New-institutional economics analysis of agro-environmental schemes. ESNIE 2005 Project: analysis of agro-environmental schemes

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ESNIE 2005 Project

ANALYSIS OF AGRO-ENVIRONMENTAL SCHEMES

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Research programme

The research is part of the ITAES programme which involves 9 European research teams. ITAES is the acronym of "Integrated Tools to design and implement Agro-Environmental Schemes", it is a Specific Targeted Research Project of the sixth Framework Programme launched by the European Commission in 2003. It has two main objectives:
-The construction of an integrated tool to analyse the interaction between the institutional process and the environmental outcome.
- The construction of an integrated tool to analyse and simulate farmers' environmental supply depending on a range of different governance mechanisms.

Context and questions

Environmental protection has traditionally been carried out through "command and control" and economic policy tools aiming at mitigating market failures to provide environmental goods. Besides the State, other kinds of actors, firms and consumers, are more and more involved in environmental protection through hybrid policies. These policies involve public authorities at several degrees and private actors from the market and civil society. Those more participatory and co-operative policy tools differ from constraining approaches by promoting the voluntariness and environmental responsibility of uptakers. They rely on market forces and especially on the production of information enabling actors to take actions in favour of the environment.

The agricultural sector has experienced this evolution with the development of contractual approaches based on the free choice of farmers to undertake environmental-friendly measures. Even if national schemes have developed, given the share of expenditure devoted to this sector in Europe, environmental contracting in agriculture has especially been administered at the European level. Several European regulations have instituted environmental contracting (Regulation EU 797/87 (article 19), Regulation 2078/92, Regulation 1257/99).

Given this context, two questions arise:

1) What organisational and institutional factors help increase economic efficiency and environmental effectiveness of agro-environmental schemes?
2) How do they compare to other environmental policy tools?

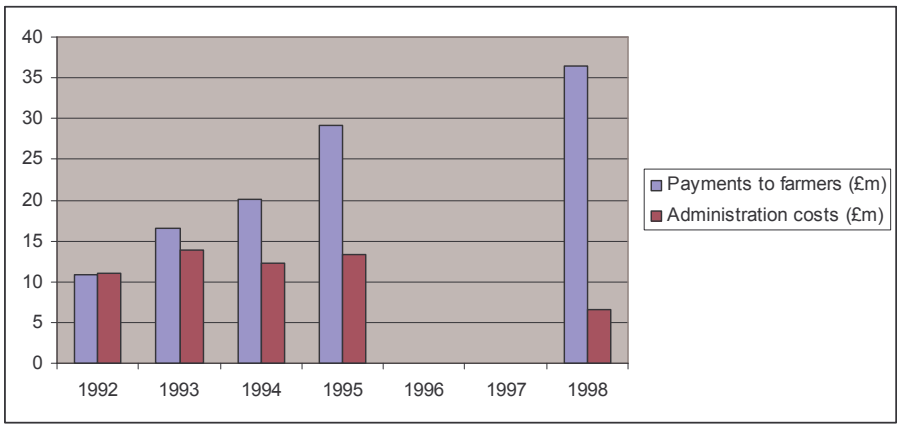
Some facts

Previous studies report two important facts to be taken into account in analysing agro-environmental schemes: the high level of transaction costs and the high organisational and institutional diversity of existing agro-environmental schemes across Europe and across the world.

High transaction costs: Several studies report high level of transaction costs in setting and running agro-environmental schemes. They encompass costs born by public authorities (administrative transaction costs) and by farmers (private transaction costs).

As for private transaction costs, Falconner (2000) reports: « Private transaction costs might amount to around 5% of the compensation payments made to farmers for lost agricultural income in average, through with a potentially wide range that has not been investigated ». As for administrative costs, Falconner et al. (2001) have studied their evolution for the English scheme (Environmental Sensitive Areas). Figure 1 reports the evolution of the level of administrative transaction costs as compared to the level of payments received by farmers. We may give two comments. First, these costs are relatively high. Second, they seem to decrease across years. Two factors influence the level of these costs: learning effects and the increasing number of participants in the scheme which enables to distribute fixed costs across more farmers.

Figure 1: Evolution of administration costs and payments to farmers in the Environmental Sensitive Areas scheme in the UK



High organisational and institutional diversity of existing agro-environmental schemes: First, the 9 case studies across Europe in the ITAES project reveal a great diversity in the application of European regulations. Although European regulations constrain regions or countries on some variables, case studies show diversity in the design, contracting, monitoring and enforcement phases (involved actors, level of decision), in the monitoring and enforcement phases, in the freedom of choices of measures left to farmers. Second, a preliminary review of the literature shows how diverse are policies aimed at providing public goods on private land. Among these are trusts, auctions, ecolabeling, …

In view of the high level of transaction costs and the high organisational and institutional diversity of agro-environmental schemes, transaction costs economics appears to be a good framework to elaborate hypotheses and test them. This kind of analysis should lead to propositions to enhance existing policies.

Research steps

Two steps may be identified:

Step 1: Two theoretical questions
How to define the environmental transaction in the framework of transaction costs economics? What criteria enable to discriminate among contractual arrangements?
We began working on this step. Indeed, environmental economics has employed the seminal contribution of Ronald H. Coase (1960) intensively but has remained relatively unaffected by the contributions of perhaps his most influential follower, Oliver E. Williamson. In a note (Bougherara et al., 2005a), we explore several reasons susceptible to explain why the Coase 1960 article has not benefited from an

operationalization *à la* Williamson. Further, we show that extending transaction costs economics to environmental related transactions constitutes a promising challenge, especially in order to provide guidance about the choice of regulatory instruments. Bougherara et al. (2005b) apply the analytical framework of discrete structural alternatives to the choice of regulatory instruments. Environmental-related transactions, which differ in their attributes, are aligned with categories of policy instruments, which differ in their cost and competence, so as to effect a discriminating – mainly transaction costs-economizing – result.

Step 2: An applied research question
How does transaction cost economics help to analyse the economic efficiency and environmental effectiveness of agro-environmental schemes?

We focused our research project presentation on the second step. The first results on the analysis of agro-environmental schemes is presented.

Transaction characteristics in agro-environmental schemes (examples from case studies)

Given that transaction costs depend on transaction attributes, transactions have to be primarily characterised before analysing the role of organisations and institutions in agro-environmental schemes environmental effectiveness (Williamson, 1985). According to the transaction cost economics perspective, the transaction is the unitary element of analysis. First of all parties and the nature of the good which is exchanged are considered before turning to transaction attributes.

Who are the parties and what is exchanged?
Case studies show that most agro-environmental schemes involve two parties: a farmer applying for a contract offered by a governmental organisation operating at one territorial level or another. Some contracts are more complex and look like a kind of collective agreement with several parties contracting more or less directly.

Note that the two involved parties contract for the exchange of environmental goods. Indeed, the European viewpoint based on the provider-gets principle reckons farmers a property right on land use. They benefit a compensatory payment for using land so as to provide non-commodity output (Hodge, 2000). According to case studies, there is evidence that all agro-environmental schemes involve compensatory payments for undertaking environmental friendly practices. Whereas most agro-environmental schemes are contracted for five years, several regions consider organic farming and conversion to grassland worth compensating only for a more limited period of time.

Measures aiming at providing environmental goods may be classified into three types:

- Maintenance measures encompass the promotion of existing practices that are not harmful for the environment. They could also be named ‘status quo’ measures.

- Externality reduction measures include measures aiming at improving the environment through a reduction of adverse effects of farming.

- Public good provision measures addressed the promotion of positive externalities of agricultural practices. The enhancement of landscapes in the ESA and CS programmes in England are typical examples of how agro-environmental schemes aim at providing biodiversity, amenities and beautiful landscapes.

An alternative classification focusing on the technology is helpful to understand what is required to farmers entering agro-environmental scheme. Indeed, the concept of jointness is instrumental since it matters whether an environmental good is a complement or not of commodities.

Although agro-environmental schemes 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 agro-environmental schemes, they may twist scheme requirements towards what they already do, so that compliance costs are nil. Agro-environmental schemes' payments may compensate farmers for practices they would have undertaken without adopting agro-environmental schemes. The problem remains to distinguish among environmental practices those that would have been undertaken should the agro-environmental scheme not have been signed.

Asset specificity

Asset specificity refers to the relative lack of transferability of assets intended for use in a given transaction to other uses. Highly specific assets lead to sunk costs, which have relatively little value beyond their use in the context of a specific transaction. The higher the asset specificity is the greater the interdependence of parties is. If asset specificity is low, firms can easily change their partnership and modify their output mix in order to comply with market opportunities. The demanding partner will choose to obtain inputs in the market place. However, if asset specificity is high, potential suppliers may find it too risky to make the necessary investments without the guarantee of adequate outlets.

Is there such specificity in the agro-environmental contracts described in case studies? Yes, although it ranges on a continuum from weak to high specificity. At least three types of asset specificity must be considered (Hagedorn, 2002): site, physical and human asset specificity.

- Site asset specificity: the asset looses value if invested in another location. Measures for protecting a specific ecosystem are not effective if undertaken elsewhere since ecosystems of specific interest are attached to a given area. Most agro-environmental schemes display such specificity especially when eligible areas rules are set.

- Physical asset specificity: One party invests in specific equipments that loose value if used elsewhere. For example, hedgerow maintenance requires specific machines.

- Human asset specificity: refers to the accumulation of specific knowledge to a trading partner or to a transaction, which looses value for another transaction. For example, farmers may invest in knowledge about specific measures to enhance the environment or about the way to monitor the contracts they sign (paperwork). Conversion to organic farming also required a precise training and learning. Otherwise, there are several cases involving specific production methods.

The agent who invests in a highly specific asset requires the other party that the contract will last. Several factors may affect asset specificity. Under joint production, the provision of environmental good depends on the provision of market commodities. Therefore, efforts to deliver environmental goods are still more or less valued through the market. Joint production is likely to lower asset specificity. When alternative channels such as green tourism exist to monetise environmental friendly effort, farmers are fewer dependants on agro-environmental schemes. Asset specificity may then also be lowered. One must however be careful with respect to agro-tourism as a means to value farmers' efforts since tourists generally enjoy more the existing environmental and rural assets than the efforts of farmers.

As developed in the next sub-section, environmental outcomes are strongly linked to knowledge about the agro-environmental technology. It follows that measures in agro-environmental schemes should reflect this need to invest in specific human capital. However, the analysis of case-study reports weakly reveal organised education and training of farmers before undertaking agro-environmental schemes.

Uncertainty

Uncertainty is pervasive in agro-environmental contracts. It potentially concerns parties' behaviour and the environmental context of the transaction.

(i) Each party in the contract benefits from a power to influence the output of the contract, the environmental effectiveness.

On the one hand, there is an informational asymmetry between farmers and the State 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 State. For example, non-point pollution prevents the State from determining which farmer has not lived up to his contract.

On the other hand, the State also benefits from an 'institutional rent'. Indeed, the State has the power to influence the rules of the game. Farmers then face a risk of contract breaching from the State after having invested according to the former contract. This happened to some French farmers. In 2002, CADs replace CTEs as a new tool for agro-environmental contracts. Only the CTEs that were already in the pipeline were signed at that time, while the ones that were about to be submitted were cancelled, although farmers had already spend some money on it. In front of some uncertainty on the stability of rules for applying for agro-environmental schemes, farmers may lack motivations to commit.

(ii) Uncertainty arises also because unequivocal causality between farming practices and environmental impact is infrequent.

Natural processes suffer from threshold effects for example. Farmers may live up to their commitment but may not be numerous enough to reach a threshold enabling the environmental improvement to happen.

Uncertainty also comes from natural processes like the weather. The Dutch case study reveals that breaching of contracts happened sometimes because bad weather conditions provided incentives for cutting the grass earlier.

Other sources of uncertainty cover the delay between the application of a measure and its effect, the difficulty of assessing the specific effect of agro-environmental schemes independently of other measures, the uncertainty about the future value of environmental benefits (option value).

Frequency of transactions and duration of agreement

Frequency of transactions between two partners is important since it enables costs incurred in establishing the contract to be distributed over many transactions. The higher the frequency of transactions, the easier it is to invest in specific assets. For example, investments in machines for hedgerows maintenance may be recovered if transactions are repeated over a certain period of time. Thus, another parameter to be considered is the duration of the contract.

Case studies show that agro-environmental schemes are usually five-year contracts without re-negotiation of the contract. Some contracts however are long-term like the long-term set aside which lasts 20 years. As noted in the French case studies, the uptake for this kind of contract remained low since it was impossible for municipalities (main actors of this scheme) to set up a 20-year budget.

However, it is often stated that five-year contracts are too short to observe any environmental improvement. Longer agreements may not only favour specific investments but also reduce the frequency of contract re-negotiation which generally incurs high costs. For instance, in England, the ESA scheme (Environmental Sensitive Areas) is a 10-year agreement with an option to withdraw after five years. It certainly helps save re-negotiation transaction costs.

Output measurability

This attribute of transactions appeared through the development of the former attributes we characterised. It is however relevant to stress the measurability output issue for agro-environmental schemes. Output measurability critically increases the complexity of implementing agro-environmental schemes. Environmental conservation or improvement is usually a hard and overall costly task because of non-point source pollution or because environmental impacts of practices appear after a more or less important delay. Only in few cases, output measurement is straightforward. The example of Netherlands where counting birds is a joint product of birds watching is seldom met. But connecting supply and demand reveals also a challenge. That is why case studies show that agro-environmental schemes usually rely on proxies like specific farming practices that are expected to lead to environmental good conservation or provision. Thus, although contracts ought to be objective oriented, they are usually practice oriented. Although it spares from measuring the level of environmental output, costs of measuring whether the farmer undertook the required practices remain high. Practice-oriented contracts at least enable to reduce uncertainty on the farmer side.

One must be careful when considering the existence of performance indicators. Sometimes, a proxy is used to define objectives but is closer to practice requirements than performance requirement. In England, the performance indicator for landscape enhancement is a threshold of agreements with a conservation plan which gives little information if not on actual improvements. It is especially difficult to set performance objectives for measures that are to some extent subjective, like aesthetic value of a landscape. The measurability of proxies is dependent on the way measures are defined. For instance, payments for stone walls maintenance are rather easy to enforce since measurement costs are low.

As a conclusion to the analysis on transaction attributes, we may say that agro-environmental schemes in Europe cover a wide diversity. As suggested above, the higher asset specificity, the higher uncertainty, the lower the frequency of transactions, and the higher output measurement costs then the higher transaction costs. Several suggestions follow from our discussion to enhance economic efficiency and environmental effectiveness: longer contracts, investments in human capital and a form of coordination of farmers in undertaking measures. Indeed, the costs of transacting will more or less affect contract efficiency depending on the way transactions are governed. The several actors in agro-environmental schemes are expected to adopt governance structures minimising transaction costs. Several organisational and institutional parameters may affect the level of these costs and what is also important, the distribution of transaction costs among parties in the transaction.

References

Coase R.H., 1960, The Problem of Social Cost, Journal of Law and Economics, vol. 3, pp. 1-43.

Hagedorn, 2002, Institutional Arrangements for Environmental Co-operatives: a Conceptual Framework, In: Hagedorn, K. (ed.) (2002): Environmental Cooperation and Institutional Change: Theories and Policies for European Agriculture. Cheltenham: Eward Elgar.

Hodge I., 2000, Agri-environmental policy: A UK Perspective, Chapter 10, pp216-240. in D. Helm (ed.) Environmental Policy: Objectives, Instruments and Implementation. Oxford University Press.

Bougherara D., Grolleau G., Mzoughi N., 2005a, Why Environmental Economics Remains Unaffected by Williamson's Contributions?

Bougherara D., Grolleau G., Mzoughi N., 2005b, Can Williamson's Analysis of Discrete Structural Alternatives Help Regulators Choose Between Environmental Policy Instruments?

Williamson O.E., 1985, The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting, New York: The Free Press.