation areas created around large dairy farmsteads. Significant impacts due to habitat changes on moorland resulting from livestock removal.</td>
<td>High prices mean wheat area likely to be maximised within rotational constraints; oilseed rape also likely to increase. Loss of set-aside will reduce diversity.</td>
</tr>
<tr>
<td>Landscape</td>
<td>Pattern</td>
<td></td>
<td>No change</td>
</tr>
</tbody>
</table>
Issues for further investigation

CAP reform is only one of a number of drivers that affect farm level management practices and the influence of CAP reform can change in magnitude relative to these other drivers. Detailed short-term monitoring is required to provide early warning of potentially harmful changes that may lead to environmental damage. The suite of environmental indicators developed by the Observatory will provide valuable time-series data which should be used to inform and frame more detailed investigations into the causes and environmental consequences of farm level change.

In addition to the gap analysis prepared for OBS02 our updated assessment of the implications for the environment of the 2003 CAP reforms has identified the following issues for further investigation:

- The potential environmental effects of the 0% rate for set-aside in relation to product price change. Baseline monitoring is vital to allow assessment of future changes;
- Further work on the impact of agri-environment schemes on land management practices. In particular the management of land coming out of the existing ESA and CS schemes and the management of landscape and historic environment under Environmental Stewardship;
- The influence of market prices on the uptake and nature of Environmental Stewardship agreements. In particular the take-up of in-field options;
- The environmental impact of ‘lifestyle farming’;
- The environmental impacts of farm level restructuring across all farming systems but in particular, beef and sheep systems in the uplands;
- The implementation and environmental impact of GAEC requirements, especially those conditions not covered by previous provisions, regulations etc, e.g. the 2m field margin requirement;
- The nature and extent of agricultural contracting and its environmental impact;
- The prospects for biofuels and biomass energy crops in relation to market price movements and policy signals, and environmental impacts of changes in production of these crops.
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ANNEX 1: RESEARCH STAGES

- Initial literature review and data analysis
- Workshops and additional practitioner interviews to identify farm changes
- Literature update
- Interviews with selected environmental-agricultural impact specialists

ANNEX 2: LIST OF WORKSHOP ATTENDEES AND PROGRAMME SUMMARY

- Lowland pastoral, dairy and mixed farming workshop: Taunton, 27th June 2007
- Hill and upland farming workshop: Penrith, 2nd July 2007
- Arable and horticulture workshop: Peterborough, 5th September 2007
- Farming sector workshop programme
- Defra Agricultural Change and Environment Observatory workshop: London, 21st August 2007
- Defra Agricultural Change and Environment Observatory workshop programme

ANNEX 3: LIST OF INTERVIEWEES AND INTERVIEW GUIDE

- List of environmental experts interviewed
- Question list for interviews with environmental specialists
- List of additional practitioners interviewed

ANNEX 4: DOCUMENTS CONSULTED DURING THE LITERATURE REVIEW

- Ongoing Research
- RELU projects
- SAC Centre For Rural Policy Analysis
- MLURI
1. PROJECT AIMS AND OBJECTIVES

1.1 Introduction

In May 2007 the Countryside and Community Research Institute (CCRI) and the Central Science Laboratory (CSL) were commissioned by the Defra Agricultural Change and Environment Observatory (the Observatory) to undertake a research project to investigate at farm level the potential environmental impacts of Common Agricultural Policy (CAP) reform and other drivers of agricultural change. This project forms part of an integrated three-year programme of research, which has been designed by the Observatory to monitor and predict the environmental impacts of agricultural change.

1.2 Project aims

The overall aim of the project was to provide an updated and enhanced assessment of the potential impacts on the environment resulting from CAP reform and other drivers of agricultural change by investigating current and predicted trends at farm level. More specifically, the project aimed to contribute to the work of the Observatory programme by building on the studies carried out in the first year namely:

1. **Environmental Monitoring Baseline Project (OBS01)** which developed a framework for environmental monitoring for the Observatory programme. The framework was then used to provide a baseline environmental monitoring assessment, identify gaps in extant monitoring programmes and make recommendations for future monitoring (CCRU & CSL, 2006a).

2. **Environmental impacts of CAP Reform – Assessment of implications of farm level changes on environmental outcomes (OBS02)** which produced an up-to-date, enhanced assessment of the potential impacts of CAP reform on the environment by combining a range of qualitative and quantitative data to examine recent and anticipated farm change (CCRU & CSL, 2006b).

3. **Quantitative approaches to assessment of farm level changes and implications for the environment (OBS03)** which provided a systematic review of the scientific evidence base linking agricultural and farm level change to the environment as well as developing some illustrative case studies to explore scenarios relating to CAP reform and its implications for the environment (CCRU & CSL, 2006c).

1.3 Project objectives and the extent to which they have been met

The specific objectives of the project identified by the research brief were to:

- Assess the current picture in terms of the implementation of CAP reform, at farm level, in England;
- Building on previous research, continue to review existing literature on the environmental impacts of CAP reform (where possible, at farm level), provide up-to-date assessment of implications for the environment, identifying the trends and impacts both in the short term and longer term of the 2003 CAP reforms;

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1 Copies of these reports and a summary report of the three projects (CCRU & CSL 2006d) can be found on the Observatory web page at http://statistics.defra.gov.uk/esg/ace/research/published/index.htm
• Highlight specifically any recent or emerging data on the farming sector which has the potential to have significant implications for the environment;

• Provide an overall up to date assessment of the implications for a wide range of Defra’s environmental priorities, highlighting where the conclusions may differ from previous analysis and issues for further investigation.

All the project objectives have been met in full and the findings of the research are presented in this report.

1.4 Report structure

This report does not repeat the findings of the OBS02 project, its purpose is to present new evidence that updates and enhances the assessment of the potential impacts on the environment resulting from CAP reform and other drivers of agricultural change. Particular attention is given to new evidence which lead us to draw different conclusions to those presented in OBS02.

The remainder of this report is divided into four sections. Section 2 describes the approach and methods adopted in carrying out the research. Section 3 provides an updated picture of the main drivers of change affecting agriculture in England, beginning with CAP reform, before examining other policy influences and economic factors. Sections 4 and 5 are the core of the report and are organised around a farming sector assessment of current and potential change to farm practice (Section 4) and an assessment of implications for the environment and Defra’s environmental priorities (Section 5).

2. APPROACH AND METHODS

This project builds upon the OBS02 project carried out during the first year of the Observatory programme and has adopted the same approach. The approach uses an iterative process involving repeated comparison, synthesis and critical evaluation of data from six key sources on the nature and extent of farm change and its environmental implications (see Table 2.1). The first stage of the project involved a detailed literature review2 covering the causes and consequences of farm change, along with an analysis of the June Survey, to identify key trends and patterns. These were then tested and elaborated upon during consultations with a range of experts and practitioners so that validation and refinement of the trends and patterns could take place. This approach combined both qualitative and quantitative data sources in a process of cross-analysis and reflection.

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2 The literature review encompassed formal and informal sources, surveys, on-going research programmes and internal Observatory research.
Table 2.1 Sources of information

<table>
<thead>
<tr>
<th>Source of information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal literature</td>
<td>Defra, GB agency and NGO research reports; policy evaluations, policy documents and the broader academic literature, covering both farmer reactions to policy and its environmental impacts/implications, and broader studies of farm decision making and farmer typologies, including local area case studies, where relevant.</td>
</tr>
<tr>
<td>Informal literature</td>
<td>Farming press (key mainstream and selected specialist), web-based media (e.g. news pages for land agents/agribusiness, key farm-linked initiatives, stakeholder groups and networks)</td>
</tr>
<tr>
<td>Surveys</td>
<td>Results from the Defra surveys (e.g. June and December Census, Farmers’ Voice, Farm Practice). Annual barometer surveys of the main industry sources.</td>
</tr>
<tr>
<td>On-going research programmes</td>
<td>Programmes identified as relevant by OBS03. (IDEMA, RELU GENEDEC, and the suite of CSL-led projects on agri-environmental themes).</td>
</tr>
<tr>
<td>Internal Observatory research</td>
<td>Data gathered and analysed by the Observatory team.</td>
</tr>
<tr>
<td>Key subject area specialists and practitioners</td>
<td>Including government, professional bodies, academia, the farming community and voluntary organisations.</td>
</tr>
</tbody>
</table>

The methods used to collect and analyse the data also closely followed those adopted by the OBS02 project in that the findings of the literature review and June Survey analysis were then used to frame the discussions for a series of four workshops and 18 subject area specialists and practitioner interviews. The workshops and interviews involved as many of the original OBS02 contacts as possible. This enabled the attendees and interviewees to reflect upon any perceived changes that had taken place during the intervening period. The research team found it particularly valuable to take quantitative trend data from surveys and reports and ask practitioners and subject area specialists to reflect upon its meaning during the workshop and interview stages of the project. The research team also found it valuable to introduce into the discussion the more qualitative evidence derived from the ‘grey’ literature on the nature and extent of the agricultural changes taking place. While being mindful that this literature included the opinions of different interest groups it helped to frame the discussions that took place.

An important element of the research design was a built in flexibility to revisit the different sources of information, whether it be written documents, surveys or individuals, to allow for re-interpretation and clarification in the light of emerging evidence (See Figure 2.1).
A detailed description of each stage of the research is presented in Annex 1, which accompanies this report. A list of workshop attendees and the workshop format can be found in Annex 2. A list of interviewees and the interview schedule is included in Annex 3. Annex 4 contains a list of the documents consulted during the literature review.

3. UPDATE ON THE IMPLEMENTATION OF CAP REFORM AND THE OTHER DRIVERS OF CHANGE

Changes in CAP policy, World Trade Organisation (WTO) policy, European Union (EU) mandates, regulations, markets, prices (product and input) as well as the occurrence of livestock disease that have occurred since the last analysis need to be considered. The following provides details of these changes and provides a backdrop for the analysis in this report.
3.1 CAP reform

Single Payment Scheme (SPS)

Since the analysis for OBS02 in 2006 the move to a flat-rate payment, which is being implemented over an 8-year transition period ending in 2012, has advanced. During this transition, the value of individual entitlements was initially based to a large extent on individual historic receipts from existing schemes. This element will reduce as the flat rate element increases. The flat rate element is 30% in 2007 and the historic rate 70%. It was argued that SPS effects on farming profitability in 2005 were not significant as the payment was still 90% historically based and thus would tend to continue to be treated as if it were coupled in the short term (Andersons 2005)\(^3\). However, with 85% and 70% historically based in 2006 and 2007 respectively, some farmers may now be responding differently. This may also be the case given that the entitlements have now been established and the scheme has ‘settled in’. Rather than the ‘wait and see’ approach adopted by many farmers in 2005, it is possible that they are considering more radical adjustment and restructuring in 2007. Research by Defra (Defra, 2007a &b) shows that there is a strong relationship between farm size and the uptake of SPS entitlement and there is some evidence that some smaller holdings are not reactivating their SPS entitlement due to the bureaucracy involved. There are a large number of small holdings, some of which may occur on marginal agricultural land and may be of relatively greater ecological interest.

A survey of 500 agricultural businesses in England and Wales in 2006 suggests that the initial hesitancy in farm planning following the introduction of the SPS is starting to lift. The survey found that 15% wanted to diversify their business interests. Only 2% thought they would have to sell up and only 4% thought they would be forced to sell assets (Agra Europe, 2006a). The most recent representative survey evidence comes from Farmers’ Voice, carried out in February 2007, (ADAS, 2007) which showed that a majority of farmers (65%) understand that their SP is decoupled from production. However, the survey also found that while half of all farmers thought that their SP should not be used for cross subsidisation; two thirds (67%) felt that they have no alternative but to do so at present. Looking to the future, just under two thirds of farmers (61%) felt the need to change their farm businesses so that nothing was produced at a loss. This was interpreted by ADAS as implying that loss-making enterprises must be eliminated or changed to make a profit.

\(^3\) Andersons the Farm Business Consultants Ltd (2005) Outlook
Table 3.1: Farmers’ understanding of decoupling and cross subsidisation using the SP (by farm type) 2007

<table>
<thead>
<tr>
<th>Statements</th>
<th>Cereal</th>
<th>General Cropping</th>
<th>Dairy</th>
<th>Grazing livestock</th>
<th>Pigs &amp; Poultry</th>
<th>Mixed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of farmers strongly agreeing or agreeing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My farm stocking &amp; cropping does not influence the size of my SP</td>
<td>67</td>
<td>60</td>
<td>73</td>
<td>01</td>
<td>73</td>
<td>05</td>
<td>55</td>
</tr>
<tr>
<td>I should not subsidise my farm production from my SP</td>
<td>55</td>
<td>53</td>
<td>09</td>
<td>55</td>
<td>03</td>
<td>51</td>
<td>60</td>
</tr>
<tr>
<td>I have no alternative but to subsidise my farm production from my SP</td>
<td>75</td>
<td>67</td>
<td>72</td>
<td>68</td>
<td>38</td>
<td>02</td>
<td>67</td>
</tr>
<tr>
<td>I must change the farm so nothing is produced at a loss</td>
<td>05</td>
<td>07</td>
<td>05</td>
<td>59</td>
<td>04</td>
<td>58</td>
<td>61</td>
</tr>
<tr>
<td>No. of respondents</td>
<td>318</td>
<td>169</td>
<td>278</td>
<td>262</td>
<td>55</td>
<td>160</td>
<td>1719</td>
</tr>
</tbody>
</table>

Source: ADAS (2007)

Views and opinions from the farming sector workshops and practitioner interviews undertaken since the Farmers’ Voice survey, suggest that farmer response to the implementation of the SPS is being strongly influenced by market conditions. It was felt that the recent increase in cereal prices had lessened the pressure for business adjustment in the cereal sector in the short to medium term (3-5 years). In contrast, the pressure for business restructuring remained across the livestock rearing and breeding sectors in both the uplands and lowlands.

Modulation

Modulation switches money from the SPS to Rural Development (or Pillar II of the CAP). It is deducted from the gross Single Payment. Modulation rates have changed since the analysis for OBS02. In 2005 EU modulation was 3%, this rose to 4% in 2006 and 5% in 2007 and thereafter. The rate of voluntary modulation has also increased. In England, it is 12% for 2007, rising to 13% for 2008, and 14% for the years 2009-2012. Consultants at Strutt and Parker (2007) estimate that total modulation deductions for English farmers will amount to £35/hectare in 2007 rising to £39/hectare in 2009. On a 200-hectare farm, they calculate, this equates to £7,800 in 2009, which is about £3,600 more than 2006 SPS deductions. Farmers may be able to recoup some of this money by joining the Environmental Stewardship scheme. However, joining the Entry Level Scheme (ELS) alone will not cover

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4 80% of the money raised through voluntary modulation will fund agri-environment schemes and will be co-financed by the UK Government at a rate of 40%. Defra news release 29/3/07. www.defra.gov.uk/news/2007/070329d.htm
6 There is a €5,000 (about £3,400 at current exchange rate) threshold below which EU modulation does not apply. However, this franchise does not apply for VM.
modulation deductions as it pays £30/hectare compared with estimated modulation cuts of nearly £40/hectare on lowland farms, although this is not the case for all farms. Given these increased modulation deductions and the fact that some farms (typically cereals, mixed, medium and large lowland cattle, sheep, and dairy farms) will start to experience SP losses, relative to their historic levels of subsidy, it is likely that some farms will be receiving significantly less SP in 2007 than in 2005.

**Cross compliance changes**

Cross compliance was phased in between 2005 and 2007 with Statutory Management Requirements (SMRs) 16, 17 and 18 on animal welfare introduced in 2007. These are, however, already applicable under domestic law and should not place any additional burden on the industry (according to Defra). There are a number of changes being made, or are expected to be made, to cross compliance standards during 2007 and 2008, due to amendments to domestic legislation, namely:

- **GAEC 10 Heather and grass burning:** The Heather and Grass etc (Burning) Regulations were changed in October 2007 and changes come into cross compliance from January 2008;
- **GAEC 11 Control of weeds:** A review of species listed on Schedule 9 to the Wildlife and Countryside Act is being undertaken, no changes are likely however in 2007;
- **GAEC 15 Hedgerows Regulations:** Changes to the Hedgerows Regulations are expected during 2007 according to the RPA website;
- **SMR 4 NVZ Action Programme measures:** Cross compliance conditions will change when the NVZ Action Programme measures are implemented;
- **SMR 5 Habitats Regulations:** Amendments to the Habitats Regulations in respect of European protected species are due to come into force in 2007, these changes were amendments to the list of species;
- **SMR8a Sheep and goat id:** Double tagging of sheep became a requirement from 1 January 2008.

A further change since 2005/6 is that, in the new RDPE (2007–2013), Good Farming Practice requirements will be replaced by the same set of cross compliance requirements that currently apply to the SPS. From 1 January 2007 cross compliance applied to farmers who entered into new commitments under land-based schemes or measures including Environmental Stewardship (ELS, Organic Entry Level Scheme (OELS) and Higher Level Scheme (HLS)); HFA; the new Energy Crops scheme; and the English Woodland Grants Scheme. Additional cross compliance requirements apply to Environmental Stewardship. These relate to fertilisers and plant protection product use. These schemes will be inspected for cross compliance purposes and any adverse findings from these inspections will be taken into account when calculating rural development payments. Where breaches are found, this may also impact on SPS and other direct payments (including nuts, energy crops and protein crops)\(^7\).

Although this is intended to be an incentive to improve environmental management, there is concern that undergrazing might become more widespread under the SPS. The England Rural Development Plan (2000-2006) included a requirement, as part of Good Farming Practice (GFP), not to overgraze or provide supplementary feed in an unsuitable way. This applied to recipients of the Hill Farm Allowance (HFA) and agri-environment scheme funding. There was also a requirement not to undergraze,

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referred to as “under-utilisation”, and defined as “Land where there is evidence of the annual growth not being fully utilised, or scrub or coarse vegetation is becoming evident, and such changes are detrimental to the environmental interest of the site.” Although agri-environment agreement holders will still be subject to GFP for the full length of their agreement, there is concern that undergrazing is not currently included in the requirements of cross compliance and that there is a risk that undergrazing will occur as result of these changes.

**Set-aside**

In 2006 and 2007 in lowland England, the compulsory set-aside rate remained at 8% so farmers were required to set-aside the same amount of land that they had been obliged to in 2005. Thus farmers’ responses would expect to be the same as found in the OBS02 analysis. In July the EU Agriculture Minister announced a proposal to set the obligatory set-aside rate at 0% for the 2008 scheme year. This proposal was accepted by the EU Agriculture Council in September 2007 and means that farmers are not required to manage any land as set-aside in 2008, although they would still be able to set land aside on a voluntary basis. It is also anticipated that the Commissioner will propose the ending of set-aside after 2009, as part of the 2008 CAP health check. The arable and horticulture workshop, held in September 2007, discussed the consequences of a move to a 0% rate and the potential implications for both farm practice and the environment are assessed in more detail in Sections 4 and 5 below.

**Sugar policy**

A radical modification of the sugar policy was implemented from July 2006 (Scenar 2020) to allow the EU to respect its WTO commitments and improve market access for developing countries. EU production is expected to fall by about 25% and EU exports will fall dramatically. Temporary cuts in sugar production quotas have also been introduced as measures to cope with unmanageable surpluses. For the 2006/07 marketing year a one-off cut in EU sugar production of up to 17% was agreed in July 2006. This will probably amount to a cut of about 2.5 million tonnes.

A sharp reduction in the sugar price has occurred to prevent the EU being swamped with imports and a similar cut has been seen in the beet price paid to producers. This has meant that British producers have faced a reduction from £30/tonne for beet in 2006, to £22.86/tonne in 2007, and this is expected to fall to £19/tonne by 2009. Beet producers will be directly compensated for some 64% of this price cut via an increase in their SPS from 2006. This Additional Sugar Support is based on their contracted tonnage held for the 2005/06 marketing year and the payment rate set at €9.71 per tonne.

Reduction of EU production will require permanent reductions in processing capacity (factory closures in England). As a response, British Sugar has closed factories at Alscoft, Shropshire and at York. These closures have had the effect of releasing quotas and concentrating sugar beet production in the arable heartlands of the East of England, according to Strutt and Parker (2006) with an estimated 1.3 million tonnes of quota being made available through the restructuring. Also for 2007, the

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8 www.defra.gov.uk/rural/uplands/grazing.htm
12 Additional Sugar Support Farmers Guardian 01/03/07.
temporary 11% cut imposed by the EU has been handed back to growers to encourage additional plantings to cover the 83,000 tonnes of quota sugar British Sugar is being allowed to purchase from the EU. United Kingdom (UK) growers will therefore have the opportunity to take on quota in order to maximise their farm gross margins. To make a profit at £20/tonne they need to reduce costs and out-perform wheat and oilseed rape. However, with improvements in varieties and agronomic techniques over recent years sugar beet is considered competitive.

As a result, Strutt and Parker (2007) report that ‘Farmers who only a few months earlier had been saying they would get out of beet growing altogether rather than try and make a profit at £20/tonne, instead spent last September buying in extra contract tonnage for this year’s crop’. Of the 1.8 million tonnes released by the factory closures, some 1.2 million tonnes has been bought on the open market by farmers in the East of England, with the majority expanding their existing operations but a few deciding to grow beet for the very first time.

The long-term analysis however shows that to reduce EU production, compulsory cuts in national sugar quota are highly likely. According to Andersons analysis (Andersons 2006a), the phasing out of sugar compensation will mean that from 2010 there is likely to be a sharp reduction in margins, and there will need to be careful consideration given by all parties to the re-negotiation of sugar beet price from 2009 onwards. The majority of growers will be prepared to factor the compensation into their margins for a year or so even though the compensation is fully decoupled. Commentators point out that once the payments drop, growers will need to evaluate their break-even point for continuing to grow the crop. However, despite prospects for the industry, some claim that the slow nature of EU sugar regime reform, the smaller-than-planned price reduction (36% not 39%), the larger-than-planned compensation package and the generous four-year restructuring fund should enable European producers to offset the worst effects. It is anticipated that the reform will reduce EU sugar production by about one-third by encouraging the exit of the less efficient manufacturers13. These inefficient producers however are generally not in the UK.

Energy crop scheme

The EU Energy Aid Payment Scheme started in 2004 and enables aid to be claimed on a wide range of crops (cereals, oilseeds and biomass crops) grown for the production of energy for heat, electricity and transport fuels on land not in set-aside. Farmers are paid €45 (around £30) a hectare but the complicated nature of the system, which sees some traders charge up to half of the aid in administrative costs or operating fees, coupled with the scheme’s inclusion in England’s voluntary modulation, means the amount of aid paid to growers in 2007 may fall. In 2006, after the payment to traders was removed, farmers were frequently left with around €22 (around £15) per hectare. This year’s rise in modulation to 17% means farmers will receive only around €15 (around £10) per hectare. The scheme is limited to two million hectares across the EU. Once that area is exceeded, the aid is scaled back on a pro rata basis; so English farmers would receive even less. This would suggest that few farmers will be attracted to specifically grow bioenergy crops by this scheme, particularly given the alternative option of selling onto more profitable cereal and oilseed food and feed markets under current conditions, though some crop will still be entered into such schemes as part of risk management strategies. EU Commissioner Marian Fischer-Boel has already indicated that there will be a proposal to scrap this scheme as part of the 2008 CAP health check.

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**Fruit, vegetables and potatoes**

EU agriculture ministers have agreed that growers in England will no longer need fruit, vegetable and potato (FVP) authorisations when claiming payments under the single payment scheme. Defra has announced that FVP authorisations will be abolished from 2008. Further changes to the SPS also mean that land used for the production of orchard crops will become eligible to support a claim for payment entitlements and also receive payment entitlements. This reform of the fruit and vegetable regime means that growers will no longer have the administrative burden they previously experienced. This presents new opportunities for some present horticultural growers to expand and for all farmers to consider growing horticultural crops or to rent their land out to horticultural growers. Also, producer organisations who promote the consumption of fruit and vegetables targeted at children will be able to benefit from additional support from the EU14.

**Hill Farm Allowance (HFA)**

The existing HFA scheme, which provides area payments to livestock producers in Less Favoured Areas (LFAs), is likely to continue until 2009. However, HFA payments will be focused on producers in Severely Disadvantaged Areas (SDAs) only from 2008. Disadvantaged Area (DA) land (including DA Moorland and DA Common Land) will no longer form part of the eligible area on which HFA will be paid. This focuses uplands support on land in the SDAs. It is argued that in comparison to land in the SDA, land in the DA is deemed to be generally higher grade agricultural land, is more accessible, and producers have more options to maximise the potential of the land. In addition, the SPS will, over time, tend to favour farmers in the DA in comparison to the SDA (since the DA is subsumed within the lowland for the purpose of defining the SPS regions and therefore receives a higher flat rate payment than the SDA).

Support for upland farmers will be incorporated into ELS in the form of a “specific uplands strand” to ELS, which will be in place no later than 2010. This Uplands ELS (UELS) will reward farmers for maintaining the upland landscape and environment and in particular encourage farmers to address the problems of both over-grazing and under-grazing in the hills15. It will be open to all eligible upland farmers and offer a higher payment than ELS to reflect the higher cost of farming in the uplands. HLS will also be available for farmers in the uplands (subject to targeting). Importantly, UELS will be focused on SDAs only16. The extended HFA period up to 2009 will give farmers some stability and the prospect of UELS may persuade some hill farmers to stay in farming.

There are however questions of eligibility. Whether farmers already in ESA agreements (a significant number in some national parks, for example Exmoor) will be eligible for UELS as well is unclear (Lobley et al., 2006). There has also been a change in eligibility for SPS and HFA on common land. Defra will now rely only on the Commons Registers held by County Councils when deciding who is eligible for these schemes on common land. As a result, farmers who have grazed on common land for years have recently been informed that they will not receive SPS or HFA on that land in future. Estimates are that up to 1,000 people, including tenants on National Trust land, could be “disenfranchised”17. This represents significant additional hardship to some upland farmers.

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14 18/6/07 The Journal  http://icnewcastle.icnetwork.co.uk
**Agri-environment schemes (AES)**

The budget for AES has increased since 2005/6. A total of £3.3 billion of modulation funds will go into Axis 2 of the Rural Development Programme England (RDPE) towards agri-environment and other land management schemes. Nearly £3 billion of this will go towards Environmental Stewardship (ES) between 2007-13, compared with £1 billion on green farming schemes between 2000-06. By early September 2007, farmers had signed 29,459 ELS agreements covering 58% of England’s farmland. Defra wants to increase this coverage to 70% by the end of 2007. Scheme uptake was on target in summer 2007, though the rate of applications had shown some signs of slowing (Boatman et al., 2007). However, higher wheat prices, may discourage farmers from committing land to agreements which might compromise the possibility of achieving high yields. Option uptake patterns show a concentration on options for field boundary management (hedgerows, ditches, walls etc), management plans, field corner management and permanent pasture, with in-field options for arable and intensive grassland generally proving less popular, apart from in-field trees (Boatman et al., 2007).

### 3.2 Other policy influences

**Nitrate Vulnerable Zones (NVZs) regulations**

As part of the NVZ Action Programme the whole farm organic manure nitrogen loading limit in relation to non grass crops was lowered from 210kg per hectare to 170kg per hectare in December 2006. This is likely to have most impact on arable farmers. Defra's proposals for the revision of the NVZs and the Action Programme measures that apply were released in August 2007. The agricultural industry had until November 13 to respond and Defra is working towards introducing the revised regulations from Spring 2008. In terms of the impact on farming, the livestock sector will have to bear the substantial costs of increased slurry storage requirements, and it is unclear whether funding will be available for this. The proposals will also have an impact on arable farmers, according to a report in Farmers Guardian, as the closed periods for application of slurry and poultry manure are projected to cost farmers up to £23m each year; while regulating cover crops would have an annual cost of up to £53m. The Farmers Guardian report also noted that for crop nitrogen limits and for compulsory manure efficiency Defra may change the nitrogen limits in the future to below economic optima for yield. The proposals call for a field-by-field and crop-by-crop annual calculation of planned and actual nitrogen and manure use.

**The EU Water Framework Directive (WFD)**

The aim of the WFD is to achieve a good level of water quality for all rivers, lakes, estuaries, coastal water and groundwater in the European Union by 2015. Implementation of the WFD is ongoing, but the directive becomes ‘active’ in 2012, when the first approved River Basin Management Plans become operational. Since the last analysis (OBS02) a monitoring network was established in 2006 and the public consultation started in 2007 on establishment of good status standards for different waters (this covers 10 river basin districts). The main approach with respect to farming is to use existing Catchment Sensitive Farming (CSF), cross compliance and Environmental Stewardship schemes. The impact on farmers will not be clear until the ecological status for each water body is decided and the necessary programme of measures has been decided (before 2009). However, modelling has

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18 31 August, 2007
suggested that very strict limits to N inputs on agricultural land would be necessary to reduce nutrient export and achieve good ecological status\(^{19}\).

**Draft Pesticides Directive**

Further EU regulation on the horizon is the draft Pesticides Directive. The proposals form part of the Environment Committee’s response to the European Commission’s planned new Sustainable Use Directive of the Thematic Strategy on Pesticides and were discussed by the European Parliament in October 2007. This new Directive aims to establish a framework to promote ‘best practice’ in the storage, use and disposal of pesticides, their waste products and packaging. The sustainable use proposal includes new obligations in relation to the training of pesticide users.

**Biofuel targets**

The European Union has set a target of 10% of all transport fuel to be derived from biofuels by 2020. In the UK the Renewable Transport Fuel Obligation (RTFO) sets a requirement for road transport fuel suppliers in the UK to ensure that by 2010, 5% by volume of all road vehicle fuel is supplied from sustainable sources. At the same time a number of processing plants have been constructed or are planned (described in OBS02). It is predicted that biofuel demand and production will increase in response to these mandates. Andersons (2006b) point out that if all of this were bioethanol, it would require 9.5 million tonnes of wheat or more than one million hectares; if all were biodiesel this would require 6.6 million tonnes of oilseed rape or 1.8 million hectares. This level of supply cannot be met in total by UK producers (Andersons, 2006b). The Government accepts that feedstocks should be grown where they can be grown most sustainably which is not necessarily in the UK.

**Trade Policy Instruments and WTO**

The WTO is seeking to achieve liberalisation of agricultural trade through the multi-lateral negotiations initiated under the Doha Development Round (DDR). The objective of the negotiations is to seek the elimination of export subsidies and significant reductions in import tariffs and trade distorting domestic support policies\(^{20}\). In the long run the process of trade liberalisation, particularly through the WTO, and the process of CAP reform, will probably increase the UK’s exposure to the world market.

In the DDR discussions in the field of agriculture, the focal points are export support, internal support and market access. Europe has stated that it is prepared to cut its average farm tariffs by more than half (from 23% to 12%); to phase out export subsidies by 2013 and to cut trade distorting domestic farm subsidies by more than 70%. In return the EU has asked that other countries (notably USA) also cut their trade-distorting domestic support. In current discussions the key issue remains the protection the EU wants against reducing tariffs on imports for so called sensitive commodities, such as beef and dairy products\(^{21}\). Although failure by the G4 countries\(^{22}\) to make progress on the DDR of world trade talks (most recently in Potsdam G4 meeting June 2007) have brought some uncertainties, it is clear that increasing international trade liberalisation, and its concomitant escalation of commodity price competition are on the horizon.

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\(^{19}\) Haygarth P, Johnes P, Butterfield D, Foy B and Withers P 2003 Land use for achieving ‘good ecological status’ of waterbodies in England and Wales: a theoretical exploration for nitrogen and phosphorus

\(^{20}\) Tariffs increase the price of imported goods while export subsidies allow exporters to maintain their price competitiveness on the world market

\(^{21}\) New WTO paper outlines concerns Farmers Guardian News 4 May, 2007

\(^{22}\) The G4 consist of the US, Brazilian and Indian ministers of trade and the European commissioner for trade.
3.3 Markets and prices

Producer prices

According to Agriculture in the UK 2006 (Defra 2006) the average producer price of agricultural products in the UK rose by 4.4% in 2006. The average price for crop products rose by 9.3%, the average price for cereals rose by 12% and the average price for livestock and livestock products rose by 1.1%.

Arable

During 2005 and early 2006 the price of both feed wheat and feed barley remained reasonably stable; prices fluctuating within a band width of £60 to £70/tonne. However, following a dry July (2006) in Europe (and a slight reduction in yields) and a poor southern hemisphere harvest, prices were forced up to £90 during the autumn of 2006. The 2006/07 season has been dominated by the market effects of crop problems (yields and quality) in the USA, the Black Sea, and Australia, leading to a tight global supply picture despite increased plantings in autumn 2006. Andersons (2007a) reported that the global reserves of grain were at their lowest levels for 30 years and this has led to further price increases, with feed wheat prices in September 2007 in excess of £150/tonne and bread wheat £190/tonne, an increase of 112% on the previous year (Table 3.2). Quality premiums are at approximately £30 over feed wheat due to concerns over both quality and lower plantings. Feed barley prices in September 2007 had risen to £159/tonne, an increase of 118% on the previous year. Market prices have been consistently above intervention in 2006 and 2007 and this increases exposure to market volatility.

Table 3.2 UK Ex-farm wheat prices 2007 (£/t)

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Source: Farmers Weekly

The forecast is for a tight global balance sheet for 2007/08. In 2007 the strong wheat price increases seen in June and early July have continued and feed wheat futures have reached £174/tonne for November with £170/tonne ex-farm achievable in the New Year. November 2008 futures traded at £134/tonne while November 2009 contracts are at £130/tonne. Forward bread wheat prices for November 2007 are projected to be at least £192, which is approximately £90 per tonne above the equivalent in 2006/07. This represents a dramatic change to 2005/06 when low wheat prices were predicted to lead to more fallowing, set-aside on marginal land and a look to alternative cropping (biofuel, niche products). Now the incentive is for farmers to expand their wheat planting area.

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25 Wheat prices reach new high 30/08/2007 FWi
26 [www.nabin.co.uk](http://www.nabin.co.uk)
Livestock\textsuperscript{27}

Towards the end of 2006 and into 2007 dairy profits continued to fall. Dairy farmers continued to suffer from erosion of the milk price (Figure 3.1) and escalating costs, although global shortages in 2007 have led some suppliers to increase prices paid to farmers.

Figure 3.1 Farmgate and market price for milk 1996-2007

![Figure 3.1 Farmgate and market price for milk 1996-2007](image)

Source: Dairy UK (2007)

For the dairy sector, following price cuts to farmers in 2006, the market situation improved for 2007 due to a combination of strong demand from European and World markets, reduced output and low stocks (Andersons, 2007b). This resulted in prices rises for a range of dairy goods\textsuperscript{28} along with rises in world market prices for both skimmed milk powder and wholesale milk\textsuperscript{29}. These increases are expected to have a positive effect on milk prices in general in the longer term\textsuperscript{30}. Andersons believe that the 2007 price rises will be sustained at least through to 2008/09 when the rolling average price for milk is expected to be in the region of 25ppl (Andersons, 2007b).

For beef, allowing older cattle back into the food chain at the end of 2005 and the relaxation of the remaining EU restrictions on UK beef exports in May 2006 came at a time when beef prices in the EU had stabilised at a relatively high level and prices for British beef reached a nine-year peak\textsuperscript{31}. Hence, the UK beef industry has spent most of the mid 2006/07 period in an optimistic mood. Liveweight (lw) cattle prices were consistently higher than in the previous two years (Figure 3.2) for the first four months of the year. Also in the first six months of 2007 the GB deadweight steer price averaged 205.8p/kg compared with 200.5p/kg during the same period of

\textsuperscript{27} It should be noted that much of the empirical work for this project (literature review, workshops and interviews) was completed prior to the 2007 disease outbreaks.

\textsuperscript{28} MDC Datum (2007) Milk Auction Prices. 8th June; www.ukagriculture.com

\textsuperscript{29} MDC Datum (2007) Milk Auction Prices. 8th June

\textsuperscript{30} http://www.ukagriculture.com/farming_news/farming_news_may_2007.cfm

\textsuperscript{31} (May 19, 2006 Agra Europe weekly. No. 2208).
Average finished steer liveweight prices were approx 6p/kg higher in spring 2007 compared to 2006.\(^\text{33}\)

**Figure 3.2 Trend in liveweight cattle prices 2005-2007**

EU beef exports in the period January-June of 2006 more than doubled year-on-year as UK exporters tried to reclaim some of the market lost following the ban on UK beef exports\(^\text{34}\). However it is considered that the home market will be the main outlet for UK beef and that retail demand remains good. Overall the forecast is for production to increase in 2007 and beyond\(^\text{35}\).

The outbreak of FMD in August 2007 had a significant impact on cull cow prices. Prior to FMD movement restrictions and subsequent export bans 75% of beef exported from the UK was cow beef. Without this export market prices in England and Wales for –O4L cows fell from over 140p per kg at the beginning of August to 129p per kg in week ended 20 October\(^\text{36}\). Prime cattle prices in England and Wales remained stable throughout the outbreak, actually increasing from around 200 p/kg deadweight just before FMD to 205 p/kg by the end of September\(^\text{37}\).

For UK sheep, UK consumer demand is reported to be improving but poor weather in 2007 has affected the lamb crop. Prices in 2006 followed the general seasonal trend. In May 2007, a year later, lamb prices did not show the seasonal price trend (Figure 3.3) and the expected steady gain was not seen, as the price fluctuated marginally around 120p/kg lw\(^\text{38}\). Sheep meat exports are forecast to be lower year-on-year due to unfavourable exchange rates and the increasing presence of New Zealand product in the EU market\(^\text{39}\). France, the primary export market for UK sheep meat, has sourced

\(^{32}\) EBLEX Update August 2007 http://store.eblex.org.uk/articles/dodownload.asp?a=store.eblex.org.uk.31.7.2007.16.43.22.pdf&i=292722

\(^{33}\) www.ukagriculture.com

\(^{34}\) September 1, 2006 Agra Europe weekly. No. 2223.

\(^{35}\) MLC Outlook for the UK Beef Sector January 2007

\(^{36}\) EBLEX Update November 2007

\(^{37}\) EBLEX Stock Briefing November 2007

\(^{38}\) www.ukagriculture.com

\(^{39}\) MLC Outlook January 2007
more from New Zealand so far in 2007. It is expected that a greater volume of sheep meat will be imported in 2007 compared with 2006 largely due to higher imports in the first few months of the year. Total sheep meat imports are forecast to be 5% higher in 2007 as a whole compared with 2006, at 136,000 tonnes (EBLEX August 2007 update).

Since the outbreak of FMD, the export restrictions have impacted on prices and lambs destined for export have been diverted to domestic markets further depressing prices. Lamb prices were significantly lower in the autumn of 2007 compared to both 2005 and 2006. Finished lamb prices at auction also fell below 80p/kg for first time since October 2000.

**Figure 3.3 Trend in SQQ lamb prices 2005-2007**

![English SQQ lamb prices graph](source)

UK pig numbers stabilised in 2006 due to both higher prices and improved price stability. As a consequence of favourable conditions for pig breeding such as low feed prices and increasing demand, production in 2006 in Europe was forecast to rise by around 3%. However, in England specialist pig enterprises experienced a reduction in profitability during 2006. In April 2006 prices fell below 100p/kg (6p/kg lower than April 2005). In April 2007 the average pig price started to recover, prices of 105.5-106.5p/kg deadweight were 5.5p/kg higher than those seen in late April 2006.

The picture in terms of prices is more optimistic in the livestock sector than in 2005/6. Global demand, supermarket power and competitive imports will influence future price, however whether prices can keep pace with the growing cost of inputs is a concern.

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40 EBLEX Update October 2007
41 Agra Europe Weekly. November 10, 2006 No. 2233
42 Agra Europe Weekly. June 30, 2006 No. 2214
**Input prices**

According to *Agriculture in the UK 2006* (Defra, 2006) the average price of agricultural inputs rose by 3.5% in 2006 and is 15% higher than in 1995. Since 2002 there has been a significant increase in the cost of energy and lubricants along with fertilisers and soil improvers (Figure 3.4). In the long term the increase in the price of fertilizers and energy is set to continue.

According to the European Commission, feed costs could rise by up to 600% over the next 3 years. This will affect livestock farmers in all sectors. Likewise the Meat and Livestock Commission (MLC) report significant year-on-year increases in input costs for livestock producers (Table 3.4). According to FWi, winter feed bills are set to rise by £40/t in 2007. The estimates are that for a one-million litre dairy farm, using compound feed at the standard rate of 0.3kg/litre the extra bill will amount to 1.2p/litre. For pigs the feed price rises are expected to hit them harder than their EU mainland counterparts because UK producers have an inferior FCR (Feed Conversion Ratio) and make less use of by-products. As a consequence by 2010 pork production could fall by one third (FWi). Compound feed prices are expected to increase between £25 and £30/tonne when existing contracts end. Pig finishers have calculated that these feed price rises need to be matched by an increase of up to 10p/kg deadweight to hit break-even levels.

**Figure 3.4 Agricultural input prices 2000-2006**

Source: Defra Observatory 2007: Environmental monitoring indicator A4

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44 Pig producers face feed price challenge FWi 03/08/2007
47 Pig producers face feed price challenge 03/08/2007 15:21:00 FWi
Poultry producers, due to the high percentage of total costs made up by feed, are under increasing financial pressure as costs increase faster than the prices received for meat and eggs. In the year to August 2007 feed prices are estimated to have increased by £42/tonne (25%), and given current forecasts this could increase to £60/tonne (38%) by early 2008. Free-range poultry producers currently pay £160/tonne compared to £127/tonne in 2006. Current indicators are that prices for both feed wheat and soya meal (the two main ingredients in compound poultry feed) will continue to increase over the next 12 months due to an increased demand from China and Asia for animal based proteins (and thus the feed grains and soya bean meal needed to produce them). The affect has been such that the world’s exporting regions are now struggling to meet rising demand (NFU 2007).

**Profitability**

*Agriculture in the UK 2006* (Defra 2006) reports that Total Income from Farming rose by 7% in real terms overall for 2006 with the greatest improvement in profitability in the arable sector on the back of significant grain price rises. In real terms, average net farm income for all types of farm in the UK is expected to be around £20,600 in 2006/07, about 20% higher than 2005/06; in real terms, farm incomes for cereals and general cropping farm types are expected to have doubled in 2006/07, while incomes for dairy and specialist poultry farms are expected to have fallen by about 20%. For the livestock sector profitability in the future will be determined by costs of production (feed prices and energy), ensuring competitiveness, environmental regulations and health of stock.

**Animal disease**

Since the last report, outbreaks of avian influenza in Norfolk in 2006, of FMD disease in Surrey 2007 and BTD in Suffolk 2007 have shaken the industry. These have had consequences for the specific sector affected by the disease in terms of lost sales due to poor consumer confidence and market access (travel restrictions).

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49 NFU (2007)  
50 It should be noted that much of the empirical work for this project (literature review, workshops and interviews) was completed prior to the outbreaks.
4. CURRENT AND POTENTIAL CHANGES TO FARM SECTORS AND FARM PRACTICE

In Section 4 attention is turned to how these various drivers of change are being expressed at farm level in England and what the implications are for farm practice. Following the approach adopted for the OBS02 project we have organised our assessment around the main farming sectors of arable, dairy, lowland and upland livestock (mainly sheep and beef). The reason for this is that the overwhelming majority of relevant literature is organised around these key farm sectors, which in turn informed our decision to structure the workshops in the same way. Furthermore, the OBS02 report identified a clear contrast between arable, dairy, sheep and beef sectors in the nature and rate of adjustments. In the period since the OBS02 report the contrast between sectors has become even more apparent.

The structure of this section does, however, depart from the OBS02 report in two important ways. First, the balance between the different sources of data used for this report differs significantly with OBS02. In this report greater reliance has been placed on the informal literature, surveys, workshops and interviews due to the limited extent of formal literature published since OBS02. Second, in this report evidence from all the sources is considered together for each of the farming sectors rather than being considered individually. In this way the assessment is sector rather than source-led.

4.1 Arable

The rise in commodity prices and the announcement that the set-aside rate will be set at 0% for the 2008 season has seen a dramatic change in prospect for the arable sector over the short term at least. The evidence collected from the literature, surveys, workshops and interviews suggest that the influence of decoupling on farm businesses has been reduced by the increase in prices. As a result the conclusions drawn by OBS02 for the short to medium term require updating.

In 2006 the evidence suggested that the predominant response to the reforms in the arable sector had been to adopt a ‘wait and see’ approach, with few farmers making radical changes in the first year. Cropping patterns were similar to those seen in 2003, which meant a significant area of fallow land and a marginal decline in the areas sown to a variety of cereal crops. Over the medium term (3-5 years), as the reduction in SP began to encourage change, it was anticipated that in the more productive areas there would be a move to large-scale block cropping of wheat and rape and the introduction of simplified rotations in which fallows played a significant role replacing second wheats, barley and other cereals. In less productive arable areas it was anticipated that significant areas of cropland would be diverted into other uses, including persistent fallow, renewable energy crops, and grassland associated with non-agricultural use and perhaps more extensive beef and sheep enterprises. In 2005 over half of all cereal farmers had input costs greater that the value of the crops produced. Similarly a study by Cambridge University (2006) estimated that at a wheat price of £60/tonne only 35% of wheat production would be profitable. Thus the majority of farmers relied on the SP for their profitability. This situation was perceived to be unsustainable and would trigger further restructuring through a reduction in cereal producers, farm expansion and cost cutting, with land in low yielding regions going out of production sooner than in higher yielding regions.

The 2007 Farmers’ Voice survey suggests the increase in crop prices has produced a remarkable change in sentiment among farmers producing the main combinable crops and that there is a new-found confidence that they can produce profitably at these higher price levels (ADAS, 2007). It must also be remembered that the survey took place during February before prices experienced the rapid rise from July onward.
(Figure 4.1). Even in February the confidence of farmers could be detected in their medium-term planning (next 5 years). Table 4.1 shows that in 2005 and 2006 farmers intended to reduce the area of grown crops. By 2007 the picture had changed and the survey found little evidence of plans to reduce cropping. The survey found that the majority of farmers did not expect to make changes to their crop areas within the next 5 years. It is also clear from table 4.1 that fewer farmers were planning to increase the area of bare fallow and other land managed under GAEC 12 rules in the next 5 years. ADAS (2007) suggest that at current prices little further land will fall out of production following decoupling.

The 2007 June Survey shows a large increase in the area of oilseed rape (non set-aside land), 21.9% more than for June 2006. The HGCA 2007 planting survey also revealed a 17% increase in area since 2006. The 2007 Farmers’ Voice survey also shows that farmers are intending to increase the area devoted to energy crops, although this survey was conducted in February prior to the dramatic rise in cereal prices. What this evidence suggests is that farmers are responding to the increased demand for biofuels. However, whilst demand may lead to more biofuel crops being grown in the UK, the price and the contracts have to be attractive to farmers. Oilseed rape is the most popular biofuel crop and how much is planted depends on the price relative to wheat, which competes for the same land. It is predicted that if oilseed rape prices rise against wheat to reach around 2.4 or 2.5 times the price, then production is likely to see a significant increase. However at current high wheat prices this boom may be delayed. The view is reinforced by previous analysis by Renwick and Hodge (2003) who argued that that it is most likely that a proportion of the conventional crop will be sold speculatively for fuel use where the price is favourable, and that any expansion of the rapeseed area is most likely to occur in areas already dominated by that crop. Similarly grain for ethanol production will most likely be derived from diversion of existing crops to industrial production. The opportunity for expansion of the cereal acreage is limited by its existing dominance in UK arable rotations (HGCA, 2005). It’s worth noting that farmers’ intentions in February (ADAS, 2007) may have changed with rising wheat prices. Estimates from Farmers Weekly CropWatch for the South region show 2007 oilseed rape drilling down by about 20% (and wheat drilling 25% up) compared to last year\(^{51}\). Arable workshop participants said they saw no evidence of any increased cropping for biofuels in the east of the country due to the low prices paid.

Contracts also have to be attractive to favour a move towards biofuels. Analysis of a recent RAGT seeds survey\(^{52}\) suggested that 73% of growers see a premium over the feed price as their most important requirement in a bioethanol contract, with only 10% valuing fixed prices and a further 10% valuing long-term arrangements (defined as three year-plus). It concluded that it was difficult to see how the industrial market could fulfil the government’s targets, at least at current market levels. There is also a suggestion that sourcing cheaper biofuel feed stock from other countries, such as Brazil, will prevent home-grown biofuels from becoming competitive.


\(^{52}\) Survey highlights emphasis on wheat for yield alone Arable. Farmers Guardian 27 July, 2007
Quantitative data from the 2006 and 2007 June Surveys support the view that the area of cropped land is not declining significantly (Table 4.2). The June Survey showed a much smaller decline in the area of wheat between 2006 and 2007 compared to recent years. This supports the evidence that a market price upswing since mid-2006 has reversed the declining trend in the area of wheat grown. The area of barley in June 2007 was very similar to 2006. There has been a continued reduction in winter planting, but an increase in spring plantings. As in recent years, there has been a further increase in 2007 in the area of oats sown nationally, in response to increased prices due to growing demand for domestic human consumption (in biscuits, breakfast cereals, etc). This increase has occurred throughout all regions of the country. The 2007 June survey showed an increased in the area of winter oilseed rape sown of 21%. The higher prices for oilseed rape, due to demands from the biofuel industry, are driving this increase in area. The results of the 2007 June Survey corroborate the views expressed in the workshops and interviews that the area of fallow has declined (-9.8% between 2006 and 2007).
These trends were discussed at the arable workshop held in September 2007 and there was agreement among the participants that the dramatic price increases over the previous year have triggered a significant shift in farmer attitude and confidence in arable farming within a very short period. Market conditions were seen to overtake CAP reform as the major influence on cropping decisions and business management. It was anticipated that high prices would be sustained for at least the next 2-3 years given the healthy forward contract prices being offered for 2009. It was felt that the arable sector was entering a bullish period (2007-09) with planting behaviour being driven by high prices.

It was also apparent from the literature, workshops and follow up interviews with sector specialists that there is considerable uncertainty as to how farmers will actually respond over the short term in different parts of the country. There was some disagreement on the likely future cropping patterns and the likely effect of the 0% rate for set-aside in 2008. In the arable workshop it was reported that higher prices meant that rotations would be modified to include more beans which would reverse the recent decline in area\textsuperscript{53} and that oats were increasingly being used as a semi-break crop. There were also suggestions that beans and oats could replace oilseed rape in some rotations. However, increases in oilseed rape plantings have also been predicted\textsuperscript{54} Farmers Weekly reported that large areas of wheat were being planted in the autumn of 2007 and that some farmers were ploughing up grass to grow wheat\textsuperscript{55}.

At the arable workshop it was anticipated that a significant area of set-aside land would be cropped in 2008. It was also suggested that set-aside would not disappear completely and that much of the environmentally beneficial long-term set-aside would remain. This type of set-aside was often on marginal land, which would not be brought back into production. A survey of 61 clients in southern counties conducted by Hampshire Arable Systems suggested an average 12-13% reduction in rotational and long-term set-aside in response to the setting of a zero rate in the 2007-08 cropping year\textsuperscript{56}. The NFU also believe that farmers would limit ploughing of set-aside, and carried out a survey which indicated that arable farmers were unlikely to cultivate non-rotational set-aside\textsuperscript{57}.

\textsuperscript{53}There was a 36% reduction in the area of field beans between June 2005 and 2006.
\textsuperscript{56} A. Bide, pers. comm..
### Table 4.2 June Survey 2006-2007: changes in wheat, barley and oats in England (’000 ha)

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>Change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North East</td>
<td>1709</td>
<td>1691</td>
<td>-18</td>
<td>-1.1</td>
</tr>
<tr>
<td>North West</td>
<td>65</td>
<td>66</td>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td>Yorkshire and Humber</td>
<td>31</td>
<td>30</td>
<td>-1</td>
<td>-2.2</td>
</tr>
<tr>
<td>East Midlands</td>
<td>227</td>
<td>226</td>
<td>-1</td>
<td>-0.4</td>
</tr>
<tr>
<td>West Midlands</td>
<td>347</td>
<td>344</td>
<td>-4</td>
<td>-1.0</td>
</tr>
<tr>
<td>Eastern</td>
<td>155</td>
<td>153</td>
<td>-2</td>
<td>-1.0</td>
</tr>
<tr>
<td>South East (inc. London)</td>
<td>472</td>
<td>471</td>
<td>-1</td>
<td>-0.1</td>
</tr>
<tr>
<td>South West</td>
<td>175</td>
<td>172</td>
<td>-3</td>
<td>-1.9</td>
</tr>
<tr>
<td>Barley</td>
<td>565</td>
<td>577</td>
<td>12</td>
<td>2.1</td>
</tr>
<tr>
<td>North East</td>
<td>36</td>
<td>36</td>
<td>0</td>
<td>-0.6</td>
</tr>
<tr>
<td>North West</td>
<td>35</td>
<td>35</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>Yorkshire and Humber</td>
<td>99</td>
<td>103</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>East Midlands</td>
<td>69</td>
<td>69</td>
<td>0</td>
<td>0.3</td>
</tr>
<tr>
<td>West Midlands</td>
<td>46</td>
<td>48</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Eastern</td>
<td>130</td>
<td>131</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>South East (inc. London)</td>
<td>59</td>
<td>61</td>
<td>2</td>
<td>4.2</td>
</tr>
<tr>
<td>South West</td>
<td>91</td>
<td>94</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Oats</td>
<td>93</td>
<td>102</td>
<td>9</td>
<td>10.1</td>
</tr>
<tr>
<td>North East</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>12.5</td>
</tr>
<tr>
<td>North West</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>15.4</td>
</tr>
<tr>
<td>Yorkshire and Humber</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>11.4</td>
</tr>
<tr>
<td>East Midlands</td>
<td>11</td>
<td>12</td>
<td>1</td>
<td>14.9</td>
</tr>
<tr>
<td>West Midlands</td>
<td>17</td>
<td>19</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>Eastern</td>
<td>9</td>
<td>10</td>
<td>1</td>
<td>12.6</td>
</tr>
<tr>
<td>South East (inc. London)</td>
<td>19</td>
<td>21</td>
<td>2</td>
<td>9.2</td>
</tr>
<tr>
<td>South West</td>
<td>21</td>
<td>21</td>
<td>1</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Source: June Survey

Areas of crop types grown on set-aside are shown up to 2004 by Langton (2007)\(^58\), derived from IACS data. Changes in IACS crop codes mean that it is no longer possible to distinguish different crops to the same level of detail, but data from the Pesticide Usage Survey indicate that relative proportions of different types of cover on non-industrial set-aside were similar in 2006 to 2004, with around 59% naturally regenerated, 35% in sown grass and 4% in wild bird cover, mustard or phacelia (D. Garthwaite, unpublished data). These percentages are likely to change in 2007-8, with the area of naturally regenerated set-aside falling faster than areas of other cover types, because farmers are more likely to return naturally regenerated (largely rotational) set-aside to production than non-rotational sown areas, which are often strips at field edges or marginal in productivity terms.

As part of the follow-up interviews to the arable workshop it was suggested that short-term changes to set-aside in response to the 2008 set-aside derogation would be minimal. Although fields in rotational set-aside may be put into cereals, it was suggested that farmers have already made their cropping plans for the 2008 season and are unlikely to change; a shortage of seeds (due to cereal market conditions)

would also limit any intention to expand cereal cropping areas. However, if set-aside disappears as part of the CAP health check and cereal prices remain favourable then substantial areas of rotational set-aside may be expected to revert to cropping. This is unlikely to apply to long-term set-aside which often occupies marginal land. It is anticipated that much of this land will remain uncropped.

The movement of arable land into other forms of conventional and unconventional production was addressed during the workshop. In contrast to the findings of the 2007 Farmers' Voice survey questions were raised in the workshop regarding the medium term future of energy crops. Although the survey found that farmers planned a significant increase in planting for energy crops over the next 5 years it was felt that much of this land would be retained within conventional production given the high prices being paid for food crops. It was suggested that the 0% rate for set-aside for 2008 would lead to a significant reduction in the area of oilseed rape grown for energy as land previously used for set-aside was diverted into growing food crops. It is not envisaged that biomass crops will be grown on a large fraction of land in place of cereals. Research by RBU and SAC (2005) (quoted in Cambridge University, 2006) found that the likely gross margin produced by biomass crops is much less than that for competing arable crops (around £100 per hectare vs. £300 for wheat or oilseed rape). Also there are large risks from these crops relating to their long-term nature and the ongoing economic viability of end users.

The reform of sugar policy was seen to have precipitated significant restructuring of production among sugar producers. There had been a significant transfer of quota to the East as farmers there bought up cheap quota from farmers in Central England who had lost their processing capacity due to plant closures. The arable workshop reported an increase in areas planted to sugar, with some first time growers. Over the long-term the most likely replacement enterprise for sugar beet was perceived to be cereals. A shift to horticultural use, now that FVP authorisation will no longer be required, was thought unlikely due to the demanding infrastructure and requirements and necessary experience needed.

The OBS02 report anticipated that there would be some opportunities for beef and sheep enterprises to expand into lowland areas, in response to falling arable margins and cheap feed prices. It was generally agreed by the workshop participants that such changes in land use would not take place as long as crop prices remain high. Nisbit and Shere (2006) predict that existing trends in undergrazing are likely to continue in lowland England in predominantly arable areas and in areas of mixed farming. They conclude that ‘the problems that hinder appropriate grazing management on many grassland and lowland heathland sites will continue and possibly worsen’.

It was felt that the current period of price buoyancy would not totally offset the need for cost cutting in the sector. While higher output prices have relieved the immediate pressure of a year on year reduction in SP, input costs, especially fuel and chemicals, are predicted to continue to rise. Land rental prices are already beginning to rise with significant increases being recorded in the value of 3-year tenancies for wheat grade land.

Taking a longer-term perspective it was suggested during the arable workshop that world supplies would eventually recover and increase in response to the price signals and that there may be more fluctuation in market prices given the unpredictability of world events. If this scenario unfolds then it is likely that future change will be more in line with the OBS02 assessment where it was argued that land quality will be an important influence on cropping decisions. When market prices for cereals and oilseeds are relatively low, heavy land which is difficult to work and light low yielding land will not be cropped, but go into temporary fallow instead. Greater numbers of
farms will become zoned with cropping efforts concentrated on the more productive areas of the farm. However, in periods of buoyant prices for the principal outputs of arable farming, the vast majority of land will remain in crops.

4.2 Dairy

The evidence collected in the period since the OBS02 report largely supports its assessment of the dairy sector. The latest Farmers’ Voice survey clearly shows that of the main farm sectors dairying continues to undergo the most radical restructuring with 17% of farmers intending to cease production while a further 20% intend to increase the size of their herds over the medium term. At the time of the survey the price of milk had fallen by 3% on the previous year and ADAS (2007) concluded that the sector continued to be driven by pressure from low milk prices rather than CAP reform. This view was supported by Andersons’ appraisal of the sector published in September 2006 (Andersons, 2006b), which reported that the industry continued to operate in the grip of cost-price squeeze where milk prices are depressed and input costs continue to rise. Significantly, it is no longer just the less-efficient businesses that are questioning their future in the industry. There are often other opportunities to employ their energy and substantial capital. The improved market conditions experienced in 2007 are likely to be sustained until at least 2008/09. However, it is anticipated that improved product prices will not negate the pressures for restructuring. In particular, increasing input costs and costs associated with NVZ and WFD environmental legislation will continue to squeeze profits and put pressure on less efficient producers to leave the industry (Andersons, 2007b & Dairy UK, 2007). A survey of 657 UK dairy farmers in February 2007 reported that more than 50% said they would not be able to meet associated costs of NVZ compliance if the costs were £20,000 or more. The survey report suggested that the potential costs could be in excess of £30,000 (MDC, 2007).

The 2007 Farmers’ Voice survey provides some updated evidence of the nature of the restructuring taking place. In addition to those farms dropping or expanding their dairy enterprises the survey found that in both 2006 and 2007 dairy farmers were planning large increases in the number of beef finishing animals (+26% and +22% respectively) and this was seen as evidence of a move into less intensive beef production by some of those farmers leaving dairying (ADAS, 2007). This is consistent with the assessment provided by the OBS02 report.

The June Survey confirms that there is a continuing decline in dairy cow numbers (Table 4.3). The survey shows that nationally between 2005 and 2006 the dairy herd fell by 1.6% and results for 2007 sourced from Cattle Tracing System (CTS)/RADAR data point to a further 1.8% decline. Looking at the regions the greatest rate of decline in dairy cow numbers between 2005 and 2006 occurred in Eastern England (-8%) and the South East (-4.7%). There is also evidence from the 2006 June Survey that the decline in dairy cow numbers is lower in the West of England (West Midlands, 0.9%, North West, +0.4%, South West, -1.6%) compared to the East.
Table 4.3 Dairy cow numbers by region 2005-2006

<table>
<thead>
<tr>
<th>Region</th>
<th>Change 05/06</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>-0.7</td>
<td>-3.4</td>
</tr>
<tr>
<td>North West</td>
<td>-1.2</td>
<td>-0.4</td>
</tr>
<tr>
<td>Yorkshire and Humber</td>
<td>-2.1</td>
<td>-2.0</td>
</tr>
<tr>
<td>East Midlands</td>
<td>-4.6</td>
<td>-4.6</td>
</tr>
<tr>
<td>West Midlands</td>
<td>1.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Eastern</td>
<td>-2.3</td>
<td>-8.0</td>
</tr>
<tr>
<td>South East (inc. London)</td>
<td>-4.5</td>
<td>-4.7</td>
</tr>
<tr>
<td>South West</td>
<td>-7.5</td>
<td>-1.6</td>
</tr>
<tr>
<td>England</td>
<td>-21.1</td>
<td>-1.6</td>
</tr>
</tbody>
</table>

Source: Defra June Survey

Additional evidence was gathered from the lowland livestock and dairy workshop held in June 2007. This evidence supports the view that despite increases in product prices the dairy sector would continue to be subject to significant restructuring over the short to medium term. Environmental legislation was identified as a particularly important factor that would maintain pressure on the industry. It was suggested that much of the dairy sector has been starved of capital investment in buildings and waste handling facilities during a decade dominated by low returns. The impact of this is now becoming apparent, as some farmers will be unable to meet the new environmental regulations. This could prompt a further round of restructuring over the medium term. For those remaining in dairying the impact of the proposed NVZ regulations may result in a divergence of farming practice separated by the NVZ boundary. Within the boundary, current stocking rates were likely to fall and systems become more extensive. There is a possibility that dairy production would move outside the NVZs. Outside the NVZ farmers were likely to focus on intensive high-yield systems based on high stocking rates and an expansion of the area of non-grass feeds such as maize.

The workshop discussed the nature and direction of the current changes taking place within the dairy sector. The anticipated outcomes were very much in line with the OBS02 assessment in that the respondents suggested:

- Continued expansion of production on farms remaining in the industry involving measures to increase yields as well as increasing herd size and farm area;
- Against a national decline in production, a geographical concentration in the South West and North West regions due to slower declines in these regions. Very little production will remain in the uplands (LFAs) unless supported by niche market processing.
- Pressure to reduce costs through targeted input use, particularly fertilizers and an increase in the use of agricultural contractors;
- Less intensive use of land coming out of dairying, with beef finishing being a popular alternative enterprise. However, there were reports of a growing number of farmers deciding against using their land for other livestock enterprises, due to low profitability, and managing it in accordance with GAEC 12 rules.

However, while the OBS02 report identified some apparently significant trends towards conversion to organic dairy production in southwest England, it was felt by
some workshop participants that this option might become less attractive when the current derogation on organic feed is removed in 2008.

4.3 Beef and sheep

As with the assessment of the dairy sector the evidence collected for the beef and sheep sectors to a large degree corroborates the findings of the OBS02 report. Indeed since the production of that report a number of the trends have deepened and there is more evidence on the ground of the nature and extent of the changes taking place. The changes in product prices in these sectors have been much smaller than the changes in the arable sector in the period since 2006 and costs have continued to rise. Thus the 2003 CAP reforms continue to be seen as a driver and magnifier of change, with the direction of change often pre-dating the impact of the reforms. In addition, the recent re-emergence of Foot and Mouth Disease (FMD) and outbreak of Blue Tongue Disease (BTD) could further shake confidence in the industry.

The Farmers Voice Survey 2007 (ADAS, 2007) shows that for the third year in a row more farmers intended to reduce or abandon their suckler enterprises than intended to expand an existing enterprise or start a new one (Table 4.4). The survey also found that almost two thirds of suckler cows were kept on grassland farms, 41% in the lowlands and 17% in the LFAs, and that most of the intended reductions would take place on lowland farms. ADAS sees this as an indication that intentions to reduce suckler cow numbers may have run their course in the uplands. This assessment was however made before the outbreaks of FMD and BTD and the marked increase in feed costs. All of these factors will have an impact on enterprise planning.

Table 4.4 Intended changes in suckler cow numbers between 2005/06/07 and 2010/11/12

<table>
<thead>
<tr>
<th>Intended pattern of change for suckler cows</th>
<th>2005 %</th>
<th>2010 %</th>
<th>2017 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of those with suckler cows that intend to make no significant changes to their herd size</td>
<td>63</td>
<td>52</td>
<td>58</td>
</tr>
<tr>
<td>% intending to cease having suckler cows</td>
<td>8</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>% intending to decrease suckler cows</td>
<td>19</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>% intending to increase suckler cows</td>
<td>14</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>Total No. of respondents currently with suckler cows</td>
<td>273</td>
<td>484</td>
<td>483</td>
</tr>
<tr>
<td>Number of farmers intending to start suckler cow enterprises as a proportion of those with them now,-%</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: ADAS (2007)

At the time of the Farmers Voice survey prices for finished cattle were 6% higher than the previous year and this had instilled a degree of confidence among producers. The survey found that farmers intended to increase the number of finishing beef cattle over the next 5 years by a total of 6% with the greatest percentage increase being on dairy farms (Table 4.5). However, this survey was made before the recent disease outbreaks and dramatic rise in feed prices.

59 Farmers Weekly, 14th September 2007, “Contemplating how to manage higher feed costs".
Table 4.5: Distribution of beef finishing animals across farm type and intended reductions in numbers from 2007 – 2012

<table>
<thead>
<tr>
<th>Farm Type</th>
<th>Cereal/ General Cropping</th>
<th>Dairy</th>
<th>LFA Grazing Livestock</th>
<th>Lowland Grazing Livestock</th>
<th>Mixed</th>
<th>All Farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution of finishing beef (2007)</td>
<td>26%</td>
<td>5%</td>
<td>(4%)</td>
<td>35%</td>
<td>25%</td>
<td>100%</td>
</tr>
<tr>
<td>Intended change in numbers 2007 – 2012</td>
<td>+2%</td>
<td>+22%</td>
<td>(-3%)</td>
<td>+9%</td>
<td>+7%</td>
<td>+6%</td>
</tr>
<tr>
<td>Intended change in numbers (2005 survey)</td>
<td>-10%</td>
<td>+50%</td>
<td>(+3%)</td>
<td>+1%</td>
<td>+2%</td>
<td>0%</td>
</tr>
<tr>
<td>Intended change in numbers (2004 survey)</td>
<td>-18%</td>
<td>+10%</td>
<td>(-17%)</td>
<td>-20%</td>
<td>-10%</td>
<td>-11%</td>
</tr>
<tr>
<td>Intended change in numbers (2004 survey)</td>
<td>-15%</td>
<td>6%</td>
<td>(-6%)</td>
<td>-6%</td>
<td>-18%</td>
<td>-13%</td>
</tr>
</tbody>
</table>

Note: Brackets denote low numbers of respondents (between 21 and 40).

Source: ADAS (2007)

The OBS02 report identified a trend towards the extensification of beef production, with intensive beef finishing becoming increasingly unviable with the transition towards an area based SP. This trend is likely to be magnified and speeded up by the rise in feed prices, which accounts for around to 55% of variable costs (20% of total costs) in intensive beef finishing systems (MLC, 2007). The OBS02 report also anticipated opportunities for the expansion of beef production in marginal arable areas as the move to an area-based SP makes cropping less viable. As might be expected the resurgence of arable prices means that little evidence for this was found in the literature review and at the workshops.

Table 4.6 shows that farmers intend to reduce sheep breeding across all farm types and this pattern has been consistent over the three preceding years. What is apparent from the 2007 figures is that the magnitude of the reduction may be increasing and the largest reduction may now be taking place in the lowlands whereas previously it had been LFA Grazing farms intending to make the largest reductions. Therefore while the OBS02 report identified evidence of increased keeping of sheep in the lowlands this trend may be reversing.
Table 4.6 Distribution of breeding ewes across farm type and intended reductions from 2007–2012

<table>
<thead>
<tr>
<th>Farm Type</th>
<th>Lowland Grazing livestock</th>
<th>LFA Grazing livestock</th>
<th>Dairylivestock Farms</th>
<th>General Cropping/Cereal Farms</th>
<th>All Farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>109</td>
<td>42</td>
<td>126</td>
<td>132</td>
<td>495</td>
</tr>
<tr>
<td>Distribution of breeding ewes (2001)</td>
<td>37%</td>
<td>23%</td>
<td>26%</td>
<td>13%</td>
<td>100%</td>
</tr>
<tr>
<td>Intended change in numbers 2007–2012</td>
<td>-12%</td>
<td>-2%</td>
<td>-3%</td>
<td>-9%</td>
<td>-8%</td>
</tr>
<tr>
<td>Intended change in numbers (2005 survey)</td>
<td>-3%</td>
<td>-3%</td>
<td>0%</td>
<td>-4%</td>
<td>-4%</td>
</tr>
<tr>
<td>Intended change in numbers (2004 survey)</td>
<td>-1%</td>
<td>-5%</td>
<td>-3%</td>
<td>(-11%)</td>
<td>-4%</td>
</tr>
<tr>
<td>Intended change in numbers (2004 survey)</td>
<td>-5%</td>
<td>N/A</td>
<td>-5%</td>
<td>N/A</td>
<td>-4%</td>
</tr>
</tbody>
</table>

Note: The figures showing the distribution of breeding ewes do not add up to 100% as some respondents classified as “pigs & poultry” reported having breeding ewes.

Source: ADAS (2007)

The June Survey provides supporting evidence of the continued re-structuring of the national beef herd through extensification in response to the SPS. The survey recorded a decline in the national beef herd of 1.7% between 2005 and 2006 (Table 4.7) and results using CTS/RADAR data for 2007 show a further fall of 1.3%. In the OBS02 report it was predicted that because of a large decline in number of heifers in calf in the North East, there would be a significant decrease in suckler cow numbers in the coming year (Table 4.8). This now appears to be the case for NE (-4.4%), particularly in the Northumberland area, where it is thought that intensive beef producers are moving into extensive grass-based systems. In 2006, there was a further decline in numbers of heifers in calf and replacements which, although not as great as 2005, suggests a further reduction in beef numbers in 2007.

Table 4.7 Beef (suckler) herd and replacements in England 2005-2006

<table>
<thead>
<tr>
<th>Head (000s)</th>
<th>2005</th>
<th>2006</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef herd</td>
<td>752</td>
<td>739</td>
<td>-1.7</td>
</tr>
<tr>
<td>Beef heifers in calf and replacements (over 2 years)</td>
<td>95</td>
<td>94</td>
<td>-1.0</td>
</tr>
<tr>
<td>Beef heifers in calf and replacements (1 to 2 years)</td>
<td>126</td>
<td>122</td>
<td>-2.8</td>
</tr>
</tbody>
</table>

Source: Defra June Survey
Table 4.8 Beef cow and heifer numbers by region 2005-2006

<table>
<thead>
<tr>
<th>Region</th>
<th>Change 05/06</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>-3.4</td>
<td>-4.4</td>
</tr>
<tr>
<td>North West</td>
<td>-0.8</td>
<td>-0.9</td>
</tr>
<tr>
<td>Yorkshire and Humber</td>
<td>-1.9</td>
<td>-2.2</td>
</tr>
<tr>
<td>East Midlands</td>
<td>-0.4</td>
<td>-0.5</td>
</tr>
<tr>
<td>West Midlands</td>
<td>-1.6</td>
<td>-1.8</td>
</tr>
<tr>
<td>Eastern</td>
<td>-0.7</td>
<td>-1.6</td>
</tr>
<tr>
<td>South East (inc. London)</td>
<td>-2.0</td>
<td>-2.5</td>
</tr>
<tr>
<td>South West</td>
<td>-2.3</td>
<td>-1.1</td>
</tr>
<tr>
<td>England</td>
<td>-13.1</td>
<td>-1.7</td>
</tr>
</tbody>
</table>

Source: Defra June Survey

As Table 4.9 shows the June Survey figures reflect the continued extensification of sheep flocks as farms re-structure following the introduction of the SPS. At an aggregate national level the total breeding flock fell by 1.3% between 2005 and 2006. The December 2006 survey recorded an even greater fall in the breeding flock of 4%. Results for the June Survey 2007 show that the breeding flock has declined by a further 3.4%. The June Survey 2006 shows that two-thirds of this decline in sheep numbers occurred on LFA holdings. This supports the evidence of sheep extensification in the uplands. Ewe numbers have declined mostly in Yorkshire & Humber region (-2.0%), particularly in the Pennine Dales Fringe and North York Moors and Yorkshire Dales, and in the Eastern region (-1.7%). As with dairying there is evidence from the June Survey that the decline in sheep numbers is lower in the West of England compared to the East (South West +0.3%, North West, -0.3%).

Table 4.9 Breeding ewe, shearling and ewe lamb numbers by region 2005-2006

<table>
<thead>
<tr>
<th>Region</th>
<th>Change 05/06</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>-7.0</td>
<td>-1.0</td>
</tr>
<tr>
<td>North West</td>
<td>-3.1</td>
<td>-0.3</td>
</tr>
<tr>
<td>Yorkshire and Humber</td>
<td>-16.7</td>
<td>-2.0</td>
</tr>
<tr>
<td>East Midlands</td>
<td>-3.6</td>
<td>-0.8</td>
</tr>
<tr>
<td>West Midlands</td>
<td>-13.2</td>
<td>-1.4</td>
</tr>
<tr>
<td>Eastern</td>
<td>-2.4</td>
<td>-1.7</td>
</tr>
<tr>
<td>South East (inc. London)</td>
<td>-7.5</td>
<td>-1.4</td>
</tr>
<tr>
<td>South West</td>
<td>4.1</td>
<td>0.3</td>
</tr>
<tr>
<td>England</td>
<td>-49.4</td>
<td>-0.8</td>
</tr>
</tbody>
</table>

Source: Defra June Survey

The workshops were able to provide further insights into the changes taking place at farm level. Participants at both the workshops were in general agreement that the OBS02 report had identified the major changes taking place to both beef and sheep enterprises. However, their views on the economic health and prospects for the livestock sector were by and large more pessimistic than the evidence derived from the literature. Many beef and sheep enterprises were considered to be heavily dependent on cross-subsidisation from the SP. It was thought that the economic situation for all types of livestock producers would deteriorate in the medium term due to increasing costs and depressed product prices. As with the dairy sector, cross compliance and the introduction of environmental legislation was seen as a major factor which would result in a reduction in the number of beef producers as many of these farmers would not be able to afford the investment to upgrade their buildings and waste handling facilities. A finding from the workshops was that, in the short-term
at least, the structure of the beef industry would show a degree of instability and it would be difficult for businesses to plan for the future with any degree of confidence. It is likely that this situation has been exacerbated by the recent return of FMD and the disruption to livestock markets.

According to some workshop participants the impacts of the transition of the SPS to an area base are beginning to be seen in the decisions of large-scale producers who previously benefitted from historically high payments. There are reports of intensive beef producers in the North East moving into extensive grass-based systems.

Since the completion of the OBS02 report there was a perception among some of the workshop participants that the economic situation in the uplands had deteriorated further. Hill sheep breeding was now thought to be less viable than beef production. OBS02 reported that upland farmers were likely to broaden their systems by integrating pure and crossbreeding systems using additional in-bye land and other low-lying land in order to obtain higher margins. Participants at the workshop reported that they had first hand knowledge of the introduction of this type of system. However it was also reported that the depression of the finished lamb market caused by competition from New Zealand and a fall in demand from France was seen as a major threat to this form of adjustment and it was possible that it would not become a major farming strategy until there was a substantial increase in price. Prices may rise in the medium term (3-5 years) but the effect may be cancelled out by reductions in SP.

OBS02 also anticipated that there would be a change in management strategies for common land and rough grazing involving the extensification of sheep production. This was discussed in the workshops and although there were variations in sheep systems throughout the uplands there was a general consensus that dramatic extensification was taking place and that it was likely to accelerate in response to rising input costs and low levels of profitability. The low profitability of hill sheep production, particularly on White Fell in the North West and Yorkshire and Humber regions, continues to threaten the continuation of traditional flock management practices. It was reported that in the North York Moors there are clear signs of super-extensification (i.e. virtual abandonment) on the least productive land. It was also reported that there were few signs of sheep farmers converting to organic production. Distance from markets and the ending of the derogation on organic feedstuffs were cited as contributing factors.

4.4 Impacts of Agri-environment scheme changes

A widely held view among the workshop participants and interviewees was that the Agri-environment schemes are becoming an increasingly important mechanism for environmental protection and enhancement. It was felt that as the full effects of the SPS were felt farmers would be exposed to increasingly volatile markets. A potential impact of this would be that land management practices could be subject to rapid change. Entry into Agri-environmental schemes was seen as a potentially stabilising influence. However, a number of issues were raised concerning the implementation of the schemes. These are summarised as follows:

- ELS is enrolling large numbers of farmers and will cover a significant proportion of England’s farmed land. It has generally been well received among both the farming and stakeholder communities (Boatman et al., 2007). However, recent price rises for agricultural producers, particularly cereals, may make ELS payment rates less attractive to arable farmers. This may result in a fall-off in uptake in the East of England, where farmers find it more difficult to enter the scheme without including some in-field options.
which may restrict crop management and be perceived to potentially affect productivity (Boatman et al., 2007).

• In arable areas there was some evidence that ELS was slowing the decline of spring barley as this land was often covered by the winter stubble option, which was among the more popular of the arable options.

• There were some concerns that HLS was being targeted too narrowly towards the natural environment and biodiversity to the detriment of some of its other primary objectives, especially landscape and historic environment. However, it was also suggested that over the life of the RDPE the focus would broaden, and that the other primary objectives of ES would not be neglected. There was also concern that some options relating to the enhancement of the historic environment were not guaranteed to be accepted by Brussels as part of the RDPE. Stakeholders surveyed during the evaluation of Environmental Stewardship also expressed concerns about HLS targeting procedures and the resources available for HLS. Anecdotal evidence was given in the workshops of individual applications receiving very high HLS scores but still being refused agreements because the land did not contain an SSSI.

• The transfer of land between the old ESA and CS schemes and HLS was discussed at all the workshops. There were reports of farmers coming to the end of their existing schemes and not being able to join HLS. It was suggested that if this happens, there might be a significant area of high environmental value which may be managed in ways that would be more harmful to the maintenance of that value. The ES evaluation also revealed concerns that some land of high, but not the highest, environmental value, could fall through the “gap” in provision between the “broad and shallow” provisions of ELS, and the “narrow and deep” approach of HLS. This issue is recognised but Natural England stresses that it ‘will need to take tough decisions to prioritise Higher Level Scheme funding in those areas which produce the highest environmental benefits’ (Natural England, 2007c). HLS agreements are now being more tightly targeted towards SSSIs and other areas of high conservation value, and farmers have to consult with Natural England, to assess whether or not their holding has any potential for HLS before commissioning a Farm Environmental Plan.

• In some upland areas the continuation of low intensity cattle farming depends on the income from agri-environment schemes and it is possible that cattle farming could disappear completely, if these agreements come to an end and are not replaced with another scheme with similar payment levels. A similar claim was made in respect of hill sheep farming. Once lost, it would be very expensive to reintroduce such enterprises. A perception that hill farmers have difficulty in entering ELS was found in the ES evaluation to be largely due to lack of understanding of the scheme and the options available. On close examination, it was found that most would be able to achieve the necessary points target without too much difficulty. However, the ELS pays farmers a lower rate per hectare than most tier 1 ESA payments. It was reported that in some ESAs, notably the Pennine Dales, farmers would be paid significantly less under ELS and this may affect enrolment in the long-term as farmers completed their existing agreements.

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60 Bishop, J., Garthwaite, D., Jones, N. & Boatman, N. (2007) An evaluation of the relative difficulty encountered by Upland and Lowland grassland farmers in entering ELS. Final report to Defra,
• There may also be a number of unforeseen negative collateral effects of the changes in agri-environment schemes. These relate to the continuation and enhancement of the rural crafts skills base and a range of socio-economic effects. If farms go mostly from ESAs into ELS, they will no longer have access to capital grants for wall and hedgerow maintenance, for example, which may have a detrimental effect on employment in these skill areas. It was suggested that the opportunities for environmental enhancement had become more limited with the introduction of ES as the focus for ELS was protection rather than enhancement.

5. IMPLICATIONS FOR THE ENVIRONMENT
This section is divided into three parts. The first part presents the evidence on farming change and the environment gathered from the literature, workshops and interviews. In part two an updated assessment of the implications of changes to farming practice for the environment is provided. The focus here is on the discussion of new evidence that has led us into drawing different conclusions to those presented in OBS02. In the third part of this section the implications of these changes are considered in terms of Defra’s environmental priorities.

5.1 Farming change and the environment: Update
The following key points of opinion emerged from the workshops and interviews. Again the purpose here is not to repeat the findings of the OBS02 project but to enhance existing information and highlight new findings.

General
• Potentially one of the most important environmental impacts of the 2003 CAP reforms is the suite of cross compliance conditions that accompanies the SPS. In total 97% of the land that is eligible for the scheme is now enrolled and this means it has to be managed in accordance with GAEC rules. As cross compliance is one of the areas that will be reviewed in the November 2007 ‘CAP health check’ there is potential that GAEC may undergo further strengthening.

• A current weakness of GAEC is that undergrazing is not adequately covered and as this report has shown reduced stocking leading to environmental problems caused by undergrazing will be a significant process in the future. It was reported that, in some areas, extensification on the commons and rough pastures of the uplands had increased in pace since the OBS02 report.

• As the previous section has shown, decoupling and the transition to an area-based SP leave farmers more exposed to market fluctuations. During the practitioner workshops it was suggested that such potential economic volatility would encourage some farmers to include a number of short-term strategies in their business planning. This may involve various aspects of land management including rental agreements and contract farming. There was potential for the management control over substantial areas of land to change hands on a regular basis. It was suggested that environmental impacts would vary depending on factors such as land quality and location. However, environmental restoration and enhancements that require long-term management may now be more difficult to achieve.

• It was reported in OBS02 that there would be more regional specialization and simplification of production systems based on comparative advantages in natural resources. This theme was taken up and enhanced during the
practitioner workshops and interviews. It was suggested that these trends were leading to an increased use of farm contractors and that the contracting businesses themselves were increasing in size. It was suggested that the increasing scale of contracting operations over an expanding area of land might have negative environmental impacts. These included the mistiming of time sensitive operations, such as maize harvesting, and the homogeneous management of large areas of land, which could be detrimental to biodiversity, farmland birds and landscape appearance.

- Simplification and specialization of production were also identified as processes that were leading to reductions in habitat and landscape diversity in the core arable areas of the East and dairying areas of the South West.
- There was a perception that ‘lifestyle’ farming was on the increase and that the environmental impacts were beginning to show in different parts of the country.
- There was general agreement that the environmental footprint of agriculture in general and dairying in particular, will be improved by the various forms of environmental regulation (NVZ, WFD and Integrated Pollution Prevention Control (IPPC)). Tightening of environmental legislation will result in greater precision in the targeting of inputs with associated environmental benefits. However, it was suggested that there may be significant cost implications for many farm businesses, notably in the livestock sector, and some of these will be unable to adapt and will stop production. This may lead to negative impacts on the environment caused by a reduction in farm labour and environmental management. In CSF areas in the lowlands there are suggestions that upland farmers may be causing problems through increased stocking rates and increased soil compaction on in-bye land. If upland farmers increase the off-wintering of stock on lowland pastures they may simply be moving the problem down the hill.
- A return to profitable farming, for some sectors, may encourage greater investment in environmental maintenance and enhancement as part of ‘good farm management’.

**Arable sector**

- The specialisation and simplification of arable systems will result in a decline in habitat diversity. In particular farmland bird populations will decline in areas where there is a move away from the habitat heterogeneity provided where potatoes and sugar beet are grown alongside wheat and oilseed rape. Block cropping leads to a reduction of biodiversity and landscape interest.
- While there had been a significant increase in oilseed rape cropping for biofuel markets this has not had any major direct environmental impacts as inputs and management practices are the same irrespective of the end market use. Only 30% of the rape grown for industrial end uses (including biofuels) has been grown on set-aside in recent years, where it can be argued there is potential for a greater environmental impact. However, the reduction of the set-aside rate to zero for the 2008 cropping season, and most likely beyond, means that cropping areas will increase irrespective of the drive towards increasing use of UK oilseeds for biofuel feedstocks, as farmers take up the opportunity to exploit additional market potential in a less constrained market.
- It is clear is that there are concerns that the environmental benefits of set-aside could be diminished if large areas are returned to arable cropping or to
more intensive grassland (Natural England, 2007a&b). This is reflected in action taken by Defra to monitor the environmental impacts of changes to set-aside (Defra, 2007c) and by the EU Commission’s plans to investigate what steps to take to preserve the environmental benefits from set-aside as part of the November 2007 CAP health check (South West UK Brussels Office, 2007). However, it was suggested that it will be quite difficult to determine at this stage what the environmental impacts of 0% set-aside will actually be, because the environmental benefits conveyed by set-aside depend on a number of factors including: the type of set-aside (rotational or non rotational), location, management and farmers’ attitude towards conservation.

• The National Farmers Union (NFU) argues on the one hand that less than 4% of the 363,000 hectares of compulsory set-aside in England is classified as being of “conservation value”, and on the other hand, much of the land in permanent or semi-permanent set-aside will not be brought back into production.

Dairy Sector

• There are signs that farmers coming out of milk production are not using their land as intensively. Extensive beef enterprises have been popular alternatives for some farmers while others are managing land according to GAEC 12 standards. There were also suggestions that if cereal prices remain high there would be potential for some of the land that is released from dairying being transferred into arable production. It was noted that the replacement of grassland by cropping may have a detrimental effect on soil conservation, particularly in areas with high rainfall that are associated with the core dairy regions.

• The decline in dairy cow numbers was likely to have less impact on the environment in terms of emissions than previously predicted due to the trend towards larger animals which produce more gas output per animal.

• The increased use of contractors in dairying may be creating environmental problems, as many operations are time critical (e.g. maize harvesting).

• The further concentration and specialization of dairy production may increase the risk of major hazardous events on such holdings.

• The reduction of dairy farming in the uplands was leading to a reduction in habitat and landscape diversity.

Livestock sector

• There was little sign of low intensity beef farming increasing in the uplands. Current economic conditions and small margins suggested that there would not be any significant increase in such systems in short term. Cattle movement regulations were identified as a prohibitive cost when economic margins were still very small. Potential conflicts between cross compliance regulations out-wintering cattle were also raised. It was suggested that while out wintering could significantly reduce costs, farmers perceptions of the risk of failing inspection were preventing more of them taking up this type of system. Overall the general feeling was that low intensity beef farming was in decline and that this had a negative impact on the environment in terms of

Set-aside substitute not the answer for farmland birds NFU Press release 31 August 2007
www.nfualine.com/x22521.xml

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biodiversity. The recently introduced ES options for grazing may be beneficial but it was too early to identify any impact.

- There is likely to be a continuation of the extensification of sheep flocks in response to rising input costs and low levels of profitability. More extensive use of low productive grasslands and commons was set to continue. In some cases this will lead to environmental damage, in other cases there will be improvements. For example, it was suggested that extensification was bringing environmental benefits to the rough grazing land in parts of the Yorkshire Dales while the same process was having a negative impact on much of the North York Moors. However, taking the uplands as a whole, opinion from the workshops and interviews suggest that the potential for environmental damage was greater if undergrazing remained unregulated.

- Reduced stocking rates will lead to an improvement in water quality if they are evenly spread around water catchments. However, if the practice of off-wintering sheep increases this may cause compaction problems on lower lying land, depending on management. This may have a detrimental impact on water quality.

5.2 Updating the environmental implications

A large part of the evidence collected for this report supports the assessment made by OBS02 concerning the current and potential impacts of farm change on the environment. It was clear from the evidence collected from the workshops and interviews that the long-term assessment (+5 years) of the likely environmental impacts of CAP reform remains essentially the same (summarised in Tables 3 & 4 of OBS04). However, what is also clear from Sections 3 and 4 of this report is that a series of unanticipated market events has occurred since OBS02 which have had a significant impact upon farmers and their management decisions. The impacts of these events have led us to revise parts of our assessment of the potential environmental impacts - on soils, water, air, biodiversity landscape and the historic environment - over the short to medium term (up to 5 years) for the arable and livestock sectors.

Revised arable sector impacts

Cropping

It is likely that there will be a significant increase in crop area, due to the return to cropping of land formerly in set-aside. This means the expected benefits for soil, water and air associated with increased fallow land will not arise. On previous set-aside/fallow land a return to cropping will increase soil erosion, nitrate leaching and the production of nitrous oxide. An increase in agro-chemical applications will increase potential sources of pollutants. The biodiversity benefits of set-aside will be reduced, possibly leading to a further decline in the Farmland Bird Index, and increased cultivation may threaten some forms of buried archaeology.

Biofuels

The increase in the cultivation of energy crops in the EU is also predicted to boost fertiliser use according to the European Fertiliser Manufacturers Association in its annual report, ‘Forecast of Food, Farming and Fertiliser Use in the European Union’. The report states that for the first time in a decade, world trends for the fertiliser

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63 CSL & CCRU 12006) OBS04: The environmental implications of the 2003 CAP reforms in England
64 2006 Agra Europe Weekly. December 22, No. 2239
industry are largely positive and forecasts that a moderate increase in nitrogen consumption will be seen in Europe as farmers opt to grow energy, instead of food, crops. However, this contradicts studies that suggested that there would be little difference in the environmental impact of growing wheat and oilseed rape crops for biofuel instead of food, as there would be little difference in agronomic management (Turley et al., 2005). Whilst some studies suggest that leached nitrogen from rapeseed was 20% - 30% less than wheat (University of Bologna, 2006) others (Turley et al., 2005) state that oilseed rape poses a higher risk of leaching than wheat due to relatively high levels of residual fertility left behind after harvest. The move towards increasing recognition of, and use of, carbon accreditation of biofuel feedstocks could influence crop management practices, encouraging reduction in tillage cultivation and nitrogen use (if compensating premiums are available). Encouraging reductions in the intensity of soil cultivation should contribute to reducing nitrate leaching and the risk of soil erosion.

Sugar beet inputs
The mixed environmental implications of the anticipated reduction in area of sugar beet were discussed in OBS02 (beet tops are used by pink footed geese and by skylarks and stone curlews when the land is sown, however the risk of soil damage is higher than under cereals). These are still anticipated although they will be delayed due to the short-term increase in beet planting reported for 2007/08.

Livestock in arable areas
It is unlikely that there will be significant growth of intensive or extensive livestock enterprises in arable areas. This will lessen the threat of localised soil compaction and poaching leading to soil erosion and nutrient loss. There will also be none of the environmental problems associated with the management of animal waste. However, there will also be none of the potential benefits for terrestrial biodiversity arising from greater habitat diversity and increased food resources associated with livestock and their waste products. This is of particular concern in those parts of Eastern England that have been planning targeted arable reversion to re-create grazed marshes and other important semi-natural grazed habitats and landscapes.

Revised livestock sector impacts

Replacement of beef by sheep
The replacement of beef cattle with sheep is unlikely to be a significant trend over the medium-term and therefore the threat to biodiversity from a reduction in habitat quality is unlikely to materialise.

Extensification on rough pasture
As a result of the practitioner workshops and interviews with environmental experts it was clear that in some upland areas there was potential for the abandonment of agricultural management on the high fell, moorland and/or commons. The environmental impacts would depend on the characteristics of the area concerned and the current grazing intensity. Research published since the OBS02 report (Nisbet and Shere, 2006) has identified the main impacts of reduced grazing pressure on biodiversity, the historic environment and landscape. The complete withdrawal of grazing animals would eventually result in large-scale scrub formation, which could have a negative impact on habitat value for open moorland species if the habitat were not maintained by other methods such as controlled burning. However, some reduction in grazing pressure on currently heavily grazed sites is likely to be
beneficial for many species, and limited scrub formation on such sites could have benefits for some species such as black grouse.

Scrub growth will also result in a loss of visible archaeology and damage to buried archaeology through root penetration, where these occur. Uncontrolled scrub growth will also increase the risk of wild fires and these will pose a threat to both visible and buried archaeology.

Significant changes at the landscape scale are also likely to occur in the uplands and Nisbet and Shere (2006) note that on the one hand ‘landscape changes are likely to be viewed as negative by those with a close association landscape either through residence or frequent visits’, while on the other hand ‘some changes may be viewed more positively such as the development of scrub which gives a more gradual, naturalistic transition between enclosed farmland and open moorland.’

5.3 Implications for Defra’s environmental priorities

The OBS02 report provided an assessment of the implications of the 2003 CAP reforms for Defra’s environmental priorities. This assessment has been updated and takes into account new evidence collected during the course of this project. Table 5.1 summarises the key changes in our assessment.
Table 5.1 Summary of environmental impacts of CAP reform

<table>
<thead>
<tr>
<th>Defra environmental priority</th>
<th>Impact</th>
<th>Predicted changes as a result of CAP reform OBS02</th>
<th>Updated assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>Compaction</td>
<td>Increase due to larger more intensive dairy farms, variable pattern in arable areas - some increase with block cropping, some decrease due to more fallow/less risky crop types</td>
<td>A reduction in set-aside/fallow now likely in the medium term (3-5 years), which could increase soil damage. Some decrease in compaction where previous dairy land is put to less intensive alternative uses. Localised increase in compaction due to expansion of sheep crossbreeding and fattening</td>
</tr>
<tr>
<td>Erosion</td>
<td>Increase due to more maize in dairy areas, decreases from more fallow, lower stocking in hills and cross compliance effects from GAEC soil plans</td>
<td>Decrease in set-aside/fallow now likely in the medium term – implies more erosion risk in arable areas</td>
<td></td>
</tr>
<tr>
<td>Soil organic matter</td>
<td>Highly variable according to location and farm type</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td>Microbiology</td>
<td>Damage from more horse keeping, more concentrated large dairy farms, benefits from shifts out of beef into sheep in some areas</td>
<td>Shift out of beef into sheep less likely in the short term so benefits reduced</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>Benefits from more extensive practices in many areas, but this also suggests reduced liming. Where stocking intensifies on upland in-bye, expect more liming here, too. Anticipate more acid grassland/vegetation on open moors</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td>Heavy Metals</td>
<td>Could see more of both of these - not a direct result of CAP reform, though: more driven by other factors</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>Nitrate pollution</td>
<td>Increased problems where cattle systems intensify, decreased where systems shift from dairy to extensive beef and sheep. Some benefits where more land is fallowed if winter cover exists, some potential benefits from more organic farming, horse keeping and crops grown for biofuels or niche markets</td>
<td>Decrease in set-aside/fallow now likely in the medium term. Decreased benefits for water quality in arable areas. Possibly reduced organic interest and reduced benefits. No benefits from more biofuels</td>
</tr>
<tr>
<td>Phosphate pollution</td>
<td>Similar pattern to that described for soil erosion. Also, any increase in outdoor pigs likely to have negative impacts</td>
<td>Decrease in set-aside/fallow now likely in the medium term. Decreased benefits in arable areas</td>
<td></td>
</tr>
<tr>
<td>Defra environmental priority</td>
<td>Impact</td>
<td>Predicted changes as a result of CAP reform</td>
<td>Updated assessment</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------</td>
<td>---------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Water (cont.)</strong></td>
<td>Pesticide pollution</td>
<td>Arable areas likely to see some changes - balance of cost/benefit depends upon precise patterns of crop change. Less spring barley, more wheat bad for fungicides, more peas bad, more fallow good but more glyphosate may be used as fallow management, which could then become a greater problem. Dairy to beef shifts and upland extensification generally good, but more sheep in some areas could increase sheep dip problems/issues.</td>
<td>High prices mean wheat area likely to be maximised within rotational constraints; oilseed rape also likely to increase. Pesticide use likely to increase as crops replace set-aside.</td>
</tr>
<tr>
<td>Water levels</td>
<td>FVP prevents significant vegetable increases, so CAP unlikely to have direct effect in this way. Minor and highly variable impacts likely.</td>
<td>Localised expansion of vegetable production as FVPs removed. Potential increase in demand for irrigation water with negative impacts on environment</td>
<td></td>
</tr>
<tr>
<td>Organisms, fish and amphibians.</td>
<td>Similar to comments on nitrogen and phosphorus</td>
<td>Decrease in set-aside/ fallow now likely in the medium term. Decreased benefits</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>Ammonia</td>
<td>Fewer housed cattle/reduced stock numbers in many areas should bring benefits. Localised increased problems where intensive dairy and intensive beef develop/concentrate</td>
<td>Increase in intensive beef production less likely in the medium term. Fewer detrimental impacts</td>
</tr>
<tr>
<td></td>
<td>Nitrous oxide</td>
<td>Less money and incentive to maintain drainage, possible decrease in fertiliser use</td>
<td>Further price-driven reduction in fertiliser use in the medium term. Potential benefits.</td>
</tr>
<tr>
<td></td>
<td>Methane</td>
<td>Lower stock numbers should be beneficial</td>
<td>No change</td>
</tr>
<tr>
<td></td>
<td>Particulates</td>
<td>Decreased wind erosion likely due to less cropping and GAEC soil plans, possibly benefits from reduced machinery use to save costs.</td>
<td>More cropping now likely to take place in the medium term. Reduced benefits</td>
</tr>
<tr>
<td></td>
<td>Pesticides</td>
<td>See above. Potential increase in vineyards could cause localised increases (but minimal areas involved)</td>
<td>More cropping now likely to take place in the medium term. Reduced benefits</td>
</tr>
<tr>
<td>Defra environmental priority</td>
<td>Impact</td>
<td>Predicted changes as a result of CAP reform</td>
<td>Updated assessment</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------</td>
<td>------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Biodiversity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invertebrates</td>
<td>Assemblage</td>
<td>Increase in arable monocultures favouring increase in certain species, but reducing diversity. Less spring barley more wheat will increase use of fungicides impacting on some invertebrates. More precise targeting of pesticides will be beneficial. Increase in set-aside on marginal arable areas will provide ground cover and habitats for invertebrates. Conversion of cereals to energy crops on less productive arable land.</td>
<td>Increase in set-aside and conversion of cereals to energy crops unlikely to take place in the medium term. Reduction of set-aside could reduce habitat value for invertebrates and birds. High uptake of marginal options in ELS may partially compensate for the loss of set-aside.</td>
</tr>
<tr>
<td>Dispersal</td>
<td></td>
<td>Increased for some species where arable block cropping. Benefits from increased set-aside on marginal areas.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Negative implications for dispersal. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td>Survival</td>
<td></td>
<td>More targeting of pesticides and increase in minimum tillage to reduce costs will provide benefits. Reduction in water quality from dairy intensification will reduce survival. Increase in set-aside on marginal land will provide benefits.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. May affect availability of floral resources for bees, butterflies etc. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td>Birds</td>
<td>Survival</td>
<td>More targeting of pesticides will benefit invertebrate food source (see above). Increase in minimum tillage will improve crop residue and weed seed availability thus improving food supply. Increase in set-aside on marginal land benefits birds by providing nesting and feeding ground.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. May reduce over winter survival of some species. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td>Abundance</td>
<td></td>
<td>Increase in arable monocultures and block cropping will decrease abundance of particular birds.</td>
<td>Loss of set-aside likely to reduce populations of some species. High uptake of marginal options in ELS may partially compensate for the loss of set-aside.</td>
</tr>
<tr>
<td>Defra environmental priority</td>
<td>Impact</td>
<td>Predicted changes as a result of CAP reform</td>
<td>Updated assessment</td>
</tr>
<tr>
<td>-----------------------------</td>
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<td>---------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Birds (cont.)</td>
<td>Food sources</td>
<td>More targeting of pesticides will benefit invertebrate food source (see above). Increase in minimum tillage will improve crop residue and weed seed availability thus improving food supply, although less spring barley more wheat will reduce winter stubble availability and food availability. Increased arable monoculture will reduce diversity of food sources. Some benefits from more set-aside on marginal land, some potential benefits from more organic farming and horse keeping.</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Loss of set-aside could affect bird populations through reduced food availability. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td>Shelter</td>
<td>Some benefits where more land is fallowed if winter cover exists. Increase in minimum tillage will improve cover for nesting. Livestock extensification will reduce trampling and improve cover for ground nesting birds</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
<td></td>
</tr>
<tr>
<td>Breeding</td>
<td>Increase in minimum tillage will improve cover for ground nesting birds. Less spring barley more wheat will reduce winter stubble cover</td>
<td>Loss of set-aside likely to reduce breeding densities of skylark and may reduce breeding success of other species. High uptake of marginal options in ELS may partially compensate for the loss of set-aside.</td>
<td></td>
</tr>
<tr>
<td>Mammals</td>
<td>Abundance</td>
<td>Variable pattern in arable areas - decrease due to arable monocultures, but increase due to more set-aside and fallow on marginal land. Better targeting of pesticides will be beneficial</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Potential for reduced mammal abundance in these areas. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
</tr>
<tr>
<td>Food sources</td>
<td>Increase in set-aside on marginal areas will benefit</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Fewer food sources available. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
<td></td>
</tr>
<tr>
<td>Shelter</td>
<td>Maintenance of hedgerows will provide benefits. Increase in set-aside on marginal areas will benefit</td>
<td>Set-aside likely to disappear and fallow land likely to reduce in the medium term. Reduced shelter. High uptake of marginal options in ELS may partially compensate for the loss of set-aside/fallow.</td>
<td></td>
</tr>
<tr>
<td>Defra environmental priority</td>
<td>Impact</td>
<td>Predicted changes as a result of CAP reform</td>
<td>Updated assessment</td>
</tr>
<tr>
<td>-----------------------------</td>
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<td>---------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Mammals (cont.)</td>
<td>Breeding</td>
<td>Concentration of intensive grass conservation production in some areas due to larger intensive dairy farms.</td>
<td>No change</td>
</tr>
<tr>
<td>Plants</td>
<td>Abundance</td>
<td>Decrease in arable areas due to reduction in grass as break crop as arable rotations simplified. Increase in minimum tillage and greater targeting of herbicides as costs are cut resulting in more perennial and annual weed species. Livestock extensification resulting in increased abundance on grasslands. Loss of beef cattle will be detrimental to grassland diversity.</td>
<td>High prices mean wheat area likely to be maximised within rotational constraints; oilseed rape also likely to increase. Loss of set-aside will reduce abundance of arable species. Maintenance of beef cattle herds will be beneficial in the short term</td>
</tr>
<tr>
<td>Diversity</td>
<td></td>
<td>Variable pattern in arable areas - increase in block cropping will reduce variety, whilst increase in non-cropped areas on marginal land will improve diversity. Replacement of fertilisers with animal slurries to cut costs may reduce diversity. Replacement of spring barley with winter wheat will reduce diversity.</td>
<td>Marginal land less likely to come out of cropping in the medium term. High prices mean wheat area likely to be maximised within rotational constraints; oilseed rape also likely to increase. Loss of set-aside will reduce diversity.</td>
</tr>
<tr>
<td>Landscape &amp; Hist. Env.</td>
<td>Pattern</td>
<td>Increase in organic practices likely to add more local variety to landscape. Block cropping in arable areas will reduce landscape diversity. Zones of large pasture and forage conservation areas created around large dairy farmsteads. Significant impacts due to habitat changes on moorland resulting from livestock removal.</td>
<td>No change</td>
</tr>
<tr>
<td>Historic/cultural features</td>
<td>Survival</td>
<td>Restructuring of farms and field units along with reduction in labour will leave many cultural features vulnerable to neglect, damage and removal. Maintenance and enhancement of cultural features on those farms adopting ES</td>
<td>Reduction in the renovation of historic features under ELS by comparison with ESAs and CS. Potentially fewer farms have access to HLS, so net reduction</td>
</tr>
<tr>
<td>Archaeology</td>
<td>Survival</td>
<td>Extensification of upland grazing leading to damage to visible and buried archaeology. Maintenance and enhancement of archaeological sites features on those farms adopting ES</td>
<td>Maintenance and enhancement not guaranteed under ELS. Funding for HLS insufficient to cover all important sites.</td>
</tr>
</tbody>
</table>

Source: Based on Table 2 of the OBS04 report
5.4 Issues for further investigation

What this report clearly shows is that CAP reform is only one of a number of drivers that affect farm level management practices and that the influence of CAP reform can change in magnitude relative to these other drivers. The report also shows that detailed short-term monitoring is required to provide early warning of potentially harmful changes that may lead to environmental damage. The suite of environmental indicators developed by the Observatory will provide valuable time-series data which should be used to inform and frame more detailed investigations into the causes and environmental consequences of farm level change.

In addition to the gap analysis prepared for OBS02 our updated assessment of the implications for the environment of the 2003 CAP reforms has identified the following issues for further investigation:

- The potential environmental effects of the 0% rate for set-aside in relation to product price change. Baseline monitoring is vital to allow assessment of future changes;
- Further work on the impact of agri-environment schemes on land management practices. In particular the management of land coming out of the existing ESA and CS schemes and the management of landscape and historic environment under Environmental Stewardship;
- The influence of market prices on the uptake and nature of Environmental Stewardship agreements. In particular the take-up of in-field options;
- The environmental impact of ‘lifestyle farming’;
- The environmental impacts of farm level restructuring across all farming systems but in particular, beef and sheep systems in the uplands;
- The implementation and environmental impact of GAEC requirements, especially those conditions not covered by previous provisions, regulations etc, e.g. the 2m field margin requirement;
- The nature and extent of agricultural contracting and its environmental impact;
- The prospects for biofuels and biomass energy crops in relation to market price movements and policy signals, and environmental impacts of changes in production of these crops.
REFERENCES


Agra Europe (2006a) UK farmers reinvest after SFP problems, Agra Europe, 6th October, p. N2

Andersons the Farm Business Consultants Ltd (2005) Andersons Outlook


CCRU & CSL (2006b) Environmental impacts of CAP Reform – Assessment of implications of farm level changes on environmental outcomes (OBS02), report prepared for the Defra Agricultural Change and Environment Observatory by the Countryside and Community Research Unit and the Central Science Laboratory. URL: http://www.defra.gov.uk/farm/policy/observatory/research/pdf/obs02.pdf
CCRU & CSL (2006c) Quantitative approaches to assessment of farm level changes and implications for the environment (OBS03), report prepared for the Defra Agricultural Change and Environment Observatory by the Countryside and Community Research Unit and the Central Science Laboratory. URL: http://www.defra.gov.uk/farm/policy/observatory/research/pdf/obs03.pdf


RBU and SAC (2005) Farm Level Economic Impacts of Energy Crop Production, report to Defra


ANNEX 1: RESEARCH STAGES

This project builds upon the OBS02 project carried out during the first year of the Observatory programme and has adopted the same approach. The approach uses an iterative process involving repeated comparison, synthesis and critical evaluation of data from six key sources on the nature and extent of farm change and its environmental implications. The first stage of the project involved a detailed literature review covering the causes and consequences of farm change, along with an analysis of the June Survey, to identify key trends and patterns. These were then tested and elaborated upon during consultations with a range of experts and practitioners so that validation and refinement of the trends and patterns could take place. This approach combined both qualitative and quantitative data sources in a process of cross-analysis and reflection.

Initial literature review and data analysis

An initial literature review covering formal and informal sources and ongoing research projects was carried out between May and June 2007 and key implications distilled for each of three main classes/situations of farms:

- Cropping farms – including arable and horticultural holdings;
- Lowland livestock and dairy farms;
- Upland farms, which will be almost exclusively livestock farms with mainly sheep and beef production.

To complement the review, a rapid analysis of Defra June and December Survey data for 2005-2006 and the provisional figures for June 2007 was conducted to look for any signs of the kinds of change predicted from the literature, or for any potentially contradictory trends.

Workshops and additional practitioner interviews to identify farm changes

Three workshops with practitioners were held around the country:

- A lowland livestock and dairy workshop in Taunton on 27th June 2007;
- A hill and upland farming workshop in Penrith on 2nd July 2007;
- An arable and horticulture workshop in Peterborough, on 5th September 2007.

At these events, a selected group of invitees including public and voluntary sector farm advisers, scheme extension officers, land agents, farmers and farmer representatives was brought together for a half-day’s discussions. A morning discussion session examined the changes that had taken place since the original OBS02 project and what changes there were likely to be in the future.

Following these events, a small number of face-to-face interviews was undertaken to pick up detail on specific sectors or specific concerns raised at the workshops which could not be covered in those events, due to a lack of appropriate expertise around the table. These particularly sought to cover the more specialist farm sectors/outputs and the extent to which CAP reforms might affect them over the coming years.

The workshops and interviews involved as many of the original OBS02 contacts as possible. This enabled the attendees and interviewees to reflect upon any perceived changes that had taken place during the intervening period.
Literature update

From the workshops and from continued scanning of emerging reports and reviews in the relevant media sources, an update to the literature review was undertaken in August and September 2007.

Interviews with selected environmental-agricultural impact specialists

To update and enhance the findings of the OBS02 report on the environmental impacts of farm level change interviews were carried out with 13 environmental experts in August and September 2007. Where possible the same people were interviewed as in OBS02 and asked to provide an updated assessment of current and potential future change.
ANNEX 2: LIST OF WORKSHOP ATTENDEES AND PROGRAMME SUMMARY

Lowland pastoral, dairy and mixed farming workshop: Taunton, 27th June 2007

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Crabb</td>
<td>Natural England (SW – dairy and beef)</td>
</tr>
<tr>
<td>Julie Edwards</td>
<td>National farmers Union regional representative</td>
</tr>
<tr>
<td>Elaine Jewkes</td>
<td>Institute of Grassland and Environmental Research</td>
</tr>
<tr>
<td>Diana Spence</td>
<td>Farm Advice Unit Livestock Specialist, Natural England</td>
</tr>
<tr>
<td>Alex Meletiou</td>
<td><strong>Land Agent, Somerset County Farms Team</strong></td>
</tr>
<tr>
<td>Ian Ball</td>
<td><strong>Natural England Regional Advocacy and Partnership team</strong></td>
</tr>
<tr>
<td>Matthew Heaton</td>
<td>Natural England organic livestock specialist</td>
</tr>
<tr>
<td>James Grischeff</td>
<td>Natural England</td>
</tr>
<tr>
<td>Pete Gaskell</td>
<td>Countryside and Community Research Institute</td>
</tr>
<tr>
<td>Julie Ingram</td>
<td>Countryside and Community Research Institute</td>
</tr>
<tr>
<td>Genevieve Groom</td>
<td>Countryside and Community Research Institute</td>
</tr>
</tbody>
</table>

Hill and upland farming workshop: Penrith, 2nd July 2007

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ian Condliffe</td>
<td>Ex RDS Upland Technical Advice Specialist, Associate CCRI</td>
</tr>
<tr>
<td>Will Cockbain</td>
<td>National farmers Union regional representative</td>
</tr>
<tr>
<td>Bill Grayson</td>
<td>Farmer</td>
</tr>
<tr>
<td>Andy Dyer</td>
<td>H &amp; H Bowe (chartered surveyors, land agents)</td>
</tr>
<tr>
<td>Mervyn Edwards</td>
<td>Natural England</td>
</tr>
<tr>
<td>Mervyn Lewis</td>
<td>Askham Bryan College</td>
</tr>
<tr>
<td>Adrian Shepherd</td>
<td>Yorkshire Dales National Park and ANPA</td>
</tr>
<tr>
<td>Geoff Brown</td>
<td>Fells and Dales LEADER +</td>
</tr>
<tr>
<td>Ian Soane</td>
<td>The International Centre for the Uplands, Penrith</td>
</tr>
<tr>
<td>Martin Staveley</td>
<td>Cumbria Vision Penrith</td>
</tr>
<tr>
<td>Stephen Chaplin</td>
<td>Natural England, Evidence Team and the Observatory steering group</td>
</tr>
<tr>
<td>Jonathan Bradley</td>
<td>Natural England Uplands Team Leader, National Evidence team</td>
</tr>
<tr>
<td>Andrew Humphries</td>
<td>Former Vice Principal of Newton Rigg and small holder</td>
</tr>
<tr>
<td>Peter Gaskell</td>
<td>Countryside and Community Research Institute</td>
</tr>
<tr>
<td>Jane Mills</td>
<td>Countryside and Community Research Institute</td>
</tr>
<tr>
<td>Genevieve Groom</td>
<td>Countryside and Community Research Institute</td>
</tr>
</tbody>
</table>

Arable and horticulture workshop: Peterborough, 5th September 2007

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oliver Lee</td>
<td>Andersons Consultants</td>
</tr>
<tr>
<td>Rachel Carrington</td>
<td>National farmers Union</td>
</tr>
<tr>
<td>Chris Stoate</td>
<td>Game Conservancy Trust</td>
</tr>
<tr>
<td>Liz Bridges</td>
<td>Natural England</td>
</tr>
<tr>
<td>Roger Wraight</td>
<td>Consultant and regional representative for British Institute of Agricultural Consultants (BIAC)</td>
</tr>
<tr>
<td>Pete Gaskell</td>
<td>Countryside and Community Research Institute</td>
</tr>
<tr>
<td>Julie Ingram</td>
<td>Countryside and Community Research Institute</td>
</tr>
</tbody>
</table>
Farming sector workshop programme

10.30  Arrival and coffee
11.00  Round table introductions and welcome from CCRI
11.10  Introduction to the workshop – aims and purpose (Peter Gaskell)
11.15  Summary of literature review and data analysis findings, followed by facilitated discussion to examine participants’ views about the validity of the findings. Exploring other issues that may have been missed.
12.30  Lunch
1.30   Current and future responses: Facilitated discussion.
2.30   Finish and depart

Defra Agricultural Change and Environment Observatory workshop: London, 21st August 2007

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Cawley</td>
<td>Defra Agricultural Change and Environment Observatory</td>
</tr>
<tr>
<td>Lindsey Clothier</td>
<td>Defra Agricultural Change and Environment Observatory</td>
</tr>
<tr>
<td>Steve Langton</td>
<td>Defra Agricultural Change and Environment Observatory</td>
</tr>
<tr>
<td>Stephen Chaplin</td>
<td>Natural England, Evidence Team and the Observatory steering group</td>
</tr>
<tr>
<td>Pete Gaskell</td>
<td>Countryside and Community Research Institute</td>
</tr>
<tr>
<td>Janet Dwyer</td>
<td>Countryside and Community Research Institute</td>
</tr>
</tbody>
</table>

Defra Agricultural Change and Environment Observatory workshop programme

10.30  Arrival and coffee
11.00  Outline of emerging findings of current research compared to last year’s (CCRI), brief discussion
11.30  Observatory internal work programme: key findings and points of relevance (Defra), discussion
       Other Defra and agency new projects of relevance, discussion as necessary
       Looking ahead: thoughts on the future Observatory Programme (all)
12.40  Finish and depart
ANNEX 3: LIST OF INTERVIEWEES AND INTERVIEW GUIDE

List of environmental experts interviewed

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owen Davies</td>
<td>ADAS</td>
<td>Landscape and ecology</td>
</tr>
<tr>
<td>Bob Evans</td>
<td>Anglia Ruskin University</td>
<td>Soils</td>
</tr>
<tr>
<td>Mike Hutchins</td>
<td>Centre for Ecology and Hydrology</td>
<td>Water quality</td>
</tr>
<tr>
<td>Colin Neal</td>
<td>Centre for Ecology and Hydrology</td>
<td>Water and aquatic biodiversity</td>
</tr>
<tr>
<td>Richard Pywell</td>
<td>Centre for Ecology and Hydrology</td>
<td>Biodiversity (systems/invertebrates)</td>
</tr>
<tr>
<td>Jeremy Lake</td>
<td>English Heritage</td>
<td>Landscape</td>
</tr>
<tr>
<td>Steve Trow</td>
<td>English Heritage</td>
<td>Historic environment</td>
</tr>
<tr>
<td>Phil Grice</td>
<td>Natural England</td>
<td>Biodiversity (birds/general)</td>
</tr>
<tr>
<td>John Holland</td>
<td>Game Conservancy Trust</td>
<td>Biodiversity (birds and invertebrates)</td>
</tr>
<tr>
<td>David Chadwick</td>
<td>IGER</td>
<td>Air</td>
</tr>
<tr>
<td>Jerry Tallowin</td>
<td>IGER</td>
<td>Landscape and ecology</td>
</tr>
<tr>
<td>Mark Robins</td>
<td>RSPB</td>
<td>Biodiversity (birds)</td>
</tr>
<tr>
<td>Tim Thom</td>
<td>Yorkshire Dales National Park Authority</td>
<td>Biodiversity (uplands)</td>
</tr>
</tbody>
</table>

Additional less formal correspondence/assistance was given by:
Lynne Walker, Council for British Archaeology;
Vince Holyoake, English Heritage;
Robert White, Yorkshire Dales National Park Authority.

Question list for interviews with environmental specialists

1. Thank them for agreeing to be interviewed. Ask permission to record the interview (So that we don’t miss any important points and to help with writing up).

2. Explain the purpose of the research: to build upon the work we did last year which investigated the emerging and likely environmental impacts of the 2003 CAP reforms in England. Remind the interviewee that last year they provided very useful information on how changes to the different farming sectors were likely to impact on the environment.

3. Say that this year we have undertaken a literature review and workshops and it is becoming clearer how farmers are adjusting to the reforms. Say that we are now looking to update and clarify how the changes are affecting or likely to affect different aspects of the environment. That’s where the current interviews come in.
4. Check to see if the area/areas of expertise is/are the same as last year:
   • Biodiversity (species and/or habitats, and which ones)
   • Landscape
   • Historic environment
   • Water (ecology, hydrology, pollution)
   • Soils
   • Air and/or climate change
   • Other: please note
     • -or just particular aspects of these: eg grazing impacts upon sward diversity, etc.
   • From this, decide which of the three area/farm type categories is most relevant to their knowledge: arable, LFA or lowland livestock, or any two, or all three.

5. Talk through the key points identified from last year’s interview and ask if anything has changed given that another year has passed? Has any new evidence come to light in the intervening period? Then ask what these changes are likely to mean for their environmental areas of expertise: which things are likely to be affected (attributes or systems), and in what ways? What might be beneficial for the environment, and what might be detrimental, in their view?

6. Update the interviewee on what we have found out this year (that has not already been covered by Q5). Briefly talk through the key trends that we have identified in the workshops and lit reviews that relate to their areas of expertise. Then ask what these changes are likely to mean for their environmental areas of expertise: which things are likely to be affected (attributes or systems), and in what ways? What might be beneficial for the environment, and what might be detrimental, in their view?

7. How might the changes develop over time and why? – can they say what is likely to change when, and how patterns of change might develop – ie from medium-term (5 years) to long term (beyond 5 years)? What are the possible uncertainties that might impact on these projections?

8. What other factors might complicate any interpretation of these changes – are there other influences that could have a bigger effect than the sorts of changes we have picked up in relation to CAP reform?

9. Briefly outline Defra’s environmental priorities

10. What are the implications of the changes they have identified for Defra’s environmental priorities?

11. Is there any other key literature summarising or detailing some of the issues we have discussed here in a particularly relevant way, that we should look at? If so, please provide references.
List of additional practitioners interviewed

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciaran Gannon</td>
<td>Defra RDS technical advice unit (for pigs and poultry)</td>
</tr>
<tr>
<td>Rob Forster</td>
<td>National Beef Association</td>
</tr>
<tr>
<td>John Thorely</td>
<td>National Sheep Association</td>
</tr>
<tr>
<td>Jim Hill</td>
<td>National Trust</td>
</tr>
<tr>
<td>Martin Lainsbury</td>
<td>The arable group (for sugar)</td>
</tr>
</tbody>
</table>

Additional less formal correspondence/assistance was given by:

Leslie Gore, Bolton Abbey Estate;
Jane Burch, CLA Eastern Region;
Darren Stretton, Cereals Team, Defra.
ANNEX 4: DOCUMENTS CONSULTED DURING THE LITERATURE REVIEW


Andersons the Farm Business Consultants Ltd (2005) Andersons Outlook


Blake, A. (2006) "HLS hassles put application on ice". Farmers Weekly, 15th December, p. 58


CCRU & CSL (2006b) Environmental impacts of CAP Reform – Assessment of implications of farm level changes on environmental outcomes (OBS02), report prepared for the Defra Agricultural Change and Environment Observatory by the Countryside and Community Research Unit and the Central Science Laboratory. URL: http://www.defra.gov.uk/farm/policy/observatory/research/pdf/obs02.pdf

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Clarke, P. (2006) "Breathing space for hills as HFS is continued". Farmers Weekly, 15th December, pp. 6-7


Farmers Guardian (2007a) Additional Sugar Support Farmers Guardian, 01/03/07.

Farmers Guardian (2007b) Is Energy Aid worth applying for this year?, 11/05/07.


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Ongoing Research


IDEMA: The Impact of Decoupling and Modulation in the Enlarged Union: a sectoral and farm level assessment (6th Framework Programme project). URL:

RELU projects

Management Options for Biodiverse Farming
Project Status: Ongoing
Type of Project: Research Project
Principal Investigator: Prof William Sutherland, University of Cambridge

Improving the Success of Agri-Environment Schemes
Project Status: Ongoing
Type of Project: Research Project
Principal Investigator: Dr James Bullock, CEH Dorset

The Sustainability of Hill Farming
Project Status: Ongoing
Type of Project: Research Project
Principal Investigator: Dr Paul Armsworth, University of Sheffield

Impacts of Increasing Land Use under Energy Crops
Project Status: Ongoing
Type of Project: Research Project
Principal Investigator: Dr Angela Karp, Rothamsted Research
Sustainable Uplands: Frameworks for Adaptive Learning  
Project Status: Ongoing  
Type of Project: Research Project  
Principal Investigator: Dr Klaus Hubacek, University of Leeds

Modelling the Impacts of the Water Framework Directive  
Project Status: Ongoing  
Type of Project: Research Project  
Principal Investigator: Prof Ian Bateman, University of East Anglia  
URL: http://www.uea.ac.uk/env/c serge/research/relu/index

SAC Centre For Rural Policy Analysis  
Management of biodiversity change - policy implications  
Project Manager: D.I McCracken  
Start Date: 01/04/2006 End Date: 31/03/2011

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Protection and Enhancement of Landscapes and Rural Communities. URL:  
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This research is funded by the Scottish Executive, and runs from April 2006 to March 2011.  
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