

## Farming and the Environnement: prospects and proposals

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## Table of Contents

Farming and Externalities	p. 1
Agro-environnemental Schemes (AeS)	p. 2
Polluter-pays Principle and Taxation	p. 5
Provision of Amenities and compensation	p. 7
Guidelines for Future Policy	p. 8

## Farming and Externalities

**F**armers in the EU have been highly successful at increasing food production since the 1950s. But this remarkable achievement has also brought costly environmental, health and social problems. As most economic activities, farming affects the environment, either through the use of natural resources as an input or by using the environment as a sink for pollution. Agriculture is a widespread source of pollution through nitrates from inorganic fertilizers and animal wastes, and pesticide use but farming also generates positive environmental outcomes. When negative and positive externalities are not included in prices they distort the market since there is an overprovision of negative ones and an under-provision of positive ones.

Current policy combines regulation, cross-compliance and voluntary-payment schemes to attain these objectives. Agro-environmental schemes (AESs) can be viewed as a means to supplement compliance mechanisms which tie the receipt of benefits from unrelated programmes to some level of environmental performance. The extensive use of payments reflects that farmers require compensation for any diminution of their rights to natural resource use. Compensation takes into account profit foregone and the need to provide an incentive to change farming practices. Do they significantly impact commodity supply leading to trade distortions or not still

remains an open question.

Compensations may be justified on conventional economic grounds once the positive externalities generated by agriculture are considered. However, they are only justified if practices or services are requested which farmers do not apply under non-distorted conditions and for which they are not compensated through the sale of their products. An example of such service is the development and maintenance of a buffer strip along the fields. Otherwise, some positive externalities are complementary with production, more output is associated with higher environmental benefits. Remuneration can be achieved by selling quality products or services, with the price being influenced by environmentally friendly practices and more generally by the environment in which they are produced. There are established experiences in this field with AOCs, organic food and green tourism.

### **Agro-environmental schemes (AESs)**

AESs were introduced in the EU in the 1980s as a separate policy domain accompanying the CAP and with clear links to natural conservation, environmental protection and landscape management. The general philosophy has drastically changed since the early environmentally sensitive area schemes which targeted well-defined and limited objectives. Thus, AESs are henceforth embedded within an ambitious rural development policy which aims multiple objectives including social, environmental and territorial aspects. This shift has resulted into a large number of programmes based on a collection of measures and no clear strategy. While there are hierarchical systems in which a compulsory menu of prescriptions (close to cross-compliance) is combined with voluntary schemes, the leading approach relies on zoning, according to holding location farmers can apply to one or several schemes or measures. The combination of measures offered to most farmers with different types of zoning lead to very complex mechanisms.

Measures offered to farmers can be categorised as follows:

- Maintenance measures encompass the promotion of existing practices that are not harmful for the environment. They could also be named ‘status quo’ measures. Almost all AESs include such measures.
- Externality reduction measures include measures aiming at improving the environment through a reduction of adverse effects of farming.
- Public good provision measures address the promotion of positive externalities of agricultural practices.

Most countries have experienced AESs targeting the reduction of negative externalities (especially water pollution). In contrast there are a few programmes focusing an increase in positive externalities. Although AESs target a shift from existing practices there is evidence that farmers may get money for already operating practices. When farmers have the power to influence the design of AESs, they may twist scheme requirements towards what they already do, so that compliance costs are nil.

In most cases, the regulator does not know the *ex ante* situation and therefore cannot control if any shift did take place or not. There is an informational asymmetry between farmers and the regulator about measures effectively undertaken and the value of the land they contract on. Farmers may benefit from an informational rent since their efforts are costly to monitor and information costly to collect for the regulator. Otherwise, the regulator also benefits an institutional rent since he has the power to influence the rules of the game. There are examples of contract breaching from the regulator.

Generally, there is no unequivocal relationship between farming practices and the environmental impact. Uncertainty, time lag and threshold effects make difficult to assess the environmental effect of an AES. In most cases

the reference situation is unknown and the likely cause-and-effect relationship between prescribed practices and stated environmental objectives is not documented. However, low uptake and geographical spread of contracted land indicate that environmental effectiveness is questionable. Most AESs applied under the umbrella of multifunctionality are a means to both support farm income and comply with WTO provisions.

Despite the AES mechanism being a contractual purchase arrangement it is not tailored to each individual situation. Typical programmes offer homogenous prescriptions to heterogeneous farmers. Uptake by farmers depends on the first place on a comparison between the offered compensation and their individual cost of compliance, including private transaction costs. Besides, uptake is higher among better educated and informed farmers and among those with a positive attitude towards the environment. In addition, a farmer is more likely to apply if a neighbour or a relative is already involved in an AES. This indicates that education, information, professional network and extension matter and can gradually shift farmers' attitudes with respect to AESs.

There is a trade-off between the level of transaction costs and the precision of policy goals. Policy makers may aim at designing precise contracts to reach the maximum level of environmental output. Achieving contract design fit with each particular environmental output provision may encompass high level of transaction costs. The regulator's challenge is to achieve a trade-off between precision and transaction costs that is acceptable by all other parties including farmers and NGOs.

The way controls are organised may impact farmers' participation. Controls require human and financial means that are often lacking. A lack of rules on the fines to be applied in case of non compliance, a lack of time to carry out controls and the difficulties to apply new rules are often reported. Co-ordination between policies may save costs since on-farm controls are already

organised for other policies. Nevertheless control systems have become intractable involving a considerable administrative burden for the Member States and the Commission.

## **Polluter-pays principle and taxation**

In contrast to pollution from point sources, programmes for reducing pollution from agriculture are mostly based on voluntary approaches providing education, technical and cost-sharing assistance. They therefore involve a transfer payment from tax payers to farmers. Otherwise they are very complex to implement, control and enforce, and finally water problems persist. In spite of a growing public concern about runoff from agriculture, public policy still remains inefficient. A series of lawsuits illustrate the disagreement of citizens who suffer disamenities from livestock farming or defensive expenditures involved by nitrate contamination of water. Paradoxically in our developed societies, agriculture maintains a profound political influence, the practical consequence of which is that agriculture has been somewhat indulged and favoured in comparison with other activities, especially concerning polluting emissions. Implicitly, agriculture benefits presumptive property rights that have distorting effects.

A consistent interpretation of the polluter-pays principle should preclude AESs for the reduction of negative externalities. The most straightforward incentive-based strategy to control emissions of a particular substance consists in taxing each unit of emissions. Charging according to the environmental cost of pollution should encourage the polluter to adjust his pollution to the optimum level. This is the textbook argument which assumes that the social cost of pollution is known. While this not true in the real world, there is an efficiency argument for applying a tax, especially in controlling multiple sources of emissions in a way that satisfies the equi-marginal principle. If the same tax rate is applied to different sources with different abatement cost functions, then each source reduces its emissions

until its marginal abatement costs equal the tax. Then abatement costs will automatically equalized across all the sources. It must be emphasized that this outcome is achieved even though the regulator knows nothing about the abatement cost functions of the different sources.

The tax strategy is in line with the prevention and polluter-pays principles but it is often criticized for non-point pollution because emissions cannot be measured at reasonable costs. In this situation, the tax strategy is not ruled out but has to be adapted, then a charge on the primary product giving rise to the negative externality is a second-best solution. Product charges should be levied on substances that are harmful to the environment, when used in production processes, consumed or disposed of. They could be applied to substances which are used in large quantities and are easy to identify. From this perspective taxing fertilizers and pesticides would be an efficient strategy because abatement costs vary from one farm to another and the production technology is flexible.

The response to a tax would vary according to farm operators' efficiency. For example if a tax on fertilizer is considered, the least efficient farmers are expected to decrease their nitrogen demand more than the most efficient ones. Otherwise, it is often argue that the impact of a tax would be moderate because family labour, land and capital are fixed. This is true in the short run, but if input fixity is relaxed a new equilibrium involving a different input-mix will emerge. Long-run price elasticity is greater than short-run price elasticity implying a stronger response to a tax. In addition, this long-run effect will be expanded if there is a potential for technical progress. Finally, for livestock farming a nitrogen tax would increase the opportunity cost of organic nitrogen and would encourage a better utilisation of manure.

The main reason for preferring taxation to other strategies is the possibility it offers of achieving more cost-efficient solutions. The biggest disad-

vantage of charge schemes is connected with the reluctance of politicians to effectively enforce the polluter-pays principle. In addition a comprehensive strategy should also include an extension and education component. The revenue the charge system generates can be used for promoting more environmentally friendly practices.

## **Provision of amenities and compensation**

Most generally conceived an AES represents a social contracting scheme that purchases changes in production practices which are hoped to induce provision of public goods. When public and private outputs are joint, other things being equalled, an increase in the provision of the amenity of interest involves a reduction in the production of a market commodity. Producers must use their limited resources such that the provision of amenity is increased, and this can be only accomplished with a decrease in the commodity. Then farmer should be compensated according to the profit foregone. The exchange rate between the public and private outputs is set equal to the rate at which society can actually trade both goods as defined by current technology. Technical progress can lead to the adoption of a new technology resulting into a simultaneous increase in the provision of amenities and private goods. This involves an investment in terms of research and extension, which is costly, and then a shift in farming practices.

An alternative means of evaluating compensation can be based on the demand side instead of the supply side. The approach would be to measure the willingness of society to exchange the private good for the public one. This could be established by standard methods of evaluation such as the contingent valuation and the travel cost methods. The 1980s saw an explosion of empirical and theoretical research in this field. A number of studies consider the preservation of today's landscape, as well as the preservation of specific habitats. Hundreds of studies value the benefits of an increase in water quality with an emphasis on outdoor recreation. It

is considered in the scientific community that reliable numbers are now available.

Under perfect competition both approaches are equivalent but in the real world they are likely to produce different values. Though a compensation based on profit foregone is likely to be more acceptable to farmers.

## Guidelines for future policy

A fundamental criticism of current policy is that it violates a basic prescription for optimal policy design, namely that there should be at least as many policy instruments as there are policy objectives. Future policy will result from a multi stage process of negotiation in which lobbies and a number of constraints (including budgetary and WTO ones) interact. While an optimal output cannot be expected, a series of recommendations must be made.

Environmental cross-compliance has been introduced to make farm support acceptable to the public by linking the payments to an issue that the public is willing to pay for. Cross-compliance is targeted towards farmers whose support is larger than their compliance costs. Individual farmers are best placed to know the costs of compliance on their own farms, whereas the regulator is not. There is thus information asymmetry that leads to over compensation in some cases, or under compensation in others. The problems of setting and monitoring appropriate standards as the basis of the cross-compliance scheme must not be underestimated.

A conflict emerges between maintaining support for all farmers that are historically eligible for support and imposing environmentally farming practices or levels of environmental performance. Given the fairness argument cross-compliance is targeted towards moderate environmental improvements. Therefore a specific agro-environmental policy is needed to achieve significant improvements.

Agro-environmental policy remains encapsulated in the rural development policy whose objectives remain multiple and complex. The proposed strategic policy goal for the EU's rural development policy is 'to accompany and complement CAP market policies in the overall aim of supporting the sustainable development of all rural areas throughout the enlarged EU'. Three major objectives for rural development policy for the coming period are considered:

- Increasing the competitiveness of the agricultural sector through support for restructuring;
- Enhancing the environment and countryside through support for land management (including rural development actions related to Natura 2000 sites);
- Enhancing the quality of life in rural areas and promoting diversification of economic activities through measures targeting the farm sector and the other rural actors.

Moreover according to a bottom-up approach these objectives should be finally articulated with the LEADER approach.

The application of the LEADER approach on a wider scale is a response to most stakeholders who claimed for a better targeting to local contexts. Since the implementation deficit partly resulted from vague and contradictory objectives, this is likely to favour the adoption of programmes that could be monitored, controlled and enforced at least at a reasonable cost.

All forms of policy intervention, irrespective of their form, impose varying levels of administrative costs on the system. More generally the costs of policing have to be taken into account when comparing policies as they constitute the social opportunity costs. AESs are characterised by higher monitoring and enforcement of conformity costs than market regulation policies. To some extent, cross-compliance suffers similar drawbacks since it requires the same administrative effort. Environmental effective-

ness, economic efficiency, compatibility with policy principles (e.g. the polluter-pays principle) and transparency of the overall system are finally very questionable. Is it possible to avoid this trap?

Policy intervention should favour economic incentives and farmers should not be compensated for complying with general regulation and for reducing negative externalities. The enforcement of the polluter-pays principle (e.g. through taxation) should be combined with education and extension. The rationale is to promote conservation mindedness and good farming practices in order to lead to a better use of the natural basis of agriculture, which is consistent with sustainable development.

For providing positive externalities, to what extent should AESs apply? It is acknowledged that the simplicity of a contract strongly influences the uptake and the compliance rate. But, the more a contract will be adapted to farmer's situation the more easily it will be implemented. From an institutional point of view also, the more decentralised the system is, the more local problems can be easily addressed. This means that contract payments and scheme management costs should be adapted when higher complexity is required. Trade-offs between the simplicity and environmental performance should be carefully considered and detailed before defining the contract prescriptions and the scheme organisation. This lead to a policy recommendation: AESs are an efficient tool for delivering amenity when apply to restricted zones and a limited number of farmers. Otherwise it is easier to monitor output-oriented programmes than practice-oriented programmes whose environmental output is uncertain.

Although AESs should only be designed so that incentives are available only for design actions that go beyond the usual good farming practices, it came out that farmers are compensated for maintaining current practices. This is the case where land abandonment is likely to lead to a loss in biodiversity and historical landscapes, or where the continuation of farming

prevents from erosion and landslides. From this perspective, sustaining beneficial practices on a large scale in mountainous and wetland areas, through easy to monitor contracts may be socially justified.

Tailored contracts involve very high costs related to the design, monitor, control and enforcement stages. Since they have to be tuned to local situations, AESs should target remarkable sites and innovative actions, and should be more integrated in environmentally oriented initiatives such as the Natura 2000 network. This policy approach should be restricted to the provision of pure public goods, while pollution abatement should be achieved through the enforcement of general regulation to farming combined with a stringent application of the polluter-pays principle. However a lump-sum subsidy is acceptable where a specific regulation is applied (e.g. water catchment areas). Tailored contracts are not relevant for maintaining farming according to a territorial perspective. Where farming must be continued to ensure the conservation of the environment (e.g. mountain areas, wetlands) the needed long run public support should be based on a very simplified scheme like the payments to compensate natural handicaps.

## Legal Mentions

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