
The Economics of UK Agri-Environmental Policy: Present and Future Developments

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Abstract

UK agricultural policy is evolving with the development of agri-environmental legislation which aims to protect and improve the rural environment. The growing importance of agri-environmental policy is further emphasised by its role in the 1992 MacSharry Reform of the CAP and its position in the 1995 Uruguay Round of the GATT. This paper provides a broad overview of the economics of agri-environmental policy in the UK. The reasons why agri-environmental policy exists, its form and the potential implications of the recent reforms are considered. It is suggested that the future development of policy in this area will need to take much more seriously the conditions required by the GATT.

1. Introduction

Some 77 per cent of the land surface of the United Kingdom is used for agriculture which means that farming is a key determinant of its biodiversity. However, over several decades, the drive for ever increasing productivity has been obtained by intensification of production, leading in turn to the destruction of natural habitats at a hitherto unprecedented rate. Typical of the problems have been the pollution of water resources by fertilisers and pesticides, soil loss, the destruction of habitats for both flora and fauna and the associated loss of general amenity value. An example of

this is that between 1984 and 1990, there was a 23 per cent net loss of hedgerow (130,000 km) plus a reduction in quality with an eight per cent reduction in flora diversity (HMSO, 1994). Adams (1996) has described the process of agricultural intensification as being Fordist, with the pursuit of standardisation at variance with the diversity and conservation of the rural environment. The genesis of this conflict can be traced back to at least 1945 when agriculture was deemed to be strategically crucial from a food security perspective. The policy of encouraging agriculture to increase the production of food was further emphasised in Article 39 of the Treaty of Rome, which brought into being the Common Agricultural Policy (CAP) and to which the objective of increasing agricultural productivity by promoting technical efficiency was central.

However, the last decade has seen the development of agri-environmental policy, aiming to either protect or enhance the rural environment. The total agri-environmental budget in England is forecast to be £114.9m in 1995/96 (MAFF and DoE, 1995). Agri-environmental policy attempts to resolve the conflict between agriculture and the environment by preventing excessive environmental degradation and destruction and by promoting agricultural practices that are environmentally neutral or positive. Policy has evolved in response to fears that the agri-environmental relationship has changed from

a complementary symbiosis, to a competitive trade-off (Russell, 1993, 1994a).

Agri-environmental policy is also becoming important internationally. The 1992 MacSharry Reform of the CAP, included provision for the introduction of additional payments linked directly to conservation and enhancement of the rural environment throughout the EU. Furthermore, the 1995 Uruguay Round of the GATT, although principally initiating multilateral price reductions, allows for decoupled agri-environmental support payments, such as those facilitated by the CAP reform. Decoupled payments are ones made to farmers which are unrelated to their current agricultural output. However, there are certain facets of the GATT reforms, and decoupled payments, which are not yet fully understood or appreciated in relation to agri-environmental policies. By focusing on the form and implementation of agri-environmental policy in the UK, this paper seeks to assess the potential difficulties which may be encountered in satisfying the GATT in terms of agriculture.

The structure of the paper is as follows. It begins by conceptualising agri-environmental policy and considering the economic rationale for the existence and form of the economic mechanisms employed to implement the policy. Several examples of UK agri-environmental policy are then assessed. To facilitate the analysis, policy is separated into that which deals with positive and negative externalities. The CAP and GATT reforms are then considered in relation to UK agri-environmental policy. Some conclusions, arising from the analysis, are offered at the end of the paper.

2. Agricultural environmental externalities

It is frequently argued that farmers, through appropriate agricultural stewardship, are the

guardians of the soil and as such protectors of the countryside. Stewardship can be viewed as a form of ethically motivated behaviour, resulting in the production of positive externalities or the minimisation of negative externalities (Colman, 1994, Weaver 1996). An externality is defined broadly to be the effect, either positive or negative, which is inflicted upon a passive party by the actions of an economic agent without the consent or agreement of the affected party. Economists normally advocate methods such as taxes, pollution permits and liability rules as means by which to internalise externalities. That is, create an incentive structure so that costs and benefits arising from the externality are accounted for by the decisions of the economic agents involved. However, as will be explained these approaches to the agri-environmental problem are not always appropriate. Many of the features of the countryside which are appreciated by society result directly from agricultural production. The crux of the problem is the changing nature of the relationship between agriculture and the environment which was once considered to be complementary and is now perceived to be competitive (Buckwell, 1989, Russell, 1993, 1994a).

A solution which is frequently proposed to deal with an externality is the creation of private property rights (Coase, 1960). In the case of agriculture, many of the property rights in land already reside with the farmer (or landowner, these sometimes being the same) and this causes a difficulty. There is a set of property rights relating to the use of agricultural land as an input into the production process but, in the absence of action to the contrary, there are no property rights for the resulting externalities because of their public good characteristics.² Thus given the joint production of agricultural output, a private good positively priced, and

environmental output, a public good unpriced, the farmer prefers to produce the private good. As an example, consider a beautiful agricultural landscape which society likes to enjoy, but for which it is not possible to charge a price because it is not feasible to exclude private individuals. Hence, farmers have no incentive to preserve the landscape (except as an input) and, in pursuing their own private objectives, such as profit maximisation, they may reduce the overall amenity and ecological value of the landscape for society. Thus, this is a situation in which the form of agricultural production preferred by the public may not be consistent with the existing set of property rights.

Historically property rights in land, and the associated right to carry out agricultural production free of restraint, have been strongly defended, given the economic pressures that have existed for greater quantities of food. However, the existing allocation of property rights need not be immutable and could be subject to change in response to changes in the preferences of society. Altering, redefining and occasionally restricting the existing allocation of property rights in agricultural land has been a major part of agri-environmental policy.

The actions of farmers, in relation to the environment, maybe categorised as either positive or negative relative to some norm or reference point (Kahneman et al, 1986), which reflects the level of responsibility that a farmer is expected to demonstrate with respect to the land, given the level of environmental quality which society demands. As the relationship between agriculture and the environment has become more competitive, and as society has demanded a greater degree of care and concern be shown toward the environment, the reference point has moved (Hodge, 1989).

With a competitive relationship between agricultural production and the environment, stewardship implies a need to sacrifice profit; profit reduction is the inevitable concomitant of stewardship. A key feature of much agri-environmental policy has been the assumption that stewardship can be forthcoming within a voluntary framework. This reflects political pressures and lobbying by the farming community which has not readily accepted the need for regulation as a means to protect the rural environment (Lowe et al, 1986, Winter, 1996b). However, it has been found to be necessary to offer financial incentives to protect the environment. Bromley and Hodge (1990) argue that the property rights in land have, via the political system, consequently been translated into presumptive entitlements in the policy arena such that any alterations to the planned production of a farmer required for environmental reasons have had to be compensated. Government has attempted to rationalise this policy by always focusing on the positive aspects of the agri-environmental relationship. In the case of agriculture and the environment, the positive has been emphasised over the negative, but this interpretation of the relationship is highly subjective and is one with which many environmental organisations strongly disagree.

Given that this is how the agri-environmental relationship is perceived, it is not difficult to understand why the Polluter Pays Principle (PPP) has not been implemented.³ Within the UK it is therefore the Provider Gets Principle (PGP), (Blochliger, 1994), that is applied. The PGP is the symmetrical opposite of the PPP; that is, economic agents are rewarded for producing positive externalities. The PGP is based on the principle that if the production of negative externalities is to be penalised, then the production of positive externalities

should be rewarded. Furthermore, the PGP recognises the public good nature of environmental output which explains why it has been necessary to concentrate on the supply side.⁴

The demand side equivalent of PGP is the Beneficiaries Pay Principle (BPP) (Brown, 1994). The BPP requires individuals to truthfully report their willingness to pay⁵ for the environmental externalities; given free rider difficulties, this approach is likely to yield sub-optimal levels of provision. The BPP can however, be implemented, if the good is not a pure public good - for example in the case of land purchased by an organisation like the National Trust.

3. Examples of UK Agri-environmental policy mechanisms

Agri-environmental policy can be crudely divided into two types: positive and negative.⁶ Negative policy is that which attempts to prevent loss of environmental features and quality. Positive policy is that which aims to maintain or enhance environmental quality. Although this differentiation of policy is simplistic - most policies exhibits both features simultaneously - it does help to illustrate the relationship between the policy mechanisms and their objectives. We begin by considering the two main positive policy mechanisms which are central to UK initiatives.

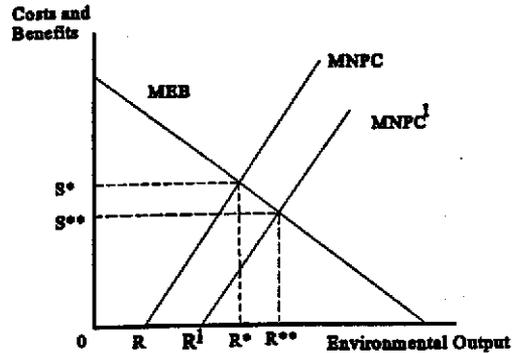
3.1 Positive Policies - Landscape and Ecological Conservation and Enhancement

The two main policies which have been used to encourage conservation and enhancement of landscape and ecology are the Environmentally Sensitive Areas (ESAs) and the Countryside Stewardship Scheme (CSS).⁷ Both policies offer incentive payments to encourage the production of rural environmental goods. Such policies provide

a (quasi) market for the rural environmental good, thereby generating an opportunity for farmers to adopt environmentally friendly farming practices whilst responding to their economic instincts.

Before reviewing ESAs and the CSS it is worth considering how these policies are affected by agricultural price support in terms of the costs of provision. Essentially the cost of agri-environmental policy is distorted by the inflated prices of agricultural support. This situation is shown in figure 1.⁸

Figure 1



The marginal net private cost (MNPC) of provision of the positive externality is artificially high because agricultural output prices are also artificially high. The MNPC originates at R to reflect the fact that at low levels of production, for the given production technology, agricultural and environmental output are complementary (Russell, 1993). If the MNPC is assumed to be the supply curve and marginal external benefits (MEB) as the demand curve, then where they intersect represents the optimal level of provision of environmental output, R*. This implies that

the level of payment required (S^*) to bring about an equilibrium in terms of the demand and supply of the environmental good is inflated. Under a reformed system, without price support, there would be a new MNPC, $MNPC^1$, to the right of the old MNPC, and a lower subsidy (S^{**}) could bring about a higher level of environmental provision, R^{**} . However, it is not being suggested that price reductions by themselves will produce environmental gains, simply that the present cost of achieving a given level of provision could be reduced significantly. As Chisholm and Hone (1996) recognise, the impact of a reduction in agricultural price support upon environmental quality is an empirical question.

Environmentally Sensitive Areas

ESAs have been described as the flagship of UK agri-environmental legislation, (Whitby and Lowe, 1994), with an expected budget of £43m in 1995/96. They are designated geographical areas, associated with a particular farming system or landscape. The fundamental objective of the ESAs is the maintenance or enhancement of the environment and landscape quality via the implementation of appropriate management practices. There are now 30 operative ESAs in the UK, a further nine proposed and there are nearly 100 throughout EU in total. This policy is an exercise in conservation on an extensive scale compared to previous schemes, marking a departure from the narrow site base approach previously typical of conservation policy in the UK.

ESAs employ a standard payment incentive mechanism to induce positive agri-environmental farming practices. Standard payments operate on a per hectare or per unit of work performed basis and are the same for all eligible farms. In terms of figure 1 the

costs of an ESA are equal to the area below S^* and above MNPC. Payments are prespecified and not tailored to specific farm requirements. They are made annually in return for following clearly defined management guidelines. These have become progressively more sophisticated, offering a range of potential options (referred to as tiers) from which a farmer can choose. An example is the Suffolk River Valleys ESA which has three tiers - tier one, a holding operation, tier two enhancement, and tier three arable conversion to permanent grassland (Russell, 1994b). Participation within this scheme is voluntary on the part of farmers. Thus, a farm might be within the designated area but the farmer may choose not to participate in the scheme. Furthermore, many of the present ESAs do not require that all the land on a participating farm is entered into the scheme. An exception to this rule is Breadalbane in Scotland.

The main advantage of this scheme is that it allows for the coverage of a substantial area of land and thus provides the possibility of having an impact on landscape quality. Using a standard payment in combination with general management requirements makes administration and operation simple. The main disadvantage is the need to offer a fixed payment to all farmers, within the area, who comply with one of the specified sets of guidelines. If the payments are considered to be compensation for profit foregone, then the scheme may overpay farmers whose individual compliance costs are low. This is clearly inefficient when the operating agency has a limited budget. Crabtree (1991) has argued that most entrants into the scheme are over-compensated and that the corollary of this is that there is a very high marginal cost of securing additional uptake. This is because the environmental management guidelines

have been set at levels which have meant that existing farming practices do not have to be changed significantly. Thus, it is not surprising that there have been high participation rates in the scheme and that it is easy for critics of the scheme to simply label its payments as disguised income support. However, it is also because a common payment is made on all hectares that are eligible and no effort is made to offer contracts or gear payments only to the extent necessary for the achievement of the objectives. Thus, it is important to ensure that the farms included in an individual ESAs are relatively homogenous in relation to their opportunity cost of participation, thus producing a more cost effective take-up. Alternatively, the scheme might offer too little compensation and only a small number of farms might participate. It is therefore important that the standard payment is set at a level which is just sufficient to induce the required level of participation at the desired level of environmental quality.

Countryside Stewardship Scheme

The CSS is a voluntary standard payment scheme, operating in England, aiming to combine landscape, historical and access objectives, but not within geographically specified areas. It therefore targets environmental features not geographical regions like ESAs.⁹ The government recently announced that, as direct price support to farmers is reduced as part of the CAP and GATT reforms, funds for the CSS will increase, thus signalling its intent to expand the CSS (HMSO, 1995). The expected budget for this scheme is £11.4m in 1995/96.

One distinguishing feature of the CSS is that it employs discretion; not all submissions (bids) to join the scheme have to be accepted. That is, even though a farm might satisfy the necessary criteria, it can be prevented from

entering the scheme. Bids take the form of an environmental management plan for the features and land which is being offered. Fear of rejection should, in principle, mean that landowners will enter their best bid to join the scheme. This approach is similar to how the internal market has been used in the NHS (Le Grand and Bartlett, 1993) and as such the CSS can be described as a sort of quasi-market for agri-environmental output. The farmer is the provider and the operating agency the purchaser, with a form of auction mechanism (sealed bid) being used to undertake public procurement (Fraser, 1996a). However, the CSS requires farmers to compete over quality as standard payments are offered for pre-specified actions whereas a new scheme, The National Forest Tender Scheme, asks farmers to compete both over price and quality. Cripps and Ireland (1994) provide an interesting economic analysis of dual criteria assessment for the auction process in relation to the competition for the independent television franchises.

There are a broad set of guidelines accompanying the CSS, in the form of a menu, that any farmer might choose to comply with, depending on the environmental resources of the farm. Examples are the set of wetland guidelines if part of the farm is marshy, and the set of chalk grassland guidelines if the farm includes some chalk grassland. A prespecified set of annual management and capital payments for each element of the scheme are specified. This allows the farmer to choose which guidelines to comply with and to specify a farm plan incorporating and detailing conservation activities to be undertaken for the payments offered. Like many of the ESAs this scheme allows for part of farm to be entered. In the associated Welsh scheme (Tir Cymen) it is necessary that the whole farm is entered.

The main advantage of this scheme, from

an economic point of view, is in the way information is handled. On the one hand it uses information about what society prefers in drawing up the broad set of guidelines. At the same time, it allows farmers to use information about what can be achieved on the farm and what it costs. Since farmers must compete with each other to get their bids accepted, it is, hoped that maximum environmental benefits per unit cost are achieved. In principle the rent accruing to the farmer from the non-discretionary standard payment mechanism, can be minimised by employing discretion. The main disadvantage with this scheme is the cost imposed on farmers in preparing bids and the general lack of an experienced cadre of consultants who might help farmers in preparing these bids.¹⁰

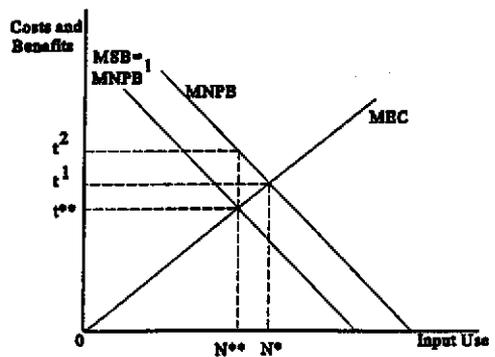
3.2 Negative policy - reducing pollution and ecological destruction

Given the emphasis placed upon farmers as environmental stewards, there are, very few policies that target explicitly the negative aspects of agricultural production. The most important at present is, however, the Nitrate Sensitive Areas (NSAs) scheme which aims to reduce the presence of nitrates in water. Reductions in the level of nitrates in water are based upon concerns for human health, such as Blue Baby Disease and stomach cancer, and the problem of eutrophication, whereby increasing levels of nitrates allows algal growth to severely reduce the level of dissolved oxygen in the water thus effecting the health of fish.

Before considering NSAs it is worthwhile again considering how the present price support regime raises the costs of agri-environmental policy implementation. If policies employed to cope with negative externalities strictly followed the PPP, a tax or other standard approach could be used.

For example, a tax could be levied on an input into the productive process, such as on nitrogen fertiliser in order to reduce nitrate leaching. At present several countries in Europe (Austria, Finland, Norway and Sweden) employ fertiliser taxes of some description (Baldock, 1992). The impact of this policy is shown in figure 2.

Figure 2



The impact of a negative externality generated by farming is captured by marginal external costs (MEC). Like Hanley (1990), the MEC originates at N , which is positive. This is because it is assumed that at low levels the eco-system has the ability to assimilate the input. The marginal net private benefits (MNPB) to the farmer from using this input are shown by MNPB. In principle it is simple to obtain the optimal level of production (input use) and externality - simply set a tax of t^1 yielding a level of input, N^* . However, the level of MNPB is inflated by the production output subsidy system (so reflecting profit from intensified production). Furthermore, although MNPB are the benefits to the farmer, they do not represent the benefits to society. These are lower since the

value to society of food production is less than farmers are paid for it. If society's benefits are represented by Marginal Social Benefits (MSB) then the true optimum is at N^{**} rather than at N^* . There are two important points to be made here. First, to achieve N^{**} , with the agricultural production subsidy system in place, requires a tax of t^2 rather than t^1 . This higher tax has a negative effect on farm incomes. Furthermore it is difficult to determine the appropriate tax level, since it depends on MSB which are not observed. Secondly, if support prices are reduced toward the world price level a much lower tax of t^{**} would be sufficient as MSB and MNPB¹ are assumed to be equal.

Nitrogen Sensitive Areas

In 1989 the draft EU Nitrates Directive was issued. The emphasis of the Directive was on limiting the use of nitrate fertiliser and stocking rates in areas designated as being vulnerable to pollution by nitrates. The UK responded to the draft Directive by amending the then Water Bill and incorporating the changes as Section 112 of the 1989 Water Act. The Act established the basic framework for the NSAs with ten being established in 1990, covering some 15,000 hectares. In addition 23,000 hectares were designated as Nitrate Advisory Areas, whereby an advertising is used to persuade farmers to adopt farming methods which reduce the potential for nitrate leaching.

The EU Nitrate Directive advises member states on how and when member states should deal with the nitrate problem. This Directive relates to the earlier EU Directive that established drinking water standards (Directive 80/778/EEC), by imposing a nitrate standard of 50 mg/l. The Nitrate Directive requires member states to monitor all waters by 1993, to identify zones that are vulnerable to nitrates and for the designation of Nitrate

Vulnerable Zones (NVZs) with full compliance by member states expected by 1999. In the UK there will be no statutory compensatory payments because it is argued that compliance reflects the fact that farmers have to meet codes of good practice. Instead there will be some grants available to assist with compliance, but they will not fully compensate farmers. Interestingly, both NSAs and NVZs will operate simultaneously although the way in which participants are treated, in terms of financial effects, will be significantly different.

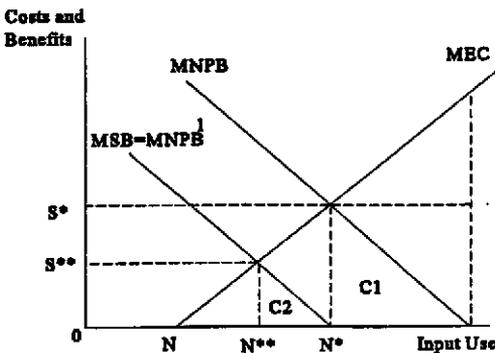
NSAs partially cover those geographical areas with high fertiliser applications and which are prone to nitrate leaching. The expected budget for NSAs is £8.4m in 1995/96. Although mandatory powers to restrict the use of nitrates in NSAs are available these powers are to be kept in reserve. Instead like ESAs, NSAs are voluntary and compliance is induced by an annual standard payment for accepting the required management practices. There are two types of NSA; the basic and the premium schemes. The premium scheme requires farmers to convert from arable to low-input grassland and, as would be expected, it attracts a higher level of payment.

With NSAs there are several reasons given as a rationalisation for offering compensation.¹¹ It is necessary to appreciate the complex nature of the nitrate pollution problem and the lack of general understanding of the processes involved. It might be assumed that nitrate pollution is highest in those areas where most fertiliser is applied, and that there is a direct connection between application and pollution, but this need not be the case. Firstly, there are many natural sources of nitrates such as decaying vegetation and animal manure. Secondly, the physical environment plays a central part in the leaching process which means that certain

regions are far more susceptible to this problem. Thirdly, there is a long lag between the application of fertiliser and the appearance of nitrates in water. Fourthly, in any case, it would be impossible to trace the pollution to a given farmer; nitrate is a typical non-point source pollutant. For this reason work on incentive mechanisms to reduce nitrate leaching has focused on the use of nitrogen fertiliser in the production process.¹² And fifthly, the elasticity of demand for fertiliser is very inelastic which implies that the necessary price increase would have to be high for there to be a significant reduction in use. Burrell (1989) estimated that the own price elasticity of demand is -0.5. Rayner and Cooper (1994), employing the cointegration technique, obtained a short-run estimate of only -0.1 and a long-run estimate of -0.25.

For all of these reasons the approach adopted in the UK with the NSAs scheme is to compensate farmers for the loss in profit associated with changing practices. The economic interpretation of compensation used to implement this approach is shown in figure 3.

Figure 3



Again if we take into account the impact of subsidising agricultural output prices, we can see how the level of compensation is affected. As with figure 2, the optimal level of private input use is at the point where MNPB is equal to zero - intersects with the horizontal axis. In order to achieve the socially optimal level of input use it is necessary to reduce the level of input use so that MNPB is equal to MEC. Under the price support regime the necessary level of compensation is S^* , whereas under the reformed system S^{**} is the necessary compensation level. Because NSAs offer a fixed payment to all farmers the area below S^* and beyond N^* represents the total amount of compensation made. However, area C_1 represents the actual compensation required under the traditional support system to cover the loss of profits. C_2 represents the equivalent under a reformed system. Figure 3 illustrates two important points. First, the necessary level of compensation under the reformed system is significantly lower. Second, with the standard payment approach, as has already been noted with ESAs, many farmers are over-compensated as the level of payment is greater than the level of profit foregone from participation.

4. CAP reform and the GATT

Agri-environmental policy has generally been able to evolve without taking into account trade issues. However, with the advent of the 1995 Uruguay Round of the GATT this is no longer possible, as closer scrutiny of policy is required to ensure compliance with the conditions of the agreement. The GATT requirements, in relation to agri-environmental policy, basically restrict the potential forms that the incentive mechanisms can take. By considering the details of the CAP Reform and the GATT, it is possible to assess the

likely implications for future agri-environmental policy developments.

4.1 1992 MacSharry reform of the CAP¹³

Although the MacSharry changes were not the first reform of the CAP, they signalled a change in emphasis. Whereas earlier reforms had been motivated by budgetary issues the real reason behind these reforms was the need to make the CAP consistent with the emerging international trade obligations which were to result from the GATT agreement (Tangermann, 1996,a). It was necessary that there was CAP reform first which could then be followed by a GATT agreement, avoiding unnecessary difficulties in ensuring compliance with the requirements of the GATT at a later stage. However, these reforms are only the beginning, with the prospects for future change looking likely as the drive to further liberalise agricultural trade and production continues.

There were three main elements to the MacSharry reforms. Firstly, a reduction in support prices of agricultural commodities - for cereals, 29 per cent by 1995/96, and for beef, 15 per cent over three years from 1993. The reforms should have the effect of reducing surplus production, reducing distortions in input use due to inflated output prices and allowing freer trade. However, there is no reason to necessarily suggest that price support reductions themselves will result in an increase of agri-environmental provision. Agriculture and the environment are still in many ways complementary, and semi or low intensity agricultural cultivation produces a landscape much preferable to the land abandonment which might result from significant price cuts (Russell, 1993).

Secondly, there is an increase in direct payments to farmers which is intended to compensate for the reduction in incomes brought about by reduced output prices.

Since payments based on hectares of crops grown and animal numbers, might be expected to act as input subsidies and thus distort production, only the land used for crops and the animals on the farms in recent years (or an agreed base year) are eligible for payment. This rule eliminates the incentive to expand crop or animal production - that is, the payments (subsidies) are partially decoupled from current production decisions. A decoupled payment is therefore unrelated to existing agricultural production and input use (ABARE, 1990).¹⁴

Finally, the third strand of the reforms is that there is provision for additional payments linked to conservation and enhancement of the rural environment. This part of the reforms is included in the accompanying measures - Agri-Environmental Programme (EEC Regulation 2078/92).¹⁵ Despite being heralded as central to the future development of the CAP this part of the reform has amounted to little more than a small extension of existing agri-environmental legislation. Winter (1996b) illustrates this point by noting that, in 1993/94, UK CAP funding amounted to £2,380m with £840m going to AAPS and only £43m to the agri-environmental package. Furthermore, with such generous direct compensation payments being offered for reductions in commodity production, the incentives for farmers to participate in environmental schemes are reduced.

4.2 1995 GATT Uruguay Round¹⁶

The GATT approach to trade policy is fundamentally liberalising, aiming to reduce or minimise barriers which inhibit free trade. Commodity based price and income support policies depress world price levels which in turn distort the location of production and in turn effect trade flows, reducing worldwide benefits from specialisation and trade. The Uruguay Round was the first time that

agriculture was included in GATT.¹⁷ This is not altogether surprising, as world trade in agriculture is very much influenced by protectionism, competitive export subsidies and the insulation of many domestic markets from world trade effects. Tangermann (1996,b) views the reforms brought about by the Agreement on Agriculture as the most significant single package ever for international agricultural trade.

Rayner et al (1993a) suggest several reasons why agriculture was included in the Uruguay Round. Firstly, national agricultural budgets were coming under increasing pressure as the costs of support escalated. For example the CAP budget grew by 20 per cent between 1990 and 1991. Secondly, the costs of protectionism had increased significantly at the same time as surpluses of major agricultural products had grown. Thirdly, the whole agricultural international trading sector had become very defensive in outlook with major exporting countries, such as Australia, experiencing a significant rise in the level of domestic protection. Finally, certain major exporting nations, such as the USA, wished to increase their share of world agricultural trade to offset increasing trade deficits elsewhere. Thus, although agri-environmental issues were not explicitly stated as a reason for the inclusion of agriculture in this round of the GATT they have been accommodated.

The acceptance of agri-environmental policy has been accomplished by distributing certain types of policy mechanism into different categories, subject to specific criteria. The important area of the agreement in relation to agri-environmental policies is covered by the so called green and blue boxes.

The green box contains policies which can continue to receive support payments and are exempt from reduction commitments. The

specific details of green box qualification are to be found in Annex 2 of the Agreement on Agriculture (GATT, 1994). Specific reference to environmental programmes is covered in sub-section 12 with eligibility and conditions of payment detailed. To qualify for green box status it is necessary that policy be judged not to stimulate production or to distort trade and can so be described as decoupled. It is easy to understand why these conditions received support in the Uruguay Round debate on defining acceptable forms of support for agriculture. Payments that accompany agri-environmental schemes, and which provide the full cost of compliance, are therefore allowed as they are unrelated to existing levels of agricultural production. This particular aspect of the GATT is unique to the agricultural sector which is an implicit recognition of the many difficulties encountered in reaching the final agreement. However, there is a further and more general requirement that policy should have none or minimal trade distortion or production effects. As Tangermann (1996b) notes, there is an internal inconsistency in the Agreement on Agriculture between the general principles and policy-specific criteria.

Policies considered to be consistent at the policy specific level might be inconsistent at the more general level because of perceived trade distorting effects. For example, in relation to UK agri-environmental policy, financial payments for participation might bring about a halo effect (Russell, 1994b). In particular, intensification of production on those parts of the farm not covered by the agri-environmental scheme made possible by the incentive payments, which will in turn change existing patterns of production which might be trade distorting. In addition, an objective of agri-environmental policy is the prevention of rural depopulation and the

maintenance of an extensive farming systems. For this objective to be met agricultural production will need to continue. Although the payments themselves to enable these objectives can be allowed under the GATT, as they are decoupled from production directly, the resulting change in the composition of agricultural production might lead to trade distortions which are again inconsistent with the general principles of the Agreement on Agriculture. As Tangermann rightly concludes, much will turn on the interpretation of minimal trade distortion or effects on production.

The blue box covers policies that do not need to be included in the calculation of the current aggregate measure of support and includes compensation payments such as those given to farmers to replace income foregone as a result of the reduction in price support payments. The blue box describes Part IV, Article 6 of the GATT (1994), Domestic Support Commitments, which allows for production limiting programmes such as Set-Aside. Although many of the policies covered by the blue box are not directly environmental in nature they do indirectly impinge upon agri-environmental schemes. That is, they continue to inflate the costs of agri-environmental policies.

A major concern that has often been articulated (Tobey and Smets, 1996) is that it is difficult to distinguish between agricultural subsidies for environmental output and subsidies for other purposes. The easiest way to avoid arguments over hidden policy objectives is to make sure that policy is properly targeted and that it does not set out to achieve multiple objectives (Colman et al, 1992). Policy will be more effective if it is transparent, with clear, simple objectives and no room for ambiguity. In terms of actual policy development this means that specific requirements, such as the planting of trees, as

opposed to broad management prescriptions, are to be preferred. This is because the target variables of policy are explicit and tangible and therefore much easier to identify. However, if agri-environmental payments are simply to replace existing subsidies, the size of an environmental subsidy that constitutes a trade distortion is also not clear. The GATT views five per cent as a threshold in the case of production, as this is considered to cause serious prejudice. Tobey and Smets (1996) found that subsidy levels at present in agriculture do not exceed this five per cent threshold level. But, this is likely to change as price support is cut further and a greater emphasis is placed upon permitted environmental initiatives and decoupled support payments. Clearly, with the increasing importance of agri-environmental policy, comparative measures and means of identification to monitor potential distortions between countries will be necessary.

Finally, with the reduction in price support, it is highly likely that there will be an increase in uncertainty of farm receipts. One result of this could be that farmers adopt a more risk averse strategy in terms of their decision making. If this is the case, farmers are potentially more likely to be attracted to the certainty equivalent payments available from agri-environmental schemes. There could therefore be a dramatic increase in the number of farmers wishing to participate in agri-environmental schemes. For this reason the role of discretion, as employed by the CSS, in the selection of farmers to join schemes may need to be more widely employed to prevent excessive budgetary increases.

5. Conclusions

Agri-environmental policy has become an ever more important part of general agricultural policy. The recognition of the

role of agri-environmental policy within the GATT, and the preceding CAP reforms, signals a shift in the balance of agricultural policy. In the 1995 UK White Paper, Rural England, it is explicitly stated that the CAP has provided incentives to farmers for production without due regard for the environment and that a major objective of the CAP should now be safeguarding or enhancing the rural environment, accompanied by a substantial level of public funding. It is interesting to observe how the gradual redefining of society's reference point has meant that the way in which agri-environmental policy is implemented has changed. Policy has been able to become more proactive and less reactive as farmers have become amenable to environmental objectives. But, it remains to be seen if the rhetoric that has accompanied these changes will materialise. Indeed, it is argued by many environmentalists that recent agri-environmental legislation is purely the product of political expediency at a time of general farm policy retrenchment. Thus the recent changes might not reflect a reassessment of the agri-environmental relationship and farmers may not have a long term commitment to the environment.

In terms of the GATT, differences in interpretation of national reference points for policy, means that what one country might call an environmental payment may be viewed as an alternative form of subsidy by another. If the environmental objectives of policy are to be called into question therefore, if at least the payments are decoupled they will still satisfy the GATT and can remain within the green box. The definition of what constitutes a decoupled payment is therefore crucial. Without a precisely agreed definition of decoupled, the green box might become a source of major trade disputes. Moreover,

agri-environmental payments might well be decoupled and still produce trade distorting effects. This is an issue which will need to be resolved in the near future.

Finally, these potential problems will only become worse as subsidies for environmental protection and enhancement increase. It is therefore probable that agri-environmental policy will be an even more important part of the agricultural trade negotiations to be initiated in 1999. Indeed, with the proposed elimination of the blue box, there will be more pressure on green box policies to take up the slack in support payments. It is almost certainly the case that the green box will need to be used very strictly if trade disputes are not to occur. Thus, the terms and conditions of the GATT will act as an ever tightening constraint on the form, scale and implementation of future UK agri-environmental policy.

Endnotes

1. La Trobe University (Fraser) and University of Manchester (Russell). Iain Fraser is on leave of absence from Manchester Metropolitan University. The authors are grateful to the editor, two anonymous referees and Geoff Edwards for helpful comments on a previous version of this paper. Remaining errors or omissions are the authors' responsibility.
2. Harvey and Whitby (1988) describe and analysis in more detail agricultural environmental output and its public good characteristics.
3. See Baldock (1992) for a detailed analysis of the PPP and agriculture.

4. Hanley et al (1996) provide an example of an application of the PGP.
5. There has been growing use of contingent valuation to assess directly the public willingness to pay for the rural environment (Willis and Garrod, 1994, and Willis, Garrod and Shepherd, 1996). The results of these studies need to be treated cautiously though, because the relationship between estimates of willingness to pay and environmental quality as measured by environmentalists is unclear (Edwards-Jones et al, 1995).
6. An alternative characterisation of policy is proactive (positive) and reactive (negative).
7. There are other agri-environmental mechanisms being used or theoretically feasible. Another form of compensation is Management Agreements (1981 Wildlife and Countryside Act). A contract is negotiated which establishes restrictions to be placed upon a farmer and the required level of compensation to be paid for not undertaking environmentally damaging actions (Fraser, 1995). Alternatively property rights can be altered by purchase or changing laws and regulations. Examples of purchase are Conservation Land Purchase (Bateman, 1989, Colman, 1989) with direct management, a lease with restrictions or to sell off the land after incorporating restrictive covenants in the deeds enjoining the purchaser to operate the farm in an environmentally sensitive manner (Hodge et al, 1992). An example of changing laws and regulations is Cross Compliance where the farmer is required to comply with some minimal set of environmental guidelines as a precondition for receiving direct support payments. The effectiveness of Cross Compliance depends on the existing agricultural support system and the relationship between agricultural activities and the support system. Cross Compliance offers a means of complementing existing conventional environmental regulation (Baldock and Mitchell, 1995, Russell and Fraser, 1995). Finally there are several interesting studies that compare efficiency and effectiveness of various agri-environmental policies (Colman et al, 1992, Whitby and Saunders, 1996, Latacz-Lohmann, 1996).
8. For a more detailed analysis of the impact of inflated support prices on the cost of agri-environmental policy, see Whitby and Hanley (1986).
9. Potter et al (1993) analyse the benefits for policy from targeting environmental features.
10. There has been an attempt to implement a similar type of incentive mechanism in the USA - The Conservation Reserve Program. Smith (1995) provides an interesting discussion and analysis of this policy.
11. Tobey and Smets (1996) have characterised this approach to policy implementation as an application of Weak PPP.
12. Hanley (1990) offers a good analysis of the agricultural nitrate problem. Fraser (1996b) provides a review of modelling policy in relation to nitrate leaching.
13. For an overview of agriculture and CAP Reform see Rayner et al (1993b), Josling (1994) and Burrell (1995).

14. See Harvey (1995) for an analysis of EU cereal policy as part of the broader CAP and GATT reforms.
15. See HMSO (1994) and Winter (1996,a) for details of the environmental schemes submitted by the UK.
16. For an overview of the Uruguay Round see Cline (1995) and the Economic Journal, Policy Forum section, November 1993.
17. Francois et al (1996) provide a good summary of the estimated benefits from the Agreement on Agriculture although these have turned out to be lower than at first expected. For a broader review of the impact of the Agreement on Agriculture see Tanner (1996).

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