THE ENVIRONMENTAL COSTS OF THE CAP

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Paper presented to the 35th Annual Conference of the Australian Agricultural Economics Society, University of New England, Armidale, February 11-14, 1991

SUMMARY

The economic costs of the CAP in terms of deadweight losses and transfers from consumers and taxpayers have been widely assessed and discussed. However, while the environmental costs associated with the CAP are now widely recognised, measures to avoid or reduce these have only been adopted during the past few years.

The main forms of environmental cost resulting from the CAP arise from increased use of pesticides, increased use of artificial and in some cases natural fertilisers, loss of wildlife habitat, reduction in species variety, and drying up and degradation of wetlands. Major consequences of these include:

- *reductions in wildlife populations and species variety;*
- *costs to other forms of agriculture, including bee-keeping and crops negatively affected by pesticides;*
- *reductions in the quality of water used for drinking in many areas, with consequent health risks and costs for treatment or replacement;*
- *loss of amenity value of the countryside and of wetlands.*

In order to reduce and reverse the environmental damage resulting from agricultural price support and structural policies, programmes have been introduced at the EC and national levels which pay farmers to set aside land, continue to farm in a traditional manner, use no pesticides, etc.

However, these policy measures are a relatively costly means of achieving environmental objectives. Reductions in the level of price support would be a more efficient means of reducing or reversing environmental damage. Current proposals for policy change would give a larger role to direct income supports.

Until relatively recent years environmental considerations were given a low weighting in agricultural policy arrangements, due mainly to the influence of agricultural lobbies on the governing political parties of the member states. While there have been significant changes to programmes to make them more environmentally friendly, the reduced influence of the 'Greens' party in Germany could reduce pressures for further changes.

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While the economic costs of the CAP have been the subject of estimation and discussion for the past three decades, discussion and analysis of the environmental costs of the CAP has only developed in relatively recent years. This paper examines the nature of the environmental damage resulting from the CAP, some of the costs involved, and some reasons for the relatively low level of consideration which has been given to environmental effects in EC agricultural policy.

Transfers from consumers and taxpayers to EC producers under the CAP have been estimated at over US $ 70 billion per year, with the net economic loss involved being estimated at up to US $ 15 billion, or up to 2.7 per cent of EC GDP by 1995. These subsidies were estimated to total US $53 billion in 1989, equivalent to 38 per cent of total output (OECD 1990, cited in The Economist (1990c, p. 75), with the average for the four years 1986-89 being 45 per cent. The level of subsidy was estimated by the United States' Department of Agriculture to be 52 per cent for 13 major commodities in 1987, and 55 per cent for soft wheat (USDA 1990). Hence from over a third to over a half of the value of agricultural production involved a loss to society, independently of any environmental costs involved, since it arose from subsidies and not the value of products at world market prices.

These costs arise because while the major goal of the CAP is income support for producers, this is achieved mainly by supporting prices at levels prices substantially above world market levels. The production of the additional output stimulated by subsidies also involves environmental costs.

Environmental costs

The environmental damage resulting from the CAP has now been recognised and commented on by a range of authorities and individuals. Publications by the OECD (1989), the World Wildlife Fund (Baldock 1989, von Meyer 1988, WWF 1988 and 1989), the British Association of Nature Conservationists (Bowers 1990), the Catholic Institute

for International Relations (CIIR 1988), and Agra Europe (1988), have dealt with various aspects of the subject.

The identification and assessment of environmental damage associated with the CAP is important because, as Viatte (1990, p. 299) states, 'We need to know more about how we can evaluate environmental benefits and costs in a way in which we can monitor agricultural policy reform'.

Environmental costs have arisen from the degradation of natural resources, loss of amenity value, damage to human health, and damage to the countryside and wildlife, including loss of species.

Producers have increased yields and output as a response to relatively high support prices and in order to take advantage of technological changes. Assistance has been provided through structural policy support schemes to modernise farms and undertake capital investments in land drainage, facilities for intensive livestock production, etc. Over 230 000 farms in the EC 10 had been approved for modernisation assistance by 1985 (WWF 1988). The incentives to increase output and undertake capital investments, and the consequent environmental costs, have been particularly large in member states which had less generous or less comprehensive systems of agricultural support prior to their accession to the EC than those provided by the CAP and other EC policies.

Pesticides

Pesticides include insecticides, herbicides and fungicides. The devastating effects of early pesticides on bird and fish populations and other wildlife were documented by Rachel Carson in 'Silent Spring' (Carson 1962) and by Hall (1987). As indicated in 'Silent Spring Revisited' (Marco, Hollingworth and Durham 1987), a follow-up to Carson's book, early insecticides such as DDT and dieldrin were replaced by others less toxic to wildlife, but in some cases with other undesirable properties. For example, carbamate pesticides were more water soluble than earlier pesticides and more likely to result in ground water contamination. Since then there have been considerable developments in the use of pyrethroids, in integrated pest management systems, biological controls, and the recently developed insect growth regulators (IGRs), greatly lessening the impact of

pesticides on wildlife populations. Genetic engineering of plants also provides opportunities to make them resistant to insect pests and hence eliminate the need for pesticides.

As Carson (1962) indicated, the earlier use of pesticides such as DDT and dieldrin had a substantial negative effect on wildlife populations, and the persistence of these in the soil and their concentration in the food chain has meant that their effects did not cease when these insecticides were withdrawn from use.

As shown in Table 1, the large EC member states are all substantial users of herbicides and insecticides. The use of fungicides is very substantial in France and the Southern European member states, presumably because of their application in viticulture. Pesticide use increased by 69 per cent in Denmark and 30 per cent in Germany between 1975 and 1989 (OECD 1989).

Table 1: **Pesticide consumption in some EC countries** (Tonnes of active ingredients)

Country	Year	Pesticides	Insecticides	Fungicides	Herbicides	Other
Denmark	1984	8018	437	2407	4702	473
France	1982	93400	5500	56700	31200	-
Germany[a]	1985	30053	1566	8491	17390	2606
Greece[b]	1976	29940	2695	26348	897	-
Ireland	1980	1470	185	210	1050	25
Italy	1983	155946	33188	82004	26056	14699
Netherlands	1985	19938	634	4363	3977	10964
Portugal	1982	14007	440	12506	955	106
UK[c]	1982	40300	1480	4780	28100	5900
US	1981	334000	41000	25000	268000	-

a Provisional data. b Data refer to the late 1980s. c Great Britain only: data refer to the early 1980s.
Note: no data given for Belgium, Luxembourg or Spain

Source: OECD (1989), p. 35

Organochlorine pesticides such as aldrin used as seed dressings have been associated with harm to bird populations. For example in the UK they are reported to have harmed yellowhammers, and there was considered to be a risk of these birds disappearing from the UK (New Scientist 1990).

One side-effect of insecticide use is the poisoning of bees through spray drift and contamination of the nectar which they collect from flowers. In the United States the cost of this has been estimated at US $135 million, and is considered to have increased substantially (Pimental).

Herbicides

The use of herbicides such as 2,4-D and the earlier 2,4,5-T has reduced the incidence of weeds in crops. From the farmer's point of view it allows contamination of grain through the inclusion of foreign seeds to be avoided. However, their use reduces the number of plant species found in fields and specific areas, and has banished the poppy and cornflower dotted fields of earlier generations in Europe.

Herbicides have been associated with the decline in small birds in the British countryside. They destroy the arable weeds whose seeds formerly sustained large flocks of larks, linnets, chaffinches, goldfinches, greenfinches, reed buntings, yellowhammers and other finches. Flocks of these are rarely seen there now, though numbers of some larger bird species, for example carrion crow and magpie, have increased (Pain 1990).

Fertilisers and water quality degradation

The increased application of artificial fertilisers, and the leaching of nitrates from slurry from intensive livestock production, have led to serious problems of water quality deterioration. The high levels of concentration of intensive livestock production in parts of the Netherlands, Denmark and France have led to have led to national legislation seeking to control the problem through such means as restrictions on holding size or expansion, restrictions on manure disposal, and requirements for holding tanks and for ploughing in within a short period after spreading.

Nitrates in water supplies can be converted into carcinogenic compounds harmful to babies and pregnant women, as well as increasing the salinity of the water to a level where it may no longer be drinkable. EC guidelines are for 25 mg of NO_3 per litre of water, with a maximum permissible level of 50 mg per litre, for drinking water supplies (Rainelli 1989, p. 147).

In West Germany in 1979 126 local water authorities were tapping sources which exceeded permissible NO_3 levels, with seven tapping water for which the level exceeded 90 mg/litre. By 1983 the number tapping water exceeding the maximum permissible level had risen to 807, and the number exceeding 90 mg/litre had risen to 57. Nitrate levels in drinking water were reported to be increasing throughout Europe. The problem is expected to be a long-lived one even if action is taken to restrict leaching from artificial fertilisers and from slurry, since there is often a time lag of 10-years between the nitrates being deposited in the topsoil and washed out, and their leaching into the groundwater (von Meyer 1988).

The problem has becor..e acute in certain areas at times of heavy rain, which flushes the nitrates into underground water tables and rivers. After heavy rain in the North-West of France in the first ten days of January 1991, the tap water was declared unsafe for pregnant women and babies in hundreds of rural areas, with nitrate levels rising above 50 mg/litre and reaching over 100 mg/litre in many areas. As a result consumers in some areas had to meet the cost of buying mineral water, while in others authorities supplied clean water in tanks, or were able to blend their supplies to achieve an acceptable level of nitrates (New Scientist 1991).

Loss of wildlife habitat and amenity value

The CAP has led to a loss of wildlife habitat and reduced amenity value of the countryside through its encouragement of the conversion of grazing land and wetland to arable land, the loss of hedgerows and increased monoculture, the cutting down of olive groves, and the lowering of water tables and drying of wetlands from increased irrigation.

In the United Kingdom there has been a trend towards the conversion of grazing land to arable land (NEDO 1987). This has resulted in a reduction in habitat for many species. The case of the Large Blue butterfly is an example of this. Around half of the British grassland which previously supported Large Blues has been ploughed up for arable land, or converted to forestry. The Large Blue disappeared from Britain, but attempts have now been made to reintroduce it (The Economist 1989).

Increased monoculture with arable crops such as wheat and oilseed rape has reduced the diversity of the agricultural landscape. This has resulted in reduced populations of lapwings, barn owls and green woodpeckers (New Scientist 1990). The hedgerows which previously surrounded and separated fields in many areas of the EC have been partly removed to allow for greater use of machinery, herbicides and pesticides, and facilitate a move from mixed agriculture to monocultures. In one part of Germany 36 per cent of hedgerows were reported to have been removed between 1954 and 1971, with 50 per cent of the hedgerows remaining being removed in the following eight years (OECD 1989, p. 36)

The loss of hedgerows means a loss of breeding and feeding habitat and shelter for birds, small mammals and insects. It changes the traditional appearance of the European countryside, with its patchwork of fields and hedgerows of trees, bushes and flowers. There is a loss of the amenity value of such sights as hawthorn hedges in bloom in spring, wild roses in June, red holly berries on hedges in winter. Many paths and rights-of-way were located beside hedgerows, and have been ploughed up along with them, curtailing the access to the countryside available to urban ramblers. Features of archaeological and historical interest such as ancient trackways and ditches have also often disappeared in the course of the landscape modification required to create large open fields for monocultures (WWF 1988).

The rate of species extinction has increased as a result of a combination of the changes discussed above, pesticide use, the damage to wetlands discussed in the next section, and other factors. In the intensive crop production area of Lower Saxony (Niedersachsen) in Germany, only 14 species became extinct between 1870 and 1950, but 131 between 1950 and 1970, with 85 per cent of these latter losses being attributed to agricultural practices (OECD 1989, p. 36).

Wetlands

Stavins (1990) notes that estimates of the annual environmental benefits of wetlands in the United States range from US $25 per acre (for fish and wildlife habitat in northern Louisiana) to over US $8000 per acre (water quality enhancement in central Georgia). The losses in terms of public benefits from the draining of wetlands and their conversion to agricultural land include water quality effects, floodwater storage, erosion control, groundwater recharge, fish and wildlife habitat, and recreational opportunities.

The CAP and related programmes have caused considerable damage to wetland areas in several member states. Field drainage is being extended at the rate of some 140 000 ha/year in France, 120 000 ha/year in the UK, 30 000 ha/year in the Irish Republic, and 25 000 ha/year in the Netherlands. Forty seven per cent of those European bird species which are endangered or vulnerable are threatened by the destruction of wetlands (WWF 1989).

The damage arises from a number of causes. The extension of drainage in areas such as the Halvergate marshes of East Anglia is used to allow intensive agriculture to be introduced onto low yielding land. In the UK high CAP support prices, especially for cereals, have been the incentive for the draining and ploughing of areas of marshland and wet grassland in order to convert them to arable crop production (Baldock 1988).

In Mediterranean Europe CAP supports have encouraged the spread of irrigation and intensive crops, replacing more ecologically sound land uses. In Spain the Daimiel and Donana Parks, major wetland areas which have been registered in the international RAMSAR convention, have been affected by the depletion of aquifers and the lowering of the water table for irrigation and other purposes. The increasingly intensive farming of agricultural land around the Donana park has also resulted in the concentration of pesticide and fertiliser runoff in the water (Ruiz Perez 1988).

At Mikra Prespa on the Greek side of Lake Prespa, which is home to diverse waterfowl including rare species, environmental damage has resulted both from increased agricultural activities supported by CAP prices, and also fish farming supported by the EC's Integrated Mediterranean Programme. Water diverted for irrigation has resulted in the reduction of the lake's surface area and the wildlife supported. Fertiliser runoff has

resulted in a growth in plants and a reduction in the water surface area. Runoff of agricultural chemicals has greatly reduced the productivity of the lake (WWF 1989).

In Germany and the UK, most extensive wetlands have already been drained. Around half the wetlands in France are considered to be affected by drainage or at some risk, and those in Greece are threatened (Baldock 1988, p. 4). The losses of public benefits from wetland conversion in the European Community due to the CAP are considered to be substantial, with the additional losses from the extension of wetland conversion to be worth between ten and several hundred million ECUs each year on the basis of estimates given by Stavins (1990) for the United States.

Policy measures

While the EC has now adopted a number of schemes aimed at reducing the environmental damage from agriculture, they are a relatively inefficient and costly means of achieving such a reduction. These schemes include special subsidies for producers who extensify production, use only organic inputs, undertake specific nature conservation measures, or set aside part of their productive area.

Many of the EC environmental schemes are to some extent optional for member states, or differ in their application. Member states have also introduced their own measures to reduce environmental damage. For example, in the Netherlands restrictions have been placed on the expansion of intensive livestock holdings, and the spreading of manure.

In the UK payments are being made to farmers to continue livestock farming and not start cropping on 6 000 ha of the Norfolk and Suffolk Broads under the 1987 environmentally sensitive area scheme (O'Riordan 1989, p. 174). Payments are also made to producers in 'nitrate sensitive areas' to reduce their use of nitrate fertilisers, cease to use them, or convert their land area to unfertilised, ungrazed heath (Financial Times 1989).

In Germany national legislation has banned the use of certain agricultural chemicals, and requires farmers to take measures such as the sowing of a green manure crop on cereal stubble in order to reduce leaching of nitrogen (Agra Europe 1989). Assistance is given to German farmers who either do not use pesticides at all, or who leave crop edges

unsprayed, do not crop the edges of fields, reduce the level of fertiliser applied, or use meadows during main insect hatching periods (OECD 1989, p. 31). Article 19 of EC Regulation 797/85 allowed member states to introduce national aid schemes such as these to support farmers who continue traditional practices or adopt new environmentally sensitive techniques (WWF 1988, p. 29).

At the Community level a number of programmes have been introduced which have some relationship to environmental goals. Community legislation for a set-aside program was passed in 1988. The scheme relies upon partial financing by member states and varies between these in the details of its operation. It allows joint EC/national subsidies to be paid to farmers who set aside a a tenth of their crop. There are requirements to prevent land being left uncovered and at risk of erosion (Field, Hearn and Kirby 1989). The major aim of the scheme is to reduce cereal production, but it could have environmental benefits if it leads to a reduction in land used for arable farming and the quantity of pesticides and artificial fertilisers used. However, in practice it appears likely to have only a very limited effect: only 1.4 per cent of land under cereals in the Community was set aside in 1988 (Manegold 1989).

An extensification scheme also provides for EC support for national schemes which encourage less intensive production reduce the quantity of output. The output reduction must be of at least 20 per cent for the products contracted for (Manegold 1989).

The 1985 EC Directive on Environmental Assessment attempted to introduce common decision making procedures throughout the Community for land use authorisations, allowing environmental considerations to be taken into account. However, the effects of the Directive on agricultural intensification have been limited both by the eventual terms agreed upon, and their application at the member state level (Sheate and Macrory 1989).

Alternative solutions

A number of means exist for reducing and reversing environmental damage. The simplest and least costly would be to reduce agricultural price supports, especially for

crops and areas identified with the highest levels of environmental damage, and use direct income supports to achieve desired transfers.

Reform proposals being prepared by the EC Commission for consideration by the Council of Ministers include a move towards lower support prices, greater direct income support for small farmers, further set aside arrangements, and grants for environmentally friendly cultivation and less use of chemical fertilisers and pesticides on their crops (The Economist 1991).

Estimating the costs

Attempts to assess the extent of the environmental damage associated with the CAP face a number of difficulties. In the absence of the CAP, EC agriculture would still have received substantial support, especially in the wealthier member states such as Germany, France and the Netherlands. The modernisation of agriculture would inevitably have led to substantial use of pesticides and artificial fertilisers, increased irrigation, a shift to monoculture, and the loss of some traditional landscape features. However, even the wealthier member states would have been unlikely to provide support at CAP levels if they had had to meet the cost directly themselves.

Some of the relevant environmental costs can be obtained, for example the costs of clearing up water quality deterioration. Other costs are much more difficult to estimate, for example the human health impacts. The lost amenity value involved in a less attractive countryside, less wildlife, fewer species, and the conversion of grazing land to arable land, is more difficult to estimate. It would require estimation of the option and existence values of wildlife, and survey work and data gathering for the application of the hedonic pricing, travel cost and contingency valuation methods discussed in Pearce, Markandya and Barbier (1989).

Reasons for the low weighting of environmental considerations in policy formation

The low weighting given to environmental objectives in the CAP system reflects a long neglect of such objectives. When the original aims of the CAP were set out in the Treaty of Rome, which established the then European Economic Community in 1958, no specific mention or provision was made for environmental goals (Clinton Davis 1988). In

December 1985 the Community agreed to adopt the Single European Act (SEA), which made environmental protection requirements a necessary component of EC policies (Avery 1988).

Overall, there has been a failure to change agricultural and other policies in an efficient manner to avoid or reverse environmental damage. However, the situation has improved somewhat on that described by David Baldock (CIIR 1988, p. 5):

> At present, the CAP remains largely impervious to environmental pressures, in much the same way as it does to consumer pressures. While the new climate of restraint and supply controls provides some opportunities for environmental reform, these are unlikely to be realised on any scale until there is a more fundamental political commitment to environmental priorities and to reducing the power of the agricultural lobby in the key Member States.

The main reason for the Community's failure to make the CAP more environmentally friendly at an earlier stage was the influence of agricultural interests on decision making at the Community and member state level. The individual and collective interests of the 'green' lobby, consumers and urban dwellers have achieved only relatively minor changes in policy. The major parties in government in the EC member states, and their partners in governing coalitions, have been the driving forces behind the policies adopted in the EC Council of Ministers. Of especial influence has been the German situation, where the majority party (the Christian Democratic Union) has required the support of a smaller party with a strong interest in agriculture (the Christian Social Union) in order to govern. As the main net contributor to the EC budget, Germany has been in a strong position to influence the nature of policies adopted.

It is Germany which has also had the best organised and represented environmental lobby in the form of the 'Greens'. However, in the December 1990 elections which followed reunification the former West German 'Greens' failed to obtain the 5 per cent of the vote necessary obtain seats in the *Bundestag*. Hence all 42 members lost their seats (The Economist 1990b). In the previous election in 1987, they had obtained 8.3 per cent of the total West German vote. The East German Alliance '90/Greens (east) coalition obtained eight seats, but only because for this election a specific limit of 5 per cent of the vote was applied for the east as a separate voting area (The Economist 1990a). Hence it is unlikely that the 'Greens' will be able to maintain their influence in the future.

The major national parties in the EC have only recently begun to adopt policy platforms which place a significant emphasis on environmental issues in the overall policy mix. Attempts are now being made to integrate environmental objectives more closely with agricultural policies, but major changes will be required just to prevent further environmental damage.

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