Land Use Policy Group

The UK statutory conservation, countryside and environment agencies

Retaining the Environmental Benefits of Set-Aside

A Policy Options Paper

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The Land Use Policy Group

The Land Use Policy Group (LUPG) of the UK statutory nature conservation, countryside and environment agencies comprises the Countryside Council for Wales, Natural England, Environment Agency, Environment and Heritage Service of Northern Ireland, Joint Nature Conservation Committee and Scottish Natural Heritage.

The LUPG aims to advise on policy matters of common concern related to agriculture, woodlands and other rural land uses. It seeks to improve understanding of the pros and cons of policy mechanisms related to land use, particularly farming and forestry; to develop a common view of desirable reforms to existing policies; and to promote these views.

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Scottish Natural Heritage

Scottish Natural Heritage (SNH) is a government body established to secure conservation and enhancement of Scotland's unique and valued natural heritage – the wildlife, habitats and landscapes that have evolved in Scotland through long partnership between people and nature. SNH advises on policies and promotes projects that aim to improve the natural heritage and support its sustainable use. It's aim is to help people to enjoy Scotland's natural heritage responsibly, understand it more fully and use it wisely so it can be sustained for future generations.

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The Environment Agency (EA) is the leading public organisation for protecting and improving the environment in England and Wales. The EA achieves this by regulating industry, waste and water quality; managing flood risk and water resources, and improving wildlife habitats in addition to many other activities. The EA also monitors the environment,
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www.ehsni.gov.uk

Joint Nature Conservation Committee

The Joint Nature Conservation Committee (JNCC) is the statutory adviser to Government on UK and international nature conservation. Its work contributes to maintaining and enriching biological diversity, conserving geological features and sustaining natural systems.
JNCC delivers the UK and international responsibilities of the four country nature conservation agencies - Council for Nature Conservation and the Countryside, the Countryside Council for Wales, Natural England and Scottish Natural Heritage.
www.jncc.gov.uk

Disclaimer

This report was produced by the authors on behalf of the Land Use Policy Group (LUPG). The views expressed within the report are those of the contractors and do not necessarily reflect the views of the agencies within LUPG.

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EXECUTIVE SUMMARY

It seems likely that set-aside will be abolished following the proposed Common Agricultural Policy (CAP) 'Health Check' in 2008. There appears to be general agreement that the primary purpose of set-aside to reduce surplus production of cereals is no longer needed and its removal will contribute to the simplification of the CAP.

In light of this change, this paper aims to put forward policy options for retaining the environmental benefits of set-aside. This includes summarising the extent and type of set-aside in the UK and the EU, the environmental benefits and disbenefits of set-aside and the evidence of why these benefits need to be retained in the future.

Set-aside in the UK comprises around 559,000 ha or 3% of the utilised agricultural area (UAA). Set-aside ranges from 0% to 13.9% of UAA across EU Member States. In addition to area, there are considerable national and regional variations in terms of type and use of set-aside. It is estimated that around 48% of set-aside in the EU is rotational, and 52% is non-rotational. The proportion of set-aside used for industrial crops in the EU ranges from 2% to 33%, with the UK figure being 14%.

Set-aside provides a range of environmental benefits, many of which could be lost if a suitable replacement policy is not established. Key beneficiaries of set-aside include breeding birds, although wintering birds, invertebrates and plants also gain significantly. Set-aside also provides an important function in terms of reducing inputs, buffering watercourses and other habitats, linking habitats and protecting soils. A valuable feature of set-aside is that the environmental benefits are widely distributed across the countryside, although they are probably greatest within relatively intensive arable landscapes. The benefits are very dependent on the type, location and management of set-aside. Energy crops grown on set-aside also provide significant environmental benefits in terms of helping to reduce greenhouse gas emissions to mitigate climate change.

In the current and future policy context, the EU can ill afford to lose the environmental benefits presently provided by set-aside. A replacement policy for set-aside could secure these benefits and thereby contribute to targets related to biodiversity (priority habitats and species, farmland birds, special sites); water quality (linked to the Water Framework Directive); soils; and climate change. Current and future influences of farmland are unlikely to diminish the need for retaining these benefits.

The policy options for retaining the environmental benefits of set-aside need not only to deliver the main benefits across the countryside but also be in line with broader EU and Member State strategic policy objectives. These include: public payments for public environmental goods and services; simplification of the CAP; freeing up the market and improving competitiveness; and developing renewable energy sources.

In light of these objectives and principles, four main policy options have been identified, developed and appraised. These are:

1. **Extend Cross Compliance** to include elements which safeguard general environmental protection benefits currently delivered by set-aside;
2. **Develop Agri-Environment Schemes** (in terms of scope and budget) to incorporate specific environmental maintenance and enhancement benefits currently delivered by set-aside;
3. **Develop Environmental Set-Aside** to oblige and guide farmers to retain on-farm environmental benefits through the selection of appropriate environmental land management options.
4. **Develop Energy Crop Schemes** to support energy crop growing on all land as part of a coherent package of measures designed to support biofuel and biomass production, subject to the development of safeguards to minimise/mitigate adverse environmental effects.

Our assessment suggests that the most realistic and beneficial way to retain the environmental benefits of set-aside would be to develop a package in which:

- General, countrywide, environmental protection benefits arising from set-aside are delivered through adapted cross-compliance conditions;
- Specific, high value, environmental benefits arising from set-aside are delivered through agri-environment scheme targeted measures; and
- The environmental benefits arising from energy crop growing are maintained and enhanced through a single, simple energy crop scheme.

There are however risks or concerns associated with the above approach. Firstly there are likely to be increasing limitations on the amount of Pillar 2 funding available for agri-environment scheme expenditure in the future. Secondly as the single payment reduces in value (as a result of modulation to pay for agri-environment scheme expenditure *inter alia*), the influence of cross-compliance will also decrease, particularly for commercial commodity producers, as the costs may well begin to outweigh the benefits. Thirdly, the continuation of energy crop production subsidies may not be the best way to achieve greenhouse gas reductions, demand-side mechanisms may be more effective in the long term. These risks and concerns will need to be appraised carefully as a suitable replacement policy for retaining the environmental benefits of set-aside is developed and refined over the next few months.

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1 Introduction

1.1 Background

The environmental impacts of set-aside have been explored by a number of studies in recent years. The results have generally shown that set-aside has been beneficial to the environment in certain ways, particularly for biodiversity and water quality. Less directly, the growing of energy crops on set-aside land has the potential to help tackle climate change. These benefits are however very dependent on the type and location of set-aside and its subsequent management.

Now it seems likely that set-aside will be abolished following the proposed Common Agricultural Policy (CAP) 'Health Check' in 2008. Accordingly, if the environmental benefits of set-aside are to be retained, a suitable replacement policy or policies will need to be found. This is the focus of this report.

1.2 Aim and Objectives

The aim of this project is to provide the Land Use Policy Group (LUPG) with a policy options paper for retaining the environmental benefits of set-aside. The views in this report are those of the consultants and not necessarily those of LUPG.

Specific objectives of the report are as follows:

- To explain the rationale for set-aside policy and its development, and now its abolition;
- To summarise how much set-aside there is across the UK and European Union (EU) if possible, where it is and how it is used;
- To outline what types/uses of set-aside there are in the UK and other Member States, including: rotational and non-rotational, blocks and strips, what percentage is used for growing industrial crops, how much is managed for environmental reasons etc.;
- To provide a summary of research findings on the environmental benefits / dis-benefits of set-aside, both in the UK and in other Member States, including: resource protection, biodiversity and landscape etc; timescales for set-aside to deliver environmental benefits; and impacts of different management practices on environmental value of set-aside land;
- To provide a summary of evidence of why we need to retain the positive benefits e.g. for meeting biodiversity, water and climate change outcomes;
- To summarise the current and future pressures on / drivers for change of farmed land and hence set-aside, particularly the desirability / likelihood of biofuels being grown on previous set-aside land;
- To put forward policy options for retaining the environmental benefits of set-aside, exploring mechanisms available (regulation as well as incentive) and to consider the public cost of these.

1.3 Methodology

The methodology used to undertake this work is set out below, in brief:

1. Collate and review documents and data relevant to set-aside, its environmental benefits and possible future policy options.
2. Develop a number of policy options and appraise these systematically.

3. Consult a number of informed individuals to test and refine these policy options.
4. Produce a draft and final report, incorporating comments from the LUPG.

2 Rationale for set-aside: its establishment, development and potential abolition

2.1 Introduction and development of set-aside

The European Commission (EC) first introduced set-aside into the CAP in 1988 as a supply control mechanism in response to the over production of cereals and increased public sector expenditure on these surpluses during the 1980s.

The first incarnation of set-aside was as the 'Five-Year Voluntary Set-Aside Scheme'. In this scheme, producers could retire 15% or more of their land from arable rotation for a period of five years in return for an annual payment. There was relatively small uptake of the scheme although some producers opted to retire all their land from arable production.

The scope and importance of set-aside changed significantly with the **MacSharry reforms of the CAP**, agreed in 1992 and implemented in 1993. These reforms were introduced to bring European agricultural support measures into a form to reach agreement during the Uruguay Round of negotiations. 'Obligatory' set-aside was introduced as part of a package of measures including direct payments for farmers, lower levels of price support and less market intervention. Supply control, to which set-aside contributed, enabled the EU to meet World Trade Organisation (WTO) commitments particularly constraints on the volume of and expenditure on subsidised exports, as well as reducing the budgetary costs of disposing of surpluses.

Under 'Obligatory' set-aside, farmers were required to set-aside a given percentage of their area under cereal, oilseed and protein (COP) crops as a pre-requisite for obtaining direct payments through the Arable Area Payment Scheme (AAPS). 'Obligatory' set-aside could be either rotated around or kept on the same areas of the farm. Set-aside areas needed to be over 0.1ha in size and at least 10m wide. Farmers received a payment for set-aside which was same rate as that paid for land in cereals and maize. Producers with a land area of supported crops under a specified ceiling were however exempt from the 'Obligatory' set-aside requirement

While there was no logical framework established for the 1992 CAP reform, nor for 'Obligatory' set-aside, assessors subsequently derived a rationale for the measure, from legislative instruments and Commission working papers (Oréade-Brèche, 2002), this included four specific aims:

- Contributing to market balance by reducing surplus production
- Developing non-food crops
- Maintaining a quality environment
- Helping to maintain small farmers.

In the period 1993-2004, the rules governing set-aside changed many times generally lessening the supply control effect and placing greater emphasis on set-aside's secondary objectives of environmental improvement and the production of non-food crops. Although set-aside had originally been introduced with supply control objectives in mind, it quickly became apparent that land diverted from production also delivered environmental benefits, so set-aside could help offset some of the environmental problems associated with operation of the CAP. The promotion of industrial crops on set-aside was deemed appropriate for various

reasons including the delivery of non-market benefits (e.g. the reduction of emissions from fossil fuels) and the production of recyclable or bio-degradable products.

Specific changes over the period 1993-2004 included:

- Changes in the proportion of eligible (AAPS) land that must be set-aside, this varied between 5% and 17.5%.
- The introduction of fixed (or non-rotational) set-aside as opposed to rotational set-aside, the only form available at the outset.
- The introduction of Voluntary set-aside, whereby farmers could set-aside up to a maximum of 50% of their eligible land.
- The introduction of Guaranteed set-aside, whereby farmers could undertake to set-aside the same land for five years in return for a guaranteed payment rate.
- The broadening of set-aside to encompass support for non-food crops, to help environmental protection and to deliver biodiversity benefits

The **Mid Term Review of the CAP**, agreed in 2003 and implemented in 2005, brought about more changes to CAP, including in the decoupling of agricultural support payments in 2005 and their replacement with the Single Payment Scheme (SPS).

Set-aside was affected by these changes, but not as much as expected given earlier proposals by the EC for compulsory, long-term 'environmental' set-aside to be delivered as part of cross-compliance.

A significant change which did occur was the requirement for land to be set-aside from all arable land, rather than just COP crops. For the first time, this resulted in set-aside being applied to land used for general cropping and temporary grass, consequently affecting its spatial distribution. The reason for this change is unclear but may have related to: the need to spread the burden of set-aside across all farming sectors for equity reasons; the desire to spread the potential environmental benefits of set-aside across more land; and/or the impracticality of treating some arable land uses differently to others under the new SPS regime.

Under the SPS, farmers over a minimum threshold received a proportion of their Single Payment entitlements as set-aside entitlements. These must be claimed against land managed as set-aside and claimed before any other payment. In other words, the set-aside requirement is a condition for the receipt of other payments. The value of set-aside entitlements is the same as the relevant regional area payment.

The set-aside requirement (% of eligible land required to be set-aside) varies from region to region. While there is no provision for voluntary set-aside under the SPS, land may be withdrawn from production provided it meets cross-compliance requirements. Set-aside entitlements once established can also be transferred to other farmers, with or without land

Similar management requirements and rules apply to set-aside under SPS as AAPS, although some changes were introduced as follows:

- Land set-aside must be maintained in good agricultural and environmental condition (GAEC)
- For justified environmental reasons, the minimum area of set-aside is 0.05ha and the minimum width is 5m[1].
- Land under agri-environment or woodland schemes that meets the description of 'arable land' under the SPS can count towards set-aside requirement.

[1] For example, set-aside can be used as 5m buffer strips along watercourses or field margins in England.

- Energy crops grown on set-aside need not be subject to a contract with a processing company and the growing of Short Rotation Coppice is now permitted on set-aside.
- Certified organic farmers can now use set-aside land as forage area.

At the same time as the introduction of the SPS, the Environmental Stewardship scheme was introduced in England with a wide range of options designed to protect and enhance the agricultural environment. Some of these are specifically intended to work alongside and enhance the environmental benefits of set-aside. Similar schemes have been introduced in other parts of the UK and in some other Member States such as France, where agri-environment options on set-aside have helped provide wildlife habitat (e.g. Little Bustards).

2.2 Potential abolition of set-aside

The future role and existence of set-aside has been called into question in recent years and months, particularly since the decoupling of agricultural support in 2005 and now looking ahead to the CAP 'Health Check'[2] of 2008.

The key question marks over the value and requirement for set-aside are set out below:

Firstly economic evaluations have questioned the efficiency of set-aside purely as a method of supply control. Economic theory suggests that set-aside is a second best policy, or worse; regulation of supply by output price being more efficient than set-aside (CRER, 2001). Several forms of policy inefficiency associated with set-aside have been identified as follows (LMC, 2005):

- The creation of 'deadweight' when set-aside payments were made on land that would have been left fallow in the absence of set-aside;
- Full set-aside payments being made on low productivity land, leading to the problem of 'slippage' (the removal of a given percentage of land from production resulting in a smaller reduction in crop output);
- Higher budgetary cost for "non-production" than would have been the case if there had been no set-aside and consequent "over-production", at least in some years;
- Loss of producer surplus with non-EU cereal producers (and, in particular, the US government) being the main beneficiaries from set-aside, which raised world market prices.

Secondly, there now appears to be little logic for the supply control objective of set-aside in a decoupled world, where market prices guide farm decisions. Limiting production runs counter to the philosophy behind the decoupling of agricultural support, one of the reasons behind the surprise expressed by commentators when set-aside was retained in the Mid Term Review agreement.

Thirdly, even if there is some value in supply control, and this remains an objective of set-aside, the widening of the definition of arable land under the Mid Term Review agreement means that set-aside is much less effective at targeting and limiting cereal production than it used to. Even before decoupling, the link between compulsory set-aside and reducing supply was weakening, as evidenced by the increasing use of voluntary set-aside.

Fourthly, the effectiveness of set-aside as a supply control measure has lessened after enlargement, since the new member states do not need to apply compulsory set-aside (LMC, 2005).

[2] The CAP reform agreement of 2003 provided for a review to be carried out in 2008. This is now generally referred to as the "CAP Health Check".

Fifthly, while there may be strong arguments for encouraging a variety of non-food crops, coupling of these support policies with set-aside is unhelpful. Schemes for promotion of non-food (including energy) crops could be developed independently, offering more security and stability for this increasingly important sector.

Sixthly, in the same way, while there is increasing emphasis on delivering environmental public goods and services through CAP, there are other, more effective ways of doing this than through set-aside. This is the domain of rural development measures such as the Environmental Stewardship scheme in England.

Lastly, there remains public unease with set-aside which is still associated with "paying farmers to do nothing". This sentiment was put across well by Lord Greaves during a debate in the House of Lords in 2005:

> *"..The whole concept of set-aside, as we have known it, does not have general public support. People think it is stupid to pay people for not growing things on land. They have a great deal of justification for feeling that. In the longer run we must move either to a system in which set-aside means something quite different—where it means something positive and not something negative—or, alternatively, move towards a situation where set-aside is no longer part of the regime…".*
>
> [Lord Greaves, Lords Hansard Text 2 March 2005]

Building on these various concerns, the EC Commissioner for Agriculture and Rural Development Mariann Fischer Boel has made a number of statements indicating her desire to abolish set-aside as part of the CAP 'Health Check'.

Mrs Fischer Boel referred to set-aside on 3rd October 2006, stating that the health check would offer an opportunity to make policy simpler:
"Set-aside is a good example of the sort of measure I am talking about. Paying farmers to leave land fallow was logical when farmers received subsidies based on production. It is much less logical in the post-reform era. To abolish set-aside would lift a heavy administrative burden."
[Farmers Weekly 6.10.06]

Mrs Fischer Boel then told the UK House of Commons EFRA Select Committee on 16th October 2006 that the issues to be covered by the CAP Health Check would include full decoupling, increasing compulsory modulation to fund rural development, removing set aside restrictions, capping single payments, abolishing intervention and in the dairy sector the possible abolition of the quota regime.

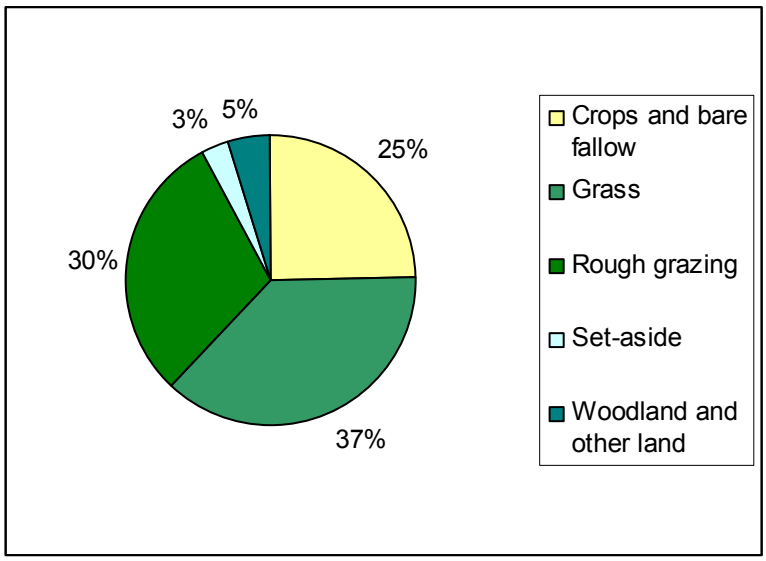
However, in a recent statement on the adoption of the EC's energy package on 10th January 2007, Mrs Fischer Boel highlighted the need to sustain and increase energy crop production noting the role of energy crop growing on set-aside land as part of the strong contribution made by the CAP to the achievement of biofuels objectives.

These statements highlight the desire to abolish set-aside but at the same time retain its various environmental benefits.

3 Extent, distribution, type and use of set-aside

3.1 Extent of set-aside

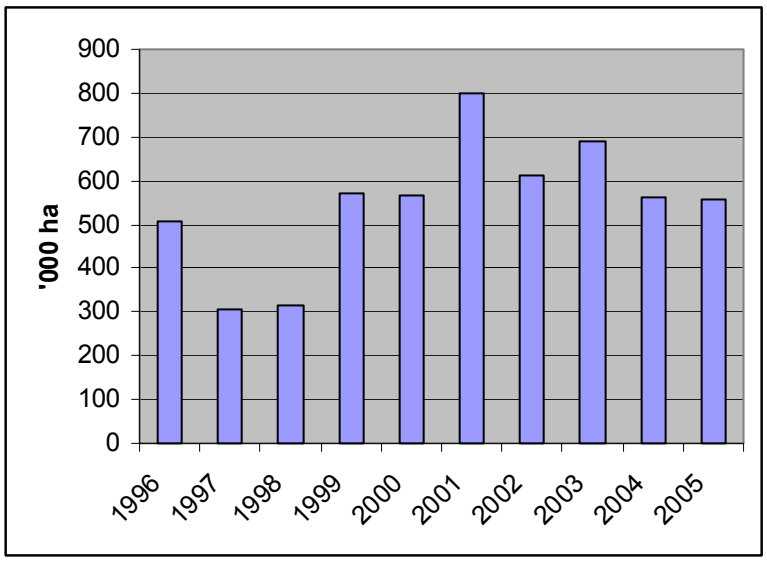
The total agricultural area in the UK in June 2005 was 18.5 million hectares, of which 3% or 559,000 ha was set-aside. The breakdown of the set-aside area is illustrated in Figure 3-1.



Source: Defra June Survey, 2001 and 2006

Figure 3-1: UK Agricultural Land Use 2005

The area under set-aside has varied considerably with changes in the official set-aside rate, economic and climatic factors. Figure 3-2 illustrates fluctuating set-aside levels ranging between 306,000ha in 1997 to 800,000ha in 2001. The major increase in 2001 was as a result of flooding and poor crop establishment conditions in 2000.



Source: Defra June Survey, 2001 and 2006

Figure 3-2: UK Set-Aside Area 1996-2005

The impact of SPS in its first year appears to have been relatively small. It should be noted however that in 2005 land left fallow has jumped well over 100,000ha due to the way in which farmers can record set-aside. In particular, voluntary set-aside can be recorded by farmers as set-aside or fallow. For example, a farmer who is obliged to have 10ha of set-aside but decides to leave 20ha uncropped can record it as either 10ha set-aside and 10ha fallow, or 20ha set-aside.

The increase in fallow under SPS is in one sense a continuation of the trend for farmers to set-aside more land than they need to. Table 3-1 illustrates the difference between compulsory set-aside and actual set-aside over the period 1996 to 2005. The figures suggest that 'set-aside is increasingly being used as a regular part of an arable rotation rather than being seen as an imposition' (University of Cambridge, 2006). It remains a popular option despite payment being no longer directly linked to total area set-aside.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Compulsory set-aside rate	10	5	5	10	10	10	10	10	5	8% (Lowland England)
Actual set-aside rate[1]	11.7	7.0	7.2	13.2	12.9	18.3	14.0	15.6	12.9	12.1[2]
Voluntary set-aside (the difference between compulsory and actual)	1.7	2	2.2	3.2	2.9	8.3	4.0	5.6	7.9	4.1

1. Calculated as the set-aside area as a proportion of total area of wheat, barley, oilseed rape, beans, peas and set-aside.
2. Actual set-aside rate for 2005 includes fallow and is based on different 'arable crops' to 1996-2004 period.

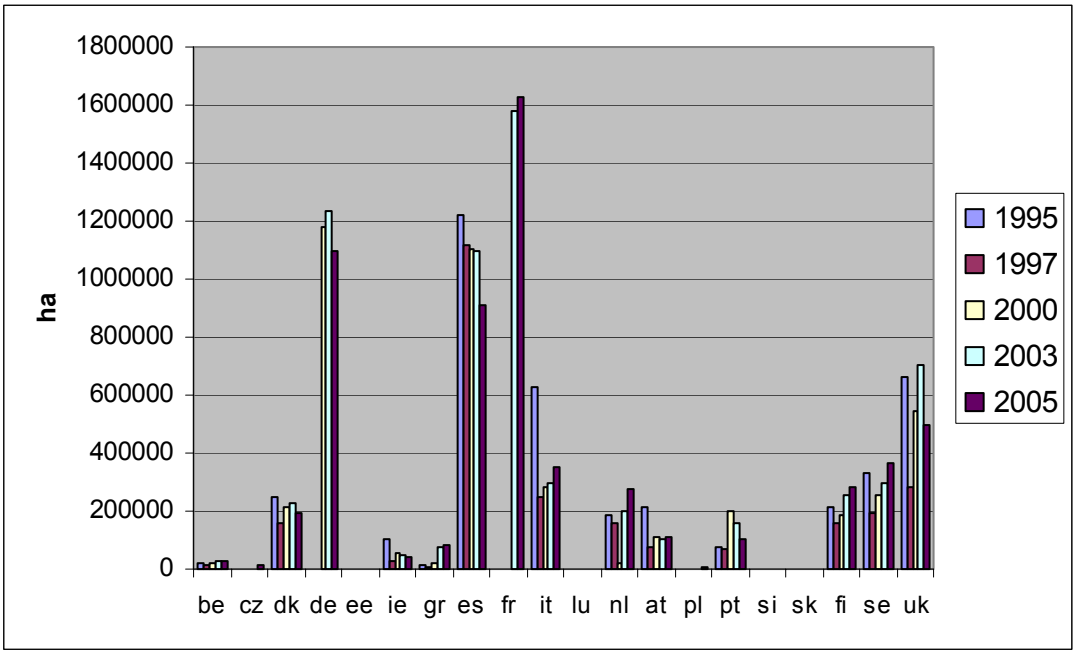
Source: 1996-2004 figures: University of Cambridge, 2006
2005 figures: Defra ACEO, 2006

Table 3-1: Compulsory and Actual Set-Aside Rates 1996-2005

European Perspective

In 2005, the UK accounted for 8% of set-aside across the whole of Europe with the fourth largest area. Figure 3-3 illustrates that France, Germany and Spain have far greater areas of land under set-aside at 1.6million ha, 1.1million ha and 0.9million ha respectively reflecting their larger agricultural area and accounting for 27%, 18% and 15% of set-aside across Europe respectively.

The overall trend for set-aside in countries such as Netherlands, Finland and Sweden is increasing, conversely in Spain it is decreasing. Germany follows a similar fluctuating trend to that of the UK in response to compulsory set-aside rates, climatic and economic conditions. The increase in set-aside in France in 2005 is likely to be explained by the fact that set-aside/fallow is classified as a single category under the new regime.



Source: Eurostat, 2006

Figure 3-3: Area of Set-Aside across Europe 1995-2005

The extent of set-aside varies significantly across the EU25. The table below shows the extent of set-aside, and set-aside as a percentage of total agricultural area is zero or very low amongst new member states; whereas in countries such as the Netherlands, Finland and Sweden set-aside accounts for more than 10% of agricultural land.

Country	Set-Aside (ha)	Utilised Agricultural Area (ha)	Set-Aside (% of UAA)	Country	Set-Aside (ha)	Utilised Agricultural Area (ha)	Set-Aside (% of UAA)
Belgium	26,140	1,385,580	1.9%	Lithuania	0	2,792,040	0.0%
Cyprus	0	151,500	0.0%	Luxembourg	3,040	129,130	2.4%
Czech Republic	12,550	3,557,790	0.4%	Malta	0	10,250	0.0%
Denmark	193,920	2,589,800	7.5%	Netherlands	272,430	1,958,060	13.9%
Germany	1,097,710	17,035,220	6.4%	Austria	108,840	3,266,240	3.3%
Estonia	370	828,930	0.0%	Poland	4,390	14,754,880	0.0%
Ireland	41,220	4,219,380	1.0%	Portugal	104,890	3,679,590	2.9%
Greece	86,170	4,016,340	2.1%	Slovenia	2,130	485,430	0.4%
Spain	911,840	24,855,130	3.7%	Slovakia	2,130	1,879,490	0.1%
France	1,630,940	27,590,940	5.9%	Finland	280,080	2,263,560	12.4%
Hungary	0	4,266,550	0.0%	Sweden	362,070	3,192,450	11.3%
Italy	354,060	12,707,850	2.8%	United Kingdom[3]	494,000	15,894,260	3.1%
Latvia	0	1,701,680	0.0%				

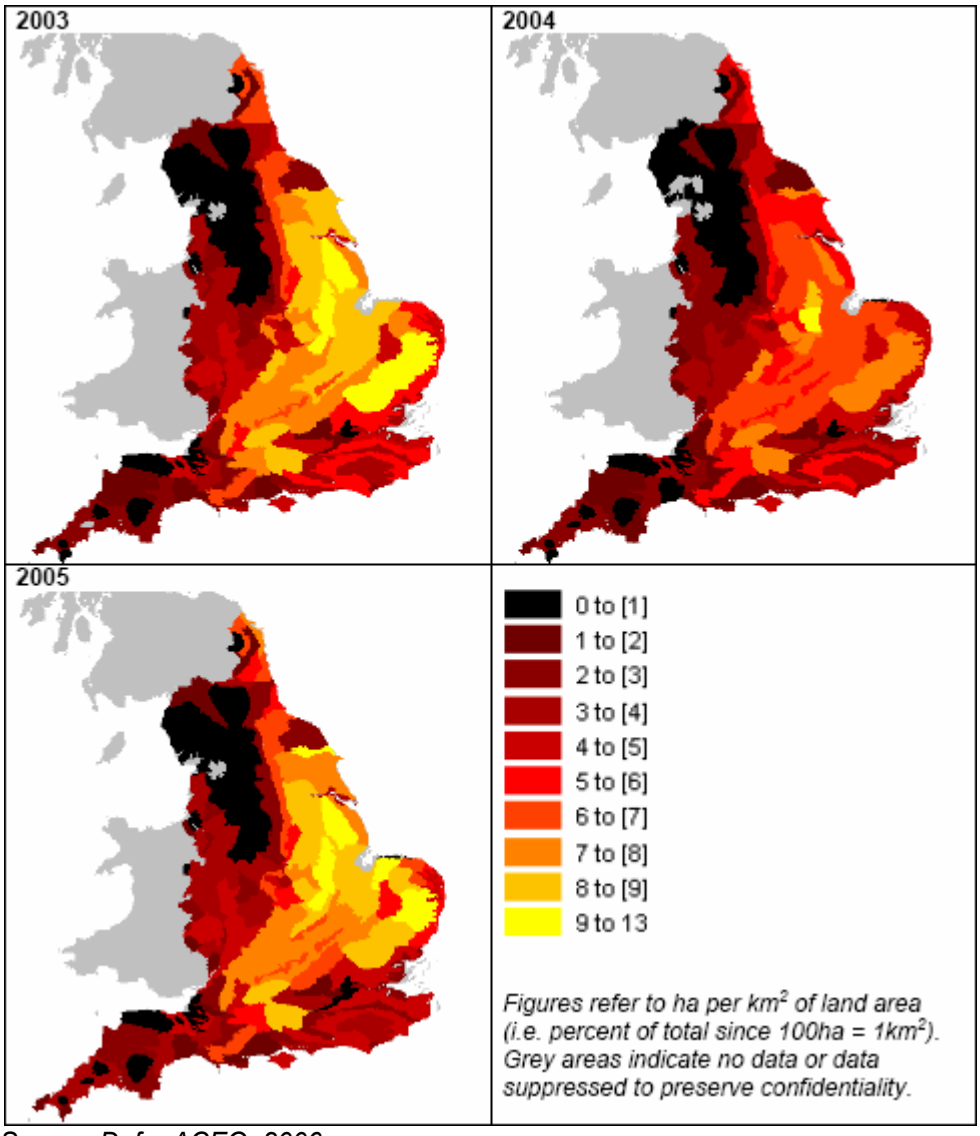
Source: Eurostat, 2006

Table 3-2: Total Set-Aside Area and Set-Aside as a Percentage of Total Agricultural Area across the EU25 2005

[3] Note the UK figures shown here relate to Utilised Agricultural Area whereas those figures shown at the beginning of Section 3.1 relate to Total Agricultural Area. The Eurostat set-aside area is based on survey responses rather than official RPA figures and is an underestimate.

3.2 Distribution of set-aside

The extension of set-aside to a wider group of farmers growing crops other than cereals, oilseeds and protein crops seems to have had only a limited impact on the distribution of set-aside in England (Defra ACEO, 2006). Set-aside is now present on some farms where it was not found before, with particularly significant increases in the North West (an increase of 34% of holdings with set-aside) and the South West (an increase of 15%). These holdings include many dairy farms with set-aside for the first time. Evidence suggests that individually these will be relatively small areas of set-aside, hence the small percentage change in total set-aside area. Livestock farmers are less likely to take up additional set-aside beyond compulsory requirement and there is some evidence of intensive dairy farmers trading in entitlements to get rid of their set-aside requirements. The maps in Figure 3-4 show the distribution of set-aside and fallow land across the UK



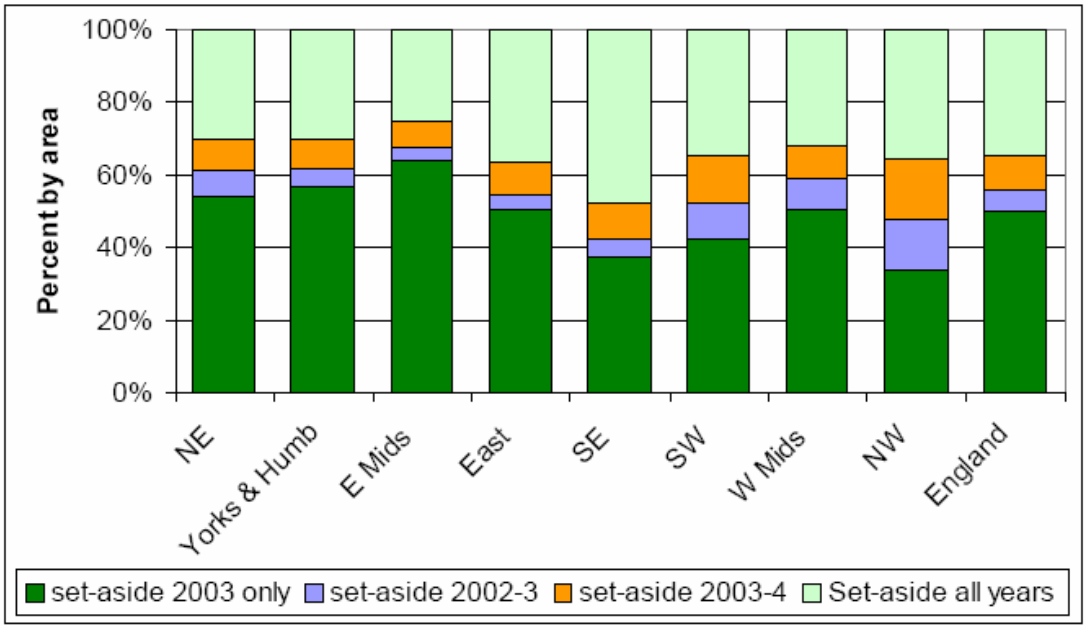
Source: Defra ACEO, 2006

Figure 3-4: Distribution of Set-Aside and Bare Fallow Shown by Joint Character Area

3.3 Rotational and non-rotational set-aside

It is not possible to simply deduce the areas of rotational and non-rotational set-aside as there has been no separate recording of these two types of set-aside in recent years and the rules have allowed set-aside to be 'flexible' i.e. it could either be on the same land in successive years or rotated around the farm.

However some evidence of the likely breakdown of rotational and non-rotational set-aside has been derived by tracking the changing land use of a subset of set-aside fields through the IACS database, see Figure 3-5 (Defra ACEO, 2006). The results showed that 35% of these fields were set-aside for all three years analysed, 15% were set-aside for two years and around 50% were set-aside for only one year (being cropped in the years before and after the control year of 2003). Regional variation is apparent with most rotational set-aside in the East Midlands and least in the South East.



Source: Defra ACEO, 2006

Figure 3-5: Pattern of rotational and permanent set-aside 2002-2004

Defra ACEO research also noted that other characteristics of rotational and non-rotational set-aside as follows:

- Rotational set-aside fields had a higher average field size (6.2ha) than non-rotational set-aside fields (3.5 ha)
- Most rotational set-aside fields were likely to be in natural regeneration (85%) whereas non-rotational set-aside also contained a high proportion of sown cover (52% natural regeneration, 42% sown with grass cover).
- A combination of rotational and non-rotational set-aside was more likely to occur on holdings with over 50ha of set-aside (49%) than holdings with under 20ha of set-aside (10%).

European Perspective

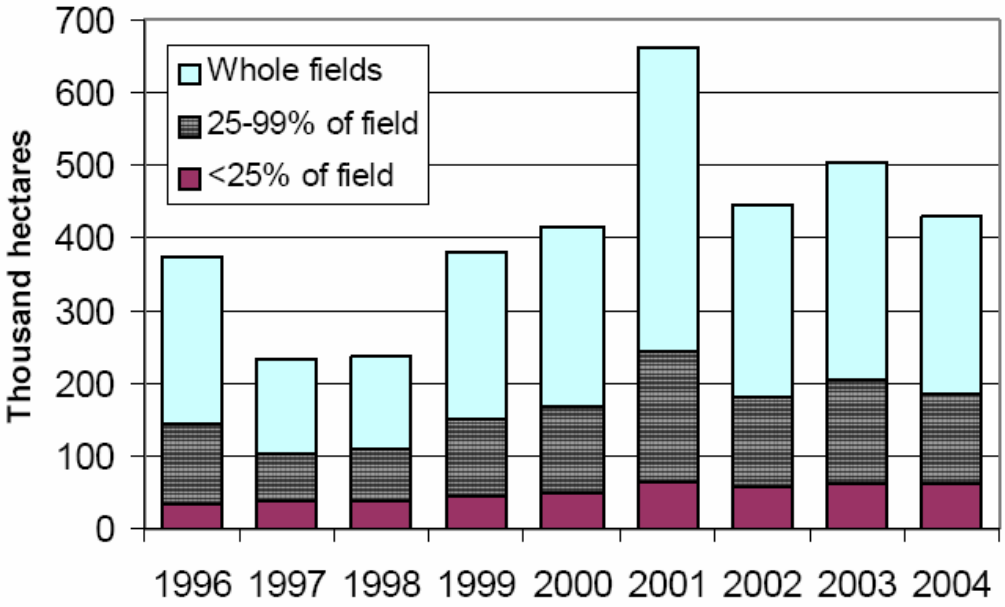
In Europe, the breakdown of rotational and non-rotational set-aside was estimated to be 48% rotational and 52% non-rotational in 2000 albeit with 'sharp national and regional variations' (Oréade-Brèche 2002). The evaluation found that farmers tended to concentrate their non-rotational set-aside on parts of their holdings that

are least productive (poor soil, washlands, tidelands, edges etc.) or most difficult to cultivate (remote, small parcels, not irrigated etc.).

3.4 Blocks and strips

The availability of data for split fields is problematic, as is any form of meaningful analysis. In particular there is no evidence relating to the use of part fields for set-aside over successive years, or the movement of set-aside within fields, or the use of set-aside blocks, strips or other areas chosen to maximise environmental benefits. A crude analysis is that under 20% of the set-aside area in the UK is likely to be in strips (Defra ACEO, 2006).

Figure 3-6 illustrates that there is an upward trend in set-aside occupying less than 25% of the field, despite a fall in set-aside rate required from 2003. This suggests that farmers are committed to maintaining small areas of set-aside in field margins or elsewhere regardless of driving factors (Defra ACEO, 2006).



Source: Defra ACEO, 2006

Figure 3-6: Area of non-industrial set aside in complete fields and blocks 1996-2004

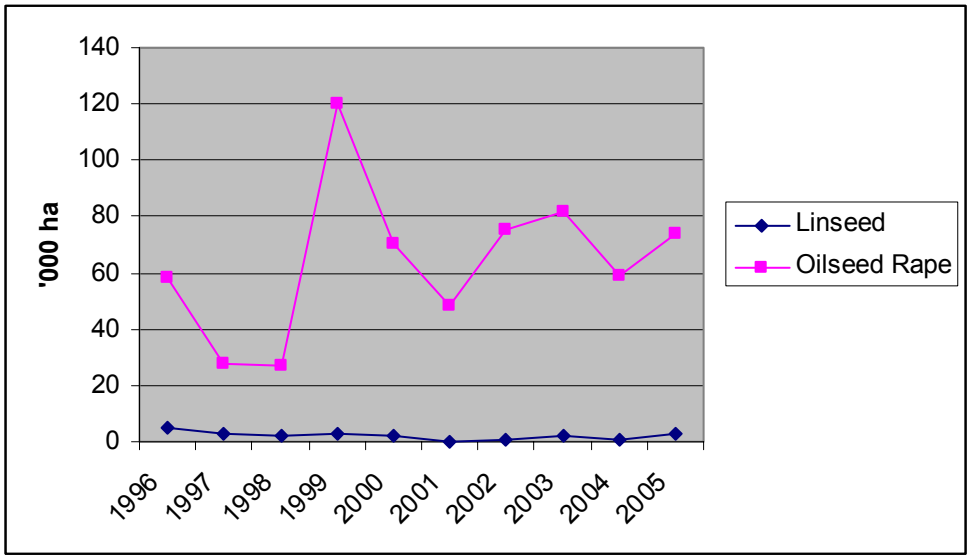
Defra ACEO evidence suggests that small areas of set-aside play an important role in breaking up monoculture, which coupled with the location of many in cereal field margins and other areas important to wildlife mean they are more important to wildlife than their size would suggest. Small areas of set-aside also differ from other permanent set-aside by having a greater proportion of wild bird cover sown, indicating that farmers are actively trying to maximise wildlife benefit in many cases.

3.5 Set-aside for industrial crops

Set-aside can be used to grow a range of non-food crops for uses such as biofuels, biomass, pharmaceuticals and industrial lubricants.

In the UK, the predominant crops grown on set-aside land are oilseed rape and linseed. Together these have accounted for 6% to 21.5% of set-aside land, see Figure 3-7. Oilseed rape on average accounts for 11.6% of set-aside ranging between 6-21% whereas linseed accounts for just 0.5% ranging between 0-1% largely due to low subsidy rates.

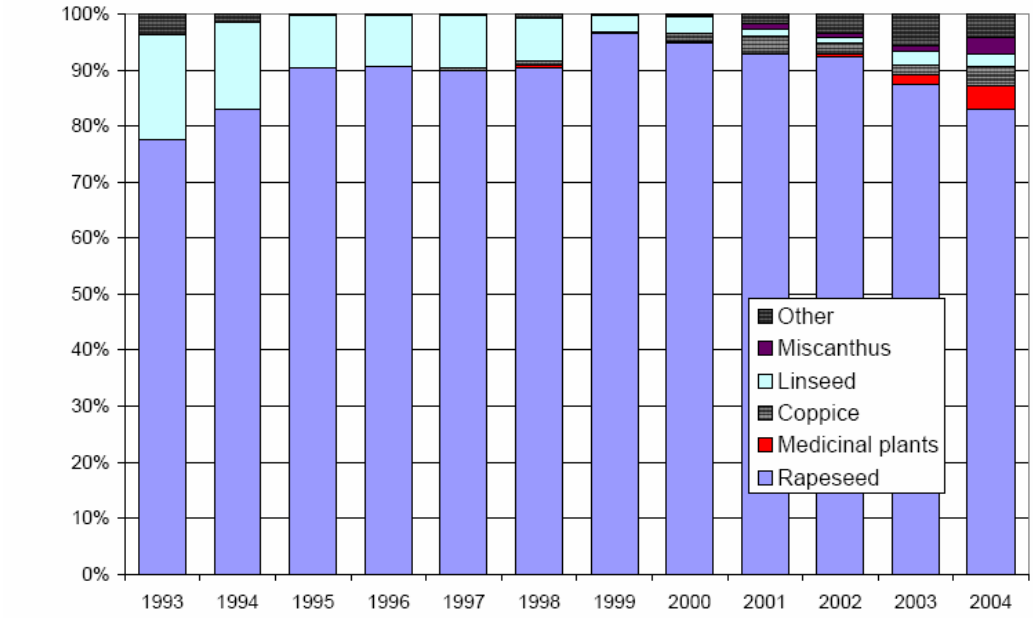
The large increase in oilseed rape planted on set-aside land in 1999 was largely offset by a decrease in plantings on other land. The reason for this switch relates to the fact that in the previous year, the total area of oil seed rape exceeded the Maximum Guaranteed Area allowed under EC rules with consequent AAPS penalties hence, in the following year, farmers chose to grow the crop on set-aside land to avoid the same situation occurring again.



Source: Defra, 2001 and 2006

Figure 3-7: Oilseed Rape and Linseed for industrial/energy use grown on set-aside land 1996-2005

Figure 3-8 illustrates that other crops, including miscanthus, coppice and medicinal plants, have become popular in recent years accounting for a small but increasing percentage of the total non-food crops grown on set-aside land.



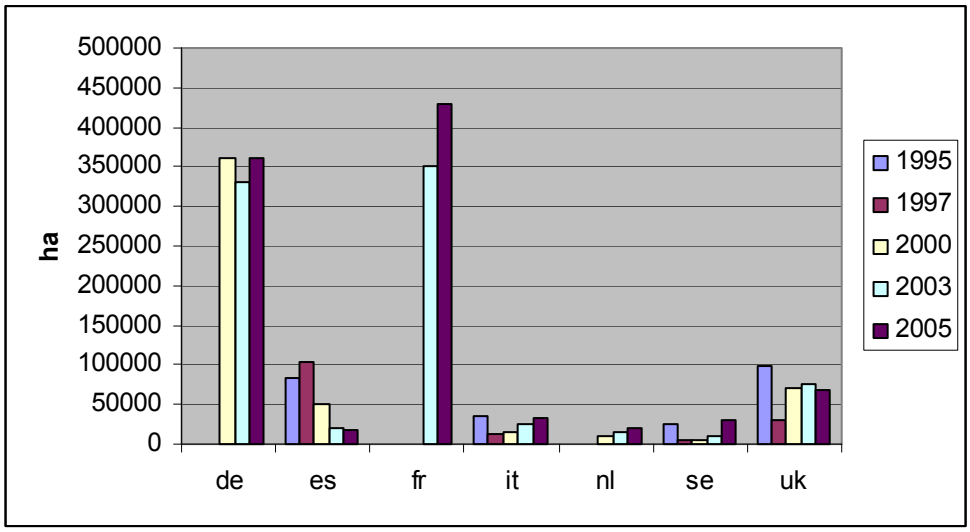
Source: Defra ACEO, 2006

Figure 3-8: Types of industrial set-aside expressed as a percentage of the total area

European Perspective

Nearly 6 million ha of set-aside in Europe is used for growing non-food crops, like the UK most of this is oil seed rape grown for biodiesel. The majority of EU countries are increasing their use of set-aside for non-food crops, conversely in 2005 the UK decreased the area of set-aside used for non-food crops. Figure 3-9 shows set-aside used for non-food crops in the major European countries, Germany, France, Spain and Italy as a comparison to the UK together with other leading players in the environmental field, Sweden and the Netherlands.

Significant proportions of set-aside land in France and Germany are used for non-food crops. In 2005 non-food crops on set-aside land accounted for 26% of total set-aside in France and 33% in Germany compared with just 14% in the UK. Whilst Sweden has undergone a massive increase in non-food crops on set-aside (over 300% in 2005 alone), increases in Italy and the Netherlands are more gradual but nevertheless sustained. Conversely in Spain, the use of set-aside land for non-food crops has decreased rapidly since 1997 to just of 2% of total set-aside area, which has also decreased in absolute terms.



Source: Eurostat, 2005

Figure 3-9: Set-Aside used for Raw Material for Non-Food Use

3.6 Set-aside managed for environmental reasons

There is little specific data on the extent to which set-aside is managed for environmental reasons. There are however a number of indicators and data sources which can be used to determine this, albeit approximately. These include:

- Cover type
- Set-aside shape/size
- Area covered by set-aside management derogations requested for environmental purposes
- Uptake of set-aside options of agri-environment schemes
- Feedback from farmer surveys

In the case of cover type and set-aside shape/size, the primary reason for selecting an environmentally beneficial option is most often likely to be agricultural rather than environmental. On the other hand requests for derogations for environmental purposes or uptake of set-aside options under agri-environment scheme options are directly linked to environmental management objectives. Farmer surveys are helpful in providing qualitative feedback on farmer actions, perceptions and intentions.

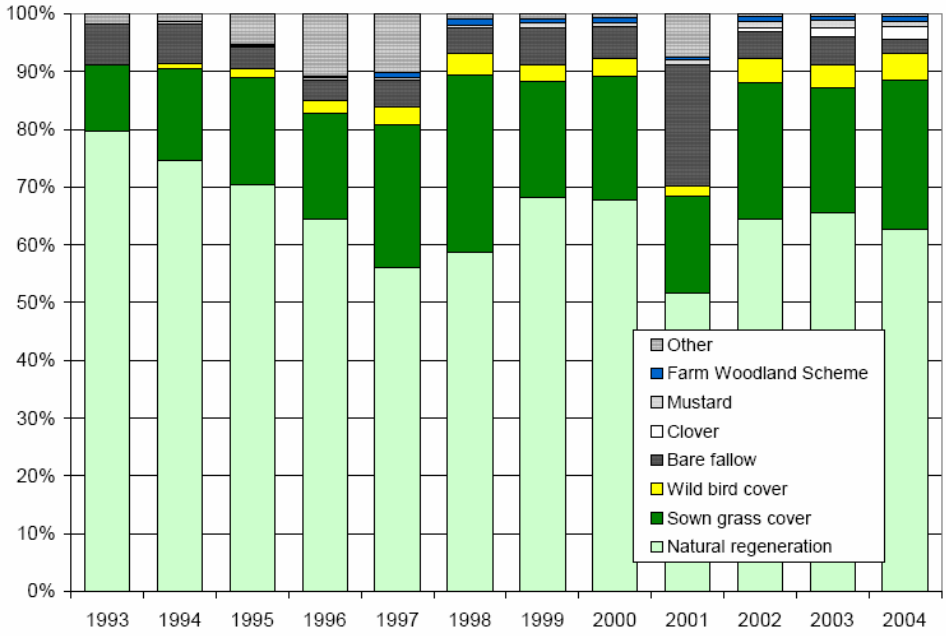
Cover type

Natural regeneration comprises over 60% of the non-industrial set-aside area in England, see Figure 3-10. Natural regeneration has been shown to provide a variety of environmental benefits including botanical species diversity and feeding areas for farmland birds, see Section 4.1. However it is also the simplest and cheapest way for many farmers to establish green cover. In other words, while natural regeneration is associated with the delivery of environmental benefits, this is not necessarily the main reason why farmers have opted for it as a green cover type.

Wild bird cover on the other hand, which includes seed-producing plants such as kale, quinoa and teasel which are known to benefit a variety of birds, is more directly linked to a desire to manage set-aside for environmental reasons. That said, anecdotal evidence suggests that wild bird cover is likely to have been

selected by many farmers for its sporting benefits, as cover and feed for pheasants and partridge, as well as its wildlife benefits. Figure 3-10 shows that there has been a steady increase over time in the proportion of set-aside sown for 'wild bird cover', accounting for an estimated 5% of set-aside in 2004.

Note the major increase in fallow in 2001 was a result of flooding preventing crop establishment; farmers were exceptionally allowed to declare such land as set-aside.

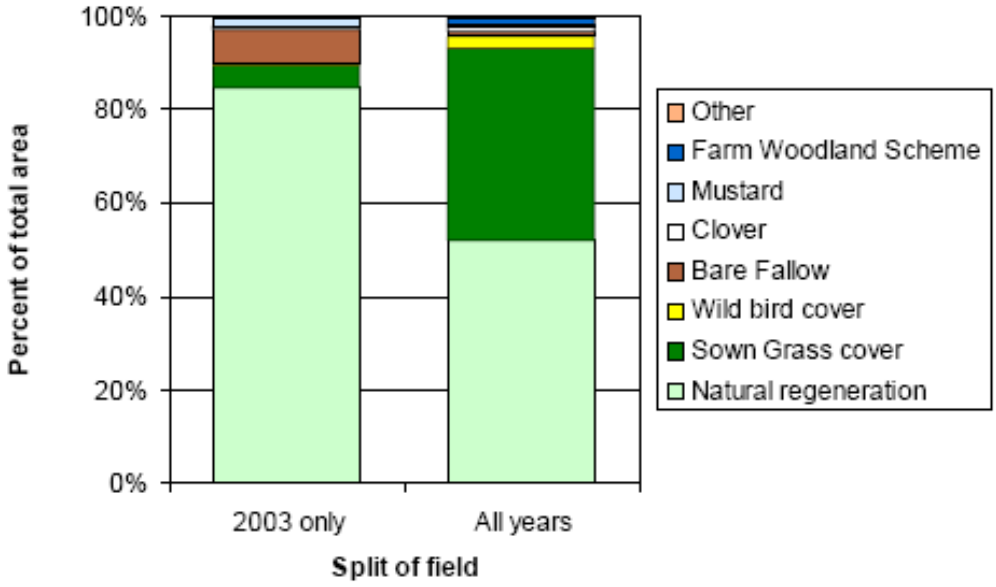


*note bare fallow relates to land declared as set aside after a late harvested crop not fallow area recorded in the June Census

Source: Defra ACEO, 2006

Figure 3-10: Types of cover crop on non-industrial set-aside expressed as a percentage of total area

Most fields in rotational set-aside have natural regeneration as a cover (85%), whereas fields in non-rotational set-aside tend to have a more even split between natural regeneration (52%) and sown grass cover (42%), see Section 2.3 and Figure 3-11.



Source: Defra ACEO, 2006

Figure 3-11: Type of cover crop on 'rotational' and 'non-rotational' non-industrial set-aside

Set-aside size and shape

Set-aside strips and small areas of set-aside are associated with environmental benefits including wildlife habitat and resource protection, see Section 3.4.

The Defra ACEO study suggests set-aside blocks comprising less than 25% of the field area will frequently take the form of strips around field margins and hence likely to be selected and managed for environmental purposes with or without other objectives. These small set-aside blocks comprise approximately 16% of non-industrial set-aside by area (approximately 70,000 ha) but 40% by number. There has been a gradual upward trend in this type of set-aside over the period 1996 to 2004, see Figure 3-6.

In addition to small areas of set-aside within fields, the Defra ACEO study also suggests that farmers are setting aside smaller whole fields more frequently either because they are less convenient for large machinery or because they allow more flexibility in meeting required areas without splitting fields. Small set-aside fields have environmental benefits in the form of more edge habitat (including hedges and ditches) and providing additional land alongside some kind of physical feature such as a river or woodland.

Set-aside derogations for environmental management

Farmers are able to obtain derogations to the prescribed set-aside management rules for environmental purposes. It is understood that the number and area covered by such derogations is very small, although only anecdotal evidence is presently available. This provides a subset of the total area of set-aside managed for environmental purposes.

Set-aside options under agri-environment schemes

The launch of the Environmental Stewardship scheme in England in 2005 introduced a number of Entry Level Stewardship (ELS) and Organic Entry Level Stewardship (OELS) 'top-up' options designed to increase the environmental

benefits arising from set-aside. These include: wild bird seed mixture on set-aside land; and pollen and nectar flower mixture on set-aside land.

While ELS/OELS is still relatively young, uptake of these options provides one minimum estimate of set-aside managed for environmental reasons. At the present time, there are 560 ELS/OELS agreements with these options covering a total of 917ha, see Table 3-3. This equates to around 0.2% of non-industrial set-aside in England.

ELS/OELS Code	ELS/OELS Option	Total number	Total area ha
EF3	Wild bird seed mixture on set-aside	442	722
EF5	Pollen and nectar flower mixture on set-aside	118	195

Source: Natural England (February 2007)

Table 3-3: Uptake of ELS/OELS set-aside options

Earlier results from other studies indicate only minimum uptake of set-aside within the 'classic' agri-environment schemes, with only 3% of set-aside is involved in agri-environment schemes in England and Wales, and only 2% in Scotland (CRER, 2001).

Farmer feedback

The farmer survey carried out by CRER in 2001 provides some feedback on the management of set-aside for environmental purposes and farmer perceptions of environmental value.

The findings suggest that a considerable proportion of non-rotational set-aside is located alongside habitats, this effectively extends them in some way or acts as a buffer, see Table 3-4. That said, the feedback also indicate that these benefits appear to be of little importance to farmers in determining the location of set-aside.

	Alongside woodland %	On hillside %	On light soils %	Alongside open body of water %
England & Wales	38	18	17	16
Scotland	42	18	18	18

Source: CRER (2001)

Table 3-4: Location of non-rotational set-aside

In the Cereals and Set-Aside Survey 1998, farmers were asked if they had used any environmentally friendly practices on set-aside in addition to those legally required. The following practices were highlighted (with percentage of sample in brackets)

- Provision of wildlife food (22%)
- Adjusting the timing of grass mowing (18%)
- Controlled spraying (14%)

Farmers were also asked to identify the main environmental benefits of arising from their set-aside. The main benefits highlighted were birds and insects. Overall those farmers with margins or part field set-aside appeared to have more wildlife benefits than others, or perhaps were more aware of their environment.

Farmers surveyed in connection with the 'Regional Level Report for the Eastern Region of England' (Oréade-Brèche 2002) stated that:

- Environment was one of the priority criteria for selecting crops (10% of farmers interviewed)
- Set-aside has made them think about environmental management (15% of farmers interviewed)
- Set-aside has had positive biodiversity benefits leading to increased populations of various bird and mammal species (40% of farmers interviewed)
- They were pleasantly surprised by the increase in wildlife, particularly birds (70%)

Summary

The area of non-industrial set-aside in England managed in a way which benefits the environment is likely to be at least 65% (natural regeneration and wild bird cover). At least some of this is likely to be intentionally managed for environmental reasons, including some natural regeneration, all the wild bird cover (5%) and many set-aside blocks and strips (16%). While feedback on set-aside derogations and uptake of set-aside options under agri-environment schemes is limited, the findings from various farmer surveys suggest that 10-20% of farmers have taken account of environmental considerations when deciding on the location, cover type and management of set-aside.

Our very preliminary estimates are therefore that:
- At least 65% of non-industrial set-aside land is being managed in a way which benefits the environment, and within this;
- 10-20% of non-industrial set-aside land is being *intentionally* managed to benefit the environment.

4 Environmental benefits and dis-benefits of set-aside

There have been many studies about the environmental impact of set-aside and a useful review is provided in University of Cambridge report produced in 2006 (University of Cambridge, 2006). A summary of the main environmental benefits and dis-benefits is set out below.

The environmental impacts of industrial crops (in particular energy crops) grown on set-aside are considered separately in Section 4.7 as these are quite different to those arising from non-industrial set-aside. The policy options are also different.

4.1 Biodiversity

Birds

Set-aside provides two main benefits for farmland birds. In the winter, set-aside in the form of stubbles provides an important winter food source for birds and in the spring and early summer it provides an enhanced habitat for breeding birds.

Stubble fields left after the harvesting of cereal crops in the autumn used to provide an important food source for granivorous farmland birds which fed on both spilt grain and weed seeds in the soil. However with the widespread switch to autumn sowing in recent years, winter stubbles disappeared with consequent loss of this food resource leading to reduced winter survival in some bird species. The introduction of set-aside bolstered the area of winter stubble, as much of it follows cereal crops and is left to naturally regenerate. Now set-aside has a very important role in terms of its contribution to the overall area of stubble (Defra ACEO, 2006). This set-aside stubble is particularly important in late winter, when fields for the remaining spring-sown crops are cultivated. In a study on the use of set-aside by birds in the winter, five out of six declining farmland bird species were found in significantly greater numbers on set-aside than would be expected if birds were randomly distributed over the farmland landscape (Buckingham et al, 1999).

Where set-aside land is allowed to naturally regenerate a patchy habitat containing many broad-leaved plants develops and this has been shown to provide good breeding and feeding habitat for many birds. Set-aside regulations discourage field operations during the spring and early summer to ensure that nests are not disturbed. The result is that a wide variety of birds including skylarks, game birds, non-passerines, passerines, insectivores and seed-eating birds appear to have strong preferences for set-aside over cropped land or grassland during the summer (Henderson et al, 2000). However, the option to spray rotational set-aside from 15th April is widely taken up, and such set-aside land then has very limited environmental value, for example as breeding habitat. Most agronomists agree that 15th April is too early to spray off the green cover to get the most effective weed control and there is an agronomic case for delaying this, with subsequent environmental benefits.

Where naturally regenerated set-aside is left for more than one year, the vegetation develops to resemble a grass sward and probably becomes less valuable to farmland birds after the second year. However, the resultant sward will tend to be more diverse than most sown grass and can develop into semi-natural grassland within five years, with significant benefits for birds which use grassland for habitat and feeding.

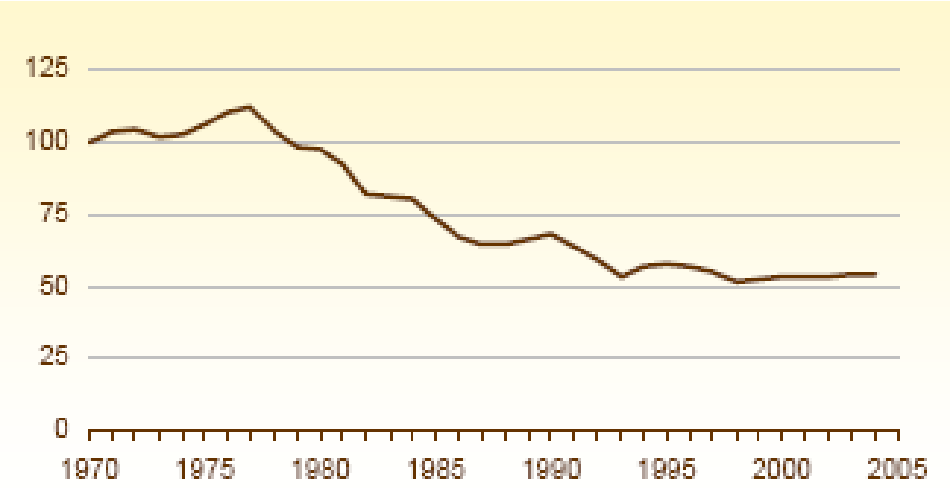
The other major form of management for set-aside involves sowing it with a grass mixture. The resulting dense sward is not ideal for the foraging of small birds, but is attractive to a variety of small mammals (see below). The seed mixture used is

important; the cheapest option of sowing with perennial ryegrass will yield comparatively few benefits, whereas a mixture including tussocky species will produce a sward with greater structural complexity and produce a higher quality habitat.

Overall, non-rotational set-aside does provide an insect-rich habitat, although it may not be readily available to birds if the sward is too dense. It may also provide nesting opportunities for ground-nesting birds if the sward is suitable. However, the current rule that demands the green cover is cut between 15th July and 15th August poses a serious threat to late nesting attempts of species such as skylarks and buntings, thereby reducing its value.

In summary therefore, rotational set-aside using stubbles and natural regeneration appears to be more beneficial to farmland birds than non-rotational set-aside through the winter period, but has very limited environmental benefits after spraying. Similarly, where set-aside is retained in the same place, maintaining it as a pseudo-crop (regularly disturbed) is generally better for birds than leaving it to natural succession. Non-rotational set-aside generally develops a greater abundance of invertebrates than other in-field arable habitats, but access for birds may be constrained by the density of the vegetation.

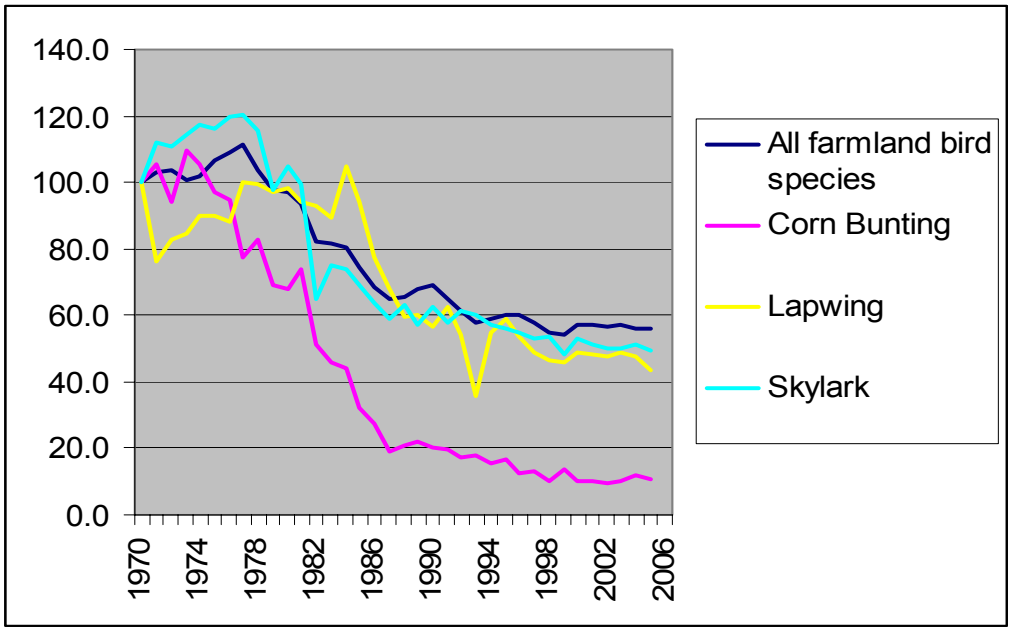
In terms of overall impact, there is some debate whether set-aside has actually contributed to increased breeding productivity and enhanced bird populations or simply changed the distribution of birds in the arable landscape. Research has shown a nine-fold increase in breeding bird numbers observed over cereal land. Furthermore, the Farmland Bird Index (FBI) which is a measure of farmland bird populations appears to have levelled off since 1993, when compulsory set-aside was introduced, see Figure 4-1. There is ongoing research to determine whether there is a link between these two factors and if so, to explain the nature of this link.



Source: BTO, RSPB. Index 1970 = 100

Figure 4-1: Index of farmland bird populations (England)

A more detailed breakdown of changes in the populations of some key farmland bird species, those one might expect to benefit from the introduction of compulsory set-aside, is shown in Figure 4-2. There is a stabilisation trend for populations of these individual species, although this occurs somewhat earlier than for the main index, suggesting other influences at work in addition to the introduction of compulsory set-aside.



Source: BTO, RSPB. Index 1970 = 100

Figure 4-2: Index of farmland bird populations (England) - specific species

Another study using the BTO Common Bird Census confirms that there is no clear 'population' effect for skylarks but suggests that this may be due to there being insufficient area of set-aside for long enough (Henderson et al, 2000). Despite this, the contribution of set-aside to curtailing the decline in farmland bird populations is emphasised. Set-aside provides a valuable network of habitat and feeding areas for birds across the arable landscape. Without doubt, the benefits of set-aside would have been greatly enhanced if some of the management rules had been modified to reduce the negative impacts on bird populations, specifically delaying the ability to spray rotational set-aside and removing the need to cut non-rotational set-aside between 15th July and 15th August.

Mammals

The effect of set-aside on mammals is not as significant as that on birds. Furthermore in contrast to birds, mammals benefit much more from non-rotational set-aside than rotational set-aside. This reflects the development of grassy and other habitats on permanent set-aside. Short-tailed voles and harvest mice in particular benefit from uncut non-rotational set-aside, providing benefits up the food chain to predators such as birds of prey. Set-aside is also a preferred habitat of brown hares (Grice et al, 2007). In a few cases, long term set-aside, together with access restrictions to reduce disturbance, has been used to create conditions suitable for otter holts. Some farmers have also used set-aside to create habitat for game animals.

Invertebrates

There is some evidence that set-aside land supports more invertebrate species than cropped land and that invertebrate diversity and density increase with set-aside age (Kennedy, 1992; Moreby and Aebischer, 1992; Poulsen et al. 1998). Anecdotal evidence also exists for huge populations of butterflies using non-rotational set-aside, with such species feeding on pollen and nectar available from plants growing on this habitat. Support for establishing suitable plants is now provided through the Environmental Stewardship scheme (ELS/OELS option: pollen and nectar flower mixture on set-aside).

Strategically located set-aside can also provide a link between two existing isolated areas of a scarce habitat, with benefits to a range of species including invertebrates which do not readily colonise new sites and have limited powers of dispersal.

Plants

Set-aside land has been shown to support more plant species than cropped land. Set-aside helps to maintain the presence of common weeds through natural regeneration although the diversity of the sward will depend on the soil type, the past history of the field and the availability of seed sources from adjacent habitats.

It is unusual for set-aside to contain scarce plant species or communities as very little remains of the seedbank in most intensive arable areas (Firbank, 1995). However there are records of rare arable plants occurring on rotational set-aside, providing the first opportunities for these plants to grow in the absence of herbicides. Where they occur, the conservation value of such situations is high.

On naturally regenerated non-rotational set-aside, particularly where semi-natural grassland is present nearby, the sward will continue to develop for some years with increasing species richness due to the arrival of perennials and species characteristic of non arable habitats. Hence, with sympathetic management, long-term naturally regenerated set-aside has the potential to produce permanent pasture of conservation value. The botanical value of sown cover clearly depends very much on the seed mixture and subsequent management, as well as the nature of the site.

A further benefit of set-aside, particularly when it is used in strips, is to buffer hedges and other ecologically valuable habitats alongside fields from pesticide drift and fertilisers.

Note, one particular area of environmental concern relating to the management of set-aside concerns the use of herbicides on naturally regenerated set-aside (see Figure 4-4). Despite potentially valuable flora becoming established on set-aside, farmers have a legal obligation to control certain weeds. This is frequently achieved by means of a single application of glyphosate, a non-persistent herbicide, in early summer[4], with the following adverse environmental consequences:

1. Use of non-selective herbicide kills all plant life in the field, thereby reducing cover for animals and preventing plants from setting seed. The loss of cover is particularly serious for ground-nesting birds, cutting short the breeding season and leaving nests vulnerable to predation. Where whole farms, or other big areas of land, are sprayed off at the same time the effects on less mobile animals are liable to be worse, particularly in respect of loss of food supply.
2. Spray drift into surrounding habitat can occur, risking the death of the hedgerow flora and consequent deleterious effects on animals through loss of food and habitat.

Little work has so far been done to quantify these impacts or to suggest improved management regimes.

[4] Current regulations allow use of glyphosate and other non-selective herbicides on or after the 15th April. Although farmers are encouraged to delay the operation until after mid-July, in practice many farmers spray before this date. In 1996/7, 71% of rotational set-aside fields were sprayed off in the period April-June (Firbank, 1998 cited by Grice et al, 2007).

4.2 Landscape and historic environment

Set-aside can be seen as introducing diversity into arable landscape and improving its amenity value. It can also introduce colour into landscape, for example through flowers (e.g. poppies) and butterflies in species-rich field margins or naturally regenerating wildflower grassland.

On the other hand, some may feel that uncropped areas make the landscape look untidy and unattractive. Landscape character can also be weakened by the inappropriate siting of set-aside. This can happen with whole field set-aside, where the field texture and colouring may be different to typically managed cropped land or the more uniform appearance of surrounding land, or with badly sited blocks or margins.

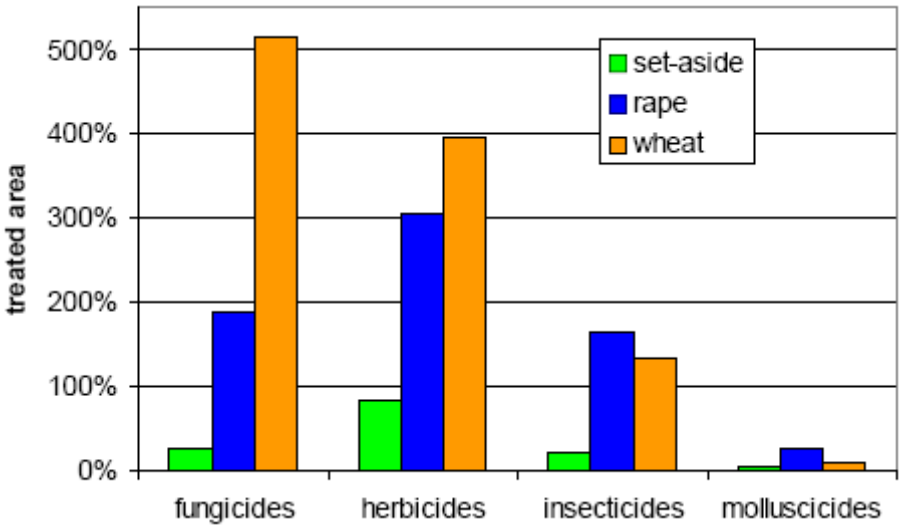
Across Europe, the impact of set-aside on the landscape was assessed to be neutral on the whole (Oréade-Brèche 2002).

In terms of the historic environment, set-aside can offer protection from arable cultivation, recognised as a major threat in the form of disturbance/destruction or soil loss to sub-surface archaeological remains.

4.3 Water

The main benefit set-aside brings to water is in the reduction of inputs to farmland and consequently reduced pollution from pesticides and fertilisers. Input reduction also benefits wildlife and climate change.

Pesticide use on set-aside is on average much lower than conventional crops such as winter wheat and oil seed rape which it typically replaces, see Figure 4-3.

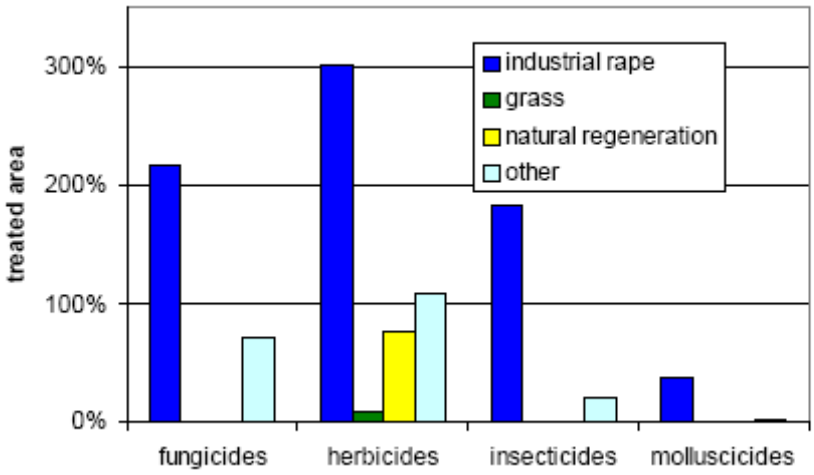


Graph shows the areas treated with different classes of pesticide expressed as percentage of total area grown. 'Set-aside' includes industrial crops. Treated areas >100% occur when crops are sprayed several times.

Source Defra ACEO 2006

Figure 4-3: Pesticide use on set-aside compared to conventional crops

The breakdown of pesticide use on different types of set-aside is shown in Figure 4-4. On non-industrial set-aside insecticides, fungicides and molluscicides are almost never used and herbicide use is low.



Graphs shows treated areas expressed a percentage of the total area grown for various types of set-aside. 'Other' includes mix of industrial and non-industrial crops. Treated areas >100% occur when crops are sprayed several times.

Source Defra ACEO, 2006

Figure 4-4: Pesticide use on different types of set-aside

A similar pattern of input use is likely to apply to fertilisers, although published data is not available; slurry and manure can be applied to set aside, but inorganic fertilisers, used in large quantities on many arable fields, are not generally permitted, except on industrial crops. These reduced levels of organic and inorganic fertiliser result in some significant reductions in diffuse pollution from nitrates and phosphates (Defra ACEO, 2006).

The effect of set-aside on nutrient leaching very much depends on the type of cover and management regime. Bare fallow and natural regeneration appear to increase leaching risk, whereas sowing a rye-grass cover appears to reduce leachable nitrate (Froment *et al,* 1999). Similarly if appropriate set-aside covers are sown at the right time of year then leaching risks appear to be minimised (Clotuche *et al,* 1998), whereas ploughing up cover at the wrong time of year can increase leaching rates.

Although it would appear that sowing a cover on non-rotational set-aside would be the most effective way of reducing nitrate leaching through set-aside, the situation is complicated by the fact that non-rotational set-aside tends to be located on the least productive land, and if farmers were in fact forced to take out the relatively more productive land at some stage (i.e. as in rotational set-aside), then total nitrogen use would be lower (Rygnestad and Fraser, 1996).

A further point is that set-aside can reduce the negative impact of surface run-off, especially when it is used to create permanent buffer strips alongside watercourses. By buffering watercourses, as well as reducing inputs, set-aside provides some direct benefits to aquatic wildlife though reduced diffuse pollution reaching watercourses.

Evidence collated for the 'Regional Level Report for the Eastern Region of England' undertaken by ERM as part of the 'Evaluation of the Impact of Set-aside Measures' (Oréade-Brèche 2002) suggested that set-aside had no noticeable impact on water management on 60% of farms surveyed and a positive impact on 40% of farms in respect of water management and quality of water. These positive cases mainly related to where non-rotational set-aside was located alongside watercourses.

4.4 Soils

The soil protection benefits of set-aside, particularly in terms of reducing soil erosion, are likely to be greatest in Mediterrranean countries. In these countries soil protection was effectively incorporated into set-aside under national laws which require cover to be provided in order to control erosion and leaching and limit or ban the use of pesticides or fertilisers (Oréade-Brèche 2002). The extent of soil protection depends largely on the type of cover, management and choice of site. The greatest erosion benefits are provided by non-rotational grass cover.

Other environmental benefits of set-aside for soils include improving soil structure, improving soil organic matter by sowing certain plants as green cover and reducing nitrate concentrations (in some cases to a tenth or a twentieth of what they were) (Oréade-Brèche 2002). .

Evidence collated for the 'Regional Level Report for the Eastern Region of England' (Oréade-Brèche 2002) suggested that set-aside has changed agricultural practices and led to better soil management on 47% of the farms visited, has had no real impact on a further 40% and has had a negative impact on 13%. The positive impacts were associated with introduction of a cover crop to enrich land, locating set-aside on land susceptible to erosion (e.g. sloping land) and long term woodland planting. The negative impacts related to poor or no cover being established and the application of pesticides on non-cultivated set-aside.

4.5 Air

Set-aside appears to have limited implications for air quality. There are potential advantages for carbon storage, although as with nutrient emissions, the benefits risk being lost with subsequent disturbance.

4.6 Climate change

Set-aside has potential value in terms of mitigating climate change. Non-industrial set-aside helps maintain a lower level of greenhouse gas emissions (GHG) from agriculture than would be the case without it. Potential benefits include reduced emissions of carbon dioxide, as a result of lower fossil fuel usage associated with fewer field operations, and reduced nitrous oxide emissions, as a result of reduced inorganic fertiliser inputs. University of Cambridge (2006) attempts to estimate these benefits, see Section 5.5.

Set-aside also has some potential value in terms of climate change adaptation. Non-rotational set-aside can also help species adapt to climate change by providing connectivity within fragmented landscapes thereby aiding species dispersal between isolated remnants of habitat (LUPG, 2002).

The contribution of energy crops grown on set-aside, in terms of reducing GHG, is considered separately in Section 4.7 below.

4.7 Industrial crops

The vast majority of industrial crops grown on set-aside are energy crops in particular oil seed rape used for biodiesel and to a lesser extent, short rotation coppice (SRC) and miscanthus grown for biomass.

The primary environmental rationale behind energy crops is to increase the proportion of total energy coming from renewable sources, reduce dependency on fossil fuels and hence reduce GHG emissions to help combat climate change.

However research has shown that there is considerable uncertainty regarding the actual GHG savings achieved by substituting energy crops for conventional fuels. Much depends on the manufacturing processes used, the subsequent use of by-products and, importantly, the nitrous oxide emissions associated with energy crop production. The latest estimates for biofuels are as follows (EUCAR et al, 2006):

- Biodiesel, from oil seed rape, is estimated to reduce GHG emissions by 53% and save 64% of fossil energy *in the most favourable case* compared to conventional diesel. Biodiesel also produces less sulphur and particulate matter.
- Bioethanol, from wheat or sugar beet, is estimated to reduce GHG emissions by 30% and save 23% of fossil energy using conventional production methods. As conventional production is energy intensive, the use of co-generation could help improve these figures to 45% and 43% respectively, although the overall GHG balance depends on the fuel source used.

Biomass, from SRC and miscanthus, will yield significantly better GHG reductions, than those cited above, when used for heat and power production. These crops are low input crops both in terms of fertilisers/pesticides and fossil fuel powered field operations. They also have future potential to produce bioethanol, although this is not technically possible at the commercial scale yet.

In terms of other environmental impacts, these are no different for wheat and oil seed rape grown as biofuels than these crops grown for food, feed or other industrial uses. Particular concerns include monoculture/block cropping impacts on biodiversity and landscape, and fertiliser and pesticide impacts on water quality and biodiversity. Nitrate run off and nutrient problems are regarded as major problems with biofuels in the USA (GSI, 2006).

The environmental impacts of biomass crops such as SRC and miscanthus are somewhat different. SRC tends to be grown on less productive arable land or grassland and does well on moisture retaining, but well aerated clay or sandy loams. Miscanthus is best suited to lowland sites with deep moisture retentive soils with yields dependent on sunshine, temperature and rainfall (in the UK, this equates to land south of the 'maize growing line' between The Wash and the Bristol Channel).

Biomass crops are associated with greater water usage than crops it is replacing such as wheat or grass, with SRC being worse than miscanthus (University of Cranfield, 2000). This is due to higher rainfall interception, evaporation and transpiration. Strips of energy crops grown in riparian zones have a particularly heavy demand on water. In practice, this means that drier areas of the country/EU are likely to be much less suitable for biomass production than wetter areas.

Another concern associated with biomass crops is their adverse landscape impact. This relates to their height and unfamiliar appearance.

On the other hand, SRC has been shown to be better for wildlife than arable crops it has replaced. These include benefits for birds, plants, butterflies and general invertebrates (GCT & CSL, 2004), although threatened farmland birds may be replaced by more common woodland species. For both SRC and miscanthus, the biggest risks are likely to relate to siting.

These concerns have led to biomass crops requiring Environmental Impact Assessments before establishment, and the development of environmental assurance guidelines and a voluntary standard for biofuels by the Low Carbon Vehicle Partnership. Energy crops grown on set-aside (and other land attracting the single payment) remain subject to the environmental protection provided by cross-compliance.

4.8 Summary

Set-aside provides a range of positive environmental benefits which are widely distributed across the farmed landscape. Key beneficiaries include breeding birds, although wintering birds, invertebrates and plants also gain significantly. Set-aside also provides an important function in terms of reducing inputs, buffering watercourses and other habitats and protecting soils. Set-aside can also be of benefit in linking existing habitats. These benefits are greater within a relatively intensive arable landscape.

While (non-industrial) set-aside is generally regarded as good for the environment, much depends on type, location and form of management.

Type of set-aside

Comparing the relative merits of rotational and non-rotational set-aside is not straightforward. While rotational set-aside benefits some species, negative impacts include potentially greater nitrate leaching. Much depends on the environmental objectives being pursued (Baldock and Beaufoy, 1992). Larger areas of set-aside and land set aside for longer periods tend to generate greater wildlife benefits however heterogeneous mixtures of rotational and non-rotational set-aside are beneficial as different species favour different habitats (Van Buskirk and Willi, 2004).
A very simple summary showing the different environmental benefits arising from rotational and non-rotational set-aside is set out in Table 4-1. Please note however this summary hides significant variations for different species or other elements within each category, so it should be treated with caution.

Environmental aspect	Rotational set-aside	Non-rotational set-aside
Biodiversity		
Birds	✓✓	✓
Mammals	✓	✓✓
Invertebrates	✓	✓✓
Plants	✓	✓✓
Landscape	-	-
Historic Environment	-	✓✓
Water quality	- or ×	✓✓
Soils	- or ×	✓✓
Air	-	-
Climate change	-	✓

Key: ✓ = some benefit; ✓✓ = particular benefit; - = neutral; × = disbenefit

Table 4-1: Environmental benefits and disbenefits of different types of set-aside

Location of set-aside

Environmental benefits are crucially dependent on the exact location of set-aside areas on the farm. In the case of diffuse pollution, siting set-aside in sensitive locations, such as alongside watercourses or near to water abstraction sites, will

increase benefits. Similarly, wildlife benefits may be maximised by using it to buffer sensitive habitats or by targeting it for the benefit of BAP species.

There are some conflicting pressures here; locating set-aside in areas of high wildlife value clearly is advantageous however it could be argued that there are greater benefits in using set-aside to attract wildlife into otherwise barren habitats, such as areas of intensive cereal production with few hedges or areas of woodland.

As with choice of type of set-aside, a heterogeneous environment is good for biodiversity, so interspersing set-aside amongst cropped fields will be of benefit, as will the sensitive management of larger blocks of set-aside to achieve heterogeneity (Defra ACEO, 2006).

Management of set-aside

A widely expressed view by researchers and stakeholders is that set-aside has enormous potential to benefit the environment but whether this potential is realised or not depends on how it is managed. Most stakeholders consulted by the University of Cambridge (2006) felt that set-aside had great potential to deliver more for the environment through better management. Equally, inappropriate management could lead to environmentally damaging consequences.

Energy crops grown on set-aside can provide environmental benefits in terms of helping to reduce GHG emissions to mitigate climate change. However there are a range of dis-benefits including nutrient problems and reduced biodiversity in respect of biofuel crops and increased water usage in respect of biomass crops.

5 Evidence of current or future need for the retention of environmental benefits provided by set-aside

5.1 Introduction

This section explores the current or future need for the environmental benefits provided by set-aside in the context of current and future policy objectives. The analysis draws largely on the University of Cambridge (2006) report which focuses on England.

The basis for assessing current or future need for the retention of the environmental benefits is an understanding of what would happen should set-aside be abolished in terms of impact on key environmental policy objectives. The assumptions made are as follows:

- Non-food crops on set-aside land would stay in arable cropping although the type of crop may change.
- Of the remaining area of arable-triggered set-aside, 75% would revert to arable and 25% would stay out of production[5]. It is to be expected that much of the land staying out of production would be in areas of the country where arable cropping is relatively unprofitable under SPS. In the core arable areas of East Anglia, Lincolnshire and Humberside and parts of southern England a higher proportion of set-aside would revert to arable use. Farmer feedback (albeit from a limited survey) suggests that rotational set-aside in particular would revert to arable use, in particular to break crops, whereas permanent set-aside is more likely to be left uncropped (University of Cambridge, 2006).
- 100% of the livestock-triggered set-aside would revert to livestock farming.

Future influences on the use and management of set-aside are considered separately in Section 6.

The main environmental benefits provided by set-aside - biodiversity, water quality and climate change - are considered below. Other environmental benefits (e.g. landscape and historic environment) are considered relatively minor and unlikely to have a significant influence on any policy or policies designed to mitigate the loss of set-aside.

5.2 Biodiversity

Biodiversity objectives are largely driven by the Convention on Biodiversity approved at the Earth Summit in Rio de Janeiro in 1992. The UK ratified the Convention in 1994 and subsequently developed the UK Biodiversity Action Plan (UKBAP), the objective of which is "to conserve and enhance biodiversity within the UK and to contribute to the conservation of global diversity through all appropriate mechanisms". The UK Steering Group subsequently developed a programme of action to meet the plan's objectives including Action Plans for UKBAP Priority Habitats and Species. These national action plans now form the basis for long-term strategic biodiversity conservation in the UK.

Priority Habitats

UKBAP Priority Habitats do not generally occur within set-aside areas. The exception is cereal field margins, although the UKBAP target for this (15,000 ha) was exceeded in 2002 and the subsequent expansion of buffer strips under ELS

[5] Based on University of Cambridge 'Business as Usual Projections of Agricultural Outputs' report for the Environment Agency.

has added to this considerably. Concerns regarding the quality of the cereal field margin habitat being created have however led to revised targets being produced in 2006, with increased emphasis on cultivated, low input margins and those providing wild bird seed and pollen and nectar sources. This suggests a need for further action to achieve these targets.

Set-aside may provide indirect benefits to other Priority Habitats by buffering sensitive habitats from potentially damaging agricultural operations. The extension of set-aside to new areas following the introduction of the SPS in 2005 may well increase this role as there will now be set-aside in less intensively farmed areas where Priority Habitats, such as species-rich hedges, grasslands, heathlands and woodlands, are more likely to remain.

Should set-aside be abolished, there is likely to be some arable reversion with detrimental impacts on cereal field margins although this would be mitigated by the requirement for buffer strips under cross-compliance (England only) and the large number of field margins entered into entry level schemes such as England's ELS. The need for set-aside as a contribution to cereal field margins for biodiversity therefore may now be diminished unless there are good reasons for increasing the UKBAP target for the habitat. The loss of set-aside would probably also lead to some detrimental impacts on hedges and other habitats as a result of reduced buffering from agricultural operations, although again this would be mitigated by cross-compliance (where implemented appropriately) and entry level schemes (where they exist). It would also be mitigated by the voluntary retention of land out of production, although this is likely to occur in less intensively farmed areas where the buffering benefits are less.

Priority Species

The likely directions of change for Priority Species should set-aside be abolished are summarised by University of Cambridge (2006). Significant dis-benefits are likely to occur for Cirl Bunting, Stone Curlew[6] and Brown Hare. While it would be feasible to compensate for the detrimental impacts of changes to set-aside through agri-environment schemes, existing populations may still be damaged and the recovery of the species hampered.

Farmland birds

Birds are considered to be good indicators of environmental conditions in the countryside. Nineteen characteristic and common farmland species are used to create the Farmland Bird Index (FBI) which forms the basis for a government Public Service Agreement (PSA) target to reverse the long term decline in the number of farmland birds in England by 2020. As most of the FBI species have dispersed populations, achievement of the PSA target will require widespread measures that are integrated with farming practices and the area of 'sympathetically-managed land' required to reverse population declines is likely to be considerable.

While set-aside provides a range of benefits to farmland birds as outlined in Section 4.1, the contribution of set-aside to overall farmland bird populations and hence the FBI is equivocal. This is mainly due to the fact that the impacts of set-aside vary considerably between bird species and the type and age of set-aside. That said, set-aside has at least helped curtail the decline in farmland bird populations.

[6] Set-aside has played an important role in the recovery of Cirl Bunting and Stone Curlew combined with special derogations/management plans and agri-environment schemes (University of Cambridge, 2006)

The abolition of set-aside, and consequent arable reversion, is likely to be detrimental to most FBI species (University of Cambridge, 2006). Although some land abandonment would mitigate some impacts for some species (such as Kestrel), the loss of naturally re-vegetated rotational set-aside in particular would probably lead to substantial and significant population declines (or at least reduced recovery) in many species. There would probably be a detectable and significant negative FBI impact. The expansion of ELS with low cost, low maintenance options over a wide area is however likely to go some way to counter this impact.

It is worth noting at this stage that a widespread uptake of intensive energy crop production on set-aside land would be highly detrimental to most farmland bird populations (irrespective of location). Although energy crops can support a diverse bird population they would displace most farmland birds (Anderson *et al.* 2004), leading to potentially significant declines in most FBI species.

Sites of Special Scientific Interest

Defra has a PSA target to have at least 95% of the area of Sites of Special Scientific Interest (SSSIs) in favourable or unfavourable recovering condition by 2010.

Set-aside may have either direct impacts on species and habitats where set-aside land lies within an SSSI boundary, or indirect impacts where set-aside lies alongside SSSIs and buffers them; this particularly applies where strips of set-aside help reduce N and P pollution of river SSSIs.

The abolition of set-aside is likely to have relatively minor direct impacts as only 0.2% of the SSSI area (2,126 ha) was under set-aside in 2005 and the resulting gaps could be targeted by agri-environment schemes. The loss of set-aside strips could aggravate the problems of N and P pollution in some localities however, again, this could be overcome by alternative targeted measures through agri-environment schemes.

5.3 Water quality

The Water Framework Directive (WFD) aims to improve the quality of surface, coastal and groundwaters in the EU. It requires that surface and groundwater are restored to good status in terms of ecological and chemical quality for surface waters and quantitative and chemical objectives for groundwaters by 2015.

Key areas of concern in respect of diffuse pollution of water by agriculture are: nitrates in surface and groundwater; phosphorus in surface water; contamination by pesticides and sediments; and eutrophication. Set-aside contributes to a reduction in diffuse pollution of water principally by reducing overall levels of pesticide and fertiliser use and to a lesser extent by buffering watercourses, see Section 4.3.

The abolition of set-aside and the consequent reversion to arable cropping is likely to increase the levels of nitrates[7], phosphorus[8] and sediment entering water catchments. University of Cambridge (2006) estimate that 88% of the set-aside area (157,000 ha) in England is in catchments at very high, high or medium risk of

[7] Mainly through the leaching of nitrates following the reversion of set-aside.
[8] Through the transfer of phosphates to water through the detachment of soil particles during soil erosion and run-off, and to a lesser extent solubilisation.

failing to reach good status in terms of nitrates and phosphates. This means that some or all of these areas are therefore likely to require additional measures to help meet WFD standards when set-aside is abolished. The impact of the loss of set-aside on sediment delivery is likely to depend heavily on the local catchment context (including the topography of individual fields) and farm management practices (such as the timing and nature of the cultivations applied and the type of crops grown on the reverted land) implying targeted measures may be necessary.

5.4 Soils

The proposal for an EU Soils Strategy in September 2006 highlights the importance of ensuring that Europe's soils remain healthy and capable of supporting human activities and ecosystems. The aim is to provide a framework for action to preserve, protect and restore soil, while giving Member States flexibility to implement it in a way which fits local situations best. Member States will need to take action to tackle threats such as landslides, contamination, soil erosion, the loss of soil organic matter, compaction, salinisation and sealing wherever they occur, or threaten to occur, on their national territories

Soil protection is also a key feature underpinning the Good Agricultural and Environmental Conditions attached to the Single Payment Scheme introduced in 2005 as part of the CAP reforms.

These policy objectives suggest that the soil protection benefits provided by set-aside need to be retained in some way. These benefits include retention of fallow, improvement of organic matter, control of erosion and measures to reduce diffuse pollution.

5.5 Climate change

Climate change policy in the EU is based on Kyoto Protocol of 1997, which became legally binding as the Kyoto Treaty in February 2005. The EU target is an 8% reduction of its 1990 GHG emissions by 2012.

The UK government has two targets in respect of GHG emissions as part of its climate change programme:

- A 12.5% reduction in emissions of its 1990 GHG emissions by 2012 (as part of the Kyoto Treaty); and
- A 20% reduction in net carbon dioxide emissions by 2010 over the same time period (set as a manifesto commitment).

The government estimates that the proposals in the climate change programme could reduce the UK's GHG emissions to about 23% below 1990 levels in 2010. This is comfortably beyond the Kyoto target. The programme could also reduce carbon dioxide emissions by about 19% in 2010, representing significant progress towards the Government's goal (NAEI, 2005). However there is little room for manoeuvre on the Kyoto commitment and the carbon dioxide target will require a significant reduction in net emissions. Recent increases in carbon dioxide emissions will make both targets more difficult to achieve (Vidal, 2005).

Set-aside makes a contribution to the reduction of GHG emissions both via non-industrial set-aside - lower carbon emissions as a result of fewer field operations and lower nitrous oxide emissions due to reduced fertiliser inputs – and energy crop growing on set-aside.

University of Cambridge (2006) suggests that, on the abolition of set-aside, the impact of reversion to arable cropping on carbon dioxide emissions is likely to be very small and impossible to estimate with precision. The impact on nitrous oxide emissions is more relevant with an increase of 0.75% in UK agricultural emissions.

This is estimated to amount to an additional social cost of £4.2 m per year at Defra's preferred price of £70 per t C.

There is no readily available research on the impact of the abolishing set-aside on energy crop growing and hence GHG reductions resulting from this activity. While it is reasonable to assume that energy crop production on set-aside currently makes a significant contribution to GHG reduction[9], there is no evidence to suggest that removing the set-aside requirement would result in a reduction in energy crop growing and hence a loss in GHG benefits. This is particularly so in light of current and anticipated future profitability (of oil seed rape for biodiesel and wheat for bioethanol), binding EU targets, the Renewable Transport Fuels Obligation coming into force in the UK next year, very generous tax incentives and existing capital grant schemes, see Section 6.2.

[9] There are currently 6 million hectares of non-industrial crops grown in the EU, the majority of this is oil seed rape grown on set-aside for biodiesel.

6 Current and future influences on farmland and set-aside

6.1 Current and future influences on farmland and set-aside

A useful summary of current and future influences on farmland is provided by University of Cambridge & SAC 'Business as Usual Projections of Agricultural Outputs' reports for the Environment Agency in 2004 and 2006, see Table 6-1.

Factor	Details
CAP Commodity Reform	Decoupling – Beef, Sheep, Cereals Oilseeds, Pulses. Decrease in milk price and Quotas in place for dairy. Sugar beet price cut and compensation SFP wholly area based payments by 2012 in England. Historic payment in Wales.
World Supply and Demand	Changes in supply and demand for commodities might influence prices and lead to substitution between enterprises. Institutional Forecasts (see below) do not suggest major future changes in prices. EU more susceptible to swings in world markets.
EU Enlargement	Minor impacts on agriculture in the UK – increased competition offset by market access – impact on sterling uncertain. Opportunities for dairy exports, but effects on beef and sheep likely to be negligible. Cereals more impact in longer term.
Environmental Measures	CAP cross compliance, Environmental Stewardship Schemes (ELS and HLS), Environmental legislation (e.g., phase out of certain pesticides). Waste Framework Directive; Nitrate Vulnerable Zones; Rural Development Regulation; Air Quality legislation (see below for detailed analysis).
WTO	Uncertain time frame but likely tariff cuts and removal of export subsidies may mean increased competition from imports with subsequent pressures on domestic prices.
Technological Change	New methods, breeds, seeds (GM etc), Integrated Farming, more access to larger machines.
Consumer	Change from supply driven to demand driven supply chain, demand for higher quality food, niche markets etc.
Growth Rates	Unlikely to feed through into major increases in demand for food products, but could expand opportunities for off-farm income.
Exchange Rates	Major impact on profitability of agriculture.
Biofuels	A certain proportion of energy supplies must come from renewable sources under the Kyoto agreement. Renewable Transport Fuels Obligation. EU legislation as well.
Climate Change	Potential to change crop and livestock production patterns in England and Wales. In addition mitigation policies likely to have impact.
Animal Health & welfare	Linked to climate change (possible new diseases) and changing consumer demand for products.

Source: University of Cambridge & SAC (2004)

Table 6-1: Current and future influences on farmland

The main implications of these influences, and the consequent projections, on set-aside and retaining the environmental benefits of set-aside are as follows:

- Wheat and oilseeds are likely to be the most profitable combinable crops and the crops likely to replace set-aside in most arable areas once it is abolished.
- Low profitability associated with many break crops may mean that farm rotations change.
- Low yielding, marginal arable land including that currently in set-aside is likely to revert to grass or simply be left idle. However higher market prices (as being experienced presently) might mean more of this land is brought back into production.

- Per hectare applications of fertiliser and sprays on arable land are unlikely to change markedly as world commodity prices (and hence pressure to extensify or intensify production) are unlikely to change markedly.
- However not all farms have adjusted their input use to match the relatively low commodity prices, so the current trend towards more targeted input applications in response to market and policy signals will continue
- Land in set-aside in livestock areas is likely to revert to grassland, maize and fodder crops although, as livestock numbers will continue to reduce, the result will be a more extensive utilisation of grassland with lower fertiliser inputs.
- In the dairy sector there will be fewer, larger and higher yielding herds. These units are likely to bring particular environmental pressures, on the other hand, they are also likely to have better grassland management practices and newer storage facilities which should help offset these pressures.
- Lower input systems may occur where a premium for output can be obtained (i.e. organic) or where agri-environment payments may offset losses. Areas under organic systems are likely to increase.
- Land in energy crops will increase although projections indicate that they are unlikely to occupy significant areas by 2015. This area is explored in more detail in Section 6.2.
- Cross compliance is expected to continue to maintain a base level of environmental protection.
- Widespread adoption of Entry Level Schemes will help reinforce the gains from cross compliance.
- Nitrate Vulnerable Zones will have a big impact where manure distribution is a key issue and for the minority of farms that are over-using inputs.
- Higher Level Schemes and targeted advice schemes such as Catchment Sensitive Farming are likely to continue to improve biodiversity and water quality.
- The continued pushing of the environmental awareness message and the enforcement of regulations will reduce the numbers of farmers adversely affecting the environment who over-use or misapply inputs. This will be assisted by improving environmental performance standards in quality assurance schemes.

6.2 Energy crops

This section focuses on the potential future growth of energy crops on set-aside and other land, including policy, market and other influences.

Energy crops include:
- Bio-fuels such as wheat and sugar beet for bio-ethanol and oil seed rape for bio-diesel; and
- Biomass such as short rotation coppice and miscanthus.

There is likely to be an increasing role for bio-fuels and biomass as part of the drive towards increasing the proportion of electricity, heat and transport fuel from renewable energy sources. Key policies include the following:

- EU Renewable Energy Directive (2001/77/EC) which sets out a reporting framework that requires Member States to account for their emissions and sets targets for GHG reductions;

- EU Renewable Transport Fuels Directive (2003/30/EC) which requires Member States to plan for an increasing supply of biofuels to replace fossil fuels for transport uses;
- EU Strategy for Biofuels produced in 2006 which sets out plans for the growth of the sector;
- EU Biomass Action Plan launched in December 2005 which aims to increase the use of energy from forestry, agriculture and waste materials. The Plan outlines measures in three sectors: heating, electricity and transport.
- EU 'Energy Package' launched in January 2007 which will promote the use of environmentally friendly energy such as biomass. Targets include:
    - 20% of EU energy consumption coming from renewable sources by 2020
    - 10% of EU transport fuel coming from biofuels by 2020

The EC Commissioner for Agriculture and Rural Development, Mrs Fischer Boel has stated[10] that "*the provision of renewable energy is a growing priority for the EU*" and that that Member States should promote bio-energy measures through rural development measures with funding through the second pillar of the CAP (although this "*should be through compulsory modulation to ensure equality between member states*"). Mrs Fischer Boel went on to emphasise the new market opportunities opening up for farmers in energy crops and stated that EU support would continue, building on decoupling, establishment grants for permanent crops of up to 50% and an Energy Crop Supplement of €45/ha (now extended to new Member States with a potential maximum area supported by the scheme of 2 million hectares). Mrs Fischer Boel also mentioned the important role of set-aside in supporting energy crop growing. She also added that cross-compliance would act as a baseline to reduce environmental damage from any kind of agricultural activity including energy crops.

In the UK, the government has introduced a number of measures supporting energy crop growing as part of its programme to combat climate change:

- The Renewables Obligation Order (ROO) requires 10% of electricity to come from renewable sources by 2010, this is most likely to come from wind generation and the co-firing of biomass with coal. Generators are obliged to obtaining Renewable Obligation Certificates (ROCs) by purchase or generation of electricity from renewable sources. There will be increasing rates of co-fired biomass from energy crops until 2016 (75% 2011-2016) then co-firing ceases to be eligible for ROCs.
- The Renewable Transport Fuels Obligation (RTFO) requires 5% of all fuels sold on UK forecourts to be replaced by biofuels by 2010. The obligation is scheduled to start in 2008.
- A 20 pence per litre reduction in duty for biofuels compared to conventional fuels.
- Farm-based support for energy crop growing, which includes:
    - The Energy Crops Scheme with establishment grants of £1,000/ha for short rotation coppice and £920/ha for miscanthus;
    - The ability to grow energy crops on set-aside and retain the single payment on this land;
    - The Energy Crop Supplement of €45/ha for energy crops grown on land other than set-aside.

Other recent developments which influence policy include the 'Biomass Task Force report to Government' in October 2005 which outlines the vision for the development of biomass and specific actions required to achieve this and then the

[10] At the launch of the EC 'Energy Package' on 10th January 2007

'Government's response to the Biomass Task Force Report' in April 2006 which identifies measures to support the sector including a new capital grant scheme for biomass boilers, support for energy crops in new Rural Development Programme for England, a Biomass Energy Centre and more public procurement. A long-term Biomass Strategy is planned to be launched this year.

In summary therefore there is a strong policy push towards expanding the area of energy crops at EU and Member State level.

Market profitability is however key to any future expansion of energy crops. Biofuel crops such as wheat for bio-ethanol and oil seed rape for bio-diesel seem relatively profitable at the present time as evidenced by increasing areas of these crops in the UK and other Member States. Much less certain however is the profitability of specialist energy crops, such as SRC and miscanthus. Recent studies suggest that the opportunity cost of growing these energy crops should have reduced in response to decoupling because the profitability of alternative land uses is reduced, furthermore the directly coupled Energy Crop Supplement should also have increased their attractiveness relative to other crops. However at current prices, SRC and miscanthus do not appear to generate a positive net, margin although producers who can attain higher yields and have lower costs may be able to grow these crops profitably (SAC and University of Cambridge, 2005).

That said, future demand for and the profitability of biofuel and biomass crops should increase over the next few years due to:

- Concern about climate change
- Concern about energy security
- Increasing global energy demand
- Increasing prices for energy from conventional fossil fuel sources which will filter through to prices for renewable energy sources such as biofuels and biomass.
- Increasing yields as new varieties are developed and commercialised.
- Reducing unit costs of production over time as planting and harvesting technology improves.

In summary, all other things being equal it is likely that an increasing proportion of set-aside will be committed to growing energy crops such as oil seed rape, wheat, miscanthus and short rotation coppice over the next 1-2 years and this will continue after the anticipated abolition of set-aside in 2009. The breakdown of energy crops by type is uncertain but seems likely to continue to be dominated by the more profitable and flexible crops - oil seed rape and wheat. In addition to the drivers already mentioned, the growth of the energy crop sector will be also be dependent on the development of suitable processing capacity and support provided by governments for this.

7 Policy Options

7.1 Introduction

Drawing on Sections 2-6, this part of the report explores the policy options for retaining the environmental benefits of set-aside.

Objectives

The objectives of any policy or policies replacing set-aside, in respect of retaining key environmental benefits of set-aside, can be summarised as follows:

- To buffer and connect land of high environmental value in order to benefit biodiversity, in particular priority habitats and species and special sites;
- To provide habitat and feed sources for a range of farmland birds across the countryside;
- To reduce inputs to agriculture and buffer watercourses in order to reduce diffuse water pollution and maintain/improve water quality;
- To protect soils where necessary by reducing erosion and nitrates and improving organic matter and soil structure;
- To contribute to the reduction of greenhouse gas emissions through fewer field operations and reduced inputs and by supporting the development of renewable energy in the form of biofuels and biomass where significant and proven GHG savings are on offer.

Principles

Drawing on the rationale for the abolition of set-aside and EU and Member State strategic policy objectives, the key principles underlying any policy or policies replacing set-aside designed to retain key environmental benefits are likely to include the following:

1. Public payments in return for the delivery of public, environmental goods and services will be delivered through CAP as follows:
    a. Pillar 1 payments (i.e. single payments) in return for compliance with *general* environmental conditions (cross-compliance);
    b. Pillar 2 payments (e.g. agri-environment scheme payments) to achieve *specific, targeted* environmental goals.

    The cost of public, environmental goods and services should be reduced over time, where possible.

2. There is a need to retain the environmental benefits from set-aside *across a wide number of farms and a wide area*.

3. CAP will continue to be simplified in the future, which would suggest fewer rather than more measures/schemes and a reduced administrative burden for the public sector and farmers alike.

4. The decoupling of CAP is connected to freeing up the market and allowing farmers to make 'free market' decisions. The EC will wish to continue this direction, where possible, to improve the competitiveness of farmers and other businesses in the EU, benefit consumers and assist with future WTO negotiations.

5. The EC wishes to develop its renewable energy sector for various reasons including improving energy security and reducing climate change impacts.

Energy crops grown on agricultural land have an important part to play in delivering these objectives and present potentially significant opportunities for farmers in the future. The EC wishes to encourage this new market.

Policy Options

The main policy options for retaining the environmental benefits of set-aside are listed briefly below and then explored in Sections 7.2 to 7.4.

1. Extend Cross Compliance

Cross compliance conditions for the Single Payment could be extended to include elements which safeguard the general environmental protection benefits currently delivered by set-aside.

2. Develop Agri-Environment Schemes

Agri-environment schemes could be developed (in terms of scope and budget) to incorporate specific environmental maintenance and enhancement benefits currently delivered by set-aside.

3. Develop an Environmental Set-Aside Scheme

The environmental benefits from set-aside could be retained by developing a specific environmental set-aside scheme, one with only environmental objectives.

4. Develop Energy Crop Schemes

Energy crop schemes could be developed to support energy crop growing on all land as part of a coherent package of measures designed to support biofuel and biomass production, subject to the development of safeguards to minimise/mitigate adverse environmental effects.

In addition to these four main policy options, there are a number of other possible policy options. These are outlined below but not explored in detail for the reasons given.

5. Legislate

Bringing in new legislation or amending existing legislation to secure environmental benefits is a theoretical option but in practice would be at odds with the current structure of regulations and incentives and bring about a significant additional burden on farmers.

6. Incorporate into the Code of Good Farming Practice

Additional measures to secure environmental benefits could be incorporated into the Code of Good Farming Practice (GFP) which provides the baseline conditions for rural development scheme funding. However, our understanding is that GFP is likely to be merged or at least made fully consistent with cross-compliance at some stage in the future. This option would also affect a different group of farmers (including those in Less Favoured Areas) than those currently involved with set-aside. As such, it would not appear to be a logical vehicle for retaining set-aside environmental benefits.

7. Incorporate into Farm Assurance Schemes

In theory some of the measures required to sustain the environmental benefits arising from set-aside could be incorporated into farm assurance schemes. However the environmental standards associated with the mainstream schemes

are presently limited and the prospect of these being developed to achieve anything other than a small proportion of the benefits currently delivered by set-aside seems remote, at least in the short to medium term.

8. Encourage voluntary uptake

With increasing environmental awareness amongst farmers and renewed interest in integrated farm management, it is possible that some uptake of measures delivering set-aside environmental benefits could be secured through voluntary uptake. However, while this would be welcome, it would be unlikely to result in the retention of the significant, widespread benefits currently delivered by set-aside, at least not in the short to medium term.

7.2 Cross-compliance

Description

This option would extend cross compliance conditions for the single payment to include elements which safeguard general environmental protection benefits currently delivered by set-aside.

Cross-compliance currently includes several GAECs which are closely linked to set-aside including those relating to: soil protection; the management of uncropped land; and (in England) buffer strips adjacent hedges, watercourses and SSSIs.

Furthermore, farmers receive single payments provided they adhere to cross-compliance requirements and conditions in the same way that they receive them provided they follow set-aside rules. Conceptually then, transferring some general environmental protection measures from set-aside to cross-compliance could be relatively straightforward.

Amendments to GAECs could include:

- Maintaining a minimum area or proportion of the farm as uncropped, ungrazed or unused land to provide an area of habitat or environmental protection (this could be rotated or permanent);
- Maintaining wider and/or more buffer strips alongside watercourses and other environmentally important features;
- Maintaining some form of environmentally beneficial cover on all land to protect soils over winter, if not cropped.

As the environmental benefits of set-aside are probably more important to retain in arable areas than livestock areas, the amendments would need to be developed in a way which is appropriate to these different circumstances. For example, the retention of a minimum area or proportion of the farm left uncropped, ungrazed or unused could include ponds, hedges or small woods in the farmed area; this would be easier to comply with in a livestock area than an arable area.

The exact amendments, as the current GAECs, would be left to Member State discretion. This would include striking the balance between general benefits arising from set-aside, which may be appropriate for cross-compliance and specific benefits which might be better addressed by other measures.

Fit with existing/future legislative and policy framework

There are already cross-compliance conditions in the Single Payment Schemes implemented by Member States. As such while some adaptation of the conditions would be required to secure the general environmental benefits of set-aside, this would not require a new scheme and should be relatively simple.

In addition, the issues intended to be addressed by GAECs, as set out in Annex IV of the 2003 CAP Reform Agreement, are similar to those issues benefiting from set-aside presently i.e. soils (erosion, organic matter and structure) and habitat maintenance.

Furthermore, Member States have already taken steps to harmonise set-aside rules and cross-compliance requirements as much as possible (Dwyer and Silcock, 2006). The concepts of maintaining winter cover, buffer strips etc are familiar ones to both government officials and farmers and advisers.

Cross-compliance arrangements in the EU are currently being evaluated and are likely to be reviewed in any case over the next 1-2 years. This would provide a good opportunity to consider how to accommodate set-aside environmental benefits.

However a major problem may be the reluctance by the EC and some Member States to expand/increase cross-compliance conditions in any way. Cross-compliance may have been pushed as far as it can go in the UK, further than in many other Member States. That said, faced with the choice of extending cross-compliance to incorporate measures to secure the general environmental benefits of set-aside or losing a proportion of the single payment linked to set-aside, Member States may prefer to opt for the former.

Effectiveness in sustaining or enhancing environmental benefits of set-aside

Cross-compliance, adapted as indicated above, should ensure that all farms across the countryside provide some minimum area available for wildlife and reduce diffuse pollution, by decreasing the nutrient 'footprint' of the farm and buffering watercourses.

Furthermore, farmers should have the flexibility to choose how to implement these obligations, subject to some simple stipulations in respect of acceptable siting and management. In this way, heterogeneity is retained; this is a valuable feature of set-aside presently and contributes to the environmental benefits which need to be retained.

Current environmental disbenefits, arising from the inappropriate management of set-aside, should as far as possible be avoided through some simple "do's and don'ts". This could take place at the same time as a review of cross-compliance "do's and don'ts" to achieve optimum environmental benefits.

At this general level, flexibility and simplicity are key.

Sustainability

Cross-compliance in its current form as part of the Single Payment Scheme is likely to continue until at least 2012.

Beyond this it seems likely that single payments will be flat rate area payments across all Member States. It seems inconceivable that these payments could be made without some form of environmental conditions in the form of cross-compliance.

There is a risk, however, that if single payments are reduced significantly in the future (as is the aim of some Member States as part of the next Financial Perspectives) the power of cross-compliance will be greatly reduced. This will be particularly the case if payment levels are reduced to a point where they are no longer attractive to the more profitable, intensive farmers. Such farmers may then decide to produce purely for the market, outside the constraints of the Single

Payment Scheme. Cross-compliance would then become a much less effective and suitable mechanism for sustaining the environmental benefits of set-aside.

It is worth noting that single payment reductions are *inter alia* likely to be fuelled by additional modulation required for agri-environment schemes.

Cost

The cost of adapting cross-compliance to deliver the benefits currently provided by set-aside depend on whether all or part of the benefits are expected to be delivered by cross-compliance.

100% of environmental benefit delivered through cross-compliance

In theory, cross-compliance could be adapted to incorporate set-aside 'lock, stock and barrel'. In other words, all 'arable' land currently subject to set-aside would be maintained as uncropped, ungrazed or unused land. For example, in lowland England cross-compliance would include a condition which requires 8% of eligible land to be left and managed for habitat and/or resource protection purposes. The cost of this change would be minimal and limited to additional public sector expenditure on developing GAEC and disseminating this to farmers. This assumes that farmers would continue to receive their current levels of single payment, including the regional area payment relating to the set-aside entitlement.

Environmental benefit delivered mainly by cross-compliance but partly by agr-environment schemes

It is more likely however that pressure from the EC, Member States or farming bodies may only permit cross-compliance to incorporate a proportion of set-aside benefits on the basis that: firstly cross-compliance should be limited to environmental protection as opposed to management and enhancement; secondly any additional environmental benefits delivered by cross-compliance must be commensurate with the general, widely distributed benefits arising from set-aside; and thirdly there is a strong case for specific, high value environmental benefits arising from set-aside to be delivered by targeted measures accommodated within existing agri-environment schemes.

In this case, a reasonable assumption may be that cross-compliance is adapted to require, say 5% of eligible land to be uncropped, ungrazed or unused. This would suggest farmers being able to retain the same proportion of their set-aside single payment, for example in lowland England 5/8 of the regional area payment, with the remaining 3/8 being deducted and diverted to Pillar 2, through some form of additional modulation, for delivery through agri-environment schemes.

The figures for lowland England, using the 100% regional area payment rates payable in 2012 (net of all deductions including national reserve, national ceiling, compulsory modulation, voluntary modulation and financial discipline) are set out in Figure 7-1. This shows that in return for a reduction in their 'set-aside' obligation farmers would lose a *pro-rata* element of their single payment amounting to around £56/ha, although they would be able to recoup some or all of this through agri-environment scheme participation. The public sector cost associated with developing and implementing this system would be greater than a cross-compliance only option.

Set-aside rate for lowland England	8%
Total set-aside in lowland England	400,000 ha say
'Set-aside payment' in 2012 (after all deductions)	€217/ha (£148/ha)
Total 'set-aside payment' in 2012	€86.8 million
Cross-compliance uncropped/ungrazed/unused rate	5%
Proportion of total 'set-aside payment' retained due to additional cross-compliance obligation	62.5% (=5/8)
Retained part of single payment for cross-compliance obligation land in 2012	**€54.25 million (£37 million)**
or	**€135.63/ha (£92.50/ha)**
Proportion of total 'set-aside payment' deducted for agri-environment schemes	37.5% (=3/8)
Additional agri-environment scheme budget for targeted measures	**€32.55 million (£22.2 million)**

Figure 7-1: Allocation of 'set-aside payment' to cross-compliance and agri-environment schemes

SWOT analysis

Strengths

- Cross compliance is an existing scheme
- Cross-compliance is likely to be a feature of CAP until at least 2012 and probably beyond
- Pillar 1 is appropriate and has the funding to secure the general environmental benefits arising from set-aside.
- There is synergy between GAEC objectives and the environmental benefits provided by set-aside
- Maintains wide distribution of uncropped/ungrazed/unused land across the countryside
- Helps simplify CAP
- Frees up more land for farmers to crop/stock/use as they wish
- Provides farmers with flexibility to chose which management options they wish to adopt for their uncropped/ungrazed/unused land
- Relatively low cost to implement
- Relatively low administrative cost to run

Weaknesses

- Potential confusion between cross-compliance land/buffer strips and agri-environment scheme land/buffer strips
- Cross-compliance changes would need to be carefully designed to accommodate historic burden of set-aside (on arable land) and set-aside in industrial/energy crops

Opportunities

- Cross-compliance review is due to take place within the next 1-2 years. This also provides an opportunity to revise the cross-compliance "do's and don'ts" to achieve optimum environmental benefits.

Threats

- Adaptation of cross-compliance to accommodate set-aside may not be acceptable to EC, some Member States and farmers.
- More modulation may similarly be difficult to obtain approval for.
- Cross-compliance may become a less effective and suitable mechanism in the long term, if single payments are reduced to the point that they are no longer attractive to the more profitable, intensive farmers.

7.3 Agri-environment schemes

Description

This option would safeguard the environmental benefits of set-aside by transferring all or part of the set-aside 'budget' to agri-environment schemes.

This would enable Member States to fund general (widespread) environmental measures (such as stubbles) and/or specific (targeted) environmental measures (such as buffer strips alongside ecologically important watercourses) through their existing agri-environment schemes. Farmers would have their single payments reduced by all or part of the set-aside element of their payment to fund these measures. This implies some form of additional modulation to transfer funds from Pillar 1 to Pillar 2.

Appropriate measures which could be adopted or extended by Member States might include:

- Measures to reduce diffuse pollution in priority catchments such as changes in land use, grazing regime etc;
- Buffer strips alongside sensitive watercourses and other sensitive habitats (e.g. SSSIs);
- Naturally revegetated rotational fallow;
- Enhanced winter stubbles (e.g. encouraging seed resources/availability through reduced agrochemical inputs on the preceding crop);
- Habitat re-creation to link existing, valuable habitats.

In the UK, these measures could be delivered either through entry level schemes or higher level schemes, depending on the targeting required.

The option would leave cross-compliance unchanged

Fit with existing/future legislative and policy framework

Member States already have a range of agri-environment schemes delivering environmental benefits including biodiversity, landscape, historic conservation, resource protection etc. These schemes have measures which can, or with some minor amendments, could deliver the environmental benefits currently delivered by set-aside. New schemes would not be required and any changes required could be accommodated within the reviews of these schemes which are carried out from time to time.

In broad terms, however, agri-environment schemes are concerned with environmental management and enhancement rather than environmental protection and it could be argued that some of the benefits arising from set-aside fall into the latter category, for example buffer strips alongside watercourses.

A more significant problem is the reluctance of some Member States to consider the prospect of more money being transferred from Pillar 1 to Pillar 2. This would take money away from all farmers and redistribute it to fewer farmers. If restrictions were somehow placed on this transfer of funds, this could place even more pressure on Pillar 2 expenditure which is already overstretched.

Effectiveness in sustaining or enhancing environmental benefits of set-aside

Agri-environment schemes could deliver the environmental benefits of set-aside effectively in the sense that the additional or extended measures which would be required are already tried and tested on the whole. The same environmental benefit could also potentially be achieved using less land than presently committed to set-aside.

Targeting guidelines to capture general environmental benefits could be provided through entry level schemes and specific measures for specific environmental benefits could be delivered through higher level schemes using pro-active approaches as necessary.

Agri-environment schemes also have fairly high uptake by farmers which means that farmers are familiar with how they work and increasingly skilled at delivering the management necessary to achieve desired environmental outcomes. In theory, existing agreements could be amended to incorporate the additional measures necessary to secure the environmental benefits from set-aside.

One concern relating to this policy option is that some farmers presently covered by the set-aside obligation may not be in an agri-environment scheme, now or in the future, either by choice, limited budget or other restriction (e.g. tenure). In other words, the funds and environmental benefits are likely to be spread less evenly across the countryside. This may not matter too much provided there is a relatively high uptake of entry level schemes across the country and a high uptake of those options designed to secure 'set-aside' environmental benefits. In reality however, some gaps in coverage are likely to occur.

Another concern relates to the cost efficiency of agri-environment schemes compared to say set-aside or cross-compliance. Experience suggests that this is likely to be lower with agri-environment schemes than compulsory 'flat rate' measures. This would mean that even if the same amount of money was secured for extra Pillar 2 expenditure, less environmental benefit would be secured. This is considered further under 'Costs' below.

Sustainability

Agri-environment schemes have been part of the CAP landscape since the 1980s and there are no signs that they will disappear either before or after 2012. They are a valued and important mechanism for procuring public environmental benefits and addressing dis-benefits. Furthermore it is feasible that their scope might even increase in order to tackle climate change issues. As such set-aside environmental benefits should be secure if delivered through agri-environment schemes.

Cost

The cost of extending or amending agri-environment schemes to deliver the benefits currently provided by set-aside depend on whether all or part of the benefits are expected to be delivered by them.

<u>100% of environmental benefit delivered through agri-environment schemes</u>

In theory, agri-environment schemes could deliver all the environmental benefits currently delivered by set-aside. However, as indicated previously, this would probably exclude some farmers and create 'gaps' in the countryside, resulting in some environmental benefits being lost in the switch from set-aside. Trying to deliver all or most of the environmental benefits through agri-environment schemes could also be expensive.

<u>Environmental benefit delivered partly by agri-environment schemes but mainly by cross-compliance</u>

It is more likely, therefore, that agri-environment schemes would be used to deliver specific, important environmental benefits, in particular environmental management or enhancement in priority areas. These benefits would require targeting in terms of siting or management.

Assuming that 5% of eligible land is required to be uncropped, ungrazed or unused through cross-compliance (see Section 7.2), the potential maximum additional budget available for agri-environment schemes to deliver specific environmental benefits through targeted measures, in our lowland England example, is set out in Figure 7-1. A breakdown of what this extra £22.2 million per annum could achieve is shown in Figure 7-2. It illustrates that this money could buy targeted measures over an extra 128,000 ha. This is likely to be an over-estimate however as part of the budget would need to be used for public sector administration of the scheme. Assuming this is in the order of 20%, a more realistic figure would be in the order of 102,000 ha (net cost £218/ha). This would be in addition to land safeguarded through enhanced cross-compliance conditions.

In addition to the public sector running costs, there would be some private sector transaction costs (akin to those under ELS) and public sector scheme development costs.

Additional agri-environment scheme budget for targeted measures		**€32.55 million (£22.2 million)**		
Indicative breakdown of possible measures using potentially appropriate ELS/HLS options		£ total	£/ha	ha
ELS options				
55%	Over-wintered stubbles (EF6)	£12.2m	120	101,667
25%	6 m buffer strips on cultivated land (EE3)	£5.60m	400	14,000
10%	Wild bird seed mixture/ Pollen and nectar flower mixture (EF2/EF4)	£2.2m	450	4,889
HLS options				
10%	Creation of species rich semi-natural grassland (HK8)	£2.2m	280	7,857
Total area benefiting from new measures				**128,413 ha**
Average payment rate				**£173/ha**

Figure 7-2: Breakdown of additional agri-environment scheme budget

SWOT analysis

Strengths

- Agri-environment schemes are an existing measure
- Agri-environment schemes are likely to be a feature of CAP up to and beyond 2012
- Agri-environment schemes already deliver most of the environmental benefits provided by set-aside
- There is increasing uptake of agri-environment schemes by farmers; farmers are familiar with the schemes and the environmental management required
- Delivers targeted measures in priority areas
- Could maintain wide distribution of uncropped/ungrazed/unused land across the countryside (through the cross-compliance element of package)
- Helps simplify CAP
- Relatively low cost to develop
- Low-medium private transaction costs

Weaknesses

- Loss of some farmers and farmland from targeted coverage
- Potential confusion between cross-compliance land/buffer strips and agri-environment scheme land/buffer strips
- Medium public sector cost to run

- In a number of Member States agri-environment schemes have not been popular with smaller farmers, due to complicated entry requirements.
- Voluntary nature of schemes

Opportunities
- Agri-environment scheme reviews take place periodically at Member State level

Threats
- Additional modulation from Pillar 1 to Pillar 2 is likely to be unpopular with some Member States.
- Pillar 2 budget is already under pressure from competing demands.

7.4 Environmental Set-Aside

Description

This option would safeguard the environmental benefits of set-aside by developing a new scheme 'environmental set-aside'.

This option was explored by University of Cambridge (2006) and was also envisaged by LUPG (2005). The scheme would have environment-only objectives which could include:

- to take significant areas of land out of intensive production in localities where arable production continues to be intensive;
- to support agri-environment schemes, by putting targeted areas of land into set-aside management in locations that provide identified priority environmental outputs: buffering for designated conservation sites, linking semi-natural areas to create habitat networks to enhance biodiversity, reducing nitrate and phosphate leaching and soil erosion in sensitive locations (e.g. near water abstraction areas, besides watercourses of significance for fish spawning), providing larger areas of cover and feeding grounds for farmland birds in locations important for the species prioritised under the Biodiversity Action Plans; and
- to introduce new payments for forms of land management that promote environmental benefits, such as carbon sequestration.

Developing a scheme which is both obligatory (to secure benefits over a wide area and to ensure equity) and targeted (to optimise the environmental benefits) would be challenging.

The existing approach of requiring a standard area or percentage of land to be set aside by every farmer whose farm exceeds the minimum area could be used, however this may not achieve the scheme's objectives as the environmental benefits potentially achievable through set-aside are likely to vary significantly between different areas.

Another approach could be to introduce some limited flexibility by providing a short list of options which farmers could select and/or be guided to. These options could have points attributed to them (like ELS in England). The farmer would then be obliged to select options to meet a minimum total number of points for his farm (the total, like ELS, could be based on a requirement for a certain number of points per hectare).

Other more complicated approaches, considered by University of Cambridge (2006), include an auction of environmental outputs and competitive tendering.

Fit with existing/future legislative and policy framework

The continuation of some form of set-aside obligation, recast as 'environmental set-aside', is plausible. However Mrs Fischer Boel has stated her desire to abolish set-aside several times and it must be doubtful whether any new policy including the term 'set-aside' is likely to receive the approval of the EC and Member States, let alone farmers or others. The scheme could however be rebranded, making it more palatable.

Another concern with environmental set-aside is its place in the policy pyramid or framework, including environmental legislation, cross-compliance, entry level agri-environment schemes and higher level agri-environment schemes. Environmental set-aside, as envisaged above, would appear to be at a level with cross-compliance or inbetween cross-compliance and entry level agri-environment schemes. There is a strong argument that the environmental land management 'marketplace' is already crowded and complicated, and another scheme would only add to the confusion.

On the other hand, if *targeted* environmental benefits can be secured as part of the Single Payment Scheme package, funded through Pillar 1, this would be advantageous.

Effectiveness in sustaining or enhancing the environmental benefits of set-aside

Environmental set-aside should ensure that all farms currently subject to set-aside will continue to provide some environmental benefits. A small number of options, supported by targeting guidelines and/or advisers, should ensure that the most important environmental benefits are retained. Elsewhere, where it is deemed that more flexibility exists, there will be opportunities for new environmental improvements, for example land management for carbon sequestration.

Sustainability

Environmental set-aside could form part of the Single Payment Scheme package until 2012 and potentially beyond.

Like the cross-compliance option however, there is a risk that the reduction in the value of single payments will make the Single Payment Scheme and its associated obligations, including environmental set-aside, unattractive to the more profitable, intensive farmers. Such farmers may then decide to produce purely for the market, outside the constraints of the Single Payment Scheme.

Environmental set-aside would then become a much less effective and suitable mechanism for sustaining the environmental benefits of set-aside.

Cost

In theory, the cost of the change from set-aside to environmental set-aside should be low. The costs would include public sector development costs and then public and private sector transaction costs. The administrative costs are likely to be similar to or lower than those for entry level agri-environment schemes. This assumes that farmers would continue to receive their current levels of single payment, including the regional area payment relating to the set-aside entitlement.

SWOT analysis

Strengths
- Environmental set-aside would be an evolution of an existing, familiar scheme
- Environmental set-aside would form part of the Single Payment Scheme, likely to be a feature of CAP until at least 2012 and probably beyond
- Funding would be through Pillar 1 rather than Pillar 2.
- Maintains wide distribution of uncropped/ungrazed/unused land across the countryside
- Provides a degree of simplified targeting to sustain environmental benefits
- Provides farmers with flexibility to chose which options they wish to adopt
- Low-medium development and transaction costs
- Low-medium administrative costs to run

Weaknesses
- Environmental set-aside is likely to face opposition from those seeking to abolish set-aside, even if it is rebranded.
- Does not contribute to CAP simplification.
- Potential confusion with existing environmental obligations/options in the form cross-compliance and agri-environment schemes.
- Degree of targeting achievable through environmental set-aside may not sufficient to address priorities.

Opportunities
- Could be introduced alongside the forthcoming review of cross-compliance

Threats
- Environmental set-aside may become a less effective and suitable mechanism in the long term if single payments are reduced to the point that they are no longer attractive to the more profitable, intensive farmers.

7.5 Energy crop schemes

Description

This option would continue and extend the current energy crop schemes to accommodate energy crops currently grown on set-aside.

It assumes that it is desirable for there to be a single, dedicated scheme to nurture and develop energy crop production in each Member State. This would offer stability and security to potential investors; producers and processors alike. It is recognised that this support would not carry on indefinitely and that the sector should be able to stand on its own feet in the medium term, say after 2012.

Energy crops would be treated like any other agricultural activity under the SPS. This would include being subject to cross-compliance conditions, as adapted (see Section 7.2 and below). The only exception would be a coupled Energy Crop Supplement which would be paid in a similar way to presently. The value of this supplement is currently €45/ha but could be reviewed in light of the additional expenditure arising from the abolition of set-aside. It is envisaged that establishment grants for biomass crops would continue in their present form or be brought into one scheme alongside the Energy Crop Supplement.

One strategic policy concern with the proposed approach of extending the energy crop scheme is whether a payment coupled to the production of energy crops is in fact the right way to deliver GHG reductions. Instead, it may be better to focus on

incentives which target the public good itself, i.e. GHGs and put in place demand-side measures, such as Obligations, aimed at creating the market, instead of production subsidies. These views may limit the acceptability and timescale of any energy crop scheme extension.

The potential environmental dis-benefits associated with energy crop growing are also likely to be a concern. As indicated in Section 4.7, these include nutrient and biodiversity effects from biofuel crops and increased water usage by biomass crops. If additional safeguards are required, in addition to the amended cross-compliance conditions, then these could take the form of conditions attached to receipt of the Energy Crop Supplement or establishment grants.

A practical concern of energy crop growers might relate to the proposed additional cross-compliance obligation relating to say 5% uncropped/ungrazed/unused land (many energy crop growers have all their set-aside land in energy crops and have no stubbles, buffer strips etc). However these growers would receive an Energy Crop Supplement on their 'set-aside' land for the first time and retain most of their Single Payment relating to this land. More broadly, the issue is one of equity and simplicity. From a policy perspective, it would be desirable to have a single system for all farmers. If additional incentives need to be given to encourage energy crop growing in the short term, then it might be better for these to be given through the Energy Crop Supplement rather than tinkering with 'special' cross-compliance conditions or exemptions.

Fit with existing/future legislative and policy framework

The continuation and extension of energy crop schemes is directly in line with EU policy objectives for renewable energy and GHG reductions, at least in the short to medium term.

Furthermore ensuring that former 'set-aside' land is treated in the same way as other agricultural land makes sense in light of CAP simplification, this applies both to cross-compliance and eligibility for the Energy Crops Supplement.

In light of climate change policy objectives which underpin EU support for energy crop growing, it is possible to envisage differential rates for the Energy Crops Supplement according to the performance of different energy crop types in reducing GHG emissions. However this development would run counter to the intended simplification of CAP.

Effectiveness in sustaining or enhancing environmental benefits of set-aside

The rules which permit energy crop production on set-aside have been effective in supporting the growth of the sector in the EU. The proposed extension of the Energy Crops Supplement to former set-aside land would continue this support.

The main issue however is whether the proposed additional cross-compliance obligation would significantly affect the growth of the sector. On balance this seems unlikely but the issue merits closer investigation; if necessary transitional measures or additional incentives may be required.

Looking at it from an environmental perspective, the additional cross-compliance obligations provide a good opportunity not just to ensure that all farmers have uncropped/ungrazed/unused land but also to address the general disbenefits associated with energy crop growing. Farmers growing biofuel or biomass crops could, for example, be required to follow certain, simple guidelines relating to the siting of uncropped land to address biodiversity or resource protection issues.

Sustainability

EU support for the energy crop sector seems set to continue for the short to medium term at least. Beyond then, support is likely to depend on the development of the sector, the growth of other renewable sources of energy, progress with climate change mitigation and WTO discussions *inter alia*.

Cost

The cost of extending the Energy Crop Supplement to energy crops grown on former set-aside land could be significant at the current payment rate of €45/ha, although this is reduced after modulation. The UK position in 2012 is shown in Figure 7-3. This indicates a relatively modest additional expenditure of £1.77 million to accommodate energy crops from set-aside.

Total set-aside in the UK	559,000 ha
Energy crops (oil seed rape, SRC, miscanthus) as a proportion of total set-aside	12.4% est. 69,316 ha
Energy Crops Supplement before modulation	€45/ha
Energy Crops Supplement after modulation (2012)	€37.4/ha (£25.5/ha)
Additional expenditure on Energy Crops Supplement	**€2.59 million (£1.77 million)**

Figure 7-3: Additional UK expenditure on Energy Crops Supplement for former set-aside land

In addition to the direct expenditure on the Energy Crops Supplement, there would be relatively low extra costs associated with adapting the scheme to accommodate set-aside land.

Private sector transaction costs to enter the scheme would also be minimal. However energy crop growers would also lose part of their single payment from former 'set-aside' land (£55/ha, see Section 7.2) and the net margin from growing energy crops on the 5% uncropped/ungrazed/unused land (this could be £100-£150/ha for oil seed rape grown for biodiesel). Together these 'penalties' could provide a significant disadvantage to energy crop growers and may need to be offset by some form of transitional measures or additional incentives.

SWOT analysis

Strengths
- Energy Crops Supplement is an existing measure
- Energy Crops Supplement is likely to be a feature of CAP at least until 2012
- Helps simplify energy crop sector support and CAP
- Relatively low direct cost to apply Energy Crops Supplement to 'set-aside' crops
- Relatively low private transaction costs

Weaknesses
- Potential significant private loss for existing growers arising from reduced single payment and loss of net margin of energy crops that otherwise would have been grown on uncropped/unused land. This also applies to the growers of other industrial crops.
- Supply-side support may be less effective in terms of GHG reductions than demand-side mechanisms.

Opportunities

- Private loss could, in short term, be eased by transitional measures or additional incentives to maintain momentum in the energy crop sector.
- Environmental dis-benefits of energy crop growing could be tackled through additional conditions within Energy Crops Supplement and/or cross-compliance.

Threats

- Failure to secure additional funds to extend the Energy Crops Supplement and any extra short term incentives which may be necessary.

7.6 Summary

A summary of the main policy options, including the cross-compliance and agri-environment scheme combination and their attributes is shown in Table 7-1.

	Cross-Compliance only	Agri-environment Schemes only	Cross-compliance & Agri-environment Schemes	Environmental Set-Aside	Energy Crop Schemes
Main environmental benefit					
Biodiversity	✓	✓	✓	✓	×
Water Quality	✓	✓	✓	✓	×
Soils	✓	✓	✓	✓	×
Climate Change	×	×	×	✓ (potentially)	✓
Policy fit	✓	✓	✓	×	✓
Env effectiveness	✓ (general)	✓	✓	✓	✓
Sustainability	✓	✓	✓	✓	✓
Funding	Pillar 1	Pillar 2	Pillar 1&2	Pillar 1	Pillar 2
Extra cost					
Public sector development	Low	Low	Low	Low	Low
Public sector direct payment	Nil	Medium	Low	Nil	Low
Public sector administrative	Low	Medium	Low-Medium	Low-Medium	Low
Private sector transaction	Low	Low-Medium	Low-Medium	Low-Medium	Low
Private sector implementation	Nil (apart from non-industrial crop growers)	Low (after a-e scheme payment	Low (apart from non-industrial crop growers)	Low	Low (but note cross-compliance impact)

Table 7-1: Summary of main policy options and their attributes

It is suggested that the most suitable replacement policy to retain the environmental benefits of set-aside is a package containing a combination of cross-compliance and agri-environment schemes, plus an extension to energy crop schemes. Environmental set-aside has merits, although its adoption would require significant work in terms of influencing policy-makers and farmers.

8 Conclusions

It seems likely that set-aside will be abolished in 2009, following the CAP 'Health Check' in 2008. There appears to be general agreement that the primary purpose of set-aside to reduce surplus production of cereals is no longer needed and its removal would contribute to the simplification of the CAP.

However there is considerable evidence of the environmental benefits of set-aside and these could be lost if a suitable replacement policy or policies is not established. Key beneficiaries include breeding birds, although wintering birds, invertebrates and plants also gain significantly. Set-aside also provides an important function in terms of reducing inputs, buffering watercourses and other habitats, linking habitats and protecting soils. A valuable feature of set-aside is that the environmental benefits are widely distributed across the countryside, although they are probably greatest within relatively intensive arable landscapes. The benefits are very dependent on the type, location and management of set-aside. Energy crops grown on set-aside also provide significant environmental benefits in terms of helping to reduce greenhouse gas emissions to mitigate climate change.

In the current and future policy context, the EU can ill afford to lose the environmental benefits provided by set-aside – whether intended or otherwise. A replacement policy or policies for set-aside could secure the benefits and thereby contribute to targets related to biodiversity (priority habitats and species, farmland birds, special sites); water quality (linked to the Water Framework Directive); soils; and climate change. Current and future influences of farmland are unlikely to diminish the need for retaining these benefits.

The policy options for retaining the environmental benefits of set-aside need not only to deliver the main benefits across the countryside but also be in line with broader EU and Member State strategic policy objectives. These include: public payments for public environmental goods and services; simplification of the CAP; freeing up the market and improving competitiveness; and developing renewable energy sources.

In light of these objectives and principles, four main policy options have been identified, developed and appraised. These are:

1. **Extend Cross Compliance** to include elements which safeguard general environmental protection benefits currently delivered by set-aside;
2. **Develop Agri-Environment Schemes** (in terms of scope and budget) to incorporate specific environmental maintenance and enhancement benefits currently delivered by set-aside;
3. **Develop Environmental Set-Aside** to oblige and guide farmers to retain on-farm environmental benefits through the selection of appropriate environmental land management options.
4. **Develop Energy Crop Schemes** to support energy crop growing on all land as part of a coherent package of measures designed to support biofuel and biomass production, subject to the development of safeguards to minimise/mitigate adverse environmental effects.

Our assessment suggests that the most realistic and beneficial way to retain the environmental benefits of set-aside would be to develop a package in which:

- General, countrywide, environmental protection benefits arising from set-aside are delivered through adapted cross-compliance conditions;
- Specific, high value, environmental benefits arising from set-aside are delivered through agri-environment scheme targeted measures; and
- The environmental benefits arising from energy crop growing are maintained and enhanced through a single, simple energy crop scheme.

There are however risks or concerns associated with the above approach. Firstly there are likely to be increasing limitations on the amount of Pillar 2 funding available for agri-environment scheme expenditure in the future. Secondly as the single payment reduces in value (as a result of modulation to pay for agri-environment scheme expenditure *inter alia*), the influence of cross-compliance will also decrease, particularly for commercial commodity producers, as the costs may well begin to outweigh the benefits. Thirdly, the continuation of energy crop production subsidies may not be the best way to achieve greenhouse gas reductions, demand-side mechanisms may be more effective in the long term. These risks and concerns will need to be appraised carefully as a suitable replacement policy for retaining the environmental benefits of set-aside is developed and refined over the next few months.

Appendix 1 References

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