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European Agri-Environmental Policy Facing the 21st Century

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Abstract

This paper: reviews the development to date of agri-environmental policy in Europe; provides a critical assessment of its achievements and shortcomings; explores its likely future trajectory in the context of continuing CAP reform; highlights potential conflicts that may result; and draws comparisons with policy approaches in Australia and the US. The paper argues that the first generation of agri-environmental measures, implemented by northern European states in the early 1980s, focused on pollution prevention and came mainly in the form of command-and-control regulation. Agri-environmental programmes of the second generation, implemented during the 1990s, essentially pay farmers for the provision of environmental public goods in the countryside, recognising the wider role of agriculture in maintaining and enhancing the 'cultural landscape'. The emphasis on 'amenity' contrasts policy approaches in Australia and in the US which focus on resource management and the control of non-point source pollution, respectively.

The paper argues that, while agri-environmental payment schemes constitute 'quasi-markets' for public goods and thus correct for a pre-existing market failure, their environmental effectiveness is often undermined by informational deficiencies and asymmetries in the farmer-government relationship. These give rise to a set of problems including adverse selection, moral hazard and high transaction costs in the delivery of policy. The problems are compounded by the fact that schemes are often poorly targeted and pursue income support as a hidden objective. The paper invokes the concept of 'joint production' to analyse the output and trade implications of agri-environmental schemes and concludes that not all schemes are trade-neutral, despite the fact that European agri-environmental payments enjoy the status of Green Box instruments in the GATT. It is argued, however, that carefully designed and targeted environmental schemes may be classified as 'trade-correcting'.

The paper concludes that the future of European agri-environmental policy will depend largely on the trajectory of the Common Agricultural Policy. If future trade talks force a significant restructuring of current support mechanisms, policy makers may face strong incentives to shift funds from Blue Box productivity support to Green Box environmental support, thereby injecting significant amounts of money into the conservation of the 'European garden'. If, in contrast, the current support system remains intact, agri-environmental policy is more likely to adopt a cross compliance approach, making income support payments contingent upon the recipients' compliance with pre-determined environmental standards.

1. Introduction

The past two decades have seen a shift in the pattern of demand for goods produced by European agriculture. Increasing wealth, mobility and leisure time, and the relocation of population towards rural areas have all acted to increase the marginal value of environmental and amenity goods relative to the marginal value of food and fibre. During the same period, the supply of such goods as scenic landscapes, wildlife or biodiversity has been seen to be in decline. The blame has been put partly on the Common Agricultural Policy (CAP) which has emphasised the production of food and fibre at the expense of the quality of rural environments. These developments have given rise to a rural environmental movement and the development of agri-environmental policy.

This paper sets out: to review the development of rural environmental policy in Europe; critically to assess its strengths and weaknesses; to explore its likely future trajectory in the context of continuing CAP reform; and to highlight potential conflicts that may arise. The analytical part of the paper focuses on the dominant form of policy, i.e. voluntary environmental schemes which offer to pay farmers for the provision of environmental public goods.

The paper is organised into four further sections. Section 2 traces the origins of the agri-environmental movement in Europe and reviews the development of agri-environmental policy and its main instruments. Section 3 is a theoretical analysis of agri-environmental contracting as the main instrument of European agri-environmental policy. It is argued that agri-environmental contracting constitutes a 'quasi-market' for public goods in the countryside, thus correcting for a pre-existing market failure. The analysis then teases out the sources of potential inefficiencies and reviews the evidence. Section 4 discusses, in the context of the ongoing debate over the reform of the CAP, two alternative routes along which EU agri-environmental policy might develop. Along the first, production support is reallocated to measures for public environmental goods and services. This 'green recoupling' enjoys substantial political clout and could become one of the few politically sustainable forms of government support to agriculture. The second route assumes that production support will persist, but that farmers will have to comply with a set of environmental guidelines in order to qualify for that support. Section 5 draws some conclusions.

2. A brief history of agri-environmental policy in Europe

2.1. Development of agri-environmental relationships in Europe

To understand the development of rural environmental policy, it is necessary to understand the dynamics of the relationship between agricultural and environmental interests. Agri-environmental relationships in Europe can be characterised, crudely, into three phases (Hawke and Kovaleva, 1998):

1. Environmental custodianship (1860s – 1920s)

For many decades, farmers were perceived as the natural custodians of the countryside and the rural environment. The prevailing view saw no conflict between agricultural activities and rural amenity because agriculture was neither intensive nor land consuming with the consequence that there was plenty of free space for country pursuits like shooting, riding or walking. It was assumed that the protection of agricultural land from industrial and residential development through farming activity

would produce an attractive rural environment. This view was reflected in the first rural environmental policies, introduced in the 1940s in the form of a system of land use planning. The main objective was to protect rural areas from urban encroachment (Hodge, 1998).

2. Suppression of environmental concerns (1930s-1960s)

Although first doubts about custodianship were voiced only in the 1960s, it probably came to an end rather earlier, in the 1930s, with the beginning of the productivist era in agriculture. In response to the Great Depression, many European countries had started to emphasise self-sufficiency and the protection of domestic markets. The trend towards protectionism was strengthened by the outbreak of the Second World War, when farmers were suddenly required to expand food production almost regardless of costs. The need to boost domestic supply became the overriding policy preoccupation in the post-war years, resulting in more protection and the introduction of new subsidies. These developments accelerated the process of technological innovation and industrialisation of agriculture, mainly in the Northern European states, which dramatically changed the relationship between farmers and the rural environment. Although the custodianship model was much more difficult to justify in this new context, the idea of agriculture as a natural use of land persisted up until the early 1970s.

3. Agri-environmental movement and paid stewardship (1970/80s →)

The 1970s have seen a break-up in the consensus over the custodianship role of farmers and the very role of agriculture in the countryside. The destructive impact of expansionist agriculture became increasingly evident in the 1970s. Farms had lost many of their natural features in order to accommodate more land under tillage, supported in turn by fertiliser and pesticides. Land consolidation programmes had resulted in removal of hedgerows and other landscape features, the erosion of semi-natural habitats, and homogenisation of landscapes. In addition, pollution from intensive agriculture had become of increasing concern, particularly in Denmark, Germany and The Netherlands. The growing anxiety and concern has been characterised by various commentators as the beginning of environmentalism in its modern sense.²

In addition there was a rising concern for food quality and growing criticism of the cost and apparent inefficiency of public expenditure on agriculture, all of which contributed to undermining the productivist ideology. The crisis of the productivist Common Agricultural Policy, introduced in 1968, was first acknowledged by the Community in the mid-1980s. The root of the crisis was seen to be an expansion of agricultural output at a rate that had outstripped the capacity of Community markets, the Community's agricultural budget and, indeed, the capacity of the natural environment (Bowers and Cheshire, 1983). In response, both national governments and the Community started to embark upon the implementation of agri-environmental policy, both in the form of statutory regulation and voluntary incentive schemes. These measures are briefly characterised in the remainder of this section. More significantly, though, the developments of the late 1970s and early 1980s would mark the beginning of an ongoing debate over an environmental reform of the CAP – an issue that will be taken up in more detail in Section 4.

² See, for example, Thomas (1983) or Robinson (1990).

2.2. Regulation of agricultural pollution

It is probably fair to say that the first generation of agri-environmental measures, dating from the 1980s, on balance focused on pollution prevention and came mainly in the form of command-and-control regulation. Statutory regulation relates to nitrate pollution, pesticides, intensive animal husbandry and silage production, and the application of animal waste to land. Many regulations were indeed pioneered by individual Member States, reflecting domestic environmental sensitivities and demands, with little co-ordination of standards across the Community.

While pollution prevention has been the major concern in most of the Community's northern countries, Britain and the southern countries form an exception. Britain's policy for the rural environment has retained a distinctive approach in that it has been emphasising countryside and nature conservation. Pollution issues have never been of primary importance. States in southern Europe were only beginning to embark on a productivist path at the time when northern states introduced their first pollution prevention measures during the late 1970s and early 1980s. Southern states had shown, by and large, little interest or initiative in developing their own regulations. The regulatory approach (as described below) has, in subsequent years, been imposed by the Community on Britain and the new Member States in the South (Greece, Spain, Portugal).

Nitrate pollution

The EC Drinking Water Directive of 1980 (Regulation ECC 80/778) was the first piece of Community regulation with potential repercussions for agriculture. The Directive introduced upper limits, *inter alia*, on the concentrations of nitrate and pesticides in drinking water.³ Member States responded with a variety of measures, ranging from closure of heavily affected bore holes, to treatment of abstracted water using blending and ion exchange, to the delimitation of water protection zones in which farmers would face mandatory constraints on the use of fertilisers and pesticides.

The Drinking Water Directive was later (in 1991) supplemented by the EC Nitrate Directive (Regulation EEC/91/676) which is concerned particularly with the protection of water (not only drinking water) against nitrate pollution from agricultural sources. It requires Member States to take action where groundwater or eutrophic freshwater bodies are likely to contain nitrates above the 50 mg threshold if protective action is not taken. The UK response has been to introduce controls on the application of nitrogen in designated Nitrate Sensitive Areas (NSA) and Nitrate Vulnerable Zones (NVZ). While participation in the NSA scheme is *voluntary* and based on contractual agreements between the Ministry of Agriculture (MAFF) and individual farmers, landholders in the 68 NVZs face *mandatory* controls on the type, quantity and timing of applications of inorganic fertiliser and organic manure. They are also required to keep records of such applications. In contrast to the NSA Scheme, farmers in NVZs are not entitled to compensation as the rules are assumed to represent 'good agricultural practice'. However, a number of member states have launched discretionary grant schemes to assist farmers in water protection zones to

³ The maximum allowable concentrations are 0.1 microgram per litre of any individual pesticide (irrespective of its toxicity) and 50 milligrams of nitrate per litre. These are blanket standards which have to be achieved throughout the EU.

improve waste facilities or to provide some indemnification on equity grounds (Meinhardt, 1991; Nix *et al*, 1999).

Pesticides

Compared to the measures to prevent nitrate pollution, Community law on pesticides is much more piecemeal in that the legislative measures are often part of other pollution control regimes. In the UK, Community law has been implemented through a combination of measures including the *Pesticides Regulations* of 1994, setting maximum pesticide residue levels in foodstuffs; the *Food and Environment Protection Act* of 1985, imposing criminal sanctions in respect of contaminated food; and *The Control of Pesticides Regulations* of 1986. The latter set out detailed rules governing proper use and storage of pesticides and other plant protection products and require users to receive adequate instruction and training (Nix *et al*, 1999; Hawke and Kovaleva, 1998). Some Member States impose specific constraints on the use of pesticides in water protection zones. Across the EU, pesticide products must be individually approved and registered prior to their sale.

Intensive livestock holdings and animal waste

The control of farm wastes, in particular animal manure, is another area which has been addressed mainly by command-and-control measures. Germany, Denmark and The Netherlands have long-established regulations governing the rates and timing of manure applications to agricultural land. Manure regulations usually contain stocking rate limitations which effectively link all forms livestock production, including poultry and pigs, to the land. In addition to national legislation, the European Union has included large intensive livestock units within the 1996 Integrated Pollution Prevention Directive (EC 96/61).⁴ Units falling within the Directive must be authorised by the relevant regulatory authority, which may impose conditions not only on the establishment and running of a unit but also on its eventual decommissioning (Nix *et al*, 1999).

2.3. The development of agri-environmental contracting

While statutory measures have been relatively well accepted and reasonably successful in controlling agricultural pollution, attempts in the 1980s to extend these measures to the emerging problems of landscape change, wildlife loss and habitat destruction have largely failed. Attempts by the German government in the early 1980s to impose mandatory controls on farming activities in nature conservation areas met stiff opposition from the farming community and triggered a long-lasting political battle over property rights in land and nature (Mährlein, 1990). Farmers regarded the statutory controls as an undue interference with their property rights and successfully argued for compensation on the basis of profits forgone. This effectively meant a reallocation of property rights in favour of the farming community and paved the way for voluntary, incentive-based policies which would eventually become the dominant instrument of agri-environmental policy across Europe.

⁴ 'Large' units are defined as having more than 40000 places for poultry, 2000 places for pig fattening, or 750 places for sows.

The compensation approach

A semi-voluntary approach to nature and landscape conservation based on compensatory payments had, by the mid-1980s, already been pioneered in Britain and in The Netherlands (Potter, 1998; Slangen, 1992). The British *Wildlife and Countryside Act* of 1981 required advanced notification from farmers intending to carry out potentially damaging operations (PDOs) on protected land, so called Sites of Special Scientific Interest (SSSI).⁵ Farmers with land in SSSIs were required to notify the authorities of an intention, for example, to drain a piece of wetland, to convert heather moorland to pasture, or to plough up species-rich meadowland. The 1981 Act introduced a requirement for local conservation authorities to compensate farmers on the basis of profits forgone where applications to carry out PDOs were refused. Management prescriptions and compensation payments are laid down in a contract, a so-called management agreement, between the farmer and the local conservation authority.

The system underlying SSSIs quickly came under criticism because it involved local conservation and national park authorities to expend large shares of their budgets on compensating farmers who were threatening to do something environmentally damaging. More importantly, local conservation bodies were seen to be taking over some of the burden of agricultural support as the replacement of forgone agricultural subsidies significantly added to the compensation bills. But this, in fact, provided the impetus and considerable ammunition for powerful lobbying for agricultural policy reform from conservation groups. A strong argument was made for redirecting money from production grants into conservation schemes (Potter, 1998).

From compensation to incentive payments

The criticism of the SSSI approach led to the, at the time, rather revolutionary idea of offering a flat-rate payment to all farmers within ring-fenced, environmentally sensitive areas, regardless of their intention to undertake an environmentally damaging operation. As a flat-rate payment, it would promote the idea that traditional farming was an activity for which the state was prepared to pay (Potter, 1998). The underlying idea that farmers would be paid for the provision of environmental goods and service (rather than being compensated for not undertaking an environmentally damaging operation) sorted well both with environmentalists and the farm lobby.

In 1984 the idea was put to the test. The Halvergate Marshes, part of the Norfolk Broads in East England, were threatened by drainage and subsequent ploughing-up. The first agri-environmental programme to operate on this revised basis was hurriedly introduced by the Countryside Commission, initially funded by the Treasury. This, the Broads Grazing Marshes Scheme, offered all farmers on the marsh a flat-rate annual payment in return for an agreement to continue farming in a low-intensity way. The scheme would prove to be a milestone in European agri-environmental policy in many respects. Firstly, it marked a shift away from the negative, reactive, compensatory approach, towards a more pro-active, forward-looking, incentive-based policy. This

⁵ SSSIs are areas of land or water containing plants, animals, geological features or landforms which are considered to be of special interest from the point of view of nature conservation. SSSIs are designated by English Nature, the government's nature conservation agency. Presently there are just over 2 million hectares of British land in SSSIs. Authorised by the 1949 *National Parks and Access to the Countryside Act*, SSSIs are a relatively old and well-established mechanism for site protection. The focus on *site* protection reflects the prevailing view, up until the 1970s, that the *wider* countryside is safe in the hand of farmers and thus does not require specific protection.

shift brought with it a shift of principles in the use of payments: initially payments were regarded as representative of lost income, while subsequently payments have been seen to reward farmers for adopting conservation priorities without regard to income. Secondly, the model adopted by the Broads Grazing Marshes Scheme would become the general model for all agri-environmental management agreements subsequently. Such management agreements today constitute the main pillar of rural environmental policy across Europe. Thirdly, the scheme marked the beginning of a reorientation to the concept of environmental custodianship or, at least, the recognition of the wider role of agriculture in the countryside. What had been implicitly assumed in agricultural policy circles – that conservation was produced jointly with agricultural outputs – was now to be explicitly engineered by paying farmers to retain or re-adopt low-intensity farming practices (Potter, 1998).

Institutionalisation of environmental contracting across Europe

The concept of ‘paid stewardship’ was first given prominence in Community law with Regulation ECC 797/85 of 1985, permitting Member States to provide funding from their own resources for agri-environmental incentive schemes in environmentally sensitive areas, such areas being prescribed by Member States. The preamble pointed out that farmers in such areas

“are in a position to perform a valuable service to society as a whole [and that] the introduction of specific measures may encourage farmers to introduce or retain agricultural production practices that are compatible with the increased need to protect or preserve the countryside”.

The 1985 Regulation marked the beginning of positive, incentive-based agri-environmental policy in the northern states of the Community. The British government launched the Environmentally Sensitive Areas (ESA) Scheme in 1986. ESAs are geographically delimited areas of particularly high landscape, wildlife or historic value threatened by changes in farming practices. Farmers in these areas are offered a flat-rate payment for adopting or maintaining farming practices of benefit to the environment. The ESA Scheme was the first agri-environmental programme to be administered by an agriculture department rather than an environment department. The ESA Scheme has evolved into the flagship of MAFF’s agri-environmental programmes. Ten years after the initial designation of six ESAs in 1986, 15000 farmers across the UK had signed ESA management agreements covering an area of 1.3 million hectares and involving payments of around £50 million (\$A125m) in 1997/98 (Nix *et al*, 1999).

The German government had taken a slightly different approach by offering, *inter alia*, a countrywide (rather than geographically targeted) extensification programme. The programme offered payments for reductions in the use of pesticides and fertilisers or, alternatively, for conversion to organic agriculture. The programme had the dual objective of encouraging environmentally friendly farming practices and achieving a 20% reduction of agricultural commodity output. Britain followed the German model of untargeted schemes with the launch of the Countryside Stewardship Scheme in 1991. The scheme aims at re-creating and restoring farmland habitats and was offered countrywide, although priority was given to certain landscape and habitat types.

By the late 1980s, most northern states of the Community had in place a number of agri-environmental incentive programmes. The notable exception was France for whom the idea of paying farmers for environmental stewardship grated against the

popular view of productive farming as the 'green petrol' of the national economy. Similarly, southern Member States, still fully committed to a productivist CAP and the further development of their agricultural industries, had largely ignored Regulation 797/85 and the opportunity it offered for introducing rural environmental programmes (Potter, 1998).

Two years after the launch of the 1985 Regulation, it was agreed that, up to a certain ceiling, agri-environmental payments may be eligible for a 25% reimbursement from the guidance section of the European Agricultural Guidance and Guarantee Fund (EAGGF). This development must be seen in the context of the mounting pressure on the CAP's budget, caused through overproduction. It marked the initial acceptance that supporting environmentally friendly farming practices might also help to curb surplus production (Baldock and Lowe, 1996).

The Agri-Environmental Regulation

The 1990s saw several more rural environmental incentive schemes put in place. The impetus came from the Agri-Environmental Regulation (ECC 2078/92), agreed as part of the Accompanying Measures of the 1992 MacSharry Reform of the CAP. The 1992 Regulation differs in crucial respects from earlier measures (Baldock and Lowe, 1996):

Firstly, it made it a *mandatory* requirement for *all* Member States to implement an agri-environmental programme. National agriculture departments across the Community were now under pressure to implement programmes with a wide variety of environmental objectives. By making implementation of the Regulation mandatory, it was hoped to prevent a repetition of experience with Regulation 797/85, which was largely ignored by Member States in the south.

Secondly, the new Regulation contains a *wider range of measures* intended to address the environmental concerns of all Member States and to avoid what came to be seen as a northern bias in the acceptability of earlier measures. The measures called for in the 1992 Regulation include, *inter alia*: substantial reductions in the use of fertilisers and pesticides (or maintenance of reductions already made); the wider use of organic farming methods; a reduction of livestock numbers per forage area; an increase in the use of environmentally friendly farming practices; the rearing of local or traditional breeds in danger of extinction; the upkeep of abandoned farmland or woodland; and land management for public access and leisure.

Thirdly, the Regulation provided for co-financing of agri-environmental schemes from the *guarantee section* of the EAGGF, thus setting the agri-environmental measures on an equal footing with the CAP's productivist programmes. The rate applicable varies between 50% and 75%, depending on whether land is located in Objective 1 regions, defined as areas lagging behind the rest of the Community. The Guarantee section of the EAGGF is not subject to the same budgetary restrictions as the Guidance section, and so the agri-environmental programmes were not limited from the beginning by a fixed annual ceiling on Community expenditure.

Finally, the new Regulation also allows for *all agricultural land* to be included in agri-environmental programmes rather than, as hitherto, only environmentally sensitive land.

In these ways, the Agri-Environmental Regulation firmly established the principle of 'paid stewardship' across the Community, which was applauded by

environmentalists. The new opportunities were greatly welcomed by all Member States. In the UK, funding for the existing ESA and Countryside Stewardship Scheme was increased, and a number of new programmes were launched. The Nitrate Sensitive Area Scheme (NSA), Habitat Scheme, Countryside Access Scheme, Organic Aid Scheme, and Moorland Scheme all came into being. In southern Member States, meanwhile, the new Agri-Environmental Regulation came to be seen as offering a supplementary source of income at a time when farming in marginal areas seemed closer to extinction than ever before (Potter, 1998; Garrido and Monyano, 1996). Not surprisingly, measures to support extensive arable and livestock systems in marginal areas, often of high conservation importance, absorb the lion's share of money currently being channelled to southern states (Potter, 1998).

By October 1996, the European Commission had provided an estimated 1.4 billion ECU or 3.6% of the total farm budget to co-finance the range of new schemes introduced since 1992, and projected that it would invest a further 4.3 billion ECU over the next five years (Potter, 1998). It has been estimated that total expenditure, including national contributions, amounts to twice the EC contribution (House of Commons, 1997). The amount of green money is set to increase further in the future. The concept of 'paid stewardship' has been unanimously endorsed by the Agenda 2000 agreement of March 1999.

2.4. Environmental Cross Compliance

Meanwhile, Agenda 2000 has given Member States the opportunity to try out a new and different policy instrument – environmental cross compliance. At its most basic, cross compliance refers to the linking of environmental conditions to agricultural support payments (Baldock and Mitchell, 1995). Farmers who choose not to comply with a set of pre-determined basic environmental guidelines risk forgoing payments from EU income support schemes. Cross compliance has gained considerable ground in the political debate in Europe since the 1992 Maastricht Treaty of the European Union. Article 130r of the Treaty requires Member States to integrate “environmental protection requirements (...) into the definition and implementation of other community policies”. Cross compliance seems to be doing just that.

In policy terms, cross compliance takes a middle ground between command-and-control (CAC) regulation and an incentive-based policy. It contains elements of CAC in that certain prescriptions need to be followed to remain eligible for CAP support payments. On the other hand, there is no coercion, and farmers are free to opt out and voluntarily forgo part of or all their CAP support payments.

There seems to be a broad understanding across the EU that cross compliance should not go as far as to impose onerous and costly obligations on farmers (Baldock and Mitchell, 1995; Countryside Commission, 1993) which might be deemed to be an encroachment on farmers' property rights. Thus cross compliance essentially is an instrument to reduce negative externalities rather than one which seeks to generate positive externalities (environmental goods and services) at farmers' expense. This means that only moderate environmental conditions, e.g. of the code-of-good-practice type, will be politically feasible. Cross compliance conditions are more likely to be geared towards pollution control than to landscape and wildlife enhancement, which is usually perceived as a positive externality. Conditions are also more likely to be 'passive' constraints, requiring farmers to conserve the *status quo*, than requirements

to engage actively in environment-enhancing activities. Any attempt to generate large, visible environmental improvements by means of cross compliance would risk upsetting the general consensus that farmers should be paid extra for providing positive environmental goods and services.

At present, it looks unlikely that all Member States will actually implement cross compliance. Germany, for example, insists that its agri-environmental laws and regulations are among the most stringent and comprehensive across the EU. Hence there is no need for cross compliance. There is more enthusiasm for cross compliance in the UK (Weise, 1999) but, at the time of writing, no national cross compliance regulation has been drafted.

3. An economic critique of environmental contracting

Environmental contracting through management agreements clearly represents the dominant form of EU agri-environmental policy at the turn of the century. The general approach has been widely approved by economists as a means of creating a ‘quasi-market’ for environmental public goods in the countryside, thus correcting for the failure of conventional markets to provide public goods at economically efficient levels. In fact, agri-environmental contracting could be seen as a particular form of government procurement contracting – not very dissimilar from the contracting for military equipment or refuse collection services (Latacz-Lohmann and Van der Hamsvoort, 1998). Clearly, these ‘quasi-markets’ differ from textbook markets in a variety of ways, making them second-best solutions to the problem of public goods provision. One such difference is that it is not the direct user or beneficiary who exercises the choices concerning purchasing decisions. In fact, demand is revealed through the political process (rather than direct interaction between consumers and producers) and is centralised in a single body acting on behalf of consumers or beneficiaries.

While environmental contracting represents a significant innovation in policy terms, there are a variety of fundamental limits to this approach. These are discussed below.

3.1. Limits of environmental contracting

An analytical framework

Figure 1 shows a conceptual framework for analysing the sources of potential inefficiencies of agri-environmental contracts. It depicts environmental contracting as a game with asymmetric information involving an environmental agency (A), a farmer (F) and Nature (N). The game starts with N choosing F 's ‘type’. ‘Type’ refers to certain characteristics of F which may affect F 's ability and costs to perform the contracted-for task. This move of N is not observed by A . This information asymmetry means that A is unable to design tailor-made management agreements that would suit the circumstances of individual farmers. In the worst case, A can only offer uniform contracts across a group of heterogeneous farmers, which cannot be optimal.

Once F has accepted the contract, he or she will employ effort, i.e. make changes to existing farming practices or adopt the prescribed farming technology. Again, the level of effort (i.e. the farmer's actions with respect to the terms of the contract) is not perfectly observed by A . Finally, N introduces noise beyond F 's control in the relationship between effort and output. This will make it difficult for A to put the

blame on F if the environmental outcome of a particular contract is judged to be unsatisfactory.

The very nature of agri-environmental contracting may give rise to a number of incentive problems which are discussed below.

Adverse selection – targeting the wrong farmers

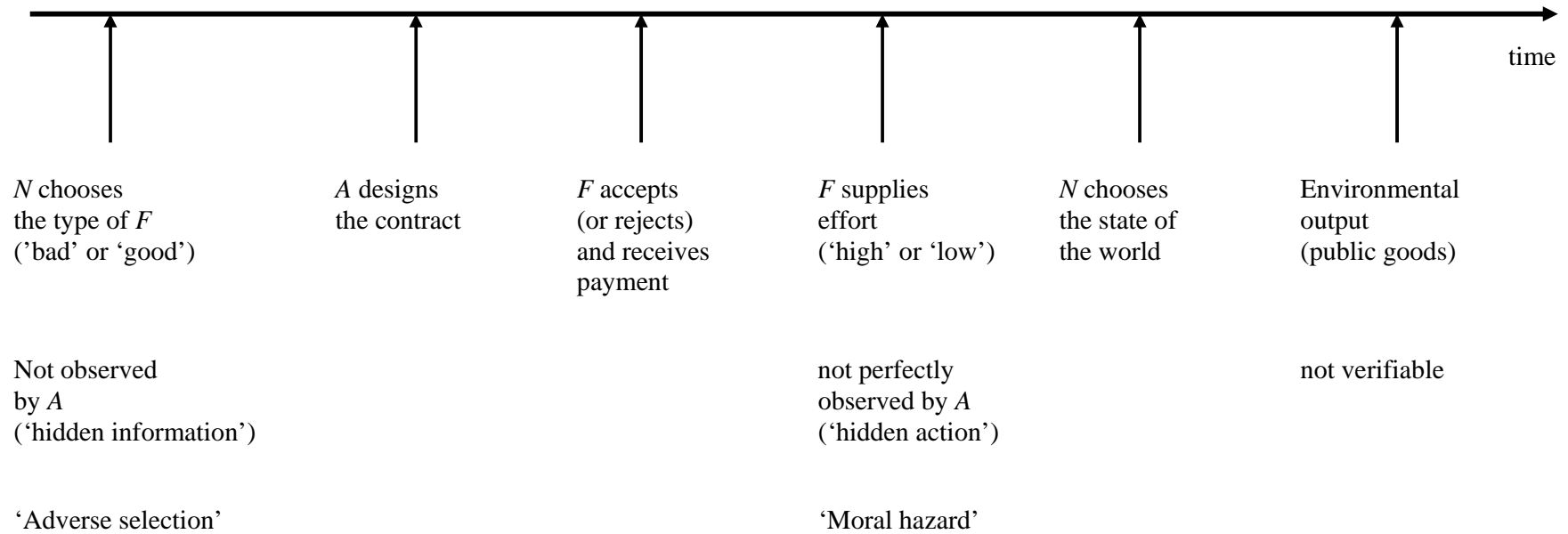
Adverse selection refers to situations where a ‘bad’ F has a greater incentive than a ‘good’ F to sign a conservation contract. ‘Bad’ and ‘good’ can be thought of, respectively, as ‘low’ and ‘high’ capability of providing high-quality environmental goods and services. A farmer who has already been using a low-input technology, for example, would have a greater incentive to sign up for an extensification programme than a farmer using a high-input technology because the former will have to make fewer and less severe changes to current farming practices. This will result in comparatively small additional environmental benefits and an overcompensation of the farmer’s opportunity costs. In fact, the low-intensity farmer will have an incentive to conceal information about his pre-contractual farming practices from the agency or, even worse, may disguise himself as a high-intensity farmer to qualify for higher payments (Latacz-Lohmann, 1998a; Fraser, 1995). This would reduce the environmental effectiveness of agri-environmental contracting.

A study by Osterburg and Nieberg (1999) provides evidence of adverse selection. The authors analysed the spatial distribution of environmental schemes uptake in Germany. They found that participation is highest in less favoured areas – regions with poorer soils, lower yields and a lower share of intensive crops, and a generally lower intensity of land use. On the other hand, they found that participating farms have reduced their land use intensities during the 5-year period of the study. In participating farms, the share of grassland increased, cereal yields decreased, and the input of inorganic fertilisers decreased, while the opposite trends were observed in the sample of non-participants. The authors conclude that the environmental effects of the schemes are likely to be limited to regions with fewer and less severe agri-environmental problems – the less favoured areas. On the positive side they found that the schemes have prevented the abandonment of marginal in those areas, a problem which has become of increasing concern.

Moral hazard – incentives to evade contract requirements

Assuming that participation in agri-environmental programmes imposes a burden on farmers, a profit-maximising landholder, as the residual claimant, will always have an incentive to default on aspects of a contract that incur a net cost and which are not readily observable by the agency. In the language of the model in Figure 1, if effort is costly and compliance monitoring is imperfect (i.e. asymmetric information), farmers will have an incentive to put in ‘low’ effort, i.e. to engage in a non-compliance gamble. Imperfect monitoring means that an individual who violates an agreement stands either a chance of succeeding with the violation, and hence having increased wealth, or a chance of being caught and punished. Obviously, the propensity to renege on agreements depends on a number of factors such as the farmer’s attitude towards risk and morality. Clearly, the need to be able to monitor management prescriptions limits the range of actions that can be controlled to those which are easy to observe.

Figure 1: Environmental contracting as a game with asymmetric information



While a number of studies (Choe and Fraser, 1999; Latacz-Lohmann, 1998b) suggest that moral hazard is a potential problem in theory, there is only anecdotal evidence of contract violations in the practice of conservation contracting. Land Use Consultants (1995) found that, on 24 per cent of sites visited, farmers participating in the Countryside Stewardship Scheme in England were compromising their contracts in some way. Hanf (1993) reported that approximately a third of the farmers participating in a German nature conservation scheme were not fulfilling their contractual obligations. In general, however, compliance records seem to be satisfactory (at least in the UK), suggesting that landholders are not operating in quite the rather narrow, self-interested way typically assumed in economic theory. Especially if contracts have standard conditions and if these conditions are familiar to all landholders within a region, the risk of non-compliance is likely to be low because there may be an element of self-policing among local landholders.

Lack of incentives for entrepreneurship

Hodge (1998) notes that there are no incentives for producers themselves to seek out new methods of reducing costs, to introduce new ideas, or to be willing to take risks for the provision of countryside goods. There is also hardly an incentive for local landholders to co-ordinate their actions across several holdings. Co-ordination, however, is required as, in many cases, the environmental objectives of the schemes relate to the landscape at a wider scale. For example, rising the water table in order to create habitats for certain species of wildlife requires a co-ordinated effort by all farmers in the relevant watershed. Present policies do not take account of such non-separabilities in supply functions among farmers because they concentrate on contracts between government agencies and *individual* farmers.

The root cause underlying these incentive problems can be seen from Figure 1 above. It is the fact that the final products, i.e. environmental goods and services in the countryside, are not directly contractable because of difficulties in measuring the state of the environment and quantifying changes. This means that the farmers' rewards cannot be made dependent on environmental *results* and, instead, must be linked to 'effort', i.e. management prescriptions. If environmental results were readily observable, as is the case in most other situations of government procurement contracting, farmers could be paid on the basis of the quantity and quality of environmental outputs. This being the case, the above incentive problems would largely disappear because higher effort, innovation and entrepreneurship would mean higher outputs and thus higher payments. Research into agri-environmental indicators may enhance the prospects for outcome-based contracts.

Uncertainty over property rights

Characteristic landscape and conservation values are generally only created over significant periods of time. This calls for relatively long-term contracts. However, once contracts expire, there can be no guarantee that the conservation assets will continue to be maintained. Farmers may have an incentive to return to more intensive forms of agricultural production at the expense of any conservation benefits that have been achieved. This raises questions about the ownership of the environmental capital generated through environmental contracts. The public may feel that they have a proprietary interest in the environmental assets to the extent that they have been created through the contribution of public funds, and that they should have a right to prevent damage to this environment in the future. Farmers may anticipate this

problem and so be reluctant to enter into environmental contracts in the first place, the concern being that restrictive designations might subsequently be introduced to protect long-term environmental gains (Hodge, 1998).

Transaction costs

The costs of operating environmental programmes includes both the incentive payments made to landholders and the costs to the agency of administering the programme. In economic terms, payments to landholders are transfers only, whereas scheme administration incurs real economic costs. These transaction costs stem largely from information asymmetries between landholders and public agencies and the heterogeneity of producers. The complexity of conservation management of different holdings with different natural and economic circumstances means that there are few standards or blueprints for plans, and there will always be a fair degree of idiosyncrasy.

Falconer and Whitby (1999) distinguish three categories of transaction costs in the operation of agri-environmental schemes. These are:

- Information costs
for surveying and designating areas of environmental sensitivity and designing appropriate management prescriptions;
- Contracting costs
including promotion of the scheme to farmers, negotiation between farmers and agency, and the administration of contracts;
- Policing costs
including costs of compliance monitoring and enforcement, environmental monitoring and scheme evaluation.

These costs tend to be disregarded in policy discussions and, where considered, it is generally assumed that they should simply be minimised.

Falconer and Whitby (1999) report the results of pan-European research into the administration costs of agri-environmental schemes, involving 37 case-study schemes in eight European Member States. Average annual administration costs ranged from 9 to 75 ECU per hectare (1 ECU \approx \$A 1.55) and from 140 to 2,446 ECU per participant. Administration costs as a proportion of total payments to landholders varied from 6% to 87%.

These transaction costs represent a significant element of public expenditure and may be sufficiently important to constrain the resources available for implementing agri-environmental policies, especially in times of public expenditure scrutiny and cut-back. The danger is that the development of administrative structures may not keep pace with the rapid increase in the scope, scale and complexity of agri-environmental schemes. The poorer members of the EU may simply not be able to mobilise the resources to fund the transaction costs of these policies. Insufficient scheme administration will inevitably result in reduced environmental effectiveness.

3.2. Trade implications of agri-environmental policy

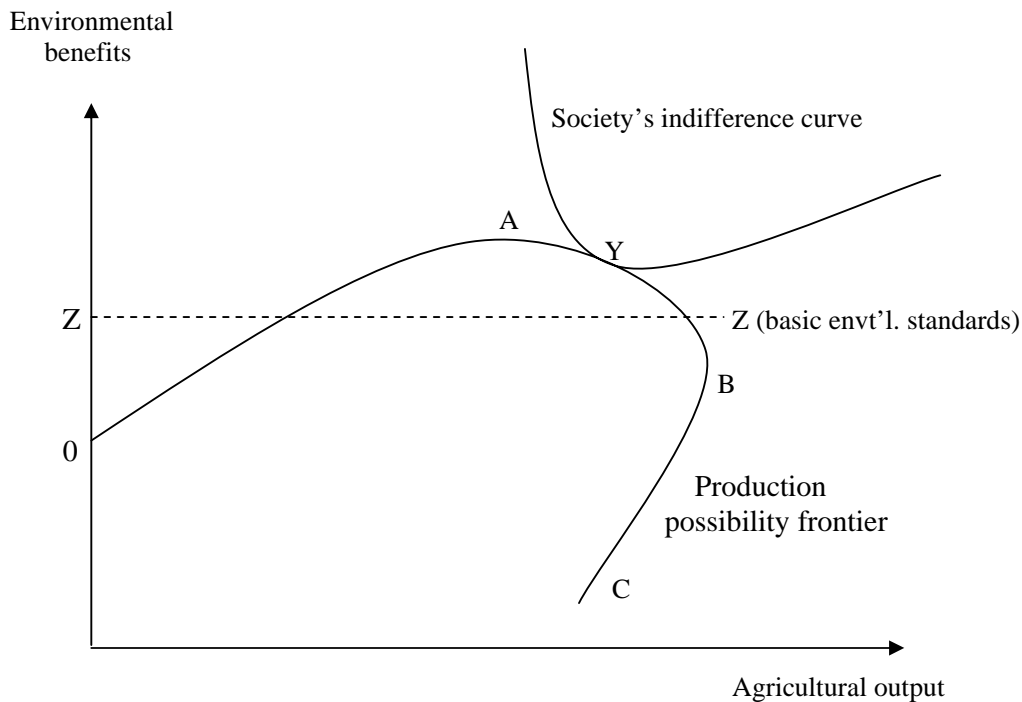
Although agri-environmental contracting is generally approved by economists as an adequate means of internalising externalities from agriculture (Buckwell *et al*, 1997;

Potter, 1998; Latacz-Lohmann, 1998a), concerns have been voiced by free-trade proponents that inadequate environmental schemes may affect production, may give rise to competition distortions and may inhibit trade flows. Those concerns are motivated by the fact that the quality of the rural environment and agricultural commodity output are joint products of farming, that is, changes in the quantity of one affect the production of the other.

Joint production and agri-environmental policy

Figure 1 is a graphical depiction of the concept of joint production. The figure shows a country's production possibilities for agricultural output (in some aggregate sense) and rural environmental benefits (again measured by some aggregate environmental benefit indicator). The production possibility frontier (PPF) shows all technically efficient combinations of agricultural and environmental 'outputs' that can be produced within a country's resource endowment. The PPF has been drawn to have three segments. Segment OA indicates that, at some low level of agricultural output, an expansion of agriculture would yield environmental benefits, e.g. in the form of enhanced landscapes quality or provision of semi-natural habitats. This complementary relationship between the two outputs has been interpreted as a positive externality of production agriculture, the provision of a public good, or simply the result of 'multi-functionality' of agriculture (Lindland, 1998; Runge, 1999).

Figure 1: Joint production possibilities for environmental benefits and agricultural commodities



In contrast, segment AB in Figure 1 represents a competitive relationship between the level of commodity output and the level of environmental quality. Environmental

quality declines with increasing agricultural production as a result of a decreasing share of natural (non-agricultural) land in the open landscape, increasing land use intensities, etc. The resulting negative joint products such as water and air pollution, soil erosion, habitat and biodiversity loss, have been interpreted as a negative externality of intensive agriculture, public 'bads' or a 'multi-disfunctionality' (Runge, 1999) of agriculture.

Segment BC, finally, shows 'inefficient technology choices' such as fertilizer application rates beyond levels that are internally efficient for producers. Such practices are assumed to result in severe environmental disruption, hence the positive slope of the PPF in this segment.

Assuming well-behaved consumer (citizen) preferences, the social optimum (point Y) must lie within segment AB. It is clear that, in the absence of agri-environmental policy, the social optimum is likely to be missed. From a theoretical point of view, it could be argued that, if the environment is unpriced, farmers would tend to overemphasise commodity output, leading to outcomes around point B in Figure 1, or point Z which indicates a minimum level of environmental quality as prescribed by command-and control regulation.

However, this argument holds true only if one assumes that farming is sufficiently attractive to be maintained everywhere. In fact, some countries (mainly those with less favourable conditions for agriculture) argue that trade liberalisation and the removal of agricultural subsidies would lead to land abandonment and thus movements downward along the PPF in segment OA.⁶

Productivist role of agri-environmental policy in marginal areas?

A number of trade-related problems arise from this analysis. The first relates to countries which claim that trade liberalisation would result in widespread land abandonment and marginalisation of agriculture. Agri-environmental policies in those countries would focus on preventing land abandonment and on keeping farmers on the ground in order to guarantee the continued delivery of environmental goods and services as joint products of farming. This may have significant effects on commodity output and could be regarded in the GATT as a productivist policy.

Converting implicit resource subsidies into explicit resource subsidies?

The second trade-related problem relates to countries which operate in segment AB to the right of the social optimum Y. In those countries, agri-environmental policy would focus on alleviating negative joint products (externalities) of the farming sector such as pollution or the impoverishment of the landscape through intensive farming methods. GATT negotiators may regard the existence of negative externalities as an unpriced input to production agriculture and thus as an implicit resource subsidy. Countries may face the argument that addressing negative externalities by means of positive, incentive-based policies amounts to turning an implicit subsidy into an explicit subsidy rather than internalising the externality (Sutton, 1989). This type of criticism would apply to programmes like the Nitrate Sensitive Areas Scheme in the UK, which offers farmers payments in return for accepting management constraints to reduce water pollution.

⁶ See for example Lindland (1998).

The potential conflict stems from the underlying allocation of property rights in the rural environment. The prevailing view in Europe is that farmers have the property right to alter the environment on their land, subject to abiding by some basic environmental standards (see line ZZ in Figure 1). As a consequence, farmers must be offered positive incentives to produce levels of environmental quality beyond the reference level prescribed by the standards. This may in many cases require payments to be made to farmers for what, on the face of it, may be seen as environmental clean-up along segment AB of the PPF in Figure 1. In other words, the view that property rights reside with landholders prevents the Polluter Pays Principle from being applied to address negative externalities.

Are organic conversion schemes productivist?

A further trade-related problem may arise from the support of organic farming, which has become widespread policy practice since the launch of the 1992 Agri-Environmental Regulation. British farmers who convert to organic farming currently receive up to £225 (\$A 560) per hectare in the first conversion year. In other EU countries, notably Germany, organic farmers continue to receive ‘conversion’ payments beyond the conversion period. Such policy practices may be seen in the GATT as trade distorting, not at least because they actively encourage the production of particular commodities, i.e. organically produced foods, which are increasingly being traded internationally.

Adverse selection in scheme design

Countryside management and extensification have proved highly elastic concepts, with environmental outputs that are often hard to measure and difficult to judge. This has been exploited by agriculture departments in some Member States to draw up schemes that do little more than subsidise existing good agricultural practice. Their green credentials serve as a cover for the pursuit of more traditional policy goals like income support, at the expense of environmental effectiveness. The state of Saxony in Germany, for example, offers farmers payments of DM 90 (\$A 70) for managing their land in accordance with the guidelines of Integrated Crop Management (ICM). Given that ICM is good agricultural practice and, in fact, common practice in Saxony, it is not surprising that almost all agricultural land has been enrolled in the scheme. The *Wissenschaftlicher Beirat* (the German government’s advisory body on environmental policy) has criticised such practices as income support in disguise as early as 1992, but little action seems to have been taken since. Potter (1998) sees this as a classic ‘implementation gap in policy’ (p. 155) which he attributes to too close an identity of interest between the agencies responsible for designing and operating the policy and its addressees, the farmers.

Trade-correcting agri-environmental policies?

Ongoing research by the author suggests that carefully designed agri-environmental policy may be classified as ‘trade-correcting’ (Latacz-Lohmann, 2000). A policy may be defined to be ‘trade-correcting’ if the benefits of internalising domestic externalities (be they positive or negative) outweigh the costs of diverting from free trade. My analysis leads to the conclusion that correcting for domestic externalities does not *always* result in net gains in global welfare, and that these gains (or losses) are not shared equally among trading partners. I argue that agri-environmental policy classified as ‘trade-correcting’ should be allowable under GATT rules.

4. European agri-environmental policy: the way ahead

Pressures on the CAP

The future development of Europe's rural environmental policy must be seen in the context of the wider CAP and its likely trajectory. There are three sets of forces which are driving the debate on CAP reform. These forces are, first, continued domestic dissatisfaction with the CAP, second, the prospect of further enlargement of the EU and, third, the impacts of the move towards more liberalised trade (Buckwell *et al*, 1997).

Politically, the most important *internal* opposition to the CAP now comes from environmentalists who have been lobbying, with growing success, for redirecting money from production grants into conservation schemes. Even so, with around 5% of the agricultural budget devoted to environmental measures, agri-environmental policy continues to be an 'accompanying measure' to a largely productivist CAP. The environmental criticisms of the CAP take an even greater force when they are combined with the ever-present pressures on the EU's agricultural budget, which makes up for more than 50% of the EU's overall budget.

The envisaged enlargement of the EU by Central and Eastern European Countries (CEECs) in the early years of the new century calls for an urgent reform of direct income support payments. It is EU policy that these payments will not be available to farmers in the accession states. This, however, would mean that the CAP no longer is a *common* policy (Buckwell, 1999).

Finally, it is well understood in Europe that the Uruguay Round Agreement on Agriculture (URAA) was just the first step in a process of agricultural trade liberalisation which will require further reductions in the level of agricultural support. Once the movement towards more liberalised trade will have regained its pre-Seattle pace, trade negotiators are likely to focus their attention on the EU's direct income support payments. These have been increased significantly since the 1992 CAP reform, and again in 1999, but they fail to meet the criteria for placement in the WTO's Green Box.

A revolutionary scenario: shifting the basis of support

These arguments call for a (further) re-orientation of the CAP in the medium-term future. It has been suggested that environmental payments will be one of the few politically sustainable forms of government support to agriculture in the years ahead and that agri-environmental policy is set to become a more dominant part of the rural policy scene (Potter, 1998; Buckwell *et al*, 1997).

Firstly, paying farmers for the provision of environmental goods and services is politically more defensible than paying farmers just because they are farmers. Such a shift of policy would thus address much of the internal criticisms levelled at the present CAP.

Secondly, carefully designed agri-environmental schemes are compatible with the WTO's Green Box and thus are likely to be immune from attacks in future trade rounds.

Thirdly, a green CAP would solve the problems resulting from the accession of CEECs. While it would be difficult to justify an extension of the present CAP to accession states, there is no reason to deny them payments for conserving and developing their environmental capital. In fact, West European environmentalists have already spotted a number of 'high natural value farming systems' in CEECs and lobby for their conservation (Baldock et al, 1997). There is also a perceived backlog of environmental cleanup. Documented evidence of pollution and soil contamination from the communist era should provide ample justification for channelling agri-environmental funds to CEECs.

Dangers arising from a green CAP

The movement towards a green CAP is not without risks. Firstly, important questions remain about the willingness and ability of farmers to take on the role of environmental stewards that is being prepared for them. At present, it looks as though farmers in the South would favour a more productivist policy which would help bring their agriculture sectors on an equal footing, in terms of productivity, with Northern Member States. Similarly, opposition to a green CAP is likely to come from farmers in CEECs who expect agricultural policy to support them in mastering the post-communist crisis of agriculture. It seems likely that the phase of agricultural modernisation and intensification will have to be passed through before farmers in those countries will begin to show serious interest in and concern for the environment.

Secondly, if support is to be based increasingly on environmental performance, a vast increase in the administrative costs of the CAP may be expected. Given the political difficulties that usually go along with attempts to inflate the existing body of public administrators and bureaucrats, it looks unlikely that scheme administration will be resourced adequately. Generally low levels of environmental effectiveness, however, may lead to questions as to the credibility and WTO compatibility of a support system that pledges to pay farmers for the provision of environmental goods and services.

Thirdly, if traditional channels of agricultural support are to be severed, policy makers, especially those who are not fully committed to a green approach, may face strong incentives to use the green credentials of agri-environmental schemes as a shield for hidden income support – see the argument of 'adverse selection in scheme design' above.

Finally, although agri-environmental payments currently enjoy the status of Green Box instruments, there is no guarantee that this will continue to be the case in perpetuity. In fact, agri-environmental support is likely to come under close scrutiny of trade negotiators if it is to become an enduring programme involving much of the budgetary expenditure on agriculture. Some of the trade-related arguments have been reviewed above.

An evolutionary scenario: environmental cross compliance

Reference was made earlier to environmental cross compliance – the latest addition to the suite of agri-environmental instruments used in the EU. Cross compliance works on the presumption that the present system of direct income support will continue to exist. A number of commentators have described cross compliance as a rather opportunistic attempt to try to make direct income payments look more respectable, rather than dealing frontally with the problems of helping farmers supply environmental and landscape services (Latacz-Lohmann, 1999; Buckwell, 1999;

Latacz-Lohmann and Buckwell, 1998). Cross compliance may be seen to suggest that the basis of the current direct payments is environmental, thus detracting the public's eye from their true purpose, namely to compensate farmers for reduced price support.

Even though cross compliance may prove a short-term cure to some of the domestic disquiet over the present CAP, it is unlikely, in the face of the other pressures, to make the present CAP politically more sustainable. Cross compliance thus involves the risk of tying environmental safeguards to a system of payments with a limited shelf life. Also, cross compliance suggests that farmers are paid to observe mandatory environmental requirements. This contravenes the Polluter Pays Principle which is an explicit part of the consolidated Treaty of the EU.

Overall it seems that the recent agreement to introduce cross compliance into the CAP has been driven more by political expediency than by economic rationale or genuine environmental concern. The reluctance of many Member States to put cross compliance into practice suggests that there is rather little enthusiasm for this approach. There seems to be a growing understanding that, if we want farmers to supply environmental goods and services, purpose-built schemes should be used to arrange their delivery.

5. Conclusions

This paper has argued that contracting with farmers for the provision of environmental goods and services has become the dominant instrument of EU agri-environmental policy over the past 15 years. The contracting approach, which has integrated environmental concerns in the heart of the CAP, is complemented with command-and-control regulation and environmental cross compliance. Regulation and cross compliance are intended to guarantee farmers' compliance with some basic environmental standards. The implicit property rights assumption behind this is that landholders have the right to carry out the most profit-maximising activity on their land as long as the environmental impacts stay within the limits prescribed by the law. If society wishes environmental improvements beyond this baseline, farmers must be paid to produce them.

While agri-environmental schemes may be seen to represent 'quasi-markets' for public goods which correct for a market failure, their environmental effectiveness is often undermined by information asymmetries between farmers and government agencies. The problem is compounded by the fact that some agri-environmental schemes are poorly targeted and pursue more traditional goals of agricultural policy such as income support and supply control as hidden objectives.

Agri-environmental programmes may either tend to reduce or to increase agricultural output, depending on the technical relationships between the two categories of output. This may give rise to conflicts in future trade talks. The paper argues that agri-environmental payments classified as 'trade-correcting' should continue to enjoy Green Box status and should not be included within the Aggregate Measure of Support (AMS).

Domestic dissatisfaction with the present CAP, the prospect of EU enlargement and the movement towards more liberalised trade suggest that 'green' payments may become one of the few politically sustainable forms of support to agriculture in the years ahead. European policy makers may face strong incentives to shift funds from Blue Box productivist support to Green Box environmental support for the

conservation of the ‘European garden’. Such a move would invite scrutiny, both domestically and internationally, of the payments and the conservation benefits that they pledge to deliver.

EU agri-environmental policies are at a relatively early stage in their development. The idea of government contracting to enhance the quality of the rural environment is a novel one, and there is much to learn about the best methods. In order to meet the challenges that lie ahead, agri-environmental policy must be developed further. Improvements are possible in the following areas:

Increasing cost-effectiveness and promoting efficiency

This could involve a combination of measures. One would be to place greater emphasis on the spatial targeting of schemes. Agri-environmental schemes should be restricted to environmentally sensitive areas where the expected benefits are highest. There is no case in offering environmental contracts in areas where, due to the natural conditions, the expected benefits are small or where the benefits are not valued by the public.

Another measure would be to offer conservation contracts on the basis of competitive bidding (rather than offering flat-rate payments to all farmers). Similar to the approach of the Conservation Reserve Program in the US, farmers would have to tender bids to the environmental agency stating the amount of payment they would require for participation in the scheme. Latacz-Lohmann and Van der Hamvoort (1997) have shown that competitive bidding could reduce the problem of overcompensation of farmers and significantly enhance the effectiveness of public spending for environmental improvements.

Clearly, both measures suggested above would involve high administrative effort. It is therefore important that sufficient resources be made available for the administration of agri-environmental schemes. Hodge (1998) suggests that some element of competition be introduced into the administration of the schemes, for example by putting the task out to tender.

Finally, there may be a case for greater EU scrutiny of scheme implementation at Member State level in order to prevent problems of ‘adverse selection in scheme design’. The review process should ensure, among other things, that only practices that go beyond good agricultural practice are supported. More generally, a checklist of ‘good practice in policy implementation’ could be developed. This would add significantly to the credibility of the policy and prevent concern about distortion of the market and unfair competition between farmers receiving different levels of aid.

‘GATT proofing’ agri-environmental policy

As noted above, there is a case for ‘trade-correcting’ agri-environmental policies. Clearly, the first step in making agri-environmental support immune to attacks in future trade rounds is to demonstrate their cost effectiveness and environmental efficiency. However, this may not be sufficient. The critical issue seems to be that of strategic behaviour of governments. If ‘subjective’ environmental benefits are widely used to justify Green Box support, there is a danger of institutionalising protectionist environmental policies. This raises the question of how countries can provide credible evidence that their agri-environmental policies are genuine and not green-label protectionism. A framework will have to be developed and agreed internationally for

deciding what policies qualify for placement in the Green Box. The present Green Box criteria seem to be too narrow.

One of the big challenges facing EU trade negotiators will be to try to reconcile different views on, and perceptions of, agriculture and its role for rural environments and rural communities. The 'Old World' view of a 'multifunctional' agriculture fulfilling the social functions of maintaining the cultural landscape, providing amenity goods, sustaining rural communities, and safeguarding rural environmental capital may sound a rather alien concept to 'New World' trade negotiators. The rural environment in Europe is a 'lived-in' environment and thus an amenity of everyday life for the vast, non-agricultural, majority of the population. Maintaining the flow of amenity benefits may require some support to agriculture. This may conflict with views in Australia and the US where agriculture is a mono-functional industry and where the main concern of agri-environmental policy is to protect the rural environment as a productive resource of an internationally competitive agricultural sector.

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