Centre for Agricultural Strategy

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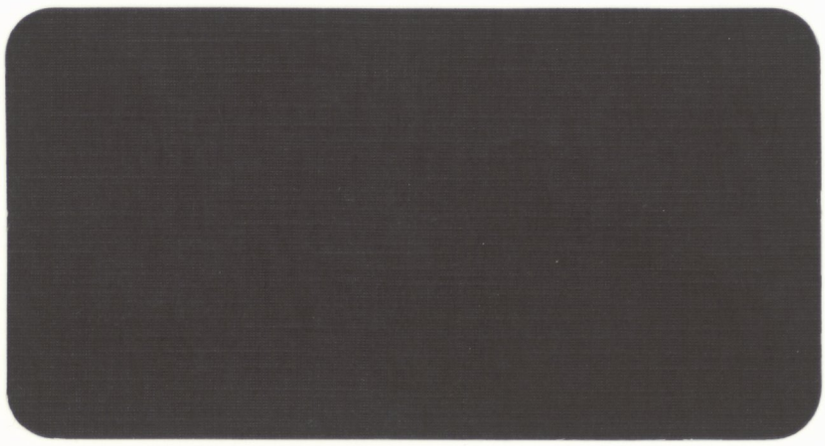

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An evaluation of set-aside management in the European Union with special reference to Denmark, France, Germany and the UK

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July 1994

ISBN 0 7049 0585 X

ISSN 0141 1330

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Acknowledgements

This report has been prepared with the co-operation of the following organisations: in the UK, the Agricultural Development and Advisory Service, The University of Reading, and various environmental organisations; in France, Institut Technique des céréales et des fourrages; in Germany, Deutscher Bauernverband E.V; and in Denmark, Danmarks Naturfredningsforening, Nordisk Landboskole, Landbrugsraadet, and Landboforening.

Executive summary

In 1992 a programme of reform to the European Common Agricultural Policy (CAP) was introduced, intending to switch support away from prices and towards direct aid for producers. This was to be phased in over a period of 3 years, starting with the 1992/93 harvest year. The measures introduced, as they apply to the arable sector, included a reduction of approximately 35% in cereal prices, compensation payments to farmers based on the area under certain "eligible" crops, and the setting aside of land previously used for crop production.

Under the current "set-aside" arrangements, farmers are not required to set aside land, but they must do so if they wish to claim area compensation payments on their cereal, protein and oilseed crops. These rules have been drawn up by the Commission for the European Union (CEU) and apply to all member states. Individual countries have been left to decide in detail what management practices were to be required, encouraged or banned on set-aside land.

In this report, a detailed comparison is made of the way in which set-aside management rules vary between Denmark, France, Germany and the UK, and of the implications of variations in those management rules and recommendations for producers, and the rest of the community. It shows that set-aside is being managed in contrasting ways in the four countries, and that significant differences exist over issues such as the establishment of a cover crop, permitted maintenance practices, the timing of various operations, and the use of chemicals on set-aside land (summarised on pp. 12-13).

It is becoming clear that set-aside is not a "zero management" option. Set-aside land needs managing, like all other farm resources, and farmers will seek to do so to their maximum advantage. The specific rules for set-aside have important farm management implications for cereal producers in each of the countries studied. It is not possible to

put precise financial values on any differences between the four countries, but clearly the more flexibility that farmers are given, the more they can manage their set-aside land to their own agronomic advantage. Of the various effects which set-aside is likely to have on farm systems, weed control emerges as one of the most important considerations.

Although the main objective of set-aside in the EU is to reduce production of certain crops, environmental objectives have also been important. The specific management rules for set-aside in each of the countries studied have important implications for the environment. Crucial elements include the balance between rotational and non-rotational set-aside, requirements for plant cover, and permitted maintenance practices. It is clear that environmental consequences of set-aside have been given great emphasis in the drafting of management regulations in some of the countries studied, but not in others. It is also apparent that clashes between competing environmental interests exist.

The use of herbicides emerges as one of the most important issues for both farm management and environmental objectives. Although the results of detailed survey work on farmer practices on set-aside land have not been published, it appears that in those countries where herbicides are permitted, the most common practice is to use non-selective herbicides at the stage when destruction of the cover crop is permitted. The limited evidence suggests that farmers who have to follow stricter rules on the use of herbicides are placed at a competitive disadvantage compared with those who have more flexibility.

It is an oversimplification of course, to imply that all herbicides have the same properties as far as their environmental costs and benefits are concerned. Both paraquat and glyphosate for example, are inactivated rapidly on contact with the soil and hence do not contribute to the build up of residuals. A further environmental issue concerning

the use of herbicides is their degree of toxicity to animals. In this respect, glyphosate has clear advantages in that it is much less toxic than paraquat.

An important longer term change is related to the introduction in 1994 of more set-aside options for farmers to follow. A complex of factors will determine which of the various options farmers decide to follow, but other things being equal, one might hypothesise that the attractiveness of non-rotational forms of set-aside will be higher in those countries where the rules for rotational set-aside have been drawn most tightly. This may make the overall objective of supply control more difficult to achieve given the higher degree of slippage expected from non-rotational forms of set-aside, but will reinforce the environmental benefits from set-aside in those countries where such objectives have already been given a high priority.

These differences have implications for the farmers in the countries concerned, for taxpayers and for those who use rural areas for recreation and leisure. Whilst set-aside will be judged mainly on its contribution to supply management, the effects on farm incomes and on the environment of the way that it is being managed are also important. It is not feasible, or desirable, that the management rules should be harmonised completely, given the wide range of agro-climatic conditions experienced across the EU, and the wish of national governments to identify their own priorities. It would seem however to be contrary to the spirit of the EU if farmers in some countries were to be given significant cost disadvantages compared with their competitors elsewhere, unless this had been recognised and taken account of in the decision making process.

Summary of set-aside rules in Denmark, France, Germany and the UK.

	Denmark	France
Options:		
Rotational set-aside:		
Limit	15%	15%
Duration	15 January - 31 August, 1994	15 January - 31 August, 1994
Flexible set-aside limit	18%	20%
Voluntary set-aside limit	50%	50%
Non-rotational set-aside:		
Limit	18%	20%
Duration	15 January, 1994 - 15 January, 1999	15 January, 1994 - 31 August, 1998
Options	None	None
Establishment of cover:		
Bare fallow	No	No
Natural regeneration	No	Yes
Sown cover crop	Yes	Yes
Establishment dates	1 October, or 14 days after harvest of previous crop	1 May
Permitted cover species	Standard seed mixtures. Maximum 25% (by number) legumes.	39 permitted species. No restriction on legumes.
Cover maintenance:		
Cutting requirements	Cutting of sown cover allowed before 1 May, but not at all during the period 1 May - 30 June. Otherwise must be cut at least once during the four week period up to 31 August.	None, except weeds not allowed to seed during set-aside period.
Chemical Use	None allowed until following October 20. Fertilisers allowed after 15 July if set-aside is followed by winter crop.	Selective and non-selective herbicides allowed. Chemicals allowed after 15 July if set-aside is followed by winter crop.
Mechanical cultivation	If set-aside followed by winter crop, cultivation is allowed from 15 July. Otherwise no intervention until 20 October.	If set-aside followed by winter crop, cultivation is allowed from 15 July. Otherwise no intervention until 31 August.

Germany	United Kingdom
15% 15 January - 31 August, 1994 20% 33% 20% 15 January, 1994 - 15 January, 1999 None	15% 15 January - 31 August, 1994 18% 50% 18% 15 January, 1994 - 15 January, 1999 Field margins, grassland, natural regeneration and wild bird cover.
No Yes Yes In the autumn or the following spring, depending on local weather conditions. Any crop not covered under set-aside scheme. No restriction on legumes.	Yes, after 1 May Yes Yes 15 December, unless harvest crop still in ground on 1 October, in which case no cover requirement. Any crop, except maize and legumes. Maximum 5% legumes.
None None allowed during set-aside period. Chemicals allowed after 15 July if set-aside followed by winter crop. If set-aside followed by winter crop, cultivation allowed from 15 July. Otherwise no intervention until 31 August.	Allowed any time, although not advised between April and mid July. Any cover remaining on 15 July must be cut short between 15 July - 15 August, or destroyed with herbicide by 31 August. Grassland and natural regeneration options of non-rotational set-aside must be cut between 15 July and 15 August. Non-residual herbicides allowed provided that, before 15 April, the green cover is not destroyed (except if replacing cover). Thus spot applications, the use of wick applicators or the use of selective herbicides that leave the majority of cover intact are allowed before that date. After 15 April, no restriction on the use of herbicides. Cultivation allowed after 1 May to control weeds only, although advised not to do so until end of June. If set-aside followed by winter crop, then cultivation allowed from 15 July.

1. Introduction

The Common Agricultural Policy (CAP) was introduced in 1966 when there were only six members of the, then, European Economic Community (EEC) and when a substantial proportion of basic foodstuffs was imported. In 1968 the six imported over 17 million tonnes of cereals and exported 6.5 million tonnes giving a net import requirement of 10.5 million tonnes. By the beginning of the 1980s the 9 (and shortly to become 10) members became net exporters, and the size of their exports grew steadily through the decade. By 1992/93 cereal production had risen to 165 million tonnes, intervention stocks stood at 26.5 million tonnes, and the 12 were producing 25% more grain than it could use domestically.

This growth in production has come about mainly as a result of increases in crop yields. In the original member countries, yields of wheat have increased from about 2.5 tonnes per hectare in the early 1970s to 6.0 tonnes per hectare in the 1990s. Yields of barley have risen from 2.0 tonnes per hectare, to 5.0 tonnes per hectare over the same period. Whilst this growth in production is a great tribute to the work of agricultural scientists, and farmers, it has caused serious problems.

The main problem is one of surplus disposal. The growth in production which has occurred has been associated with prices guaranteed to farmers appreciably above the world market price. Hence, it has not been possible to sell the growing volume of production, in excess of domestic European Union (EU) consumption, on world markets at prices which are competitive and which remunerate farmers at the level guaranteed by the CAP. The solution to this difficulty, has until recently, been firstly a system of intervention buying, which stores surplus produce until supply and demand relationships change, and secondly subsidised exports (export restitutions) which supplement the returns which farmers can obtain for their crops on world markets with

additional payments provided by taxpayers within the EU. By 1993 these interventions in the cereal sector were costing over 7000 million ECUs, or 20% of total CAP expenditure on agriculture. Support for oilseeds accounted for a further 8%.

There were two consequences of this growing problem of surplus production. The first was the cost of intervention already alluded to, and the second was the distortion on world markets caused by the subsidised exports. The latter caused considerable aggravation to other agricultural exporters, particularly the USA, and was a major threat to the successful completion of the Uruguay Round of the GATT negotiations.

By 1992, it was generally agreed that the need for reform of the CAP was overwhelming, and in that year a programme of reform was put in place, intended to switch support away from prices and towards direct aid for producers. This was to be phased in over a period of 3 years, starting with the 1992/93 harvest year. The CAP reforms were intended to achieve the following objectives:

1 Achieve a better balance between supply and demand in agricultural markets.
2 More competitiveness in European agriculture, both internally and internationally, through substantial price reductions.
3 More extensive methods of production, thereby helping to conserve the environment and reduce agricultural surpluses.
4 Redistribute support to benefit more vulnerable enterprises.
5 Continue to provide employment for a sufficiently high number of farmers whilst encouraging mobility of factors of production, particularly land, in order to create more efficient production structures.

The measures introduced to implement the above objectives, as they apply to the arable sector were the following:

1 A substantial reduction in cereal prices (approximately 35% in three years).
2 Supply control through "set-aside" for farmers intending to apply for aid (except in the case of farmers producing less than 92 tonnes of cereals per year).
3 Payments to farmers based on the area under certain "eligible" crops.
4 The introduction of agri-environmental action programmes.
5 Financial incentives for farmers agreeing to afforest their land.
6 A voluntary early retirement scheme.

Thus, set-aside emerged for the first time as a central feature in EU farm policy, although a voluntary scheme had been introduced in 1988. This original scheme, which preceded the more comprehensive overhaul of the CAP in 1992, was introduced as part of a package of measures designed to curb over-production and bring the costs of the CAP under better control. Essentially, farmers were offered the set-aside option as compensation for lower support prices. They were required to take 20% of their land out of production (for 5 years) in return for set-aside payments. By 1993 some 1.5 million hectares had gone into this voluntary scheme, about 3% of the total arable area within the EU (this figure would be substantially lower but for the inclusion of set aside on a number of former state farms following the unification of Germany).

What is set-aside?

Set-aside is an input control mechanism, the input being land. It is therefore not unlike quotas in some ways, but offers farmers incentives not to use land rather than penalties for overuse. Other terms are sometimes used to describe basically the same policy mechanism. Amongst the most common are "land withdrawal", "land retirement", "land reservation", "land banking" and "acreage allotment schemes".

Set-aside may be used to meet a number of different objectives. Amongst them are the following:

1 To reduce production of certain targeted crops.

2 To obtain environmental goods. In the USA, for example, set - aside has often been used as a soil conservation measure.

3 To assist the process of structural change in agriculture. It may be used to persuade farmers with certain categories of farm (eg smaller ones) to cease production, thus changing the size distribution of remaining farms.

In the EU the main objective of set-aside is to reduce production of certain crops, but environmental objectives also figure. The first attempt to incorporate environmental objectives within the CAP came with the publication in 1985 of the Green Paper *A Future for Community Agriculture* (CEC, 1985) which, *inter alia* suggested set-aside schemes as a mechanism for both reducing over production of certain commodities and arresting (indeed reversing) the deterioration in the rural environment.

Elements of set-aside schemes

Whilst set-aside schemes share certain objectives and features they may vary in their design features. Buckwell (1986) lists seven elements of set-aside schemes which need consideration:

1 **The total quantity of land to be set-aside.** The extent of this is likely to depend on perceptions concerning the future growth of supply and demand, although it is never certain by how much the land area has to be reduced in order to reduce production by a targeted amount.

2 **Restrictions on categories of land which can be withdrawn.** There are three possibilities here. The first is to stipulate that only land in certain classes (eg very poor land) is eligible. A second criterion relates to the previous use of land, eg only land which was previously under certain crops, and the third may

set a maximum to the amount of land in any particular region which can be withdrawn (in order to prevent whole regions being wiped out).

3 **Duration of schemes.** Schemes may involve farmers in withdrawing land for only one year. Others may run as long as twenty years. The main determinant of length will be whether the scheme is predominantly a supply control measure or whether environmental considerations predominate. The latter will normally require rather long-term land retirement.

4 **Degree of compulsion.** Compulsory schemes have attractions for policy makers as they bring more predictable results, but it is difficult to set fair rates of compensation when cost and yield structures vary. In a voluntary scheme, everybody is free to make their own calculations and judge where the net benefit lies.

5 **Compensation or payment rates for set-aside.** In a compulsory scheme compensation could be anything that a Government judged to be appropriate, and politically acceptable. Where schemes are voluntary, rates of payment are likely to be set at levels designed to counterbalance the income lost through giving up farming the land concerned. In some cases there may be additional payments to induce farmers to use the land in new ways, eg by planting trees.

6 **Constraints imposed on land set aside.** Farmers will usually be required not to grow a prescribed range of crops, or maybe to grow no crops at all. In most cases there will be a requirement to maintain the land in certain ways, eg by establishing a cover crop.

7 **Eligibility.** Eligibility may be conferred on young or old, full-time or part-time, those in certain farm size categories, those willing to set aside certain minimum areas, or those growing certain types of crops at some prescribed point in time.

So, there is clearly no single set-aside model: there are as many different models as there are different schemes. This to a large extent reflects the many different objectives that lie behind set-aside programmes.

Does set-aside work?

No single agricultural policy measure has created as much public attention in recent years as has set-aside. To the general public, it appears that farmers are being paid to do nothing. Farmers feel offended that their basic instincts to cultivate, sow and harvest are being impeded. Economists suggest that set-aside is an inefficient mechanism for either surplus reduction or improving the rural environment.

The main criticisms of set-aside as a policy instrument are that:

(i) it usually proves an ineffective means of reducing production and;

(ii) that it distorts factor prices and thus leads to inefficient patterns of resource allocation.

Point (i) revolves around the extent to which "slippage" is likely to occur. Slippage refers to two phenomena. The first is the extent to which the reduction in area of targeted crops falls short of the targeted percentage reduction of the crops concerned. This may occur, for example, if farmers are able to bring additional land into cultivation, substitute "programme" crops for "non programme" crops, or simply avoid the rules illegally. The second phenomenon is the extent to which the reduction in production of targeted crops falls short of the reduction in area of targeted crops. This will occur, for example, if farmers are able to set aside their least productive fields, or if they increase production on their non set-aside fields. Point (ii) concerns the reductions in economic efficiency that will occur if the use of one input is artificially constrained, leading to a substitution of other factors of production like fertiliser. This will be exacerbated if set-aside leads to an appreciation in land values as has happened in the USA where set-aside for supply control, artificially distorts the land market, resulting in higher land values, crop prices, farm incomes and a more intensive agriculture on

remaining cropland, and may encourage conversion of extensive land to arable production, assuming all other policy factors remain unchanged (Ervin 1988).

The case for and against set-aside rests on its cost effectiveness compared with the other policy instruments which could have been used. There were, and are, alternatives. Most economists call for a return to market prices and a removal of all distortions in factor and product markets. It is argued that if there is a need to protect farmers against declining incomes, this should be done by direct income support, so that only the needy benefit. The previous policy of protecting farmers' markets and disposing of surplus produce though subsidised exports could have been continued, although this would probably have been at the expense of a GATT agreement. Unlike market support, set-aside is not seen as a trade-distorting measure.

As indicated earlier, set-aside also has environmental objectives. A lesson from USA experience is that it is unlikely that a single set-aside scheme can be designed which will simultaneously maximise the achievement of both supply control and environmental objectives. Either one has to have two schemes, or accept a degree of compromise, with a single scheme which runs the risk that it may not be very effective at achieving either.

2. The current set-aside scheme

Introduction

The current set-aside scheme was introduced as part of the CAP reforms which took place in 1992. As part of the reforms package a new "target price", covering all cereals, was introduced. This is to be reduced in three annual steps, starting with the 1993/94 marketing year. By 1995/96 the cereal price will have fallen by 35%. The Arable Area Payments Scheme will compensate farmers for losses in sales revenue that result from these price changes.

The basic amount of compensation offered for cereals is 25 ECU/tonne for the 1993/94 marketing year, and will increase to 45 ECU/tonne by 1995/96. An individual farmer is entitled to compensation for land under cereals equal to the basic amount multiplied by the average cereal yield in his region. Land under protein crops is entitled to compensation equal to a basic amount of 65 ECU/tonne, multiplied by the average cereal yield in his region. Land under oilseed (excluding linseed) is entitled to compensation equal to a basic amount of 152 ECU/tonne, multiplied by its own average yield. The compensation for oilseeds, however, will be adjusted accordingly if the actual world price differs significantly from that projected by the EU.

Eligibility

The current set-aside scheme is not a compulsory one. Farmers are not required to set aside land. However, they must do so if they are to claim area compensation payments on their arable crops The area of set-aside for the 1992/93 harvest year had to be equal to 15% of the combined total of arable area plus any land set-aside under previous schemes. The land set aside must have been cultivated with a view to harvest in 1992, or have been in temporary grass harvested for hay or silage.

To be eligible for compensation payments, a number of other regulations were stipulated by the Commission. The most important of these are summarised below:

1 The minimum block size of set-aside land was to be 0.3 ha.

2 Land must be kept in good agricultural condition, **with precise management arrangements left to the discretion of each member state.**

3 Land had to be set aside for at least 7 months between December 15th and August 15th, with individual countries setting the precise dates themselves.

4 Set-aside land had to be rotated each year so that, in effect, the entire arable area of a farm would be set-aside over a period of six years.

5 Land set aside must have been farmed by the applicant for at least two years. Duly justified cases, eg arising from inheritance and for new entrants, are exempt from this regulation.

6 Set-aside land could be used for the production of suitable crops for non-food uses (see below).

7 Land set aside under the old scheme did not count towards the new set-aside requirement, although those contracted to these schemes had the option to opt out if they wished. Once existing contracts expired, however, the land could be brought back into arable use and compensation claimed on it.

8 Transfer of the set-aside obligation to another farmer was allowed if national environmental rules would otherwise force the farmer to reduce his animal production.

From the 1993/94 marketing year, all set-aside land under the new scheme would be eligible for a compensation payment calculated on the basis of 45 ECU/tonne multiplied by the appropriate regional yield for cereals.

Industrial set-aside

Crops could be grown on set-aside land, however, providing they were to be used exclusively for the manufacture of a non-food end product. A strict set of guidelines, which had to be adhered to, was issued by the Commission. The main regulations were as follows:

1 Crops that could be grown included cereals, oilseeds, short rotation coppice, plants primarily to be used for pharmacy and perfumery and vegetable plaiting materials. These could be planted providing they were used for the manufacture of eligible end products.

2 Eligible end products included vegetable fats and oils for use other than animal and human consumption, agricultural products burned in power stations for energy and ethyl alcohol for use in motor fuel. Products derived from cereals or potatoes eligible to receive starch production aid were not permitted. The economic value of the end product had to be greater than that of any human or animal by-products which arose.

3 Contracts with the final processor had to be available for inspection before the crop was sown. In the first year of the scheme, however, contracts could be signed after the sowing of the crop.

The scheme is dependent upon the introduction of adequate control mechanisms, and if these were absent within a member state, eligible crops and end products could be excluded as appropriate.

The simplified scheme

Producers could apply for compensation either under the "general scheme" (as above), open to all growers of cereals, oilseeds and protein crops, or under the "simplified scheme" which is open only to small producers. Small producers are defined as those who make a claim for an area which is no bigger than that necessary to produce 92 tonnes of cereals. This area was to be defined using regional yield figures. Under the

simplified scheme there was no obligation to set land aside to be eligible for compensation payments. Farmers who participate in the simplified scheme are also exempt from any special set-aside arrangements which may be imposed if regional base areas are exceeded.

Compensation payments, however, are only based on cereal rates even though the farmers concerned may be producing oilseeds and/or protein crops. If small producers wish to claim oilseed and/or protein crops compensation rates they would have to join the general scheme and set aside land as appropriate.

Large producers are also permitted to participate in the simplified scheme if they wish to avoid the set-aside requirement. They can only claim compensation payments, however, for land up to the 92 tonne limit. Any crops grown on land in excess of this limit would be purchased at the market price and no compensation payment would be due.

Changes introduced in the second year of the scheme

There have been a number of important changes to the rules of the scheme for the 1993/94 cropping season which affect all countries. The dates for rotational set-aside have been changed to start on January 15th at the latest, and to finish on August 31st at the earliest. In June 1993 it was also announced that, starting with the 1993/94 harvest year, the basic amount of compensation for set-aside land would be increased by 27% from 45 ECU/tonne to 57 ECU/tonne.

Non-rotational set-aside

Non-rotational set-aside arrangements were introduced for the 1993/94 harvest year. Non-rotational set-aside land should not be interrupted for a minimum period of 60 consecutive months, beginning January 15th of the first year. Any land under other aid support programmes cannot be counted towards the non-rotational set-aside requirement for the arable support payment scheme. Non-rotational set-aside requirements have been

set at the rate of 18% for the UK and Denmark, and 20% for all other member states. Compensation payment rates are the same as those available for rotational set-aside.

The special 18% non-rotational set-aside rate for the UK has been introduced to allow a two-year statistical survey by the community. This aims to discover whether the 18% non-rotational set-aside rate is sufficient to produce as great a reduction in production as the 15% rotational set-aside. If the 3% difference is deemed inadequate, the rate will be increased to the level applying in the rest of the EU (ie 20%). The 18% limit has been introduced for Denmark because it has been designated a nitrogen sensitive zone.

Voluntary set-aside

It has also been agreed to compensate farmers who wish to set aside land above the minimum required to be eligible for the arable support scheme. Total set-aside land (compulsory plus voluntary), however, is not allowed to exceed 50% (ie, total set-aside land is not to be greater than the total arable area upon which compensation payments are claimed). Individual member states can limit the application of this rule if it contradicts other environmental programmes or if there is a danger of the virtual abandonment of whole regions.

There is one exception to the 50% limit. This is for land which was set aside under the previous 5-year schemes. These areas are entitled to be set-aside for a further 5 years, even if the resulting total set-aside area exceeds the 50% limit. Under normal conditions there will be a requirement not to cultivate the land before entering the new set-aside arrangements, although this did not apply to land that had already been cultivated following the completion of the old 5-year set-aside period in August/September 1993.

The basic amount of compensation is set at the standard rate (ie, 57 ECU/tonne) for the voluntary set-aside land up to the 50% limit. Land over the 50% limit (ie, only land

entering the new scheme which was under the previous 5-year scheme) will be compensated at a reduced rate of 40 ECU/tonne.

Although it was intended to implement this option for the 1993/94 cropping year, a number of rules remained uncertain and farmers were warned that if they participated in the scheme, they did so at their own risk. In particular, the Commission intends to adopt regulations which guarantee that voluntary set-aside land actually reduces the amount of land used for arable crops. As yet these rules are not known.

Mixed set-aside

Decisions have also been taken to allow mixed rotational and non-rotational set-aside land on the same farm for the 1993/94 harvest year. This has been set at the non-rotational rate (18% for the UK and Denmark, and 20% for other member states).

Linseed

In the light of the rapid expansion in the area of linseed sown in the 1990s, the Commission has decided that linseed should also enter the arable support scheme. The area sown under linseed more than doubled between 1991 and 1992 and, the Commission suggests, it would be an obvious distortion to leave linseed outside the arable support scheme.

3. Individual country management rules for the 1993/94 harvest year

Introduction

The discussion so far has related to the rules that have been drawn up by the Commission for the European Union (CEU) and which apply to all member countries. Individual countries were left to decide in detail what management practices were to be required, encouraged or banned on set-aside land. The most important differences in these between member states for the current set-aside season are summarised below.

Management rules for rotational set-aside land

Cover crop

Nearly all member states have required a cover crop on rotational set-aside land. In most cases this can be established either via natural regeneration, or by sowing a suitable cover crop. Denmark, however, has stipulated that natural regeneration will no longer be permitted on rotational set-aside land and that, from the 1993/94 harvest season, a suitable cover crop must be sown by all farmers participating in the arable support scheme. Greece has stated that although natural regeneration is permitted, it would prefer set-aside land to be fallowed bare, in order to reduce the risk of fire. Alternatively a suitable cover crop is permitted.

Spain's regulations are the least restrictive, asking only that farmers conform to the minimum specifications requested by the EU (ie, that the land is kept in good agricultural condition). It is likely, however, that extra rules will be applied by local governments in Andalucia, Castilla de la Mancha and Castilla Leon.

Where the sowing of cover crops is permitted, or requested, differences exist between permitted species and establishment dates. Germany has not specified any suitable cover crop species, only that it must not be an arable crop. Belgium, Greece, Luxembourg and

the Netherlands have all stipulated what species can be used as a cover, but have not set any date by which the cover must be established.

Denmark, France, Ireland and the UK have all set dates by which the cover on rotational set-aside land must be established. Denmark and Ireland have both set precise dates: October 1st and January 15th, respectively. France has recommended that the cover is established in the autumn, but it may be sown in the spring at any time up to May 1st. Likewise the UK. expects the cover to be established in the autumn, but farmers are exempt from this requirement if the field has not been harvested by October 1st.

Only Belgium and Denmark have made allowances to increase the percentage of clover in the cover mixture (25% in the case of Denmark), if the cover crop is to be sown for game cover or for use by bees.

Maintenance

The maintenance requirements for rotational set-aside land also vary considerably between member states. Many have stipulated regulations with regard to the cutting of cover crops. Both Belgium and Luxembourg state that the crop must be cut before the crop flowers, and weed multiplication begins. An exemption to the cutting requirement exists in Belgium, however, where set-aside land has been sown with special mixtures intended for bees and game cover. In Ireland, cutting is not permitted before April 15th, but if any cover crop remains after July 15th, it must be cut at least once before August 31st. In the UK the cover crop may be cut at any time, but if any remains after July 15th, it must either be cut at least once by August 15th, or destroyed by August 31st. In Denmark cutting of the cover crop is allowed up to May 1st, but between May 1st and June 30th, no cutting is permitted, in order to provide cover for wildlife. It is then mandatory for the cover crop to be cut at least once within the final four weeks of the set-aside period.

Other countries, however, have not set any of these conditions. The Netherlands requests only that the cover crop is cultivated into the land at the end of the set-aside period. France requires farmers to establish a cover crop by the May 1st but has left all decisions regarding how this can be best achieved to the farmer. Germany, Greece, Portugal and Spain have made no specific cutting requirements on set-aside land.

Similar variations exist with regard to cultivation practices. Cultivation of the cover crop is allowed from April 15th in Ireland and from May 1st in the UK. In Luxembourg and Portugal only naturally regenerated vegetation is allowed to be cultivated from May 15th. In Greece, farmers are requested to destroy any natural regeneration in specified high fire risk zones by June 30th, and to cultivate any sown cover crops by the end of the set-aside period. Bare fallow can also be cultivated at any time throughout the set-aside period.

In Belgium, Denmark, Germany and Portugal, however, cultivation is only allowed from July 15th, and only if the land is being prepared for the sowing of the following winter crop. Spain's regulations are similar, although some cultivation of a light nature before July 15th is also allowed (no further details are available).

Use of chemicals

Significant differences exist between member states in the use of chemicals on rotational set-aside land. Belgium, Spain, France, Italy and the Netherlands have placed no additional restrictions on the use of chemicals, whereas Denmark, Germany and Luxembourg have virtually banned their use on rotational set-aside land. In Greece the use of pesticides and fertilisers (though not herbicides) has also been prohibited.

The UK and Ireland have allowed restricted use of non-residual herbicides and/or systemics on rotational set-aside land after April 15th. In Portugal similar chemicals are

allowed on sown cover crops, but on naturally regenerated cover crops the use of chemicals are not permitted.

Management rules for non-rotational set-aside land

At the time of writing, Italy, the Netherlands and Spain had not published any details of management requirements on non-rotational land. Although Greece, Luxembourg and Portugal had also not published any details it is thought that the rules will be the same as for rotational set-aside. For Germany there are no differences between rules for rotational and those for non-rotational set-aside.

In Belgium the only difference between rotational and non-rotational set-aside is the requirement to establish a cover crop by May 15th of the first year, which can be started, in the first instance, via natural regeneration, but must have a sown cover crop at a later date. Denmark has stated that there are no differences between the management of rotational and non-rotational set-aside, except that the obligatory cover crop can be re-established every year if desired. Likewise, Ireland's management regulations are the same for non-rotational and rotational set-aside, except that lime may be added to non-rotational and that a green cover must be maintained on the land throughout the set-aside period.

France also stipulates that a permanent green cover must be maintained on the set-aside land, and established no later than May 1st. The cover crop must be a sown crop, although there are exemptions from this requirement in the first year of the scheme. The use of herbicides is permitted to control weeds, but farmers have been advised to take care that the herbicide is not used to such an extent that the cover crop is destroyed.

The UK offers four basic options to its farmers:

1 **Field margins;** setting aside land at least 0.3 ha in area and at least 20m wide, and establishing a cover by sowing or natural regeneration.

2 **Grassland;** sowing a grass cover.

3 **Natural regeneration;** establishing a green cover by natural regeneration from the preceding crop and the existing seed bank in the soil.

4 **Wild bird cover;** sowing a mixed cover and replacing it regularly.

With the exception of the wild bird cover option, the cover crop must be cut at least once between July 15th and August 15th each year, with the cuttings left to rot on the land. Non-residual herbicides are permitted on non-rotational set-aside land, but non-selective herbicides are permitted only under very limited conditions. Fertilisers are not permitted, except on land set aside for the wild bird cover option.

The implications of variations in management rules between countries

In the sections which follow, a detailed comparison will be made of the way in which management rules vary between the UK, France, Denmark and Germany, and of the implications of variations in those management rules and recommendations for producers, and the rest of the community. Initially however, it may be useful to identify the main economic and environmental factors that will be affected by the rules set by individual countries governing the management of set aside land.

Farm management objectives

It is becoming clear that set-aside is not a "zero management option". Set-aside land needs managing, like all other farm resources. The most important management objectives are the following:

1 **Prevent nitrate leaching.** This is both a farm management and environmental objective. Nitrate leaching will be prevented through minimum soil disturbance, and by maintaining good plant cover. There may be variations

between regions in the extent to which natural regeneration provides adequate cover. For example, in more northerly latitudes, good cover may not be established by this means and there is a greater case for insisting on a planted cover crop. There may be a conflict of interest here, between farming and conservation interests. Farmers have tended to favour a bare fallow, for ease of management, but experimental evidence suggests that the better the plant cover, the less the level of nitrate leaching.

2 **Weed control.** The problem of weeds is affected both by the type of cover crop established, and the way in which it is managed. The main choice of control lies between mechanical control and herbicides. The effectiveness of cutting depends on a number of factors, but particularly soil type. On heavy, water retentive soils, cutting may be required as often as 4-5 times, whereas on lighter soils, 2-3 times may be sufficient. Cutting may be required from early April to prevent all weed species from seeding. Evidence suggests that weeds on set-aside land change their growth habits, and this affects weed control methods. For example, frequent cutting, lack of competitive cover, and nutrient decline, produce weeds which seed at a lower height than in other circumstances, and thus may be difficult to destroy by cutting. Some types of cover crop may themselves become a weed problem in the subsequent crop. For those countries in which it is allowed, chemical control seems, by general consensus, to give better weed control although it is more expensive than cutting.

3 **Pest control.** Two main pest problems have been associated with crops following set-aside. Slugs may be more prevalent than in continuous cereal growing, but it is not clear that any particular management practices are more effective than others in reducing the problem. Wheat bulb fly is the other pest problem, and threshold levels have been found to be high in post-set-aside crops. Bare land in the summer is the condition in which the fly will prosper. Hence one solution is to leave the cover crop in place until later in the

summer, mowing regularly to prevent seeding. However, as already indicated, this may give inadequate weed control. An alternative is the destruction of the winter cover crop and the establishment of another quick growing one (like mustard) in the early summer to replace it.

4 **Disease control.** Infected cereal volunteers can provide a source of disease inoculant for nearby crops, particularly in the autumn. However, it seems that generally, crops are less susceptible to these diseases after set-aside than in continuous cereals growing. Bare fallow tends to be the best barrier against cereal diseases.

5 **Yield optimisation in subsequent crops.** Research in the UK suggests that yields following set-aside are higher than in continuous cereals growing systems, and highest when either bare fallow or natural regeneration have been used. Yields of wheat following set-aside were some 15-20% higher in test plots than following other cereals. The variations were greater on lighter soils than heavy ones. The yield responses were about half those to be expected following traditional break crops like oilseed rape or beans. The optimum level of nitrogen applications on crops following set-aside were similar to those in continuous cereals, so set-aside is unlikely to affect subsequent levels of nitrogen application.

Set-aside land needs to be managed, and farmers will seek to do so to their maximum advantage. Of the various effects which set-aside is likely to have on farm systems, weed control emerges as the most important consideration. A critical aspect of weed management is whether or not farmers are permitted to use herbicides. Pest and disease management may be locally important but are unlikely to raise as many difficulties as weed control. The management of set-aside land may affect yields of subsequent crops, but it is unlikely to significantly affect input levels.

Another important decision which farmers now have to make, and which will affect the whole farm economy, is the choice between rotational and non-rotational set-aside. When offered a choice previously (ie, under the 5-year scheme,) more farmers chose non-rotational set-aside.

Previous studies (eg, Ansell & Tranter, 1992) show that significant reductions in fixed costs can be achieved when farmers set aside land. These consist mainly of reductions in machinery and labour costs. It is likely that savings in fixed costs will be higher in non-rotational set-aside than rotational, because the number of cultivations are fewer, and the proportion of land that has to be set aside is greater. Farmers will need to decide whether the advantages offered by permanent set-aside outweigh the requirement to take an extra 5% of arable land out of production (3% in the case of the UK and Denmark).

Environmental objectives

The notion of environmental interests when applied to rural land use issues is usually meant to mean one of three things:

1 access to the countryside;
2 attractive rural landscapes, and
3 abundant and varied wildlife.

Set-aside is capable of affecting all three of these, as the following examples illustrate:

1 **Access.** Farmers may be required or encouraged to allow public access to set-aside land, particularly if it takes the form of field margins.
2 **Attractive rural landscapes.** There is a general perception that set-aside land, particularly when it has been allowed to regenerate naturally is unsightly, compared with normal expectations about the appearance of farmed land. Sown cover crops may be less unsightly.
3 **Wildlife.** Modern methods of intensive arable husbandry have reduced populations of many species of vertebrates and invertebrates. Set-aside provides an opportunity to reduce conflict between farming and wildlife

interests, by taking land out of production and, for example, allowing ground-nesting birds opportunities to successfully raise young.

The management rules for set-aside are likely to have major implications for environmental objectives. Crucial elements are likely to be:

1 **The balance between rotational and non-rotational.** Non-rotational set-aside is likely to have greater environmental benefit, because a greater diversity of plant species is likely to develop, and this will support a greater and more varied fauna.

2 **Requirements for plant cover.** This will affect the amount of nitrate leaching and hence the ecology of water courses.

3 **Permitted maintenance practices.** There are several examples of these, but the most important issue is probably how and when the cover crop can be either wholly or partly destroyed. When cutting is allowed at any time, there is clearly a risk of killing or maiming animals. When the cover crop can be ploughed in, early in the summer, habitat will be destroyed.

The use of herbicides is probably the biggest issue. There is a general perception that "chemicals" harm the environment. However, most environmental groups (in the UK anyway) take the view that the use of non-residual herbicides to destroy green cover is preferable to cutting and cultivation, particularly where the latter is permitted in the spring. Even when green cover is destroyed by herbicides in the spring the resultant mulch provides useful cover for many species, providing it is not ploughed in.

4. The management of set-aside in Denmark

Introduction

Denmark has an arable base area of 2 million ha. Total claims under the Arable Area Payment Scheme amounted to 1.8 million ha for the 1993/94 harvest year. Total set-aside was 212000 ha, or 10.5% of total arable area claims. Initial estimates indicate that 205000 ha are under rotational set-aside, and 7000 ha under non-rotational set-aside. The set-aside area in Denmark accounts for a little over 4% of the EU total.

In the current year (1993/94) farmers have the choice between rotational and non-rotational set-aside. They may also have a mixture of the two. As elsewhere, the set-aside requirement is 15% for rotational, but (in common with the UK) is only 18% for non-rotational. Voluntary set-aside is also permitted, provided the total set-aside area does not exceed 50% of total arable area.

Six-year rotational set-aside management rules

Set-aside duration is January 15th-August 31st. A sown cover crop must be established by October 1. Natural regeneration is not allowed. This is a change from the first year. It was decided that natural regeneration provided an inadequate cover to prevent nitrate leaching. If the previous crop has not been harvested by October 1st, then the cover must be established within 14 days of the harvest.

The sown cover may consist of a variety of standard seed mixtures or of a special mixture if the land is to be used for environmental purposes (eg, for game cover or for use by bees). If this is the case then a maximum of 25% of clover seed (by number, not weight) can be used. This is an increase by 5% from the first year of the scheme, in an attempt to further improve the wildlife habitat of set-aside.

Plant cover must be continuous throughout the set-aside season. Cutting of the cover crop is permitted, although not during the period May 1st - June 30th. This is a change from the first year when farmers were obliged to cut the cover crop in May. These changes followed objections by hunting and environmental organisations as to the degree of damage caused by cutting during this period.

If set-aside is to be followed by a winter crop, then mechanical cultivation is permitted from July 15th. In the first year, cultivation was allowed from May 15th. This was changed following further objections from hunting and environmental organisations. If set-aside is not followed by a winter crop then there is an obligation to cut the cover at least once during the four-week period up to August 31st, and then no intervention is allowed until October 20th.

Non-rotational set-aside management rules

Non-rotational set-aside duration is from January 15th, 1994-January 15th, 1999. There are no significant differences between rotational and non-rotational set-aside rules. If the cover is insufficient by October 1st each year, then such areas must be re-seeded. Land which was naturally regenerated in the first year can be transferred to permanent set-aside without the obligation to sow a new cover crop.

Chemical use

The use of chemicals of any kind is not permitted on set-aside land. If a winter crop is to follow set-aside then fertilisers are allowed from July 15th. However, there is no mention of other chemical use and it is assumed that herbicides and pesticides are not allowed until the end of the set-aside period (August 31st). If set-aside is followed by a spring crop, then use of chemicals and fertilisers is not allowed until October 20th.

Existing Danish environmental regulations

In Denmark the set-aside issue has been complicated by the imposition of a number of other stringent national environmental regulations. The government wants to reduce nitrate leaching by 50% (based on the 1981-85 average) by 1997. As part of this programme, 65% of the area of all Danish farms over 10 ha must be "green fields" throughout the autumn period, ie, grown with winter crops, fodder maize, grass, lucerne, root crops, late outdoor vegetables, etc.

Set-aside has been introduced to complement these objectives. It is hoped that the establishment of a green cover, the absence of ploughing and the banning of fertiliser/chemical use on set-aside land, will reduce nitrate leaching. Areas under grass are not considered "green fields" if they have been ploughed before October 20th. This explains why intervention on set-aside land is not allowed before this date. Thus, in effect, rotational set-aside in Denmark lasts from October 1st to October 20th in the following year.

Under Danish environmental regulations all farms over 10 ha must make fertiliser and crop rotation plans. The size, location and preceding and present crop of the individual fields has to be recorded, together with the volume, nutrient value and times of application of manure. The volumes and types of commercial fertilisers must also be stated. This has to be completed before May 1st in the growth season. A strict limit on fertiliser use is placed on Danish farmers and if these limits are exceeded farmers are penalised. This is a very effective mechanism with which the abuse of set-aside can be monitored.

The impact of set-aside rules on the farm economy and the environment

Establishment of a cover crop

It is estimated that the cost of establishing a cover crop is £30-40/ha, and that total cutting costs will be around £85/ha. The extension service advises the sowing of a slow-growing cover crop to ease the need for cutting more than two or three times during the set-aside period.

There have been complaints over the requirement to establish a cover by October 1st. Last autumn was a period of high rainfall and many farmers had difficulty in establishing a cover by this date. Many complained about the degree of uncertainty which resulted from apparent government indecision. Farmers were not told whether they would be allowed to establish a cover crop later in the year, or even in the following spring, despite the adverse weather conditions. This uncertainty created considerable anger amongst Danish arable farmers.

A potential contradiction exists in environmental objectives when establishing a cover crop. It is possible for the previous crop to be harvested at the start of September, and for the new cover crop not to be established before October 1st. Where this occurs, a partially established, naturally regenerated, cover would be destroyed and replaced by a sown crop. There is some concern that the sown cover will not have sufficient time to establish itself fully, and so would be less effective in reducing nitrate leaching compared with natural regeneration.

For climatic reasons, some argue that October 1st is too late for a cover crop to be established effectively in Denmark, particularly if adverse weather conditions persist. This is particularly true if the previous crop was harvested late and the cover crop was sown within the following 14 days. Last year, following heavy rains in the autumn, many cover crops were sown late, and had little time to establish. In such cases the

cover only grew to a height of 1-2cm, which was ineffective in reducing nitrate leaching.

Weed control

Because a naturally regenerated cover will increase species diversity on set-aside land, environmentalists argue that this method is preferable to the sowing of a cover crop. However, this would increase problems of weed control for the farmer and boost the argument for the use of herbicides on set-aside land. Since environmentalists in Denmark (including the Ministry of Environment) are opposed to the use of any chemicals on set-aside land, the sown cover option (combined with restricted cutting dates) is seen as the best compromise available.

The only option available for controlling weeds is by cutting. Most agree this tends not to be very effective, and there is some concern that weeds may be a problem on set-aside land. Weed type is an important factor to consider. On rotational set-aside, weeds have only one season to develop, and are believed to be only a marginal problem to farmers. Weeds which develop after three or four seasons of set-aside are far more problematical. This obviously has important implications for permanent set-aside.

The obligation to sow a cover crop should significantly reduce the weed problem. In addition, the Danish extension service advises farmers to be aware of the set-aside obligation the year before, and to plant the cover crop with the crop to be harvested in that year. When the crop is harvested the cover should be well established and relatively free of weeds for the following set-aside season. This raises questions as to the effects of this practice on harvest yields, and as to the limitations this imposes on the use of chemicals on the harvested crop (ie, which chemicals will destroy the underlying cover crop). Despite this, a significant number of Danish farmers are believed to have adopted this practice in the second year of the scheme.

Some concern has been raised over the quantity of herbicides required to bring the land back into cultivation following the end of the set-aside season. It is argued that if non-selective herbicides were allowed throughout the set-aside period, weeds could be more effectively contained, and that this would reduce the overall quantity of chemicals required. This argument is not universally accepted, however, and many consider the weed problem to be only marginal, especially if the advice of the extension service is followed. In any case, there appears at present little or no opportunity to change these regulations.

Rotational versus non-rotational set-aside

The Danish government obtained the 18% limit for non-rotational set-aside, because the whole of Denmark has been designated a nitrogen sensitive zone. This is seen as an important advantage for Danish farmers.

Problems have been identified with the non-rotational option, particularly if the land is brought back into cultivation. After five years, weed infestation would be particularly serious, and very costly for the farmer to resolve. Cultivation is not allowed until January 15th of the final year of set-aside, which is clearly too late for the land to be used for crop production in that year.

In the first year, rotational set-aside was the only option open to farmers. It is widely believed that in the future a significant number of farmers will transfer to the permanent set-aside option. This did not occur in the 1993/94 harvest season because the precise rules did not emerge early enough for farmers to make an informed decision. It is agreed that the permanent option is both easier and cheaper for the farmer to implement. A number of benefits can be identified:

1 It allows the least productive arable land to be set aside, minimising production losses.

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090/1: : |a HD1920.5.Z8 |b A67 1994
092/1:0 : |a 338.184 |b An82a |2 20
100:1 : |a Ansell, D. J.
245:13: |a An evaluation of set-aside management in the European Union with special reference to Denmark, France, Germany and the UK / |c D.J. Ansell, S.A. Vincent.
260: : |a Reading <England> : |b Centre for Agricultural Strategy, the University of Reading, |c 1994.
300/1: : |a 95 p. ; |c 30 cm.
440/1: 0: |a CAS paper ; |v no. 30
500/1: : |a "July 1994." LTUL DONE
AQT0290

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650/1: 0: |a Agriculture and state |z European Economic Community countries.
650/2: 0: |a Agriculture |x Economic aspects |z European Economic Community countries.
700/1:1 : |a Vincent, S. A.
710/2:2 : |a University of Reading. |b Centre for Agricultural Strategy. LTUL DONE
AQT0290

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UL BOOK ISBN 070490585X
Ansell, D. J.
An evaluation of set-aside management in the European Union with special reference to Denmark, France, Germany and the UK / D.J. Ansell, S.A. Vincent.
-- Reading <England> : Centre for Agricultural Strategy, the University of Reading, 1994.
(CAS paper ; no. 30)
STATUS a DT 06/21/96 AD none
NOTES
001 1I CN |a stp |b HD1920.5.Z8 |c A67 |c 1994 |d 06/25/96
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2 Because the least productive areas are set aside, it is assumed that the land would not be brought back into cultivation. Any problems of weed infestation would not need to be resolved.

3 A cover crop needs to be established only once every five years, reducing the costs of implementing set-aside.

The voluntary set-aside option has not been popular, because of the low compensation levels offered. Interest in voluntary set-aside will probably increase in the future as compensation payments increase, and when the precise rules are known.

There is a general feeling that rotational set-aside will produce only minor environmental benefits, and that much more emphasis should be placed on the five-year schemes. Indeed, environmental organisations are pushing hard for the introduction of a 20-year set-aside option. Here there appears to be a major contradiction between Danish national and European Union objectives over the operation of set-aside. In Denmark, most interest lies in the five-year scheme as this has the greatest potential to benefit the environment, at the expense of production curtailment.

The non-rotational field margin option open to British farmers generated considerable interest amongst Danish farming and environmental organisations alike, and they would like to see a similar option adopted in Denmark in the third year of the scheme.

Non-food use

The extension service calculates that, at best, non-food winter rapeseed will give a return equal to half of that available if the land was set-aside. Despite this, in the first year of the scheme, a little over 18000ha, equal to about 9% of the total set-aside area, was used for non-food production. The was mainly winter rapeseed for biofuel production, most of which was exported to France. The growing of winter rapeseed has

a beneficial impact on the following wheat harvest, and it was stated that this was the only truly effective method for controlling weeds on set-aside land.

Environmentalists agree that to maximise the environmental benefits of set-aside, some land would be better suited to non-food uses, particularly for biofuel production. This is not actively encouraged by the Danish government at present. Biofuel is taxed at the same rate as fossil fuel in Denmark, and as a result it is not economically viable for use in the domestic market. Agriculturalists and environmentalists are pushing the government hard to offer a tax exemption on biofuel in the future.

Compensation levels

Many farmers complain that the level of compensation given is inadequate. This is exacerbated by the fact that Denmark has only one regional base area, and the same level of compensation is given despite the range of soil quality within the country (e.g. land in Jutland sells for as little as £700-800/ha, compared to as much as £6000-7000/ha in parts of Zealand).

In the first year a significant number of large-scale producers participated in the simplified scheme to avoid the set-aside obligation. The 92-tonne limit in Denmark is set at 17.6 ha, yet the levels of compensation were so low, that farmers with up to 180 ha found it more profitable to apply under the simplified scheme. Improved compensation payments in the second year for set-aside land will increase participation by large producers, but many are still being unfairly penalised by the present arrangements.

It is feared the present arrangements will increase the rental value of poor quality land, (particularly in Jutland) since landlords may find it more profitable to set aside land rather than renting it to other producers. This will have a significant impact on pig

producers who, under Danish law, must for every 20 pigs have 1 ha of arable land on which to dispose of slurry.

Evaluation of set-aside arrangements in Denmark

Set-aside regulations in Denmark have been established via consultation between a number of institutions, including agricultural unions, the Agricultural Council, various wildlife organisations, the Ministry of Agriculture and the Ministry of Environment. Public awareness of environmental issues has been an extremely important factor in this process. Environmental groups such as The Danish Society for the Conservation of Nature (who hold regular meetings with the government over the issue of set-aside) appear to have the support of the majority of the public. Both the Ministry of Agriculture and the Ministry of Environment are sensitive to these issues, and had already issued a number of strict environmental guidelines to its farmers before set-aside was introduced.

It is no surprise, therefore, that environmental factors have dominated the implementation of set-aside in Denmark, and that any changes made to the scheme for the second year reflect these interests. As the regulations currently stand, Danish farmers probably have the least flexibility in implementing set-aside in the EU. Some farmers are angry that insufficient consideration has been given to their needs, but the strength of public opinion in Denmark is such that most acknowledge there is little chance of making significant changes to the rules in the near future.

The two most important problems farmers have experienced have been the October 1st deadline for the establishment of the cover crop, and weeds. There is broad agreement that the cover-crop establishment date should be made more flexible, especially in the event of adverse weather conditions. Such a change could be argued on agricultural as well as environmental grounds, since last year many cover crops which were sown late did not have time to establish, and proved ineffective in reducing nitrate leaching.

The weed problem has been minimised by the sowing of a suitable cover crop. Although Danish farmers are required to sow a cover crop, experience from other countries shows that when farmers have a choice between a naturally regenerated and a seeded cover, many are choosing the latter option, because of the impact this has on suppressing weeds. This is especially important in countries like Denmark where the use of herbicides on set-aside is not permitted. It would appear likely, therefore, that most Danish farmers would sow a suitable cover crop even if the regulation were not in place, especially as there appears little chance of changing the rules on herbicide use in the near future.

At this stage it is too early to determine what impact set-aside will have on arable farms in Denmark. In the long term set-aside may reduce a farm's fixed costs. However, differentiating between the impact of Danish set-aside management rules and the impact of reduced cereal prices under the new EU Arable Area Payment Scheme would in practice be impossible. It is also difficult to differentiate between the impact of set-aside and Danish environmental regulations.

In the short term, doubt has been cast as to whether set-aside would have a significant impact on fixed costs, primarily because the scheme was still new and a number of important changes were still expected. Thus, farmers were cautious, and unwilling to make significant changes to their farming systems until the picture was made clearer. Indeed, there was considerable anger amongst Danish farmers at the lack, and lateness, of set-aside information, coming from both Brussels and the Danish government.

5. The management of set-aside in France

Introduction

France has the biggest arable sector in the EU, and has an arable base area of 13.5 million ha. Total claims under the Arable Area Payment Scheme amounted to over 13.1 million ha for the 1993/94 harvest year. Total set-aside was over 1.8 million ha, or 13.7% of total arable area claims. Initial estimates indicate that 1.6 million ha are under rotational set-aside, and 200000 ha under non-rotational set-aside. The set-aside area in France accounts for 34% of the EU total, and it is by far the largest contributor.

In the current year farmers are offered two main options:-

1 6 year rotational set-aside at a rate of 15%.

2 "Free" set-aside, at a rate of 20%, of which there are three versions:

rotational set-aside of between 2 and 5 years;

non-rotational set aside;

mixed set aside (rotational + permanent).

Six year rotational set-aside management rules

1 Duration: January 15th, 1994 to August 31st, 1994.

2 Sown cover of designated species.

3 Natural regeneration allowed, except after grassland.

4 Green cover duration: May 15th, 1994 to August 31st, 1994.

5 Weeds and weed control: no seeding during the set aside period.

6 Cover uses: none during set aside period, farm uses after August 31st, 1994.

Non-rotational set-aside

1 Duration: January 15th, 1994 to August 31st, 1998.

2 Cover types: sown cover only.

3 Green cover duration: May 1st, 1994 to August 31st, 1998.

4 No seeding permitted.

5 Control of cover: seeding allowed to help establishment.

6 Cover uses: none during the set-aside period.

Permitted cover species

There are 39 species of cover crop permitted. Unlike most other countries, there are no constraints on the use of legumes in sown cover, and there are ten permitted types of legume which can be used in rotational set-aside and seven in permanent set-aside.

Use of herbicides

Herbicides are generally allowed, and there is a list which permits 22 allowed active ingredients. This includes selective and non-selective herbicides.

The impact of set-aside rules on the farm economy

In the first two years of the Arable Area Payment Scheme, the first priority in France has been to establish the areas that are eligible for payment. The management rules have received much less consideration than in Denmark and the UK, for example. One of the reasons for this is that every French Department is a separate yield reference area, which complicates the administration of the scheme. Many farmers, for example, have farms which fall into two separate Departments. The French management rules are therefore currently described as "provisional".

Set-aside during the 1992/93 harvest year

The statistical information which follows was obtained from a survey carried out by the *Institut Technique des Céréales et des Fourrages* (ITCF) in the summer of 1993. This was a postal survey of 1000 farmers throughout the whole of France.

1 **Bare fallow**

In the first year of the current set-aside scheme, there were few constraints on farmers' management of set-aside land. There was, for example, no requirement to establish a cover crop of any kind, and 40% of set-aside land was under bare fallow for the whole set-aside period. Farmers regarded this as the cheapest option. Approximately half the farmers ploughed the land in autumn; the others used stubble cultivation. Fifteen percent used chemical weed control. Several cultivations proved necessary in order to control weeds, and even then a substantial number of farmers experienced difficulties in controlling weeds, particularly thistles and grasses. The total cost of managing bare fallow has been estimated by ITCF at between £50 and £100/ha. The direct costs, which are those that farmers probably consider most in planning their arable management, were estimated at £11/ha in the absence of ploughing and £25/ha with ploughing.

2 **Natural regeneration.**

This method of establishment of a cover crop accounted for 38% of set-aside land. In few cases did farmers plough, and in about half of all cases no stubble cultivation was practised. In 23% of cases some chemical weed control was practised without destroying the cover. Most farmers (63%) destroyed the cover crop by mechanical means at the end of the set-aside period. Twenty five percent used herbicides in association with soil cultivation. The total costs were estimated at between £50 and £100/ha and direct costs at between £19 and £63/ha. The two main problems identified by farmers were the difficulty of establishing an adequate cover crop, and the problem of weed control. In 93% of cases farmers reported a problem with weeds in naturally-regenerated cover crops.

3 **Sown cover crop.**

Cover crops were planted on 21% of farms. In 40% of cases the land was ploughed and in most of the remainder a seedbed was prepared through stubble cultivation. In some 30% of cases subsequent seedbed preparations were carried out. In 57% of cases the cover was established in the spring, and in the remainder in the late

summer or autumn. In 75% of cases the growth of the cover crop was controlled by mowing and in a further 15% of cases, wholly or partly by herbicides. The cover crop was destroyed by cultivations in 75% of cases, by a combination of cultivations and herbicides in 10% of cases and by herbicides alone in 4% of cases. The establishment of a seeded cover did not eliminate weed problems, and 80% of farmers reported some level of weed infestation.

The total cost of the establishment, management and destruction of seeded cover was again in the range £50 to £100/ha, with average direct costs estimated at £40/ha. The two principal conclusions of farmers concerning seeded cover were firstly that it had beneficial effects on the following crop and secondly that it led to fewer problems in controlling weeds.

In summary, the problems experienced by French farmers in managing set-aside, in order of importance, were as follows:

1 Weed infestations in following crops, leading to increased herbicide costs.
2 Difficulties in working the soil following set-aside, particularly incorporating residues.
3 Pest problems, particularly slugs.
4 Unfavourable effects on the following harvest.
5 Infestation of the following crop by the cover crop itself.

The cost of set-aside management

It is not possible to give precise figures on the costs associated with managing set-aside because there are so many different practices which farmers may have to adopt. Weather during the farming year will also affect costs. It may be necessary to cut set-aside more often during wet years, for example. In addition there are some effects of set-aside which are difficult to quantify, like the effects on the yield of subsequent crops. Thus a

"cost" of a minimal approach to managing set-aside may be loss of yield in the next crop in the rotation.

There are estimates, however, of the costs associated with the different operations which farmers may carry out. The following tables are a list of costs for various operations drawn up by *Service Etudes Economique* of ITCF, in consultation with farmers.

Table 1: The cost of operations which may be carried out on set-aside land

Operation	**£/ha**
Stubble cultivation	17
Cutting (per cut)	13
Herbicide application (not incl. cost of herbicide)	5
Fertiliser application	7

Table 2: Recommended method for managing rotational set-aside and associated costs

Operation	**£/ha**
2 stubble cultivations, seeding and rolling	67
1 cutting	13
1 mechanical destruction of crop cover	17
Total cost	**97**
Cost of alternative operations	**£/ha**
Destruction of crop by non-selective herbicide	49
Seed (if planted cover is used)	18-35

Table 3: Costs of permanent set-aside during its first year

Operation	£/ha
Soil cultivation	42-59
Seed	14-42
Maintenance	0-13
Total cost	**56-115**

In subsequent years of permanent set-aside the annual cost is estimated at £26/ha.

ITCF estimate the minimum cost consistent with good agricultural practice is about £96 per hectare.

Table 4: Assumed materials costs

Material	£/ha
Seed:	
trefoil or clover	35
stubble turnips	18
Herbicides:	
selective, for thistles	16
selective, for grass weeds	44
non-selective, for cover destruction	45

Farmers' intentions for the 1993/94 set-aside year

The following table shows the proportions of farmers proposing to follow different set-aside options in 1993/94. In the event, of course, the bare fallow option was not available during the current year. The expectation in France is that the use of non-rotational set-aside will increase, except in the best arable areas, where parcels of poor land do not exist, and where set-aside provides a useful component of the rotations.

Table 5: Farmers' intentions for the 1993/94 set-aside year

Set-aside option	%
Permanent, or non-rotational set-aside	34
Rotational, with planted cover crop	26
Rotational with natural regeneration	16
Rotational with bare fallow	18
Rotational with industrial crops	2
Undecided	4

Evaluation of set-aside arrangements in France

Relatively little attention has been given to the management rules in the first two years, whilst efforts have been concentrated on accurately identifying the areas eligible for arable compensation payments. However, as the scheme becomes established, more attention will be focused on how set-aside is managed.

In 1992/93, French farmers were given maximum flexibility, certainly more than in any of the other countries studied. Not unexpectedly, farmers chose the least-cost options, and either maintained a bare fallow, or allowed natural regeneration to take place. Advisors feel that farmers have been unduly influenced by the wish to avoid direct costs, and the associated cash outlays on seed and sprays. They point out that the indirect costs of mechanical cultivation, wear and tear on machinery and higher depreciation rates are substantial, as has been indicated above.

In addition, farmers are experiencing difficulties in managing their existing systems, particularly in coping with the weed problems. Both bare fallow and naturally regenerated covers have contained weed infestations at various levels. For this reason farmers are being advised to change their management practices. Specifically they are being advised against natural regeneration because of the increased risks of annual

weeds seeding or perennial weeds multiplying. The recommendations for rotational set-aside are that:

1 Farmers select seed species which quickly provide a good covering of the ground (even if this means legumes in areas of low fertility.).
2 Rapid establishment of good cover requires thorough seed bed preparation, high seed rates and possibly, the use of selective herbicides.
3 The cover crop should be managed by spraying of non - selective herbicides to delay seeding, or by regular mowing or chopping of the crop.

There is perceived to be a problem with respect to the position of herbicides and set-aside land. As indicated earlier, there is a list of 22 active "ingredients" which can be used on set-aside. This list has been derived as an administrative need rather than on the basis of sound agronomic practice, or on environmental grounds. When set-aside was introduced there was a need to derive a list of permitted herbicides, and this was based on existing practices on arable land. Scientists feel that there is a need to increase the range of selective herbicides available, particularly for use during the early growth of the sown cover crops, and especially against grass weeds (particularly bindweed, climbing buckweed and couch grass) and docks and thistles. Similarly, there is a need for herbicides to control seeding in cover crops.

The environmental pressures in France have not been as strong as they have been elsewhere, and this is reflected in the very flexible management rules, which have been derived mainly through consultation between the Ministry of Agriculture and the Farmers Unions. Environmental lobbies have not been important. There is no consensus of opinion, for example, that nitrate leaching into water courses is a major problem associated with agricultural practice, hence the advice to farmers to sow leguminous cover crops in order to rapidly establish cover. The banning of bare fallow for the whole set-aside period, however, indicates that environmental considerations are beginning to assume more importance. It should be noted, however, that cover does not have to be

established until May 1st, and that nitrate leaching is likely to be more of a problem during the winter months.

Fundamental changes are taking place on arable farms as a result of the new economic environment. It is not possible to separate the effects of set-aside from other aspects of the Arable Area Payments Scheme and the lower level of intervention prices, all of which are affecting the farm economy. One development which illustrates the changing situation is the growth in producer co-operatives in the better arable areas. These consist of perhaps 8-12 farmers coming together to pool both machinery and labour in order to reduce fixed costs. They would simultaneously manage their set-aside in a collective way.

6. The management of set-aside in Germany

Introduction

Germany has the second largest arable sector in the EU, and has an arable base area of 10 million ha. In the first year Germany exceeded its national arable base area, and was the only country in the EU to do so. Total claims under the Arable Area Payment Scheme amounted to over 10.1 million ha for the 1993/94 harvest year. Total set-aside was over 1.4 million ha, or 13.8% of total arable area claims. Initial estimates indicate that 1 million ha are under rotational set-aside, and 415000 ha under non-rotational set-aside. The set-aside area in Germany accounts for 22.7% of the EU total, and is the second largest contributor.

In the current year farmers are offered three main options:

1 Six-year rotational set-aside at a rate of 15%.

2 Three-year rotational set-aside at a rate of 20%.

3 Five-year non-rotational set-aside at a rate of 20%.

Farmers have the option of a mixed (rotational and non-rotational) set-aside at the rate of 20%. A combination of the two rotational options is not permitted. Voluntary set-aside is also permitted up to a limit of 33%. This is 17% below the EU limit, and has been imposed by the German government following experiences of the previous five year voluntary schemes. Under these schemes certain regions suffered from severe production losses, because land rented to agricultural producers was reclaimed by landlords and placed into set-aside.

Six-year rotational set-aside management rules

Set-aside duration is January 15th to August 31st. A cover of herbage must be established. This can be done in the autumn or in the following spring, depending on local weather conditions. The cover can be established either by natural regeneration or by the sowing of a suitable crop. There are no restrictions as to what the sown cover

should be, except that it cannot be an arable crop covered under the EU arable payments scheme. There are no restrictions as to the percentage of clover to be used in the cover crop.

There are no obligations/restrictions on the cutting of the cover crop. In the first year there was an obligation to cut the cover in June. This was changed for the second year following objections by hunting and environmental organisations as to the degree of damage caused by cutting during this period.

If set-aside is to be followed by a winter crop then mechanical cultivation is permitted from July 15th. Otherwise no such action is allowed until the end of the set-aside period.

Non-rotational set-aside

Permanent set-aside duration is from January 15th 1994-January 15th 1999. There are no significant differences between rotational and non-rotational set-aside rules.

Chemical use

No chemicals or fertilisers are to be used throughout the set-aside period. The exception to this is if set-aside is to be followed by a winter crop, in which case chemical and fertiliser use is permitted from July 15th.

The impact of set-aside rules on the farm economy and the environment

Establishment of a cover crop and weed control

To provide a cover of herbage, farmers have the option of either natural regeneration or the sowing of a suitable cover crop. Natural regeneration will increase the diversity of flora and fauna on set-aside land, and environmentalists have argued that this method is preferable to the sowing of a cover crop. However natural regeneration will increase problems of weed control for the farmer. As herbicides are not permitted on set-aside

land, many farmers have turned to the sowing of a suitable cover crop in the second year of the scheme (though no figures were available at the time of writing).

This, in conjunction with cutting, has proved to be the most effective method in controlling weeds on set-aside in Germany. Although environmentalists are not keen on the sown cover option, they recognise that natural regeneration increases calls for the use of herbicides, and given the degree of opposition to the use of any chemicals on set-aside, the sown cover option is seen as the best compromise available.

A sown cover crop also tends to be more effective in controlling nitrate leaching in areas where this is a particular problem. However environmentalists fear that, if the sown cover produces a high biomass yield and is left to rot on the set-aside land, this will result in increased nitrate levels in soil water. It is argued that, under these circumstances, the farmer should be allowed to harvest the cover crop to prevent such problems arising. Alternatively, a greater restriction could be placed on the range of eligible cover corps. In Germany, the only restriction is that it cannot be a crop covered under the Arable Area Payment Scheme; this is the least restrictive of the four countries studied.

Similarly there are no restrictions placed on the proportion of legumes allowed in the cover crop, despite potential problems of increased nitrogen contents in soil water. This is another area of concern for environmentalists, particularly in nitrogen sensitive areas where set-aside is practised.

Rotational versus non rotational set-aside

In the first year, rotational set-aside was the only option open to farmers. In the second year some farmers have transferred to the non-rotational set-aside option. The extent of the transfer was limited, however, because the precise rules were late emerging from Brussels, and farmers were unable to make an informed decision. It is widely believed

that many more farmers will adopt the non-rotational option in the future. The fact that the non-rotational rate is set at 20% in Germany, compared with 18% in Denmark and the UK, is not seen as a significant factor in determining how much land will be set-aside on a non-rotational basis.

The most important factor affecting non-rotational set-aside participation in Germany is soil quality. As in Denmark, concern has been raised over the potentially serious problems of weed infestation, and the late date before cultivation is allowed on non-rotational set-aside land. These factors discourage the bringing back of land into production, and deter farmers from setting aside good quality land on a non-rotational basis. Thus on farms where there are no significant pockets of poor quality land, the non-rotational option is not expected to be popular. Where areas of poor quality land do exist, however, the non-rotational option is expected to be widely adopted. It is envisaged that farmers in such areas would set-aside the most marginal land permanently. This would minimise production losses arising from set-aside, and avoid the expense of bringing the land back into cultivation.

From an environmental perspective, rotational set-aside is considered important in Germany. The main reasons given are that it allows a period of rest for the soil, fauna and flora. It is also an opportunity to allow the organic content of the soil to increase. The fact that set-aside results in 15% of an arable farm not being subject to chemical use over a period of 8 months is seen as a particularly important benefit.

Although it is generally agreed the non-rotational option will produce greater environmental benefits, concern has been raised by some over the potentially damaging effects of acid rain on set-aside land. It is argued that acid rain will reduce the pH value of the soil, and that when the land is brought back into cultivation at the end of the five year period, it will require substantial quantities of lime/chalk. As it is doubtful whether

many farmers adopting the non-rotational option will chose to bring the land back into cultivation, this is unlikely to be a significant problem.

It is felt that non-rotational set-aside would be much better suited to certain environmentally sensitive areas, and that to achieve this there needs to be greater flexibility in the rules regarding the transfer of set-aside obligations. As in Denmark, the non-rotational field margin option open to British farmers was considered beneficial to the environment, and the Farmers' Union felt that such an option should be offered in Germany.

Non food use

The use of set-aside land for production of non-food crops is not significant in Germany. This is primarily because of the lack of a domestic market. In the first year of the scheme a limited export market for non-food rapeseed existed in Italy. The Farmers' Union are hopeful that the German government will encourage the expansion of the domestic biofuel market in the near future, thereby increasing the incentive to grow non-food rapeseed on set-aside land.

Evaluation of set-aside arrangements in Germany

Germany was the only country to exceed its national base area, and more attention has been paid to resolving these problems than to the specific management rules of set-aside land. Most of the Länder of the former East Germany exceeded their base areas by between 1.6% and 16.8%. Farms in these Länder were required to follow set national plans drawn up by the former Communist government. Following unification, these farms entered the market economy and were free to determine which crops were most appropriate according to local agronomic conditions. When regional base areas were drawn up in 1992/93, there was little indication as to what area would be under cereals in these Länder, and estimates had to be made based upon unreliable data. In the event, these estimates proved inaccurate and a number of base areas were exceeded. Some

modification to the base areas has occurred for the second year of the scheme, although not by the full overshoot recorded in the first year. There is considerable anxiety that similar problems will occur again this year, and that such problems will not be confined to Länder in the former East Germany only.

The main problem is that a significant number of arable farmers have decided not to participate in the Arable Area Payments Scheme. Of an estimated 550,000 arable farmers eligible for compensation payments, 150,000 decided not to apply for any form of compensation in the first year of the scheme. These were mostly part-time farmers and/or farmers who considered the financial reward of set-aside too small to warrant the amount of paperwork involved.

Following the 27% increase in compensation for set-aside land, and the continuing fall in the price of cereals over the next two years, set-aside will appear a financially more attractive option to farmers who have thus far not entered the scheme. As more farmers are persuaded to apply for compensation, and arable area claims increase, there is a real danger that several of the Länder will exceed their base areas. If this occurs farmers will be penalised heavily (as required under EU set-aside legislation), and this will have a far more significant impact than any changes to the specific management rules of set-aside.

The set-aside regulations which do exist, have been established via consultation between the German Farmers' Union, various environmental organisations, and the Ministry of Agriculture. As is the case in Denmark, public interest over the impact of agriculture on the environment has been an important factor in these discussions. Although not as restrictive as Danish regulations, it is clear that environmental issues have had an impact on the drafting of set-aside arrangements in Germany. The banning of herbicide use on set-aside land is the clearest example of this. The change in cover crop cutting obligations between the first and second years also reflects the growing importance of environmental issues surrounding set-aside.

However there has been a degree of compromise between farmers' organisations and environmental groups in Germany. Although cutting is no longer required in June no ban has been imposed, and thus farmers are still allowed to cut during this period if weed problems become particularly serious. Similarly, most environmentalists would prefer to see natural regeneration on set-aside land but, given the increased weed problems that often result, a sown cover crop is seen as the next best option.

Weed control is undoubtedly the most significant problem to arise from the present set-aside arrangements. The only method of control available is by cutting, which tends not to be very effective. To minimise such problems the German extension service strongly recommends that farmers sow a cover crop. In the first year of the scheme the majority of farmers allowed natural regeneration, as this appeared to be the least-cost option available to them. In the second year of the scheme many more have elected to sow a cover crop, as it is recognised that this reduces weed problems, and hence the cost of bringing the land back into cultivation at the end of the set-aside season.

At this stage it is too early to determine whether or not set-aside management rules will have a significant impact on a farms' fixed costs. In any case it is unlikely to be practical to distinguish between the impact on costs of management rules and the reduction in cereal prices. In addition, over 70% of arable support applications were under the simplified scheme (higher than for the three other countries studied), many of which were from family-run farms where the scope for reducing fixed costs tends to be more limited. It is clear that most farmers are unwilling to make any significant modifications to their farming systems until all the precise rules established at Brussels are known, or until the scheme is better established and no more important changes are to be expected. Given the problems of exceeding base areas in Germany, this would appear to be some way off.

7. The management of set-aside in the UK

Introduction

The UK has an arable base area of 4.4 million ha. Total claims under the Arable Area Payment Scheme amounted to over 4.1 million ha for the 1993/94 harvest year. Total set-aside was over 688000 ha, or 16.7% of total arable area claims. The set-aside area in the UK accounts for 11.9% of the EU total, and is the fourth largest contributor.

During 1993/94 farmers have a choice between rotational and non-rotational set-aside. Initial estimates indicate that 556000 ha are under rotational, and 133000 ha under non-rotational set-aside. Farmers are permitted to have a mixture of the two. As elsewhere, the set-aside requirement is 15% for rotational, but in common with Denmark, is only 18% for non-rotational (compared with 20% in the rest of the EU).

The management rules for rotational set-aside in 1992/3

The main elements of the rules were as follows:

1 A green cover had to be established by December 15th.

2 A bare fallow was permitted after May 1st.

3 If no bare fallow had been established, the cover had to be cut before July 1st.

4 If land going into set-aside still had crops in the ground on October 15th, no green cover was necessary, but bare fallow had to be established by June 1st.

5 Green cover could be established by regeneration of unburnt stubble.

6 If a green cover was sown, it should be a mixture of two varieties. Legumes should be no more than 5% by weight in seed mixtures.

7 The cover must be cut once by July 1st unless fallowed by June 1st.

8 Agricultural chemicals were generally banned apart from slurry

9 Herbicide use was limited to spot treatment of individual weed species.

Modifications to the second year of the scheme

Some important modifications were made to the rules for the 1993/94 season, including the following:

1 Non winter-hardy cover crops, like mustard, could be used.

2 The requirement that only seed mixtures could be planted was relaxed.

3 The range of crops following which natural regeneration could be used was extended to include all except maize and legumes.

4 The exemption to the need to establish green cover relating to crops still being in the ground applied from October 1st, rather than October 15th.

5 Non residual, non selective herbicides can be used, if necessary from April 15th, and can be used at any time to replace natural regeneration with a planted cover crop.

6 Selective herbicides can be used at any time to control weeds, providing they do not destroy the cover crop.

The rules for non-rotational set-aside

There are four non-rotational options available:

1 **Field margins:** areas must be of at least 0.3 ha. and 20 metres wide, and established either by natural regeneration or sowing grass.

2 **Grassland:** can be either undersown or planted soon after harvest. Any grass species may be sown. The green cover must be cut short between July 15th and August 15th (although up to 10% may be left uncut.)

3 **Natural regeneration:** after a combinable crop (other than maize or legumes). No ploughing or deep cultivation is allowed, nor non-selective weed-killers in the first year. The green cover must be cut between July 15th and August 15th.

4 **Wild bird cover:** initial cover by natural regeneration, replaced in the spring by a mixture of two crop groups. Cover must be replaced after 1 or 2 years.

The general rules for the above option are as follows:

1 Non-residual selective herbicides may be used, providing green cover is not destroyed.

2 Non-selective herbicides may be used to create a bare strip when needed, or replacing old green cover under the wild bird option.

3 Fertilisers, manure, organic waste and lime may not be used, except that 30 kg/ha of nitrogen can be used to help establish a new crop under the wild bird option.

Reasons for changes between 1992/93 and 1993/94

The changing regulations were a result of experience with set-aside in the first year, and an attempt to establish a workable compromise between efficiency (in terms of supply control), agronomic needs and environmental objectives.

The development of effective management practices for set-aside land was assisted by the fact that experiments funded by the Ministry of Agriculture, Fisheries and Food (MAFF), and carried out by the Agricultural Development and Advisory Service (ADAS) had commenced as early as 1987 (when the original 5-year scheme was announced) to compare different treatments of set-aside land. The experiments compared year-long bare fallow, autumn-sown Italian rye grass and natural regeneration. The experiments have suggested that whilst pests and disease problems may be associated with set-aside, weed infestation is the main problem (Clarke, 1993). Cutting may prove an inadequate mechanism because weeds change their growth habits in set-aside conditions and may flower, and seed at lower heights (Clarke, 1993). Ploughing-in the cover crop, whether it be natural regeneration or sown cover will not guarantee a weed-free seedbed for the subsequent crop, as cultivations alone fail to contain weed seed numbers adequately (Froud-Williams, 1988).

The level of weed infestation will also be affected by the kind of cover established. A thickly sown cover crop of mustard or ryegrass will suppress weed growth, and will reduce nitrate leaching effectively. However it is more costly to establish, and produces a sward that lacks the biodiversity associated with natural regeneration, which is regarded as important for wildlife habitat. In addition, the sown cover crop can become a weed problem. Italian rye grass, for example, which is recommended by MAFF as cover, has great persistence and may be difficult, or expensive to control in succeeding cereal crops.

The use of herbicides is now permitted on set-aside land. Farmers may use selective, non-residual herbicides at any time to control weeds, providing they do not destroy the cover crop, and/or may destroy the entire cover after April 15th April. This change was introduced for both agronomic and conservation reasons. The weed problem has already been discussed. The conservation benefit relates to the fact that the use of herbicides may remove the need for farmers to cut their set-aside land in the spring, which may destroy the nests of ground-nesting birds, and the feeding ground of others. Later cutting would reduce this particular problem (cutting is banned in the sensitive period in Denmark), but is less effective in controlling weeds as many will have flowered and seeded by that time (Froud Williams, 1988).

Whilst there are conservation gains in using herbicides on set-aside land there are two concerns. One is the tendency for weeds to build up resistance if herbicides are over-used. For this reason, some feel that the use of selective herbicides on set-aside land should not be encouraged, or that, as was previously the case, farmers should be required to obtain special dispensation for such use. The second concern is the effect of non-selective herbicides on biodiversity. If farmers use such herbicides early in the spring, before plants have seeded, everything is destroyed. This may be convenient from an agronomic point of view, but less so for conservation.

Another reason for the relaxation of the rules concerning herbicides is the effect on the landscape. There was considerable criticism in the UK, in the first year of set-aside, of the deterioration of the rural landscape, resulting from weedy fields, particularly when the weeds were thistles and docks. Public perception of set-aside was significantly affected by this effect.

Effects of the management rules on the farm economy

Set-aside is managed in the UK through a mixture of rules and recommendations. A reasonable balance has been aimed at between short-term agronomic convenience and longer-term conservation interest. Farmers are offered a relatively limited number of rules, and a series of recommendations (the explanatory guide distributed by MAFF to farmers claiming arable area compensation, which sets out the rules, and recommendations does not seem to have an equivalent in other countries). They offer farmers considerable flexibility and the capacity to adopt practices which will fit their particular circumstances in the year in question.

Set-aside is not a "costless" crop for farmers however. The following is a list of the costs of the various operations which may be required, based on standard data for the UK (taken from Nix, 1994). The operating costs cover labour, machinery repairs and depreciation, and fuel. They are based on the assumption that farmers carry out the operations themselves, rather than using contractors.

Table 6: Cost/ha of operations which may be carried out on set-aside land

Operation	£/ha
Stubble cultivation	14
Seeding (broadcasting)	11
Topping	16
Ploughing	32
Rolling	15
Spraying	6

Table 7: Assumed material costs/ha.

Material	£/ha
Seed:	
ryegrass at £1.30/kg and 30kg/ha	39.00
mustard at £1.30/kg and 25kg/ha	32.50
Spray:	
selective, eg Fluazifop-P-Butyl	30-90
non-selective, eg Glyphosate	41-55

Thus the cost to a farmer of managing set-aside over a year could range between about £50/ha (one stubble cultivation and two toppings) to £100/ha (stubble cultivation, seeding, herbicide application). As suggested earlier, however, the cheapest approach in the short run may lead to problems in the long run.

Evaluation of set-aside arrangements in the UK

The evolution of management rules and recommendations in the UK has emerged through evidence accumulated from experimental work and through pressure from farming and environmental lobbies, particularly those associated with wildlife. Farmers have been provided with detailed explanation of the rules, and recommendations as to what they should or should not do. There is a considerable level of agreement that the rules constitute a reasonable compromise between the various objectives which are

being pursued, namely, the reduction of production of certain crops, avoidance of nitrate leaching, control of agronomic problems and encouragement of diversity in flora and fauna. The introduction of a non-rotational set-aside offers a new set of options to farmers. It is not expected that there will be a large uptake in the first year, mainly because the precise rules did not emerge early enough for farmers to make a considered decision. In the longer run, however, it is likely to become more important, particularly in the poorer arable areas. In general, conservation interests are served better by non-rotational set-aside, and it may suit some farm situations. It may well exacerbate the "slippage" problem however.

Invitations to tender for a detailed evaluation of the agronomic and environmental consequences of set-aside have been issued by MAFF. The study will identify the agronomic impact of set-aside on management decisions relating to weed, pest and disease problems, and investigate the impact on fauna and flora. It is envisaged that the evaluation would indicate how modifications to the management options for set-aside land might maximise environmental benefit whilst minimising any detrimental agronomic effects (MAFF, 1994). Until the results of this evaluation are available, it is unlikely that any significant changes to the rules will take place. Certainly, none is planned for the coming year.

8. Discussion

This study has shown that set-aside is being managed in contrasting ways in the four countries uncer consideration. These differences have implications for the farmers in the countries concerned, for taxpayers and for those who use rural areas for recreation and leisure. Whilst set-aside will be judged mainly on its contribution to supply management, the effects on farm incomes and on the environment of the way in which it is being managed are also important. The effects of variations in management rules on these two items are considered below.

Effects on farm incomes

From the viewpoint of farm economy, set-aside is an enterprise like any other. It has an output, the area payment, and it involves costs. Some of these are direct costs, like seed and herbicides; others are indirect costs, like machinery and labour. How much farmers receive in different countries (or in regions of different countries) for their set-aside "enterprise" will vary. It will vary on the output side, because whilst the set-aside payment is fixed per tonne at the EU level, the amount which farmers actually receive is a multiple of the basic amount per tonne and the average cereal yield in the "production region" which the national Government has elected to use over the period 1986/87 to 1990/91. The basic amount per tonne was originally fixed at the 1995/96 cereal area payment, but has been increased for the current year by 27%.

The major variation in set-aside payment is between the lower cereal yielding countries in the south of the EU, and the higher yielding ones in the north. The extent of yield variations between Denmark, France, Germany and the UK in the reference period was small (ranging between 6.9 t/ha in France and 7.2 t/ha in the UK) but intra-country differences in yields are substantial. Those countries which choose big yield regions, like the UK, clearly penalise those farmers who produce on the best land, compared

with countries like France and Germany which have chosen to use much smaller yield regions.

There is logic in relating set-aside payment to the productive capacity of the land taken out of production, it would not seem right to compensate farmers at the same level for land taken out of production which was capable of yielding 3 t/ha of cereals as for that which could yield 7 t/ha.

The net income generated by set-aside is also affected by the costs of managing set-aside land. These costs can vary substantially, not because of real differences in input costs since in the countries studied, the unit cost of inputs is about the same. The major cause of cost variation is differences in the management rules with which farmers have to comply. These have been explained in detail in the preceding sections, but are summarised below, together with the cost implications.

Establishment and maintenance of a cover crop

Denmark insists on a cover crop being sown, the other countries merely offer it as option. The cost of sowing a cover crop lies in the range £30 to £50/ha which amounts to some 10-15% of the value of the set-aside payment. This may, however, be compensated by savings elsewhere. A well established cover crop restricts weed growth, and may thus obviate the need for the use of herbicides. The advantages to farmers of establishing a cover crop are demonstrated by the fact that even when they are not required to, a significant proportion choose to do so.

It is striking that at precisely the date that farmers in the UK may create a bare fallow (May 1st) French farmers have to establish a cover.. However, practice may differ more than the rules. French farmers are being advised to create a cover crop in the autumn for agronomic reasons, and farmers in the UK are discouraged from destroying their cover crop as early as May 1st unless they feel that it is essential to do so. In fact whilst set-

aside may not be ploughed until May 1st in the UK the cover crop can be destroyed by herbicides as early as April 15th. In Germany the cover crop may not be destroyed until July 15th and only then if a winter crop is to be sown. In other cases mechanical cultivation may not begin until August 31st. In Denmark cultivation may begin on July 15th (in 1992/93, the date was May 15th, but after protests from conservation groups, the date was put back for the following year.) Of these various sets of arrangements it would seem that UK farmers have some advantage in having more time to prepare set-aside land for the subsequent crop, and in phasing their cultivations for the entire farm over a longer period; July 15th, which is the critical date in the other countries falls in a very busy time of the arable farming year.

Time by which cover must be established

This ranges from between October 1st in Denmark to May 1st in France. The former date gives farmers little flexibility, particularly in a wet autumn, and effectively extends the set-aside period over a much longer period than in France. French farmers can cultivate their land as many times as they wish up to May 1st in order to control weeds. The UK requires cover by December 15th, and Germany allows farmers to establish either in autumn or spring.

It is not possible to put precise financial values on these differences, but clearly the more flexibility that farmers are given, the more they can manage their set-aside land to their own agronomic advantage. Given the great diversity in agro-climatic conditions across the EU it does not seem feasible that all countries should be required to follow the same practice.

Requirement for cutting

All countries, except Germany, make some requirement for cutting (unless herbicides are permitted). In the UK, the cover must be cut once, unless a bare fallow is established by June 1st., in France the rules state that cover should not be allowed to seed, and in

Denmark, the cover must be cut once during the four week period leading up to 31st August. Denmark does not permit cutting during the period May 1st to June 30th, in order to protect birds. Given that farmers are not allowed to use any chemicals on set-aside land this additional constraint clearly exacerbates the weed control problem, since May and June are periods of rapid weed growth, particularly in a wet spring. The estimated cost of cutting cover is in the range £13-£18/ha. It does not seem that differences in cutting requirements will lead to substantial variations in farm incomes, except that in areas where the growth of cover is vigorous, for climatic reasons, more passes with a mower will be necessary in order to control weeds.

Use of herbicides

A major factor affecting farm management decisions is whether or not farmers are allowed to use herbicides. There is a clear distinction in this respect between the UK and France which do so allow and Denmark and Germany which do not. If farmers are not allowed to use them, they have to rely on cutting, possibly on several occasions, and planting a cover crop which is capable of smothering weed growth. Allowing farmers to spray designated types of herbicides does not result in all of them so doing. In France, for example, a survey suggested that in 1992/93 about 15% of farmers used herbicides to destroy the cover. It is not surprising that the proportion is quite small since the cost of spraying exceeds the cost of cutting. However in that year 40% of set-aside land in France was under bare fallow, so no such destruction was necessary. Now farmers have to maintain a green cover between May 1st and July 31st, and it is expected that more will use herbicides, in order to get land quickly into condition for planting the next crop in the rotation.

In the UK, non-specific, non-residual herbicides can be used from April 15th, and specific, non-residual ones at any time. With these flexibilities, and the added freedom to cut at any time and as many times as desired, and plough or cultivate the land from May 1st the UK rules seem to give farmers the most effective weed control options.

In Denmark and Germany, farmers are at some disadvantage. It is acknowledged in Denmark that weed infestation in set-aside land is a problem, and hope is being pinned on the establishment of dense, green cover crops to smother weed growth. The evidence suggests, however, that whilst such a strategy may reduce weed problems, it will not solve them.

In Germany, the situation is similar, although farmers may use herbicides after July 15th, whereas in Denmark the regulations are being interpreted as banning herbicides and pesticides until August 31st (although fertilisers may be used from July 15th). As indicated in chapter 6, there was some discussion in Germany as to whether the rules should be changed in order to allow herbicides in the second year. In the event hunting and environmental interests prevailed, and no change was made. As in Denmark, a sown cover crop is regarded as a partial solution, although it is not compulsory.

There is general agreement amongst research scientists that simply cutting set-aside cover crops will not control weeds, and that the situation is likely to get worse as weed species gradually adapt to a set-aside environment. It is too early to tell what the long term consequences will be, but farmers in the UK and France are clearly at some advantage over their competitors in Denmark and Germany as far as this aspect of set-aside management is concerned.

Environmental effects

It should be clear from the preceding discussion that environmental consequences of set-aside have been given great emphasis in the drafting of management regulations in some countries but not in others. At one extreme is Denmark, and at the other is France where, as yet, they have not been of great concern.

The environmental consequences of set-aside management can be considered below in terms of nitrate leaching and effects on flora and fauna.

Nitrate leaching

This has dominated the discussion in Denmark, where the problem is perceived as being very serious, and where specific targets have been set for the reduction of nitrate levels in groundwater. The recent discovery of pesticide residuals in groundwater further hardened the stance against the use of any chemicals on set-aside land.

This emphasis on the reduction of nitrate leaching has led to the insistence on planted cover crops established early in the autumn, and maintained until mid-summer. There is general agreement that a planted cover will, in most years, produce better protection against nitrate leaching, although following a late harvest and wet autumn it may be difficult to establish. The other countries have compromised. Both the UK and Germany cite the reduction of nitrate leaching as an objective of the set-aside arrangements, but have not made a planted cover crop mandatory. The UK does require the cover, whether planted or through natural regeneration, to be established before the winter, the period when leaching is likely to most acute. France and Germany have been less demanding, although farmers are being encouraged to establish cover in the autumn.

Effects on flora and fauna

In all four countries some weight is given to wildlife in framing the management rules. Cutting is banned in Denmark during the period when ground nesting birds are vulnerable. In the UK, spraying cover crops with non-selective herbicides is preferred to establishing a bare fallow from May 1st because the resulting mulch continues to offer habitat for wildlife. However, this is a recommendation and not a rule. In France, the need to keep a cover in place until July 15th prevents this course of action, and farmers have to choose between cutting to control weed growth during the summer, or using selective herbicides. In Germany it is pressure from wildlife groups (including hunters) which has led to an extension to the cover crop period.

With the additional option of non-rotational set-aside now available, conservation objectives can be catered for more explicitly, and the UK, in particular, has framed the non-rotational management rules with wildlife interests occupying a central place. Rotational set-aside offers limited opportunities for conservation, mainly because the short period does not allow a more diverse range of flora to become established. Biodiversity is seen as an important aim in some countries. It should be possible in the future to differentiate between the two forms of set-aside, with conservation objectives being pursued mainly on land in non-rotational, and agronomic considerations being given more emphasis on rotational set-aside.

Not only is it true that agronomic and environmental objectives may clash, but there may also be clashes between environmental interests. Thus, whilst in Denmark the priority given to the reduction of nitrate leaching leads to the insistence on a planted cover crop, in the UK it is emphasised that a naturally regenerated cover crop may contain a greater diversity of species, and thus provide habitat for a wider range of wildlife. Similarly the banning of herbicides, because of concern about residual effects, may lead to the adoption of cultivation practices which are more harmful to wildlife.

It is an oversimplification of course, to imply that all herbicides have the same properties as far as their environmental costs and benefits are concerned. The issues are complex, but herbicides of long persistence and having a major effect on micro-organisms are most environmentally damaging because of the disruption they cause to the ecological equilibrium (Hance + Holly, 1990).

Although the results of detailed survey work on farmer practices on set-aside land have not been published, it appears that in those countries where herbicides are permitted, the most common practice is to use non-selective herbicides at the stage when destruction of the cover crop is permitted. These non-selective treatments usually involve the use of paraquat or glyphosate, although only the latter is effective in killing perennial weeds.

Both of these herbicides are inactivated rapidly on contact with the soil and hence do not contribute to the build up of residuals. A further environmental issue concerning the use of herbicides is their degree of toxicity to animals. In this respect, glyphosate has clear advantages in that it is much less toxic than paraquat or diquat.

Consequences for rural economy and society

The major structural and agronomic changes which are taking place on European farms have consequences for those who live and work in rural areas. Set-aside, for example, reduces the demand for labour, but so will a reduction in the prices of arable crops. The two effects are not separable, and technological change will tend to reinforce the effect. Economists have consistently argued that set-aside distorts land prices, and this study has identified one example of this in Denmark.

Set-aside also affects the economic environment of those who make a living both upstream and downstream of agriculture. The use of certain inputs (like seed and fertilisers) will be reduced and so will that of certain outputs (like cereals). There will thus be secondary employment effects in the industries concerned. Other sectors may benefit, like those making certain types of grass-cutting equipment.

Differences in the management rules between countries will have some bearing on these secondary effects. Firms producing seeds and herbicides will be more adversely affected in some countries than others, according to whether seeded cover has to be established, and whether herbicides are permitted.

Longer-term issues

Farmers, their advisors, scientists, environmental interest groups and policy makers are in a learning situation as far as set-aside management is concerned. Some of the short-term changes in ecology and the consequent agronomic implications are already becoming apparent, and have been discussed in this report. Many other changes,

however, will take several years to emerge. Most husbandry practices, whether based on chemical or mechanical technology, alter the dynamic equilibrium which normally exists in vegetation, and through that will also affect animal populations. The use of selective weed-killers, for example, changes the conditions for the plants which are not susceptible, giving them more space, light, water and mineral nutrients; the use of non-selective herbicides leading to the creation of bare areas will result in a vegetative succession staring with the invasion of "pioneer" species (Hance & Holly 1990). Mechanical cultivations, particularly ploughing, also have an effect on microbial activity in the soil, and reduces the diversity and number of soil fauna.

Studies are now being put in place which will seek to identify the nature of these changes. From the farmers' point of view the effectiveness of long term-weed control, under the various management arrangements will clearly be of vital interest. Will the stricter rules on the use of herbicides in Denmark and Germany, for example, place farmers at a competitive disadvantage compared with those in the UK and France? The limited evidence suggests that they will. If farmers in the two former countries encounter a more rapid build up of weed seed banks in the soil, they will presumably have to counter this with higher levels of herbicide use in succeeding crops. The long-term changes in the levels and types of herbicide may therefore differ from the short term.

The other important longer-term change is related to the introduction in 1994 of more set-aside options for farmers to follow. Given the lateness of the specification of the rules for "flexible" and "guaranteed" set-aside it is unlikely that the full impact of this will appear until the 1995 harvest and onwards. A complex of factors will determine which of the various options farmers decide to follow, but other things being equal, one might hypothesise that the attractiveness of non-rotational forms of set-aside will be higher in those countries where the rules for rotational set-aside have been drawn most tightly, ie Germany and Denmark. This may make the overall objective of supply

control more difficult to achieve given the higher degree of slippage expected from non-rotational forms of set-aside, but will reinforce the environmental benefits from set-aside in those countries where such objectives have already been given a high priority. This illustrates once again the way in which policy objectives conflict.

A final point relates to the overall level of set-aside in the EU. During the first year of the current scheme production of cereals has fallen by less than 2%. It is too early to say that set-aside has failed in its primary objective given the impact of favourable production conditions on the 1993 harvest, and the likelihood that in the first year of the scheme farmers would put their poorest land into set-aside. It does seem likely, however, that the proportion of land that farmers are required to set aside will have to be increased, and the extent of that increase will be related to the choices farmers make between the various set-aside options, which itself will be affected by the management rules prevailing in each country.

Conclusion

This study has shown that the management rules for set-aside vary considerably in Denmark, France, Germany and the UK. This is mainly a reflection of the different weighting given to the various objectives which Governments are using set-aside to achieve, beyond the central EU objective of reducing the level of production of certain commodities. It is not feasible, or desirable, that the management rules should be harmonised completely, given the wide range of agro-climatic conditions experienced across the EU and the wish of national governments to identify their own priorities. It would seem, however, to be contrary to the spirit of the EU if farmers in some countries were to be given significant cost disadvantages compared with their competitors elsewhere, unless this had been recognised and taken account of in the decision-making process.

One of the surprising facts to emerge from the consultations which lie behind the preparation of this report, is how little was known by interested parties in one country about the management rules pertaining elsewhere.

9. References

Ansell, D J & Tranter, R B (1992) *Set-aside: in theory and in practice.* Reading: Centre for Agricultural Strategy.

Buckwell, A (1986) *Controlling cereal surpluses by area reduction programmes.* Discussion Paper in Agricultural Policy 86/2. Ashford: Wye College, Department of Agricultural Economics.

CEC (1985) *A future for Community agriculture.* COM (85) 750. Brussels: CEC.

Clarke, J (1993) *Management of set-aside land: research progress.* London: MAFF.

Ervin, D E (1988) Cropland diversification (set-aside) in the US and the UK. *Journal of Agricultural Economics* No. 39, 183-195.

Froud-Williams, R J (1988) The effect of extensification and set-aside on annual broad leaved weed species in cereals. *Aspects of Applied Biology.* No. 18, 1-26.

Hance, R J & Holly, K Eds (1990) *Weed control handbook: principles.* 8th edition. Oxford: Blackwell Scientific.

ITCF (1994) *Enquête Jachère Tournante; Campagne 1992-93.* Paris: ITCF.

Nix, J (1993) *Farm management pocketbook.* 24th edition. Ashford: Wye College, University of London.

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