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**The design of Agri-environmental Schemes in EU:
Lessons for the future**

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The main purposes of this report is twofold: developing of a framework for analysing the characteristics, design and implementation of AESs; and testing of AESs with this framework. After an analysis of the instruments that can be used for controlling the agri-environmental problems, the relevance of actual AES characteristics are tested by using results and tools of ITAES. Recommendations for policymakers and stakeholders are derived.

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1. Introduction

1.1 Background

In addition to marketable goods such as food, raw materials, and ornamental plants the agricultural sector also produces 'non-marketable' goods like wildlife and landscape, biodiversity and other rural amenities. These joint products are called external effects, and are the result of a specific way of using agricultural land. Agricultural landscapes such as 'small-scale landscapes' - characterised by small fields surrounded by hedges or wooded bank - or peatland areas with narrow plots and wide ditches are the by-products (or joint production) of farming when land use was relatively capital-poor, small-scale and labour intensive.

Agriculture had until the middle of the 19th century quite a positive influence on the development of wildlife and landscape in Europe. Often the situation around 1850 is viewed as a climax in the nature conservation scenes: the profusion and variation of flora and fauna and the diversity of types of landscapes was immense. The agricultural activities caused by adjusting to natural conditions of the a-biotic environment the spatial differentiation in nature and landscape values also. So the settlements and roads often followed the whimsical pattern of high, dry parts in the landscape. Fields, pastures and hayfields were situated in places where the natural situation with the fewest effort could be adapted to be used in these capacities. Beside the large diversity of flora, fauna and landscape, other important characteristics of 19th century agriculture were that they used their own waste (manure), and even processed waste from the cities, used no fossil fuels or non-natural substances and made only use of a small amount of raw material inputs.

Gradually the balance between agriculture, nature and landscape changed. Before the introduction of (artificial) fertilizers, agriculture played an important role in keeping recycling system closed. Farmers delivered the products to the cities and in turn took the cities' waste back with them to use again in manuring. Looking back, the introduction of artificial fertilizers about 1850 caused a revolution in agriculture. The availability of plant-feeding elements was age-long a bottleneck for sandy soils. Fertilizer made it possible to cultivate waste land into agricultural land (Slangen et al., 1996: 388). For a long time agriculture was able to perform its function of producing food, raw materials and ornamental plants without seriously threatening wildlife and landscape, and the quality of water, soil and air.

Since 1950 there has been a large increase in real income per capita in Western Europe. This development meant a stimulus for agricultural production. However, the rising cost of labour induced labour-saving and production-enhancing techniques that increased agricultural output and helped the dwindling numbers of farmers achieve incomes levels comparable to those outside the agriculture sector (Oskam and Slangen, 1998: 113).

In practice this led firstly to a strong mechanization. As a result, land and landscape had to be drastically adapted. Land re-allotment, which so far had only been carried out on a limited scale, increased (Slangen et al., 1996: 390). Plots were enlarged, ditches filled, lines of trees cleared, wet soils drained, soil profiles agronomically improved and farm buildings relocated. Secondly, we saw the intensification of the land-use. Reclamation and re-allotment have led to low-nutrient ecosystems like those dominated by heather or bluegrass, once major components of the landscape, being transformed into ecosystems rich in nutrients, or being vanished to the margins of the rural area. With the intensification of the land use, more and

more areas were manured and drained. Fertilization, humidity, grazing intensity, plot shape and size and the 'scale of the landscape' have been standardized.

Thirdly, we saw a strong move towards specialization and farm enlargement. Specialisation at farm level resulted in the demise of the mixed farm and a scaling-up of farming. Farm enlargement became apparent from the rise in the numbers of livestock per farm, an increasing acreage of crops per farm, as well as from increased plot and farm size. A fourth factor was the increased use of non-factor inputs. The intensification of land use as mentioned above has been reflected in the use of non-factor inputs like concentrate and mixed feed, fertilizer and pesticides. It was the intensified use of these means that led to the environmental pollution caused by agriculture. These developments were at odds with preserving nature and landscape, and the quality of soil, water and air.

While agriculture was experiencing these developments, at the demand side higher incomes and levels of welfare increased the demand for wildlife and landscape, as well as for leisure and outdoor recreation. Thus, during the time when the supply of wildlife and landscape decreased, the demand for them actually increased. Changes in demand co-determine changes in the institutional environment. This implies that during a period of economic growth and the associated evolution of societal preferences, the rules of the game for the agricultural sector change. For example, ownership or property rights with respect to the environment or landscape, which were traditionally part of agriculture, are now contested. Farmers have to adapt themselves not only to changed price signals, but also to a new institutional arrangement giving agriculture its proper place in society. The introduction of agri-environmental schemes (AESs) in the EU-member states is one of the changes in the rules of the game for agriculture sector in the last thirty years.

1.2 Purpose

The main purposes of this report is twofold: (1) developing of a framework for analysing the characteristics, design and implementation of AESs; and (2) testing of AESs with this framework.

For realising these main purposes we distinguish four sub-goals. The first is a description of and an analysis of the instruments that can be used for controlling the agri-environmental problems. The second sub-goal of this report is to develop a framework for analysing the characteristics, design and implementation of AESs. The third is the application of the framework for testing the AESs. The last sub-goal is giving recommendations for policymakers and stakeholders.

1.3 Overview of the report

In Chapter 2 we will firstly describe the general concerns about agri-environmental problems. Second, we will pay attention to possible solutions for preventing the losses of environmental goods caused by market failures. The response on market failures is mostly government intervention. The government has a broad range of instruments for preserving the quality of water, soil, air, nature and landscape. The instruments can be grouped in: knowledge-enhancing, communicative and persuasion instruments, direct regulation (including cross-compliance), fiscal facilities, subsidies and charges, and government provisions (incl. in-house production of the government). Third, we discuss in this chapter whether in-house

production of the government is a better alternative than AESs contracts between farmers and the government

In chapter 3 we will first analyse whether we can view AESs as contracts and determine what type of contract they are. Second, we show that AESs are incomplete contracts. Third, we give evidence based on a number of key elements that AESs are neoclassical contracts. Fourth, contracts have some properties such as voluntary exchange, having coordination and motivation elements, implicit or explicit agreements, detailed formulated or on global goals and objectives. We test whether these properties apply to AESs. Fifth, we will give an overview of design principles for reducing of contractual failures of AESs. Sixth, we will present a description of the design and implementation of AESs through the years in the EU. We finish chapter 3 with a framework for analysing AES. This framework consists of (1) the properties of AESs as contracts; (2) the design principles for reducing contractual failures; and (3) the criteria for policy analysis for AESs in practice. These three toolboxes together form a comprehensive framework for analysing AESs as contracts.

The framework will also be used in chapter 4 and chapter 5 for mapping the results of the work packages of ITEAS. Chapter 4 also presents the results of the case study areas.

This report finishes with an outlook and policy recommendations in chapter 5.

2. General concerns agri-environmental problems and possible solutions

2.1 Introduction

The purpose of this chapter consists of giving an overview and analysis of the instruments that can be used for controlling the agri-environmental problems; including an analysis whether in-house production of the government is a better alternative than AESs-contracts between farmers and the government.

In Section 2.2 we will describe the general concerns about agri-environmental problems. Next, in Section 2.3 we will pay attention to the possible solutions for preventing the losses of environmental goods caused by market failures. The response on market failures is mostly government intervention. The government can make use of a broad range of instruments for preserving the quality of water, soil, air, nature and landscape. These instruments can be grouped in: knowledge-enhancing, communicative and persuasion instruments, direct regulation (including cross-compliance), fiscal facilities, subsidies and charges, and government provisions (incl. in-house production of the government). In section 2.3.4 we discuss whether in-house production of the government is a better alternative than AESs contracts between farmers and the government. Section 2.4 concludes the chapter with a summary and some conclusions.

2.2 General concerns agri-environmental problems

The loss of environmental goods such as the quality of water, soil, air, nature and landscape, and of rural landscapes is one of the major contemporary challenges for developed countries. Agriculture and forestry, occupying most of the rural land throughout Europe, are activities that have a major influence on the European rural environment and landscape. The European countryside is mainly man-made, resulting from centuries of management of rural areas for food, raw materials, and ornamental plants.

Until the last few decades, this caused few problems because agriculture was traditionally a closed system, where the land was mainly used for the production human food and feed for animals, producing manure to be returned to the land as sources of nutrients. It was also in the interest of the rural population and land owners to maintain or improve the resource base of the land by carrying out practices such as the maintenance of roads, hedges, ditches, drainages and water regulation systems, woodland management and so on. These practises also brought the advantage of providing, as an unintended by-product, a diverse array of landscapes and environmental goods and services. These public goods are now regarded as a key environmental asset and are highly valued (Huylbroeck et al., 1999: 2).

As long as agricultural operations were relatively small in scale - before mechanisation, scale enlargement, and the increased use of external inputs - there was a degree of harmony between agriculture and the countryside in which it operated (Huylbroeck et al., 1999: 2). However, the rising cost of labour induced labour-saving and production-enhancing techniques that increased agricultural output and helped the dwindling numbers of farmers achieve incomes levels comparable to those outside the agriculture sector. In practice this led to strong mechanization, intensifying of land-use, strong specialization, farm and scale

enlargement and increased use of non-factor inputs, such as concentrate and compound feed, fertilizers and pesticides. The combination of these factors has led to a threatening of the quality of water, soil, air, nature and landscape.

In the same period in which European agriculture underwent drastic structural changes, public demand for environmental goods - especially for nature and landscape and facilities for outdoor recreation rose significantly, mainly in response to increasing prosperity, income per capita, shorter working week (i.e. more leisure time) and increased personal mobility. Increased urbanisation also stimulated the increased demand for rest and space in the country side. In other words, whereas rural landscapes were losing many of their attractive features, the general public's appreciation and at the same the public concern about these landscapes was growing (Slangen, 1992: 334).

This public good dilemma – decreased supply and increased demand –has gained increasing importance as an item of policy. This reflects the shift in the emphasis of consumer concerns from that of securing adequate food supply towards taking a greater interest in nature and landscape and rural amenities. Governments have introduced policies not only to persuade farmers, as the custodians of rural resources, to contribute positively to the preservation of nature and landscape but also to avert further degradation (cf. Huylenbroeck et al., 1999: 2). The implementation of an institutional innovation in the field of preserving environmental goods should contribute to achieving an equilibrium between the willingness to pay and the (marginal value) of quality of water, soil, air, nature and landscape, and of rural landscapes to the society as a whole (Runge, 1999: 13).

The shift in the emphasis more to the consumers is linked to the relationship between the status and allocation of private property rights between farmers and the government as well as the *reference-level* (cf. Bromley and Hodge, 1990: 208 – 209). Hanley et al. (1998: 103) defines the *reference-level*, as the level of quality of the environment that the society feels should be present. The *reference-level* can also be the *status quo situation*, or a standard or expectation of the provision-level of environmental goods (cf. Hannemann, 1999: 75). In other words, it all depends on what people find 'normal' or as what it should be.

Through shifting of citizens' preferences, the *reference-level* also changes and hereby also the opinion and attitude over the allocation of property rights between farmers and the government change. If the *reference-level* of a society for the quality of the environment rises (the measuring rod is at a higher level), the property rights of these goods will be situated more in the public domain (cf. Barzel, 1997: 5). The result is that people feel that environmental goods, such as nature and landscape, belong more to the society, even though they are located on the land of the farmers. Through such a shift in preferences the allocation of property rights is not fixed. Through changes in allocation of the property rights, the relative decision-power of farmers on the use of their land diminishes. Farmers will say: *this is my land; I have the full property rights*. Through the characteristics - non-rivalry and (to a certain extent) non-excludability – environmental goods such as nature and landscape are not private goods however. Citizens will for this reason, and also because of the shifting of property rights, say: *it is our wildlife and landscape*.

The allocation of the property rights can change with time. An important influence on the changes is the shifting of people's preferences¹. Changing preferences lead to a change in the *optimal level* of environmental quality. This means that by changing preferences the *reference level* also changes. The status quo of property rights arrangements which have served agriculture so well exist for historical reasons and may not necessarily be appropriate for the future. Shifting values and changing perceptions of the role of agriculture will surely bring about shift in property rights and policy entitlement. Summarising the public good dilemma, the shift preferences, followed by a change in reference level which has consequences for the allocation of property rights, ask for government intervention.

2.3 Possible solutions for preventing the loss of environmental goods

In economic theory the market economy is often taken as a starting point to indicate the reasons for government intervention. If all conditions for perfect competition have been fulfilled, the operation of such an economy is efficient or Pareto-optimal without government intervention. In practice, however, there are all sorts of imperfections, which results in market failure. The loss of environmental goods such as the quality of water, soil, air, nature and landscape, and the loss of typical rural landscapes is a terse example of market failure.

Market failure is a reason for government intervention. The existence of market failure implies that there are some opportunities for mutual gains that are not being exploited. This means that there are other feasible allocations in which everyone can be better off that are not attained. Beside market imperfections the government can act to achieve goals that are not usually met by the market mechanism. These two reasons constitute the basis of government intervention from the viewpoint of economic theory. If these reasons arise in the domain of nature and landscape, the quality of soil, water and air, and the loss of typical rural landscape then they constitute a justification for government intervention.

Government intervention does not necessarily mean that the government deals with all the aspects that can be distinguished in the production of goods and services. The most encompassing way of government intervention takes place when ownership, management, financing and production are in government hands. Market failure can even be a motive for the government to take property, management, financing and production of certain services into its own hand. However, the decision to bear the costs of a facility collectively need not imply that the government should also take on the production. With reference to costs, the contribution to the costs by the government can vary from zero to a hundred percent.

For purely public goods it is reasonable to expect that ownership, management, financing and production are in the hands of government. In the case of quasi-public goods, such as most of the environmental goods, the actual method of provision should depend on efficiency and redistribution motives. The characteristics of excludability and rivalry are tangible criteria for economic efficiency. In the end, policy considerations determine the actual supply method: government production or private provision. A sustainable agriculture² produces not only private goods but also (impure) public goods.

¹ Citizens feel that the environmental quality is going to decline, and want to prevent this. This is revealed in a shift of people's preferences.

² We use here the term sustainable agriculture as short cut for an agriculture that takes care for environmental goods such as the quality of water, soil, air, nature and landscape, including rural landscapes.

The most important points to consider when analysing government intervention in order to realize sustainable agriculture can be found in the government's objectives, its measures or instruments. Both the objectives and the instruments are part of the institutional environment. For judging government measures the following steps can be distinguished: (1) the formulation of operational or testable objectives (of sustainable agriculture) for the measures; (2) the testing of the instruments employed, in terms of their:

- a. effect, i.e. the extent to which instruments are used. This reveals their acceptability;
- b. effectiveness, i.e. the extent to which the instrument contributes to the realization of the set goals;
- c. efficiency, i.e. the ratio between costs and benefits;
- d. income distribution aspects, i.e. who profits from the benefits and which group in society bears the burden or costs;
- e. legitimacy or (public) support for the instruments.

This procedure supposes that the governments and the EU policy targets have developed. This means that the agricultural policy for the agricultural sector should include environmental objectives. Oskam et al. (1998: 41-45) give an overview of a set of objects for environmental policy and the criteria for evaluating the instruments useful for research projects in the field of *sustainable agriculture*.

The government has a broad range of instruments for preserving the quality of water, soil, air, nature and landscape. The instruments can be grouped in several ways: knowledge-enhancing and communicative instruments, financial instruments and physical regulations. Another way is making use of a matrix with behaviour, transaction and persuasion on one side, and the role of government in public law, in private law and as a participant on the other. The sub-headings below contain a classification based on a combination of influence on behaviour and the role of government.

2.3.1 Research, extension, education and persuasion

With this knowledge-enhancing and communicative instrument the government tries to achieve a voluntary modification of the behaviour of farmers. One of the key assumptions of the market of full competition is that all information is available to the decision-makers (Boadway and Bruce, 1989: 123). Lack of information can lead to producers and consumers to make the wrong decisions. The government can use this instrument to correct the functioning of the market as an information supply mechanism. A good information supply can lead to a change in preference and, in that way, to a change in the behaviour of producers and consumers. Individuals can become more aware of their *property rights* in the area of wildlife and landscape and the quality of soil, water and air.

The gathering and processing of information aims to clarify the state of affairs and the potentialities of preserving nature and landscape and of limiting pollution. Information asymmetries can be removed with this instrument. Stimulation and persuasion can lead to the start of a process of 'absorption' of environmental values (WRR³, 1992: 140). In that way a voluntary change of behaviour can be induced. The gathering and spreading of information, and incitement and

³ WRR means Scientific Board for Government Policy

persuasion broaden the basis and the legitimacy of the policy. This set of instruments can be effective and efficient.

2.3.2 Direct regulation: interdictions, obligations and licences

The government prescribes that certain actions of farmers are prohibited, compulsory, or allowed under the conditions that prescribed rules of behaviour are observed. Among these are the well-known set of interdictions, obligations and licences. These prescriptions are direct in character. They have a direct and compulsory influence on the behaviour of producers and consumers. A characteristic of legal regulations is that they impose considerable limitations on property rights. In most EU- countries, we see their application reflected in the instruments the government has employed for the conservation of the quality of soil, water and air. Prohibitions and obligations dominate the policy advocated. Licences have so far hardly been applied as instruments of environmental policy for agriculture and horticulture in the EU. Licences can be seen as property rights. The application of licences or permits is not meaningful in the case of any material or activity that can be lethal to man and environment in very small concentrations. Licences or permits can consist of the right to carry out certain activities like cutting trees, emission rights and the (restricted) use of manure (e.g. in the form of restricted use of the minerals N, P and K) on land. In principle, emission and pollution rights can be tradable. Pollution rights, being tradable, bring flexibility in the allocation of the limited quantity of emissions tolerated.

Legal measures comprise regulations amounting to physical limitations, for example quotas. A distinction can be made between regulations under public and private law. The government role in public law, combined with the behavioural mechanism of 'compulsion', results in direct regulation. In private law regulations, the role of government is limited to legislation and the role of facilitator for a private implementation process. In this approach tradable production or pollution rights are a combination of the public and private law role of the government. There is a limitation on total pollution, enforced by public law (the quantity of licences determined unilaterally by government) and private law rules for the trade in licences. As the target group is confronted both with compulsion (not to exceed the volume permitted) and with the opportunity to realize transactions (trade in licences), aspects of both behavioural and transaction play a role.

A special application of direct regulation in the EU is cross-compliance coupled with good farming practise. It is a tool to improve compliance with existing standards for preserving the environmental conditions. Fulfilling these standards is called good farming practise. According to Box 2.2 good farming practise can be described as maintaining agricultural land, especially land which is no longer used for production purposes, in good agricultural and environmental condition. For 'good farming practise', member states are given considerable freedom of interpretation. While the broad issues tackled are the same for all member states, (soil erosion, soil organic matter, soil structure and minimum level of maintenance) the criteria used to define and instruments used to address these issues differ between countries. The criteria chosen reflect the differences in national priorities and geo-climatic and eco-systematic backgrounds. The most common measures are the establishment of a certain level of green cover during winter, the control of unwanted shrub and tree encroachment, and restrictions on machinery use and on stubble burning. In some cases, the selection of measures was probably also guided by how easy they were to control and enforce. Some countries used the implementation of good farming practise to introduce new requirements to farmers while other used existing standards.

Box 2.1 Good farming practice

Member States shall ensure that all agricultural land, especially land which is no longer used for production purposes, is maintained in good agricultural and environmental condition. Member States shall define, at national or regional level, minimum requirements for good agricultural and environmental condition on the basis of the framework set up in Annex IV, taking into account the specific characteristics of the areas concerned, including soil and climatic condition, existing farming systems, land use, crop rotation, farming practices, and farm structures. This is without prejudice to the standards governing good agricultural practices as applied in the context of Council Regulation (EC) No 1257/1999 and to agri-environment measures applied above the reference level of good agricultural practices” (Council Regulation No. 1782/2003, Article 5).

The basic requirements of good farming practise are related to soil erosion, soil organic matter, soil structure and a minimum level of maintenance. By soil erosion it is meant to protect soil through appropriate measures. The standards are a minimum soil cover; a minimum land management reflecting site specific conditions and to retain terraces. Soil organic matter focuses on the maintenance of soil organic matter levels through appropriate practices. There are standards for crop rotations and arable stubble management. Maintaining the soil structure is quarantined by appropriate machinery use. Ensuring a minimum level of maintenance and avoiding the deterioration of habitats is realised by (1) a minimum livestock stocking rates or/and appropriate regimes; (2) protecting of permanent pasture; (3) retention of landscape features; (4) and avoiding the encroachment of unwanted vegetation on agricultural land. The basic requirements for good farming practice have to be fulfilled to be eligible for direct payments.

According to Bonnieux, et al. (2004:15), cross-compliance mechanism refers to the linking of environmental conditions to agricultural support payments (Baldock and Mitchell, 1995). Compliance with a series of restrictions related to the environment, food safety or animal welfare is required to be eligible for other programmes. Thus *ex ante*, each farmer has to compare additional costs involved by the compliance mechanism to the additional benefit from the support scheme. This instrument influences private behaviour and indirectly results into the provision of positive externalities (Dunne and O’Connell, 2002 and 2004). Nevertheless the voluntary nature of cross-compliance mechanism may be questioned. Indeed, where support payments are high, it is very close to a mandatory tool (OECD, 2003b). For that reason, it fits within the instrument ‘direct regulation’ (see Bonnieux, et al., 2004:15).

2.3.3 Fiscal facilities

The emphasis here is on the financial aspect and not on the legal ones. The tax mechanism is used as the steering mechanism through tax rebates or tax benefits for persons or institutions. In some EU- countries there are tax facilities for the owners of forest, nature areas and real estates (for example tax exemption for forestry enterprises). For certain investments aiming at environmental protection, there can be facilities for accelerated depreciation. Tax benefits are an attempt to exert direct influence on the behaviour of economic subjects.

The advantage of fiscal regulations over subsidies is that they are simpler. No money has to be handed over. Government tax advantages have two types of costs: lost income and costs of implementation. Another objection against tax benefits is that they may give rise to transfers

that may change the secondary income distribution. From a financial point of view, enterprises with a high marginal tax rate are in a better position to invest than enterprises with a lower tariff.

2.3.4 Subsidies/compensations and charges/levies

By granting subsidies and imposing charges, the government aims at having an indirect influence on the quantity and quality of an activity. The expenditure on subsidies or the income from charges is directly related to certain activities by the person being subsidized or paying a charge. When subsidies are applied to activities with favourable external effects, they can be used as 'compensation' or 'stimulation' premiums. Compensation premiums are paid for income lost as a consequence of a government regulation. An example is the compensation paid to farmers having a nature management agreement. Income compensation brings the economic subjects back to their original income level. Stimulation premiums are less restrictive. They are not linked to any legal arrangement, public or private. The government gives financial support to encourage certain activities. Economic subjects are free to use this financial support and there is no compulsion to carry out the activity concerned. Applications are: subsidies for afforestation, maintenance of landscape elements, environmentally friendly manure storage on farms and environmentally friendly production techniques, etc. (Compare EU Environmental Directive 2078/92).

In the case of activities with negative external effects, for example polluting emissions, the application of the subsidy instrument may be undesirable. Baumol and Oates (1989: 211-233) show that the subsidizing of emission reduction in a situation of full competition decreases the emission per enterprise, but may increase total emission. The lower cost resulting from subsidies will lead to a lower cost price, to greater sales, and an expansion of the existing firms or the entry of new polluting firms. In this situation subsidies are neither effective nor efficient. Nevertheless, in practise they are often applied by the government.

Like subsidies and tax facilities, charges belong to the systems of financial incentives. The influence of charges on the behaviour of economic actors is different from that of subsidies. Charges are taxes that raise the cost price of certain (in this case, polluting) activities. The imposition of a charge can be conceived of as an effort to give a price to negative external effects, which are thus included in the production and consumption decisions of economic subjects. By placing a levy on environmentally polluting activities, the government may try to influence their amount and in this way, the quality of soil, water and air. The legitimacy of this indirect method of managing the environment can be traced back to the 'polluter pays' principle.

A pollution tax is supposed to charge the instigator of the negative external effect with the costs of the damage done. He will bring these costs into the weighing up of the marginal costs and benefits of his production or consumption. The activity that causes the negative external effects will be pushed back to the point where the marginal benefits of the external effect for the instigator equal the marginal costs of the external effect on account of the damage to be compensated.

An argument in favour of levies is that the market is left intact as a transaction mechanism. A bureaucratic apparatus as required for public law regulations, information gathering, legislation, implementation and checks can be omitted. Baumol and Oates (1989: 163-165)

argue that the use of charges enables environmental goals to be reached at the lowest cost. A condition for this *lowest cost property* is that firms minimize their costs at every output level and that the market prices of inputs reflect the 'opportunity costs'.

However, a system of charges is not without problems. It also requires information on the existing volume of damage, the different alternatives to damage limitation, prevented damages and their evaluation and the spread of damage (Siebert, 1987: 102). Furthermore, various activities or pollutants interact, which means that the consequences of one pollutant cannot simply be added to the consequences of another activity. The problem of deficient ecological knowledge comes on top of this. In many cases no direct link can be found between emissions and concentrations of pollutants in the environment. An iterative process of trial and error is often used to find the suitable and the correct level of the tax.

2.3.5 Government provisions

If government intervention is considered necessary because of market failure, the question arises to what extent? The whole spectrum of possibilities ranges from **the polar case** 'public production or in-house production by the government' to **the other polar case** 'only a contribution in costs of the provision by private production'. For purely public goods, it is reasonable to expect that ownership, planning, management, financing and production are in government hands. This is the most comprehensive form of government intervention. Decision making, financing, implementation and exploitation are in the hands of the government, which thereby secures scarce means with alternative uses: land, labour and capital, and produces goods and services with these. This is called *in-house production of the government*. Services which the government carries out, in practice, cover the whole spectrum from purely public goods to purely individual goods and services. However, in case of impure public goods or private goods the type of provision should depend on efficiency and redistribution motives (cf. Rosen, 1995: 55).

In most EU- countries the government plays an important role in preserving nature and landscape by having ownership, planning, management, financing and production of forest and nature in its own hands. The used governance structure is in this case in-house production of the government. Governance structures support transactions and are mechanisms for co-ordinating of transactions. The polar cases of governance structures are markets and organisations based on authority, also called hierarchies. In markets, co-ordination is based on prices, while in hierarchies, it is based on authority. Between those governance structures we have hybrid forms. Hybrid forms contain co-ordination mechanisms based on co-operative exchange, like contracts, clubs and so on. **Agri-environmental schemes in the forms of contracts belong to the hybrids.** Public production or in-house production by the government belongs to the governance structure *organisations based on authority*. This unified ownership or do-it-yourself by government can be seen as an alternative to private provision by contracts with land owners or farmers.

Private provision by contracts with private land owners and farmers means that, if the good is to be privately provided, the government has to decide whether to: (a) contract directly for the production of the commodity and retain responsibility for distributing goods; (b) provide a subsidy to producers, with the hope that some of the benefits will be passed on to consumers through lower prices; or (c) provide a subsidy to consumers (Stiglitz, 1986: 203). **However, for agri-environmental schemes only (a) or (b) are relevant.**

In the remainder part of this Section we will compare the governance structures 'public provision' and 'contracting out'. **The reason is that the agri-environmental schemes are for a large part contracts between the government and farmers. The instruments used in these contracts are rules and subsidies. The rules involve a loss in property rights.** We will analyse in more detail contracts in Chapter 3.

As said unified ownership or do-it-yourself (by government or nature conservation organizations) can be an alternative to private provision by contracts with farmers. The choice between in-house provision and contracting-out has proven to be controversial. Hart et al. (1997: 1127- 1161) have developed a theory of government ownership and contracting that throws light on the cost and the quality of the service under alternative provision schemes. In their model, the provider of the service - whether a government employee or a private contractor - can invest time to either improve the quality of the service or to reduce its costs.

Both types of improvements prior to implementation require the approval of the owner of the asset. If the provider is a government employee, he or she needs the government's approval to implement either improvement, since the government retains residual control rights over the asset. As a result, the employee receives only a fraction of the return of either the cost reduction or the quality improvement. By contrast, if the provider is a private contractor, he or she has the residual control rights over the asset, and hence does not need to get government approval for a cost reduction. At the same time, if a private contractor wants to improve quality and get a higher payment, he needs to renegotiate with the government since the government is the buyer. As a consequence, the private contractor generally has a stronger incentive to reduce costs as well as to improve quality compared to the government employee (Hart, et al., 1997: 1129).

There are two situations in which direct government production is likely to be superior (Shleifer, 1998: 13; Van Damme, 1998: 811). In the first situation, the government may not know what it wants. In that case, a contract will be very incomplete and the costs associated with renegotiations are considerable, so that contracting becomes very expensive. The second situation arises if the contract party has a strong tendency to reduce costs, but this is accompanied by a reduction in (non-contractible) quality. The adverse effect of cost reduction on quality is significant (see also Hart et al., 1997: 1142). In both situations government production is likely to be a better solution. However, in general, both situations do not apply to preserving nature and landscape, the quality of soil, water and air, and the loss of typical rural landscape.

For example, if more nature is wanted, agricultural land on a large scale could be converted into nature areas. However, if the government does this, there are not only important financial and economic consequences (cf. Oskam and Slangen, 1998: 129), but it also has negative effects on rural employment and income and it will lead to a loss in typical rural landscapes. It means it is not only a very expensive alternative to contracts with farmers, but it creates the problem of government failure, which is in the domain of public choice theory. This theory emphasizes the self-interest of politicians and bureaucrats as an important factor in understanding government failure. However, a complete theory of non-market failure also requires consideration of the internal organization of the government. According to Laffont and Martimort (1998: 674, 683), the regulatory rights and the design of communication channels between the regulatory hierarchy and the interest groups both affect the behaviour of

the government agencies. Different institutional arrangements affect economic efficiency and the distribution of rents induced in the economy.

With regards to contracting out, agreements for preserving wildlife and landscape with farmers are a second-best solution (see also Slangen, 1997: 152), because these are incomplete contracts. These types of contracts involve hidden information and hidden actions. Most of the contracts for preserving wildlife and landscape are neo-classical contracts. One characteristic of neo-classical contracts is the restricted role of prices as a factor of adjustment. This is caused by the presence of specific assets, while complete self-enforcing safeguards are difficult to implement. We will come back on these issues in more detail in Chapter 3. Combined these factors have consequences for the usefulness of the role of the price mechanism for setting the price of these contracts. In the governance structure 'market', price is used as the coordination mechanism. For contracts between government and farmers the role of prices as coordination mechanism is more restricted. Other aspects like the rules of the government in the AES are also important for allocation, quantity etc.

Usually farmers combine assets like land, labour and capital with purchased inputs to produce agricultural products. To maintain the quality of wildlife and landscape it could be necessary to reduce the intensity of some of these inputs while using more of certain other inputs. Depending on the setting, there are different types and levels of opportunity costs (based on dose-response methods, replacement cost, alternative costs, and substitute costs). All these opportunity costs share a common trait in that they do not value a commodity via a demand curve (Marshallian or Hicksian) and therefore fail to reveal 'true' valuation information and welfare effects. However, these methods are still useful heuristic tools in any cost-benefit analysis of projects, policy or action (cf. Perman, et al., 2003: 339-440).

2.4 Summary and conclusion

Preserving nature and landscape, the quality of water, soil, air, and the typical rural landscapes is one of the major contemporary challenges for developed countries. Agriculture and forestry, occupying most of the rural land throughout Europe, are activities that have a major influence on the European rural environment and landscape. The European countryside is mainly man-made, resulting from centuries of management of rural areas for food, raw materials, and ornamental plants. As long as agricultural operations were relatively small in scale, before mechanisation, scale enlargement, and the increased use of external inputs, there was a degree of harmony between agriculture and the countryside in which it operated.

After 1960, the rising cost of labour induced labour-saving and production-enhancing techniques that increased agricultural output and helped the dwindling numbers of farmers achieve incomes levels comparable to those outside the agriculture sector. It resulted in a strong mechanization, intensifying of land-use, strong specialization, farm and scale enlargement and increased use of non-factor inputs, such as concentrate and compound feed, fertilizers and pesticides. The side-effects of these factors have led to a threatening of the quality of water, soil, air, nature and landscape.

In the same period in which European agriculture underwent drastic structural changes, public demand for environmental goods - especially for nature and landscape and facilities for outdoor recreation rose significantly. In other words, whereas rural landscapes were losing

many of their attractive features, the general public's appreciation and at the same the public concern about these landscapes was growing.

This public good dilemma of environmental goods - decreased supply and increased demand - has gained increasing importance as an item of policy. This reflects the shift in the emphasis of consumer concerns from that of securing adequate food supply towards taking a greater interest in nature and landscape and rural amenities. Governments have introduced policies not only to persuade farmers, as the custodians of rural resources, to contribute positively to the preservation of nature and landscape but also to avert further degradation.

This shift in emphasis is obviously a result of a change in preferences of the consumers. This also means a shift in the reference level about what should agriculture be and how should it be done in practice. A change in reference level involves that more property rights of environmental goods than in the past will be situated in the public domain. This has consequences for the allocation and the quality of the property rights for farmers. Farmers will say: *this is my land; I have the full property rights*. However, through the characteristics - non-rivalry and (to a certain extent) non-excludability - environmental goods, such nature and landscape, are not private goods. Citizens will for this reason, and also because of shifting of property rights, say: *it is our wildlife and landscape*.

With failure of the markets to preserving nature and landscape, the quality of water, soil, air, and the typical rural landscapes the question arises do we need government intervention and what type? Market failure is a reason for government intervention. Government intervention does not necessarily mean that the government deals with all the aspects that can be distinguished in the production of goods and services. The most encompassing way of government intervention takes place when ownership, management, financing and production are in government hands. However, it is only for purely public goods that it is reasonable to expect that ownership, management, financing and production are all organised by the government.

For preserving the quality of water, soil, air, nature and landscape the government has a broad range of instruments at its disposal. The instruments can be grouped in: (1) research, extension, education and persuasion; (2) direct regulations (rules of laws), e.g. cross compliance; (3) fiscal facilities; (4) subsidies and levies (taxes); (5) government provisions. Although all the instruments can be seen as government provisions, we interpret here government provisions as the range of interventions with 'public production or in-house production by the government' at the one hand of the spectrum and 'provision by private production by concluding contracts' with farmer or other private land owners at the other hand. In-house production of the government is only preferable (1) if the government does not know what it wants and (2) if the contract party has a strong tendency to reduce costs, but this is accompanied by a reduction in (non-contractible) quality. However, public provision of nature and landscape - instead of contracting out - will not only have important financial and economic consequences, but also negative effects on rural employment and income as well as lead to a loss in typical rural landscapes.

Contracting out is not without problems. It is a second best solution, because of the incompleteness of contracts. Such contracts are vulnerable for hidden information, hidden actions and lack of credible commitments. Other important questions with contracting are: (1) who will be involved as contract partner: which farmers, which group of farmers or which NGOs; (2) what are the targeted areas; (3) for what: water quality, erosion or landscape

elements; (4) which types of contract: short or long term, detailed or flexible; (5) what type of coordination mechanism will used: only the price or rules and directives also?

3. Framework for analysing contract design and implementation

3.1 Introduction

The purpose of this chapter is to develop a framework for analysing the characteristics, design and implementation of AESs. In section 3.2 we first analyse whether we can see AESs as contracts and which type of contract. Second, we show that AESs are incomplete contracts. Third, based on a number of key elements we make clear that AESs are neoclassical contracts. Fourth, contracts have some properties such as voluntary exchange, having coordination and motivation elements, implicit or explicit agreements, are detailed or on general in terms of goals and objectives. We test these properties on AESs. Fifth, we will give an overview of ways or design principles for reducing of contractual failures of AESs.

In section 3.3 we present a description of the design and implementation of AESs through the years in the EU. In Section 3.4 we will present a framework for analysing AESs. The framework consists of the properties of AESs as contracts, the design principles for reducing contractual failures and the criteria for policy analysis for AESs in practice. These three toolboxes together form a comprehensive framework for analysing AESs as contracts. Section 3.5 concludes the chapter with a summary and some conclusions

3.2 Contract design: types and properties

3.2.1 AES are incomplete contracts

Any transaction which is of the type "You scratch my back, I'll scratch yours" – or as a *quid pro quo* – can be considered as a form of contract. When there is a long term relation or a long duration between purchase and delivery (*quid* and *quo*), a contract is an essential element of the transaction relation (Hart and Holmström, 1987: 71). **The argument of the relative long duration of transaction certainly holds for agri-environmental schemes.**

Just as with the market, we can also start analysing contracts from an ideal-typical situation. That is a perfect contract. This is a complete contract which can solve all the coordination and motivation problems. In an ideal situation there are no problems about property rights. A complete contract specifies what each party is to do in every possible situation, and arranges the distribution of realized costs and benefits in each contingency so that each party individually finds it optimal to abide by the contract's terms (Milgrom and Roberts, 1992: 127).

Every contingency is anticipated, all relevant information is available, and all risks involved in the contract are divided up in an optimal manner among the contracting parties, at lowest costs (cf. Cooter en Ulen, 1997: 186). If the original plan is efficient then the complete contract implements it and brings about an efficient result. Such a contract is considered to be complete because, when signed, it can be immediately implemented. All the ordinances in the contract are verifiable, so that one of the parties can call upon a third party, for example a judge, to enforce the contract.

However, in reality due to a number of reasons, most contracts are incomplete. It is too costly - and sometimes even impossible - to take all contingencies into account, to work out a plan as to when a certain contingency will occur, to check if the other party keeps the agreement,

and to monitor the conduct of the other party. Furthermore, the enforcement of contracts can be costly. In short, incomplete contracts arise as a result of lack of information (hidden information and hidden actions), bounded rationality and the high transaction costs of obtaining all the required information, and of perfectly monitoring and enforcing the agreements. **This means that agri-environmental schemes are incomplete contracts and for that reason a *second-best* solution.**

3.2.2 Types of contracts

In order to decide to which type of contract agri-environmental schemes belongs, we will present an analytical framework in Figure 3.1. Lyons and Metha (1997: 48), on the basis of the work of Macniel (1979), distinguish three types of contracts: classical, neo-classical and relational. The emphasis here is on the duration, the nature of the coordination mechanism, the nature of the contracting parties and their mutual relationship keeping in mind the process of exchange in the future. According to Deakin and Mitchie (1997: 11), this typifying provides a basis for a theory explaining **contract form, duration**, and the **distribution of power** (control rights) in the relationship, **contractual duties** and **enforcement**. Lyons and Metha (1997: 49) make use of five key elements which characterise the three types of contracts. Box 3.1 gives an overview of the five key elements:

Box 3.1 Five key elements for classifying contracts

Classical contract

- The identities and personal characteristics of the parties are irrelevant
- A discrete exchange or transaction is specified
- Contingencies and/or unexpected events, and penalties for non-performance are specified
- Written documents overrule any verbal agreement
- Court of law arbitrates in the case of difference of opinion or in the event of disagreement

Neo-classical contract

- The identities of parties is of importance/ matters
- Usually is of fixed duration. Normally it specifies a fixed duration (and /or task to be completed)
- It is accepted that not all unexpected events can be specified (or accepted that not all contingencies can be specified)
- Written documentation provide the status quo basis for further negotiation
- Arbitration procedures exist in case of differences in opinion or dispute

Relational contract

- The identities and personal characteristics of the parties are crucial
- It is often of unspecified duration (or normally indeterminate duration)
- Norms of behavior, or shared codes of conduct specify the reaction to new developments, or inform responses to new developments as they unfold
- Written documentation is used as an official document of agreement, or is treated as a record of what has been agreed
- Values and norms of behavior, or shared codes conduct are of greater importance than written documents in case of differences in opinion. They overrule written documents in settling disputes

Source: Lyons and Metha (1997: 49)

A first important difference between the three types of contracts is **identity** and **personal characteristics** of the partners. The identity and the personal characteristics of the contracting parties are for the classical contract not important, but are for relational contracts crucial. The classical contract usually involves discrete or one-term transactions with a low degree of *asset specificity*, *uncertainty*, *frequency* and *connectedness*, and *performances* are easily to measure. This is justified by 'identity does not matter'. The low frequency shows that little or no repetition of the transaction is to be expected. The short term orientation of the classical contract means that all future rights and duties of the concerned parties are completely returned, or do not exist. Further, the absence of relation specific investment means that opportunistic behaviour can be effectively countered by the threat of exclusion (exit) from the market or appeal to a court of law (cf. Deakin en Mitchie, 1997: 11).

A second difference is the **duration**. The duration of the relationship in a classical contract is specified, but it remains unspecified in a relational contract, or it is even infinitive. The duration of a classical contract can be extremely short, like a transaction on a spot-market. The duration of neoclassical contracts is in-between the classical and relational contract.

A third difference is the focus on how people are expected to deal with an unexpected event or with **contingencies**. This is especially important in situations with relation-specific investments. In that case we have to deal with asset specificity. If investments are relation-specific, then the usefulness of the classical contract is limited, or even ineffective and inefficient. Agri-environmental schemes are often characterised by relation-specific investments. Box 3.2 gives some examples of asset specific investments.

Box 3.2 Asset specificity and nature and landscape preservation

Asset specificity refers to the degree to which an asset is committed to a specific task, and thus cannot be redeployed to alternative uses without sacrificing the majority of its value. For example, for nature conservation the following three types of asset specificity are relevant:

1. Site specificity, which refers to an asset that becomes committed to a particular use owing to its location. The land used for preserving wildlife and landscape, because of its 'use' but also because of its 'site', is asset specific. Valuable areas for wildlife and landscape are immobile and location tied (that is tied to a particular area).
2. Physical asset specificity, such as investments in machinery, equipment or land, and one that has a narrowly defined purpose. Investments in land or in machines used for wildlife and landscape preservation have a narrowly defined purpose, and are sunken investments.
3. Human asset specificity that arises through learning-by-doing. Preserving wildlife and landscape is a process of learning-by-doing; it requires an investment in human capital and time.

A fourth difference is related to the procedure to be followed in case of conflict of opinion, with neo-classical contracts specifying an arbitration procedure in anticipation of problems in dealing with changing circumstances (cf. Lyons en Metha, 1997: 49). Relational contracting is characterised by the substitution of the legal system, and its associated formal documents remain more in the background due to the use of informal agreements such as verbal promises, *letters of intent*, or *gentleman's agreements*. The identities and the attributes of the contracting parties are of considerable importance. Values and norms of behaviour, shared codes conduct, reputation, trustworthiness and the relationship itself are of greater importance

than written documents in case of differences in opinion. They overrule written documents in settling disputes. The success of the transaction depends on the extent to which both parties can trust each other, refrain from opportunistic behavior and rely on co-operative behaviour in the event of unexpected events (cf. Lyons en Metha, 1997: 51).

Based on the criteria of a classical contract we can investigate whether agri-environmental schemes comply with these criteria. The classical contract is “*everything included*” or *complete*. The performance and counter performance are determined ex-ante, and all the provisions for all events are specified for the duration of the contract. There are no specific investments made and there is no particular virtue in continuing the (business) relationship. Concerns which remain open for the parties are covered by contract laws (rights). It would not matter if problems were ultimately resolved by court action (cf. Lyons en Metha, 1997: 51). The beginning and end of the contract are clearly defined. This concept of the classical contract is also used in standard neo-classical economic theory. The ideal type of the *complete contract* can be seen as a consequence of the model of the perfect working market where personal relations play no role (cf. Furubotn and Richter, 1997: 142). **It is clear that agri-environmental schemes are not classical contracts.**

Next we can - based on the criteria of relational contracts - investigate whether agri-environmental schemes comply with these criteria. Relational contracting is characterised by the substitution of the legal system, and its associated formal documents remain more in the background due to the use of informal agreements such as verbal promises, *letters of intent*, or *gentleman’s agreements*. The relationship itself is often of greater importance than the content of the contract and the written documents of the contract in case of differences in opinion. In a *relational contract*, it is recognised that there are gaps in the agreement. Relational issues, commitment and trustworthiness can overcome these problems. **However, these criteria of relational contracts mostly do not comply with agri-environmental schemes.**

One characteristic of neo-classical contracts is the restricted role of prices as a factor of adjustment. This is caused by the presence of specific assets, while complete self-enforcing safeguards are difficult to implement. These factors when combined have consequences for the usefulness of the role of the price mechanism to set the price of these contracts. In the case of classical contracts the market is suitable as governance structure and can be used to set the price.

Based on the key characteristics of classical, neo-classical and relational contracts, we present in Figure 3.1 a framework for classifying and analysing contracts. The key characteristics are: duration of the contract, identity of the parties concerned, role of price as co-ordination mechanism, special characteristics of the object (degree of *asset specificity* or transaction-specific investment) and the importance of specific guarantees. These characteristics are inter-related. For example, the importance of specific safeguards increases with a rise in the asset specificity. This framework can be applied in many fields, such as land use contracts, management agreements, franchisor-franchisee relationships, agri-environmental schemes, and so on, sometimes requiring only minor adjustments.

At one end of the spectrum, we have the classical contracts, and at the other end, the relational contracts. On the left side we have the classical contract for which the price is the most important coordination mechanism. The identity of the partner is not relevant. Duration is short, and asset specificity is small. Safeguards are not important. Shifting from left to right

the role of the price as a coordination mechanism becomes less important and other elements are becoming more important.

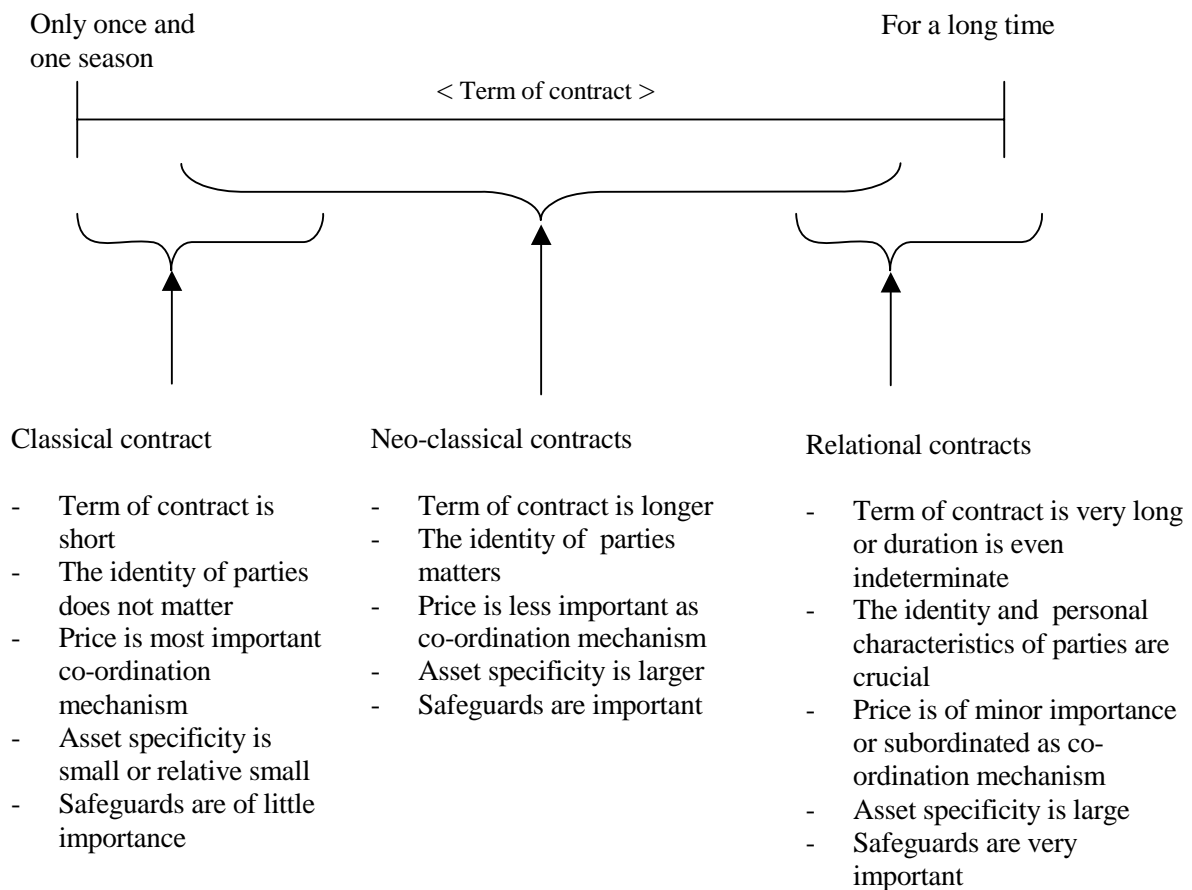


Figure 3.1: The spectrum of contracts

A **classical contract** is of short duration, and the identity of the parties and personal characteristics are of no importance. The duration of the relationship in a classical contract is specified, but it remains unspecified in a relational contract, or it is even infinite. The duration of a classical contract can be extremely short, such as with the spot-market. Transactions, which take place in a similarly as in the spot market, can be considered as classical contracts. In the classical contract, the price is the most important co-ordination mechanism (cf. Menard, 1996: 157). In general, the prices will be relatively high. Safeguards and written procedures are of limited meaning here. The economic advantage for both parties is the driving power of the transaction. For agri-environment schemes this type of contract is unsuitable, and likewise for land which requires careful handling (heavy clay or peat), or where careful management is necessary because of the quality of wildlife and landscape.

The duration of **neoclassical contracts** is in-between the classical and relational contract. It can be a yearly repeated contract, or a contract for a longer period. The identity and personal

characteristics of the parties matter and are important. Where contracting parties make to make relation-specific investments – like farmers in agri-environmental schemes - which can not be redeployed at low cost, neoclassical contract are more suitable, effective and efficient. Earlier, we presented in Box 3.2 an overview of the different types of relation-specific investments. Some provisions in the contract are necessary, like longer duration and safeguards. Otherwise these investments in land, nature and landscape will not take place and a *hold-up problem* arises⁴. As a result, there will be no efficient agri-environmental schemes practices, and socially optimal land-use will not be made. The longer period of contract can limit the threat of opportunism by the other since this would mean foregoing the chance to realise relation- specific investments. **The role of norms of behaviour, shared codes of conduct, trustworthiness, reputation becomes more important.**

As investments in land, nature and landscape increases, there will be a greater need for safeguards in the form of written documentation and legal rules as protection against lock-in⁵ effects. Safeguards in the form of written documentation are also needed in the case of land which requires careful treatment (heavy clay or peat) or for management of wildlife and landscape. Further, there is a need for an arbitration procedure or a conflict-solving mechanism in case of disputes. Price as a co-ordination mechanism is less important here as compared to the classical contract. As special characteristics increase (e.g. level of asset specificity or the relation-specific investment), the importance of 'safeguards clauses' increases, while that of the price as co-ordination mechanism declines.

On the other side of the spectrum is the **relational contract**. The duration of a relational contract is left unspecified, but the identity and the personal characteristics are obviously of importance here. These contracts are intended for long term relationships. The price as co-ordination mechanism plays a subordinate role in the partnership. In classical contracts written documents overrule any verbal agreement, in the neoclassical it provides a basis for further negotiations, while in the relational contract it is used as an official document of agreement. However, an important difference is that in the relational contract, the relationship is often more important than the content of the contract (for example, a marriage contract).

In the case of a relational contract the relationship itself could be even more important than the content of the contract (as a marriage). Contracts at the *relational* side of spectrum include strong personal involvement, have a long duration, and anticipate the possibility of events as a normal part of the continuing association between the parties. Marriages and long-term labour relations are examples of relational contracts (cf. Furubotn en Richter, 1997: 143).

A mentioned earlier, agreements for preserving wildlife and landscape with farmers are - because of their incompleteness - a second-best solution (see also Slangen, 1997: 152), These types of contracts involve hidden information and hidden actions. **Based on the five key elements and characteristics of classical and relational contracts it can be concluded that the agri-environmental schemes belong to neoclassical contracts.** Weak management agreements like the 'less favoured areas' agreements or simple maintenance agreements could have elements of, or have the character of a classical contract. In the case of one precisely

⁴ The possibility of hold-up arises in every contractual relationship which is incomplete. The reasons may be diverse. As soon as a person has selected a specific technology or relationship, the discontinuation or termination of the relationship can be extremely expensive. Further, as a result of unforeseen circumstances, the position of one of the parties in the contractual relationship can result in a deterioration or change in the negotiation position of the parties over time. Termination of the relationship can indeed be costly.

⁵ Lock-in effects mean that your alternatives are strongly reduced. It can be the result of being held-up. It is an ex-post phenomenon, while hold- up more an ex- ante problem is.

defined task (e.g. grazing animals on land for a specified period), classical contracts appear appropriate. However, for packages of tasks, neo-contracts are more suitable.

One characteristic of neo-classical contracts is the restricted role of prices as a factor of adjustment. This is caused by the presence of specific assets, while complete self-enforcing safeguards are difficult to implement. Combined, these factors have consequences for the usefulness of the role of the price mechanism for setting the price of these contracts, and with that of the role of the price as coordination and motivation mechanism.

3.2.3 Properties of agri-environmental schemes as contracts

A contract is a commitment to a mutual agreement which is enforceable and recognised by non-interested third parties. In general, a contract specifies the actions each party will take (for example the delivery of a good or service by one party and the payment to be made by the other party) and may assign decision-making powers (cf. FitzRoy et al., 1998: 232). Contracts can be verbal or written and possess the following properties:

First, the closing of a contract is a *voluntary exchange*. Because it is voluntary, it is only accepted if the expected result of the agreement is individually and mutually advantageous for both parties (Milgrom and Roberts, 1992: 127). **Most of the agri-environmental schemes are voluntary.** The *voluntary exchange* is an important difference with cross-compliance.

Second, they contain a coordination mechanism. Figure 3.2 gives an overview of four groups of coordination mechanisms (cf. *Borgen and Hegrenes, 2005: 12*). On the left side we have the 'invisible hand' group. The coordination mechanism here is the price. This is the coordination mechanism for governance structure the 'spot market'. At the bottom of Figure 3.2 we have 'handbook' group. In this case the coordination mechanism consists of rules, directives and safeguards. The 'handbook' as a coordination mechanism is often used for the governance structure 'contracts'. For detailed contracts the emphasis is on the handbook. However, too much emphasis on the handbook allows distrust to develop among the contracting parties; contracts are becoming solidified distrust. For this reason, contracts often also contain a price as a coordination mechanism. In that case, the coordination mechanism of contracts consists of combination of 'handbook' and 'invisible hand'. In general, the type of contract determines which coordination mechanism will prevail and what the role of the price will be in the relationship *quid pro quo*. Price could be a compensation (counter performance) or an incentive mechanism.

At right side of Figure 3.2 we have the 'visible hand' group that is used in firms and organisations based on hierarchy. By hierarchy we mean that the positions in the firm are ranked; higher order level commands lower level. In this case, the coordination will be carried out by authority or direct supervision. These coordination mechanisms are not relevant for contracts in general, and AESs especially. After all, farmers have their own farm and are not vertically integrated with the government. Both parties - the farmers and government – retain their separate external identity.

At the top of Figure 3.2 we have the 'handshake' as coordination mechanism. Important elements are common values and norms, and mutual adjustment. Common values and norms pertain to a congruent set of preferences within a group of people. They form co-ordination principles that guide a group or community. Such a group can range from a family to a club,

from a church to a volunteer group or team of people working towards a common goal⁶. Common values and norms (based on repeated interaction promoting solidarity, consensus and trust) and codes of conduct can serve as co-ordination mechanism to groups of people.

Standardisation of norms and values means shared codes of conduct usually for the entire organisation, so that everyone functions according to the same norms of behaviour. The motivation, trust and commitment underlying the operation of this organisation can be understood as evolving from the standardisation of values and norms or shared codes of conduct through selection (see Douma and Schreuder, 2002: 171).

Mutual adjustment refers to the co-ordination achieved by informal horizontal communication. Small organisations, such as partnership, consultancy firms, architectural bureaus, can rely on mutual adjustment as the main coordination mechanism. By doing so, it can maintain a spirit of innovation (cf. Douma and Schreuder, 2002: 42). Mutual adjustment is also the important coordination mechanism in a group of people working together without hierarchy. There is no boss, so there can be no direct supervision. An applied example is here are farmers working together in activities for preserving wildlife and landscape and the coordination is carried out by (informal) horizontal communication, such as the environmental co-operatives of farmers in the Netherlands.

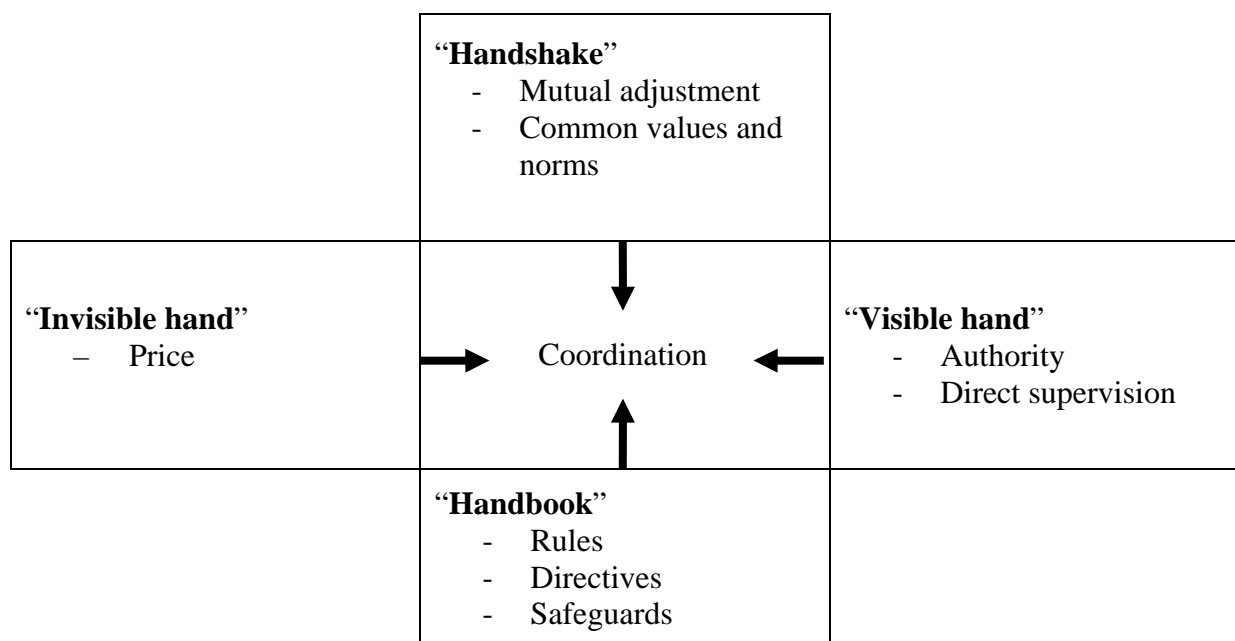


Figure 3.2: Coordination mechanisms (adapted from Borgen and Hegrenes, 2005:12)

The coordination mechanism is not the same for classical, neoclassical and relational contracts. In the classical contract the price is most important coordination mechanism (“invisible hand”). For the neoclassical contract, the price as a co-ordination mechanism is less important, compared to the classical contract (combination of “Invisible hand”, “Handshake” and “Handbook”). The price as co-ordination mechanism often plays a

⁶ Repeated interaction promotes solidarity, consensus, trust, and common values and norms in a group. Therefore common values and norms, and codes of conduct can serve as co-ordination mechanism to groups of people. Effective co-ordination based on common values and norms coincides with a strong motivation and high commitment of individual members of a group to achieve their common goal (CPB, 1997: 55).

subordinate role in relational contracts and in such contract the relationship itself could even be more important than the content of the contract (as with a marriage). **For that reason an important question will be what are the most important coordination mechanisms of AESs?**

The **next** property of contracts concerns motivation. Motivation questions arise because individuals have their own private interests, which seldom correspond perfectly to the interests of other parties, the group to which the individuals belong or the society as a whole. Such problems arise because specific plans cannot be described in a complete enforceable contract (Milgrom en Roberts (1992: 126- 127).

Hence, the **third** property of contracts is that they contain a *motivation-element*. Many contracts contain a steering mechanism which defines performance criteria and the means to measure the performance. Motivation is included in the specification of a reward-structure which marks the level of payment if a minimum level of performance is attained. The motivation elements are mostly not the same for classical, neoclassical and relational contracts. Performance-based pays fit well with classical and (may be to a lesser extent) with neo-classical contracts, but hardly or not with relational contracts. Trustworthiness, reputation and career concerns are more important for neo-classical contracts and especially for relational contracts.

In the psychological literature it is argued that there are two kinds of motivations: intrinsic or internal to the individual concerned and one extrinsic or external. The pressure or feelings to do your work well does often so much not arise from financial incentives but from internal motivation. It is also argued that there may be a trade-off between the two kinds of motivation, such that too heavy emphasis on extrinsic motivation can drive out intrinsic motivation. So motivations activated by external factors, such as monetary incentives or direct order (as in hierarchical governance structure), can crowd out motivations that are internal to the individual, such as more **altruistic concerns** (Le Grand, 2003:53).

As said, one of the characteristics of neo-classical contracts is the restricted role of prices as a factor of adjustment. This is caused by the presence of specific assets, while complete self-enforcing safeguards are difficult to implement. These factors have consequences for the role of the price mechanism for setting the price of these contracts, and with that of the role of the price as coordination and motivation mechanism. Most of agri-environmental schemes have a flat rate per ha as reward-structure. **The question will be what are the most important motivation elements of AESs?**

The **fourth** characteristic of contracts is that the set of agreements in a contract can be **explicit** or **implicit**. An explicit contract is one in which there is a written document about the agreement. An implicit contract is one which has no formal record of the terms and conditions agreed upon by the parties. Such contracts are enforceable by the *reputation-mechanism* (Milgrom and Roberts, 1992: 139, 259). This raises the question whether and when a party is able and in a situation to develop and maintain a desired *reputation*. A party with a short-term horizon is less willing to invest in a reputation than a party with a longer-term horizon. Therefore reputation is less important for classical contracts. Similarly, investing in a reputation at the beginning of a game is more attractive than at the end. However, in order to build a reputation, the game has to be played several times. **The set of agreements in agri-environmental schemes are mostly explicit.**

The **fifth** characteristic of contracts is that the relationship in a contract is often more important than in a market transaction. Contracts are mostly incomplete and often relational in nature. Relational contracting means that the impossible task of setting up a complete contract is not attempted. Instead an agreement is set up which frames the relationship. The parties do not agree on detailed plans of action (Milgrom and Roberts, 1992: 131) but rather:

- on goals and objectives;
- on general provisions that are broadly applicable;
- on the criteria to be used in deciding what to do when unforeseen contingencies arise;
- on who has what power to act and the bounds limiting the range of actions than can be taken; and
- on dispute resolution mechanisms to be used if disagreements do occur (Milgrom and Roberts, 1992: 131).

Such contracts can in fact work quite effectively; at least when the potential conflicts are not too great and the parties are not inclined to be opportunistic in their dealings with on another (Milgrom and Roberts, 1992: 131). Of course, such contracts could be relational contracts only. **These conditions do not apply for agri-environmental schemes. On the contrary, farmers have often to deal with detailed plans and regulations. Flexibility is hardly present. This means that the content of the contract is considered as more important than the relationship.**

Based on these five properties we can observe that coordination and motivation are very important properties of contracts. AES as contracts are mainly based on the 'handbook' approach to contracting. However, too detailed and formal contracts may seriously inhibit the growth of trust and will lead to high transaction costs. Particularly in the field of preserving environmental goods, a more innovative approach is necessary. One must seek recourse to alternatives, more based on the 'handshake' as coordination mechanism and reputation mechanism (cf. Nooteboom, 1999: 55)

3.2.4 Design principles for reducing of contractual failures of agri-environmental schemes

Agreements for preserving wildlife and landscape with farmers are incomplete contracts. These types of contracts involve hidden information, hidden actions, and lack of credible commitment. The problem of hidden information can be reduced by 'building-in' self-selection conditions into the contract. For example, farmers may have to follow courses about wildlife management, or voluntarily become members of an environmental co-operative with membership dues. The problem of hidden actions could be resolved by monitoring or incentive contracts. An alternative solution is to require posting of bonds to guarantee performance, which can be paid back if the performance is satisfactory or if targets are reached. Using such solutions may still lead to incomplete contracts, but some self-enforcing elements could be incorporated. The problem of lack of credible commitment can be solved by making use monitoring, graduated sanctions and conflict resolving mechanisms. In this section we will give a systematic overview of what could be helpful for effective and efficient contracts for agri-environmental schemes, or more in general for reducing contractual failure.

Bounded rationality, the chance of opportunistic behavior, hidden information, hidden actions, lack of credible commitment and lack of trust between people – in the case of AESs between farmers and the government - mean that we have to develop design principles. Design principles discipline people, firms, organizations and the government, and reduce the

undesirable effects of above mentioned phenomena. They are essential elements or conditions that help to account for effective and efficient contracts.

Figure 3.3 gives an overview - based on the literature and theory – of *design principles* or mechanisms for reducing the effects of hidden actions (adverse selection), hidden information (moral hazard), shirking⁷, lack of credible commitment and trust. In other words these are mechanisms for dealing with contractual failures as result of the incomplete contracts. As shown in Figure 3.3, there is some overlap in the various ways for reducing the effects and some methods can be used for different phenomena. The list is not exhaustive, but reflects the most important principles.

An analysis can be made to determine in which way and on what level environmental measurements (instruments/arrangements) take into account the *design principles* for reducing hidden actions (adverse selection), hidden information (moral hazard), shirking, lack of credible commitment and trust. A relevant question is to what extent do parties involved in designing AES make use of design principles for reducing the effects indicated in figure 3.3?

The effects indicated in Figure 3.3 (*hidden information, hidden actions, shirking, lack of credible commitment, and trust*) result from incomplete contracting. Incomplete contracts⁸ mostly involve hidden information and hidden actions. Hidden information is an ex-ante information problem and can lead to adverse selection. For example, in the case of membership of an environmental co-operative, the board of the environmental co-operative does not know if one of the (potential) members possesses private information which, if known to the environmental co-operative, would influence the attitude and conduct of the board. Ways in which the problem of hidden information can be reduced are *signalling, screening* and *self-selection conditions*. We call these ways design principles.

⁷ Shirking is a form of hidden action, but the term shirking is sometimes more connected with team production.

⁸ *Incomplete* contracts are contracts that do not try to take into account all future contingencies, because of incomplete foresight of what the future will bring. Incomplete foresight makes it impossible to take all future contingencies into account when writing a contract.

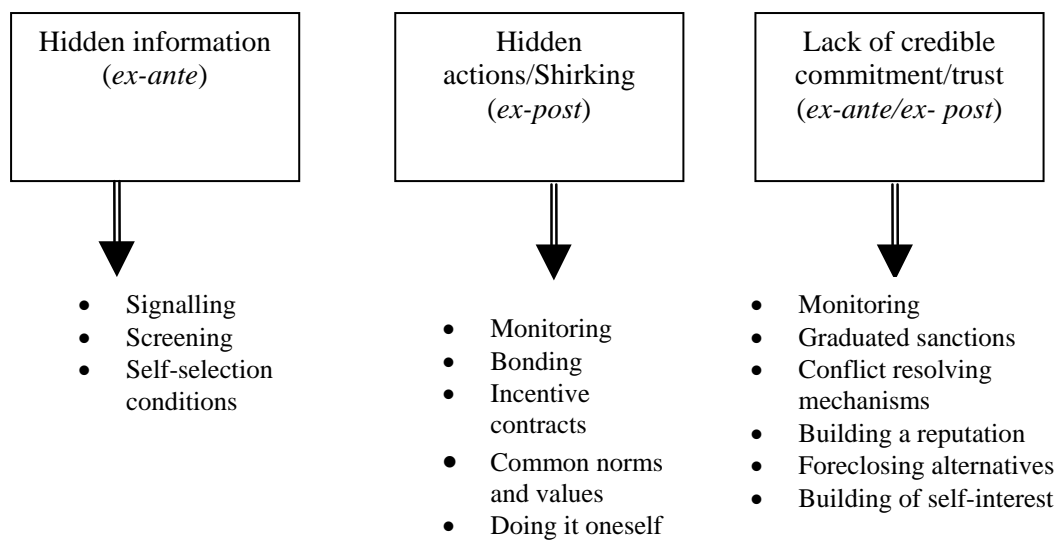


Figure 3.3 Design principles for reducing the effects of hidden information, hidden actions, shirking, lack of credible commitment, and trust

Signalling occurs when the better-informed party makes certain verifiable facts known, which when properly interpreted, may indicate the presence of other unobservable but desirable characteristics. In signalling, the privately informed party takes the lead in adopting behavior that, when properly interpreted, reveals their information. For signalling to be effective, the receiver must believe that the signal is credible. That is, the observable characteristic must clearly point to the unobservable, desirable characteristic. A signal for the qualification of a potential member of an environmental cooperative or a potential contract taker could be his education. For example, has he followed a course in wildlife and habitats management? In order to distinguish themselves as credible candidates for an AES such as a nature management contract with the government, farmers may have to follow courses on wildlife management, or become on a voluntary basis, a member of an environmental co-operative with membership dues.

Screening refers to activities undertaken by the party without private information (mostly the principal) in order to separate different types (agents) of the informed party (= group of agents) along some dimensions. It is the uninformed party who undertakes activities in order to make the informed parties group or sort themselves into separate types. Screening means that one of the contracting partners demands certain elements in the set of observed characteristics that are correlated with unobserved but desirable elements. An example is that for some AES it could be necessary that farmers have followed a course for preserving environmental goods. Screening is in this case a strategy available to an uninformed party (for example, the government) that, if successful, will encourage the better-informed party (for example, the farmer) to reveal information. To allow the informed party to voluntarily reveal his private information, we need an information revealing mechanism.

Simply making known to the relevant group what the organization offers and what it expects can induce some *self-selection* among potential candidate-members. Sometimes this can be a by-product of other policies. Self-selection is usually a type of behavioural response to some screening activity that cause workers to choose from a menu of contracts and sign the one

they like best. To assure that potential candidate-members choose the contracts intended, we need a particular form of the incentive compatibility condition, called *self-selection conditions*. The ‘building-in’ of self-selection conditions in contracts reduces the problem of hidden information.

Second column in Figure 2 refers to hidden actions or shirking. These are ex- post phenomena. The problem of hidden actions or shirking could be reduced by monitoring, incentive contracts, bonding, common norms and values, and in-house production. Monitoring can be carried out in different ways. Self or mutual monitoring by farmers could be a solution. Such a task can be carried out or delegated to group of farmers, e.g. an environmental cooperative. The advantages are reducing transaction costs for government and enhancing the social control among farmers. An alternative would be making use of third parties⁹, such as groups of volunteers of NGOs. In this case it will help the credibility if the third parties consist of experts and are independent. Finally, the monitoring activities can be carried out by the government. However, this involves public transactions costs.

Incentive contracts mean a variable payment depending on the efforts or performances. The incomes become subject to random factors. Most farmers are risk-averse and dislike having their income dependent on random factors. The risk created by incentive contracts is costly to these farmers. They are not well off with a risky income as they would be receiving the same expected level of pay for certain, and they thus have to be paid more on average to convince them to accept these risks. From the government’s perspective, this extra income is a cost of using incentive pay (cf. Milgrom and Roberts, 1992: 187).

A third solution would be to require the posting of bonds to guarantee performance, to be paid back if the performance is satisfactory or if targets are reached. Using such solutions may still lead to incomplete contracts, but some self-enforcing elements will be incorporated. Fourth, in homogeneous groups, the incidence of hidden actions can be reduced by common norms and values. A fifth way to prevent some forms of moral hazard is for the government to do all the work *by himself*; the in-house production by the government variant. This has been discussed in Section 2.3.5.

An important element in co-ordinating and motivating people is commitment. We often have to deal with the problem of imperfect commitment. Imperfect commitment refers to the inability of parties to bind themselves to follow through on threats and promises that they would like to make, but which, having been made, they would later like to renounce. This problem affects both ‘market relationships’ and ‘contractual relationships’, although their nature and impact may differ between organisational forms (cf. Milgrom and Roberts, 1992: 30). However, long-term contractual relationships like AESs require commitment.

It means commitment alone is not enough, it should also be credible. This can be done by making use of the triptych monitoring, sanctions and a conflict- resolving mechanism. It means that the crux for bringing about credible commitment in AESs as contracts are monitoring, graduated sanctions and conflict-resolution mechanisms. However, these activities should be carried out on a low cost level. The role of monitoring and credible commitment should be emphasised: without monitoring there can be no credible commitment; without credible commitment there is no reason to propose new rules. Mutual monitoring or monitoring by volunteers reduces costs. Farmers who violate the rules are likely to be subjected to graduated sanctions, depending on the seriousness and the context of the offence.

⁹ The reported information is some times called ‘fire alarm’

If individuals are going to follow rules over a long period of time, there must be some mechanism for discussion and for resolving what constitutes a conflict or a difference of opinion.

One possibility would be that those who are selected as the leaders are also the basic mediators or resolvers of the conflict (cf. Ostrom, 1990: 94 -101). Another possibility would be **making use of third parties**. To be useful and reliable the third party has to be **independent**, and **an authority or expert**. To make promises trustworthy, credible commitments need to be established. This is not a problem if the courts can make agreements binding, but in many relational contracts, such courts-assured solutions are difficult to bring off (Furubotn and Richter, 1997: 276).

External coercion is also a frequently cited theoretical solution to the problem of commitment. However, in the case of a self-organized group of farmers who would like to take care of the environment - for example an environmental co-operative for farmers - this solution does not address what motivates the external enforcer to monitor behaviour and impose sanctions (cf. Ostrom; 1990: 44). A self-organized group must solve the commitment problem without an external enforcer. The members have to motivate themselves to monitor and be willing to impose graduated sanctions to keep conformance high. They have to be self-motivated to observe agreements without the use of an external enforcer.

According to Ostrom (1990, 1998: 94-100), a self-organised group can monitor itself, administer penalties (graduated sanctions), and provide a conflict-solving mechanism to ensure credible commitment. One condition is that it should be possible to do this at low cost. Ostrom (1990: 45) emphasises **first**, the importance of monitoring in such a group: *without mutual monitoring, there can be no credible commitment*. Monitoring and graduated sanctions should preferably be done not by an external authority but by the participants themselves. Monitoring by subordinates or volunteers keeps costs low. **Second**, the persons who break the rules must be confronted with penalties according to the seriousness (i.e. graduated sanctions) and the context of the offence. **Third**, if individuals must follow rules over a long period of time, there must be a mechanism for discussing and resolving differences in opinion. The presence of a conflict-resolving mechanism provides no guarantee that the individuals will keep to the agreement. However, it is according to Ostrom (1990: 94-100) difficult to imagine how a complex system of rules can be maintained without a conflict-resolution mechanism. Such mechanisms can sometimes be quite informal. **It is remarkable that in all the countries conflict-resolution mechanisms for AESs are missing.**

Reputation is the view formed of an individual or organization by another based on past experience, and used especially as a basis for forecasting future behaviour. In some cases, it is possible that a farmer is able to make known favourable information about him self (e.g. information that he is a desirable contract partner, e.g. a high-quality sustainable farmer, etc). This impression is made credible by actions in an early period of a long run relationship. That is, through time a farmer was able to develop his reputation (cf. Hirschleifer and Riley, 1995: 431).

In an environment of imperfect information in which people fear opportunistic or bad-behaviour, reputation is very important. A good reputation can overcome all the problems of opportunistic behaviour, while a bad reputation increases the chance of opportunistic behavior and hold- up problems (cf. Hart, 1995: 66-67). Building a **reputation** is one way of showing commitment. The value of a reputation - and thus the costs incurred in building and

maintaining a good one - depends on how often it proves to be useful. This in turn is related to the frequency of similar transactions, the time horizon over which similar transactions are expected to occur, and the profitability of the transactions. The incentives to build and maintain a *reputation* are larger, the more frequent the transactions, the longer the time horizon, and the more profitable the transactions (Milgrom and Roberts, 1992: 139). It is clear that these arguments also hold for farmers concluding AESs. However, the same also holds for the other contracting party, the government.

AESs are contracts (and thus transactions) between farmers and the government. It is a two-sided mechanism. Looking at both sides from a reputation perspective, it makes the question important which party has the most to lose from a damaged reputation? This is likely to be the one with the longer time horizon, the more visibility, the greater size, the greater frequency of transaction. This outcome also indicates which party in contracting such AESs should have the discretion to direct activities in unforeseen events. It should be the one with the most to lose from a damaged reputation (cf. Milgrom and Roberts, 1992: 139). This is mostly the government.

This discretion power can also create a special form of opportunistic behaviour of the government called **time inconsistency** (= *rules of the game are changed by the party deciding the policy or rules*). The concept of *time-inconsistency* is identified and developed by Kydland and Prescott (1977: 475). It occurs when a policy which originally seems optimal but after some time, or when the time comes to put it into practice, or as time goes by, it is no longer considered optimal by the policy makers. An important aspect of this concept is **credibility**. Without a binding agreement, which keeps the government to the original plan, the government has the decision making competence to change to a new policy which appears better under present circumstances.

The problem is that, if people realise it, they would anticipate a change in policy and would behave in such a way that politicians would not be able to achieve their objective. Time inconsistency often occurs in AESs. A more general example is that in the case management agreements for preserving nature and landscape by the farmers, they may expect that the government, once the agreement is closed, will lower the compensations. Farmers can anticipate this by being extremely reluctant then when it comes to closing a management-agreement. Another actual example concerns the protection of nests of meadow birds. In the Netherlands, many farmers had a contract for protecting nests of meadow birds. Recently however, according the European Commission (October 2006) it is not anymore allowed to give farmers a compensation, because protecting nests of meadows birds belongs to good farming practise¹⁰, and is included in cross-compliance regulation. Farmers perceived this as negative and the government will lose its credibility loss and reputation. Of course the discretion power of government makes such an intervention possible.

According to Ostrom (1990: 93-94) it is clear from case studies that even in repeated settings where reputation is important and where individuals share the norm of keeping agreements, reputation and shared values and norms are insufficient in themselves to produce stable cooperative behaviour in the long run. For that reason she argues that not only monitoring and sanctions are necessary, but also conflict resolving mechanisms. The latter are also meant for reducing the problems of time inconsistency created by the government

¹⁰ The policy of stretching out the concept of good farming practise with enclosing protection of meadow bird, preserving nature and landscape is a typical example of time inconsistency.

If we look at the sources of commitment and trust, there is some overlap. Trust is closely related to social norms of behaviour, which is also an important element in commitment. However, credible commitment can also be realized through more formal rules and through foreclosing alternatives. If the government makes the external production circumstances more difficult, for example, by increasing the water level in peat land areas or if the government threatens with re-zoning of the land use, it forecloses alternatives and makes certain AESs more attractive. By doing so the government creates a kind of credible commitment on his part.

A well-known example of foreclosing alternatives is from Julius Caesar. He sometimes burned the bridges behind him as his army advanced on the enemy. Burning the bridge committed his army to attack by foreclosing the opportunity to retreat. This commitment is achieved by foreclosing the opportunity to run away (Cooter and Ulen, 1997 : 170). However, it is also a signal that you are willing to fight. Commitment alone is often not enough, it must also be credible. Burning the bridges behind you is way of creating credible commitment.

In situations that generate strong temptations to break mutual commitment, or where there is a lack of common values and norms, sustaining co-operation cannot rely entirely on communication. More robust and long-lasting regimes or organisational modes (e.g. for common pool resources) involve clear mechanisms for monitoring rules conformance and graduated sanctions for enforcing compliance. Monitors - who may be the participants themselves – do not use strong sanctions for individuals who rarely break the rules. Modest sanctions indicate to rule breakers that their lack of conformance has been observed by others. By paying a modest fine, they rejoin the co-operation in good standing and learn that rule infractions are observed sanctions. Repeated rule breakers are severely sanctioned and eventually excluded from the group. Rules meeting these design principles reinforce contingent commitment and enhance the trust participants have that others are also keeping their commitments (Ostrom, 1998: 10).

Building-in of self-interest means that people are doing things that are of interest to themselves. These interests can vary from financial benefits to a *license to produce*.¹¹ The latter is also connected to the concept of *responsible entrepreneurship*. The understanding of “*responsible entrepreneurship*” is fully on the move and is related to a varied and complex phenomenon. In general one understands among this that a farm should not only think of economical value of the firm (mostly represented by the profit of the farm), but also of the social and ecological values as result of the firm’s activities on social and ecological quantities. This is pointed out with the “triple-p bottom line”. The three p’s stand for *profits*, *planet* and *people*, i.e. to the extent that farms are able to realize sustainable developments from economic (profits), ecology (planet), and society (people) point of view. From this viewpoint, firms function in a socially responsible manner (*responsible entrepreneurship*) if the economic, social and ecological values that it produces fulfil the expectations of the stakeholders. Satisfying the social and ecological criteria creates in fact a “permit” to carry out its activities (see Huylenbroeck and Slangen, 2003: 114).

¹¹ This argument is also connected with the status and shifting of property rights in rural areas. After all, when someone has complete property rights, there is no need to worry about what others might think.

3.3 *Agri-environmental programmes in the EU: design and implementation of AES throughout time*

3.3.1 Period 1957- 2000

There was no environmental provision in the Treaty of Rome (1957). The decision to set up a formal environmental policy was taken at the Paris Summit of October 1972. This directed the Commission to establish the First Action Programme on the Environment (1973). This Action Programme noted the interconnection between environmental and agricultural policy, and affirmed that the Commission would increase 'its campaign in the future for the protection of the natural environment and particularly within the framework of the agricultural policy'. With respect to agriculture the position of the Commission has been given in more details in its 1985 Green Paper which proposed that agricultural policy should 'take account of environmental policy, both as regards the control of harmful practices and the promotion of practices friendly to the environment' (Bonnieux et al., 2004: 3).

Earlier measures have been embedded into legislation concerned with the modernisation of farms which was viewed as a basic factor in the development of the common agricultural policy (Article 39 of the Treaty of Rome). Thus agri-environmental policy was a by-product of the structure policy. The first agri-environmental measure is generally taken to be Article 19 of Regulation 797/85 which merely permitted Member States to make payments for the provision of public goods by farmers (Bonnieux et al., 2004: 3).

However, earlier legislation related to less favoured areas targeted the conservation of the countryside and introduced compensatory payments to farmers. Directive 75/268 and its amendments are directly linked with Directive 72/159 on the modernisation of farms which was part of the EU farm structure policy. However, they are often thought of as environmental measures because they are in keeping with the First action programme on the environment of 1973 that pointed out the relationship between farming and the environment. Their purpose is stated as 'the continuation of farming, thereby maintaining a minimum population level or conserving the countryside in certain less-favoured areas' (Bonnieux et al., 2004: 3).

This legislation explicitly initiates a territorial approach whose aim was to stop agricultural and rural exodus, which threatened the survival of certain areas and the preservation of the natural environment and landscape. Member States are authorised to apply a special system of aids for specified less favoured areas. Handicaps must arise principally from permanent natural conditions which are unfavourable for farming. They are due chiefly to the poor quality of the soil, the degree of slope of the land and the short growing season. This leads to higher production costs and 'prevent farms from achieving a level of income similar to that enjoyed by farms of comparable type in other regions'. So based on economic, social and environmental reasons Member States were authorised to introduce a special system of aids for these areas to encourage farming and to raise farm incomes in these areas. The two first reasons are consistent with the goals of the common agricultural policy while the third one is new in EU legislation. Indeed, this legislation acknowledged the positive contribution of farming to the environment and its side effects on tourist and craft activities (Bonnieux et al., 2004: 4).

Compensations combined allowances and investment aids. Annual allowances were paid in the form of headage payments per livestock unit whose amounts were related to the severity of handicaps affecting farming operations. In less-favoured areas more favourable financing

terms were justified. The subsidy increased under Directive 75/268. Regulation 797/85 replaced several structure directives and at the same time modified the less-favoured areas Directive 75/268 (Bonnieux et al., 2004: 4).

Article 1 of Regulation 797/85 set out the overall purpose which is 'to improve the efficiency of holdings and to help develop their structures, while at the same time ensuring the permanent conservation of the natural resources of agriculture'. This highlights the role of the natural basis to sustain agriculture but does not focus on conservation as a policy goal independent of farm productivity. However, Article 19 was the major policy initiative regarding the integration of environmental considerations into structure policy. Member States were permitted to introduce their own national aid schemes for the support of appropriate agricultural practices, 'compatible with the requirements of conserving the natural habitat and ensuring an adequate income for farmers' in 'environmentally sensitive areas'. These areas were defined as being 'of recognised importance from an ecological and landscape point of view'. In order to qualify for aid, farmers must also agree not to further intensify their production and to set stocking densities and the intensity of production at a level 'compatible with the specific environmental needs of the area concerned' (Bonnieux et al., 2004: 5).

However, the environmentally sensitive area scheme did not benefit from the European budget and must be paid from national money only. Two years later, Regulation 1760/87 provided the possibility of co-financing up to 25% of compensation by the EAGGF. Only four countries (Denmark, Germany, the Netherlands and the UK) have implemented Article 19 before this amendment. Regulation 1760/87 also introduced 'schemes designed to encourage the conversion and extensification of production' whose primary objectives were the reduction of agricultural production rather than environmental protection. If the reduction in output is effected by the withdrawal from agricultural production of farmland, such land may be left to fallow with the possibility of rotation, afforested or used for non-agricultural purposes. Extensification is likely to produce positive environmental externalities (Bonnieux et al., 2004: 5).

Regulation 2078/92 was introduced as part of the MacSharry reform of 1992, was presented as a package extending the emphasis of the Common Agricultural Policy. This regulation dealt with agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside. The measures had to provide an alternative source of income in order to compensate the change in farm support involved by the 1992-reform. Regulation 2078/92 was a main pillar for agri-environmental programmes (Bonnieux et al., 2004: 6).

Member States were obliged to implement this agri-environmental scheme. European co-financing was up to 50% or even 75% in Objective 1 regions. Funding from the Guarantee rather than the Guidance section of the FEOGA opened access to a much larger and more flexible budget. Aid scheme under Regulation 2078/92 and its further amendments (Regulation 2772/95 and Regulation 746/96) included a series of measures (Article 2), see Bonnieux et al. (2004: 5).

Some measures are in keeping with Article 19 while some others are associated with the development of programmes which were already available in some Member States. It is the case for example of organic farming, protection of local breeds, and management of land for public access and leisure activities schemes. Although, these measures met the main concerns

of Member States they did not match with a firm economic logic. Indeed some farmers might be compensated for producing desirable goods or for continuing environmentally friendly practices, while others might be paid for reducing a negative externality. Obviously, reducing pollution arising from an over-use of fertilisers and pesticides can be distinguished from measures oriented towards the enhancement of the countryside. There has been some debate about whether incentive payments should be made for complying with water standards since they may be viewed as inconsistent with the polluter-pays principle (Huylenbroeck and Whitby, 1999: 187; Bonnieux et al., 2004: 7). Another point of debate are the results of the agri-environmental schemes. According to Gatto and Merro (1999: 44-45), is the relative scarce results of the agri-environmental schemes undertaken in the '90 due to the novelty of these policies and their long pay-off period.

The distribution of agri-environmental programmes according to countries reveals patterns which result from different strategies and concerns (Bonnieux and Dupraz, 1999). For instance, France, UK and Sweden have implemented local programmes which are in line with Article 19. These favoured landscape management and habitat protection but relied on quite sophisticated contacts involving high administrative costs. Germany has targeted small areas where polluting inputs are banned and offered farmers high compensation levels in order to enhance biodiversity. By contrast a number of programmes in Austria, France, Germany and Greece were oriented towards the reduction of negative externalities and were clearly incompatible with the polluter-pays principle. Meanwhile Italy has favoured programmes aiming at local endogenous development by enhancing rural tourism or the marketing of local agricultural quality products.

3.3.2 After 2000¹²

Under the Agenda 2000 Common Agricultural Policy reform, agreed in Berlin in March 1999, rural development policy became the so-called second pillar of the CAP. It will accompany the further reform of market policy across the whole EU. The objective is to introduce a sustainable and integrated rural development policy to ensure better coherence between rural development and the market policy and to promote all aspects of rural development by encouraging the participation of local actors. Past agri-environmental policy approach is continued and even reinforced within the rural development policy.

Regulation 1257/1999 established the framework for Community support for sustainable rural development from 1 January 2000. This Rural Development Regulation (RDR) relies on an integrated approach of rural economy which is consistent with the multifunctional features of agriculture. It aims at:

- Improving competitiveness in rural economy,
- Reinforcing agricultural and forestry sector,
- Conservation of rural environment.

The rural development measures eligible under this regulation are given in Title II of Regulation 1257/99 and fall into two groups:

¹² This section is based on Bonnieux et al. (2004: 8-12)

- Accompanying measures of the 1992 reform: early retirement (Chapter IV), less-favoured areas and areas with environmental restrictions (Chapter V), agri-environment (Chapter VI) and forestry (Chapter VIII);
- Measures to modernise and diversify agricultural holdings: investment in agricultural holdings (Chapter I), setting-up of young farmers (Chapter II), training (Chapter III), improving processing and marketing of agricultural products (Chapter VII), promoting the adaptation and development of rural areas (Chapter IX).

The mid term review of the CAP built into the Agenda 2000 agreement, brought additional important decisions in 2003 on the reform of the 1st pillar by introducing a further decoupling of support from production in the form of the Single Farm Payment (SFP). The SFP was based on a historical reference, provided for cross compliance and a Community modulation scheme allowing transfer of revenue from the 1st to the 2nd pillar. With the reformed CAP, to be implemented from 2005 onwards, the 1st pillar concentrates on providing a basic income support to farmers, who are further free to produce in response to market demand. To receive this support farmers must respect statutory requirements (18 standards in the field of environment, public, animal and plant health and animal welfare) and keep their land in good agricultural and environmental conditions (also when deciding not to produce).

- For rural development policy, being only half way through its programming period, it was decided not to fundamentally alter the basic framework. The environmental provisions have been strengthened in the amending Regulation 1783/2003, but the general philosophy was not changed.

Member States had the opportunity to combine: rural development, early retirement, agri-environmental and forestry schemes within their 2000-2006 rural development programmes tailored to fit the specific situations of rural areas. Agri-environmental policy is the only compulsory element of the RDRs which had to be implemented over all Member States.

Policy measures can be classified according to their function, either by addressing the protection of the environment or by the maintenance of the countryside. Measures under the heading ‘agro-environment’ reward farmers throughout the countryside for their contributions to environmental quality and quantity above a baseline. Less-favoured area measures support traditional systems of farming where the countryside has to be farmed in order to maintain the features of the landscape and biodiversity. The former measures directly address environmental issues while the latter operate indirectly.

Though it is not their main purpose, a further series of measures are likely to positively impact the environment. For example, support for forestry which ‘shall contribute to the maintenance and development of the economic and social functions of forests in rural area’ (Article 29). This is also true for specific measures under the heading ‘promoting the adaptation and development of rural areas’ and for some measures related to the support for investment in agricultural holdings and vocational training.

Furthermore, there is a policy trend towards establishing standards for all farmers and linking farm support to the delivery of public goods. Thus the implementation of several EU policies will lead to prescriptions on farming practices targeting environmental protection. For instance the implementation of the Water Framework Directive 2000/60 is likely to involve specific limitations in certain areas. In addition, according to Regulation 1257/99, compliance with ‘minimum standards regarding the environment’ is required to benefit a setting-up aid to

facilitate the establishment of young farmers (Article 8) while support for early retirement can contribute to convert agricultural land to forestry or ecological reserves (Article 11).

3.4 Framework for analysing AES

In Figure 3.4 all the attributes that are important for analysing AESs are brought together. The AESs as contracts in practice are at the centre of the figure. On the top level we have placed the properties of AESs (see Section 3.2.3), at the right side the results of contracts in terms of uptake, environmental effectiveness, efficiency and income distribution effects (based on Section 2.3), and at the bottom the design principles for reducing contract failures (see Section 3.2.4).

A first property for AESs is voluntary participation. Because of our definition of 'uptake' - the extent to which people make use of the instrument - between participation level and uptake consists an important relationship. The uptake (also called effect) can be measured in ha, number of contracts, number of farmers' participation level, and so on. The second property of AESs is having a coordination mechanism. As indicated in Figure 3.1 the price is important, but also rules and directives can function as coordination mechanisms.

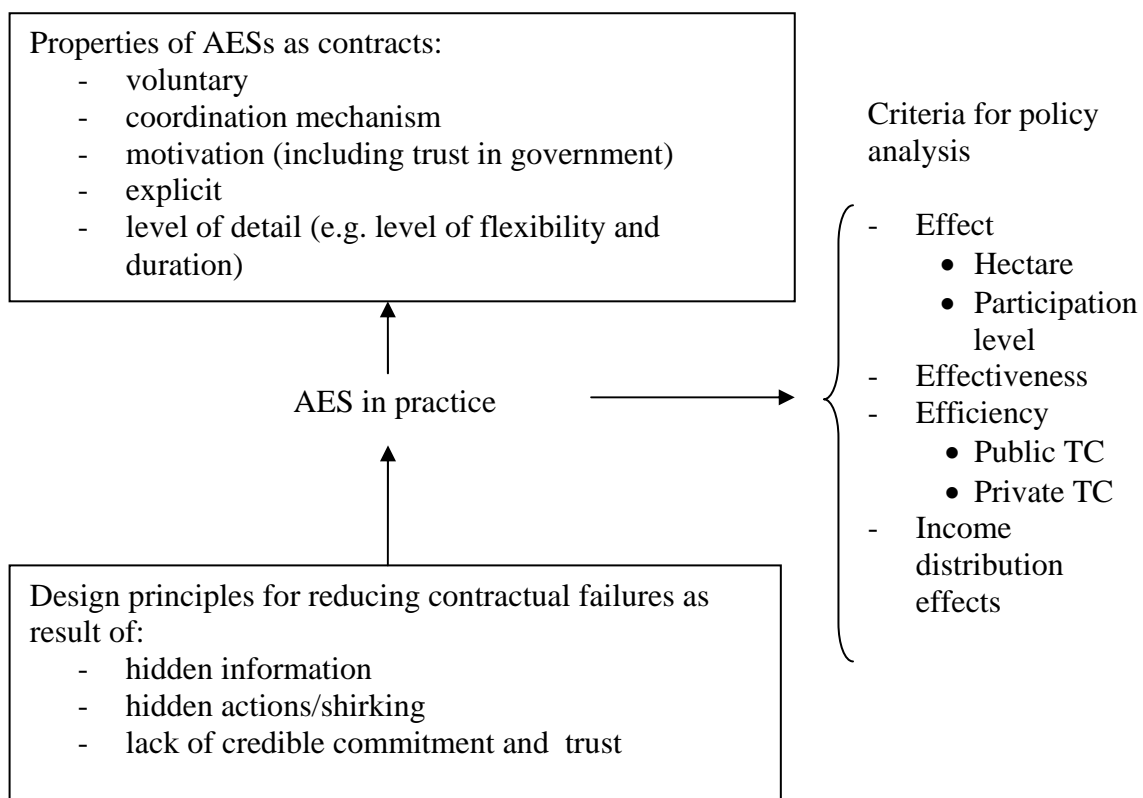


Figure 3.4: ITAES framework for analysing AESs

The third property of AESs is motivation. Motivation for participating can be derived from external motives such as performance criteria, means to measure performance, and the reward structure, as well as internal motives such as license to produce and altruistic motives.

Motivation can also be derived from trustworthiness and reputation of the government. A fourth property of AESs is the presence of written documentation. These are called explicit contracts. The fifth property is that farmers have to often to deal with detailed rules and fixed duration. AESs are mostly not a contract based on goals and objectives where general provisions can be broadly applied. On the contrary, the contracts are often detailed and flexibility is hardly present.

On the right side of Figure 3.4 we have the criteria for policy analysis concerning AESs in practice. It includes the results of contracts in terms of uptake (= effect), effectiveness, efficiency and income distribution effects. Uptake has before been discussed in relation with the voluntariness. The effectiveness refers to which the AESs contributes to the realisation of environmental goals. Generally, efficiency refers to cost and benefits. Here we restrict efficiency to private and public transactions costs. The income distribution effects concern the paid compensation for AESs and forgone income.

At the bottom of Figure 3.4 we have placed the design principles for reducing contractual failures as result of hidden information, hidden actions/shrinking as well as lack of credible commitment and trust. It also includes the problems of time inconsistency of the government. The ways how we can reduce these problems have been described in Section 3.2.3, and are called design principles. We would to like investigate on which level AESs are making use of design principles for controlling the problems of hidden information, hidden actions/shirking as well as lack of credible commitment and trust.

In chapter 4 and 5, this framework will used for analysing the AESs. We would like to investigate

1. Voluntariness, participation level and effect;
2. Most important coordination elements;
3. Motivation for participating;
4. Level of detail, flexibility;
5. Environmental effectiveness;
6. Efficiency: public and private transaction cost;
7. Compensation level
8. Use of design principle for reducing contractual failures.

3.5 Summary and conclusion

Based on the *quid pro quo* principle, AESs can be considered as contracts. When AESs consists of a long term relation or a long duration between purchase and delivery (*quid* and *quo*) the contract even becomes an essential element of the transaction relation. The argument of the relative long duration certainly holds for most AESs. Most AESs-contracts are incomplete because of lack of information and because of bounded rationality of the people involved. It would be too costly (i.e. too high transaction costs) to take all the contingencies into account. However, on the other hand the enforcement of incomplete AESs-contracts can also be costly.

The contractual approach of AESs provides a comprehensive framework for analysing AESs as contracts. It consists of three toolboxes: (1) the properties of AESs as contracts; (2) the design principles or mechanisms for reducing contractual failures; and (3) the criteria for policy analysis concerning AESs in practice.

Concerning toolbox (1), AESs as contracts have the following properties. First, closing of such contract is voluntary. That is an important difference with cross-compliance. Second, all AESs contain a coordination mechanism. It mainly consists of 'handbook coordination', in which rules, directives and safeguards are very important elements. Third, AESs as contracts contain motivation elements. Motivation is included in the specification of the reward structure. However, most AESs have a flat rate per hectare. Fourth, AESs are an explicit set of agreements with a high level of detail. There is hardly any flexibility. In many contracts the relationship is often more important than in market relationship. However, a fifth property of AESs is that they generally are based on detailed plans and rules. It means that the content of the contract is more important than the relationship. This underlines the handbook as coordination mechanism.

Concerning toolbox (2), it was mentioned earlier that agreements for preserving wildlife and landscape with farmers are incomplete contracts. For that reason we need - *design principles* or mechanisms for reducing the effects of hidden information, hidden actions, shirking, lack of credible commitment and trust.

Mechanisms for reducing **hidden information** include signalling, screening and making use of self-selection conditions. A signal for the qualification of a farmer for concluding an AESs could be his education. For example, has he followed a course in wildlife and habitat management? In order to distinguish themselves as credible candidates for nature management contracts with the government, farmers may have followed courses on wildlife management, or become on a voluntary basis, a member of an environmental co-operative with membership dues. A difference between signalling and screening is that in the case of screening the activities for getting information are undertaken by the party without information. An example here could be that only farmers who have followed a course for preserving environmental goods are allowed to participate in an AES. Self-selection means that farmers choose from a menu of contracts and sign the one they like best or fit best with their own farm. If farmer are risk-averse they would prefer a flat rate per hectares. The 'building-in' of self-selection conditions in contracts reduces the problem of hidden information.

The problem of **hidden actions** could be resolved by monitoring, incentive contracts, bonding and in-house production. Monitoring can be done with self or mutual monitoring by farmers. Such a task can also be carried out or delegated to group of farmers, e.g. an environmental cooperative. The advantages of this include reducing public transaction costs and enhancing the social control among farmers. An alternative would be making use of third parties¹³, such as volunteers or NGOs. In this case it will help the credibility if the third parties consists of experts and are independent. Finally, the monitoring activities can be carried by the government. However, this involves public transactions costs.

Incentive contracts mean a variable payment depending on the efforts or performances. Most farmers are risk-averse and dislike having their income dependent on random factors. The risk created by incentive contracts is costly to these farmers. They have to be paid more on average to convince them to accept these risks. From the government's perspective, this extra income is a cost of using incentive pay.

¹³ The reported information is some times called 'fire alarm'

An alternative solution would be to require the posting of bonds to guarantee performance, to be paid back if the performance is satisfactory or if targets are reached. Using such solutions may still lead to incomplete contracts, but some self-enforcing elements will be incorporated. A fourth way to prevent some forms of moral hazard is for the government the 'in-house production by the government' variant. Last but not least it is important to be aware that in homogeneous groups, the incidence of hidden actions can be reduced by common norms and values. However, this means that we have to make use of the handshake approach as a coordination mechanism.

An important element in co-ordinating and motivating people is **commitment**. However commitment alone is not enough, it should also be **credible**. This can be done in the first place by making use of the triptych: monitoring, sanctions and a conflict- resolving mechanism. The crux for bringing about credible commitment in AESs as contracts are monitoring, graduated sanctions and conflict-resolution mechanisms. However, these activities should be carried out on a low cost level. The role of monitoring and credible commitment should be emphasised: without monitoring there can be no credible commitment. Mutual monitoring or monitoring by volunteers reduces costs. Farmers who violate the rules are likely to be subjected to graduated sanctions, depending on the seriousness and the context of the offence. If individuals are going to follow rules over a long period of time, there must be some mechanism for discussion and for resolving what constitutes a conflict or a difference of opinion.

The presence of a conflict-resolution mechanism does not guarantee that farmers with an AESs will keep to the agreements. However, it is difficult to imagine how any complex system of rules could be maintained over time without such a mechanism, even quite an informal one. One possibility would be that those who are selected as the leaders are also the basic mediators or resolvers of the conflict. Another possibility would be **making use of third parties**. To be useful and reliable the third party has to be **independent**, and the member should be **an authority or expert**. To make promises trustworthy, credible commitments need to be established. This is not a problem if the courts can make agreements binding, but in many relational contracts, such courts-assured solutions are difficult to bring off. **However, it is remarkable that in all the countries conflict-resolution mechanisms for AESs are missing.**

A second mechanism to create credible commitment is reputation building. In an environment of imperfect information in which people fear opportunistic or bad-behaviour, reputation is very important. A good reputation can overcome all the problems of opportunistic behaviour, while a bad reputation increases the chance of opportunistic behavior and hold- up problems. The value of a reputation - and thus the costs incurred in building and maintaining a good one - depends on the frequency of similar transactions, the time horizon over which similar transactions are expected to occur, and the profitability of the transactions. It is clear that these arguments hold for farmers concluding AESs, but also for the other contracting party, the government. However, building credible commitment and trust by using the reputation mechanism involves making use of the handshake as coordination mechanism

A third mechanism to create credible commitment is by foreclosing alternatives. If the government makes the external production circumstances more difficult, e.g. by increasing the water level in peat land areas or the government threatens with rezoning of the land use, it forecloses alternatives and makes certain AESs more attractive. By doing so the government creates a kind of credible commitment. A fourth mechanism to create credible commitment is

building-in of self-interest. These interests can vary from financial benefits to a *license to produce*.¹⁴ The latter is also connected to the concept of *responsible entrepreneurship*.

AESs are contracts between farmers and the government. It is a two-side mechanism. Both parties should refrain from hidden information, hidden actions and lack of credible commitment. The government is likely to be the one with the longer time horizon, the more visibility, the greater size and the greater frequency of transaction. For that reason, it has most to lose from a damaged reputation. On the other hand, the government has also the discretion to direct activities in unforeseen events.

However, this discretion power of the government can often create a special form of opportunistic behaviour of the government called **time-inconsistency**. It occurs when a policy which originally seems optimal but after certain period of time it is no longer considered optimal by the policy makers. Time-inconsistency reduces trust in the government and the reputation of the government.

Concerning toolbox (3), important criteria for policy analysis are the uptake of AESs, the environmental effectiveness, efficiency in terms of private and public transaction costs, and the effects on the income of farmers.

In summary based on the preceding we can conclude that the contractual approach of AESs is very useful. The properties of AES as contracts, the design principles for reducing contractual failures and the criteria for policy analysis for AESs in practice together form a comprehensive framework for analysing AESs as contracts. Important parts of the properties of AESs as contracts are coordination and motivation. The coordination mechanism of AESs is mainly based on the handbook. This leads to detailed contracts. However, on the one hand detailed contracts can be destructive for developing trust between farmers and the government, and detailed contracts involve high transaction costs. On the other hand, low levels of trust of government officials in farmers leads to detailed contracts.

Contracts are a two-side mechanism. Both parties have to build up reputation and trust. A low level of trust of farmers in the government or a low reputation of the government has important consequences for the uptake of contracts. Time-inconsistency of the government has a negative influence on the trust of farmers in the government. It affects commitment and creates a negative influence on the uptake of long term contracts especially. Building up credible commitment, trust and good reputation are important rules of thumbs for contracting. However, it also means making use of the handshake and not only the handbook as coordination mechanism.

¹⁴ This argument is also connected with the status and shifting of property rights in rural areas. After all, when someone has complete property rights, there is no need to worry about what others might think.

4. The contribution of ITAES to the design of AES

4.1 Introduction

The purpose of this chapter is to present the most important results of the ITAES project. In Section 4.2 we will present a worldwide overview of Agro environmental schemes. Section 4.3 gives an overview of the 10 case study areas and parts of the process of AES implementation in which different stakeholders would like - and are - to be involved. This process can be divided in a definition, contracting and enforcement (including monitoring) level. This Section is based on the individual reports prepared for each country which give an overview of the state of the art concerning agri-environmental programmes and the descriptions of AES in the case studies areas. The ITEAS- framework presented in Chapter 3 gives the theoretical background contractual issues of AESs.

Section 4.4 focuses on the methods for assessing the environmental effectiveness. A central issues in the ITAES-project are institutional aspects, public and private transaction costs. These are discussed in Section 4.5. The contract attributes and the compensation levels are analysed in Section 4.6. The results are based on a choice experiment among 1800 farmer in 9 countries. Section 4.7 focuses on design principles AESs as contracts. The challenge is to balance between improving or maintaining environmental characteristics, limiting the costs of the schemes and the uptake. Based on the empirical results it proves that it is important for the uptake to take into account the institution design of the contracts, extension services, social capital level of the farmers and trust in the government. The Chapter finishes with a focus on ex- post evaluation of AES through the lens of multi criteria analysis in section 4.8.

4.2 Agro Environnemental Schemes: a worldwide overview.

Agricultural production affects the environment in many ways, generating negative and positive effects. Neither reduction of negative externalities nor simulation of positive ones can be achieved at a satisfactory level on the basis of market activities, there is therefore a need for agri-environmental programmes. They are often considered as a means to both support farm income and comply with WTO provisions. Indeed, there is a shift from price support towards agri-environmental programmes.

A comparison between the EU and a sample of countries allow to clarify differences and similarities between agri-environmental programmes. This sample includes among others the US, countries such as Argentina whose agriculture and food sector have an important contribution to the overall economy, and countries such as Switzerland and Japan where agriculture is marginal from an economic perspective. The support to farming, assessed by the producer subsidy equivalent, ranges from about zero up to 75%.

According to the existing national or local situations, agri-environmental programmes address the reduction of negative externalities or focus on the positive externalities generated by agricultural production. In Europe and Japan, negative externalities tend to be associated with the over-intensive use of farmland, while in the other countries they have traditionally been linked to over-extensive use of land. Alternative explanations for the observed differences between the EU and other countries can be related primarily to differences in factor endowments and national contexts including stakeholders' preferences, cultural and institutional aspects, and secondarily to the pressure to liberalise international trade.

The main environmental impacts of agriculture on the environment are related to soil erosion, degradation of water quality and wildlife habitats. Soil erosion is mostly associated with grain production and sheep breeding. It is traditionally linked with the use of marginal land including highly erodible soils and drained wetlands, and generates adverse effects both on-site and off-site. Major exporting countries have experienced soil erosion problems which in some cases threaten long-term soil productivity. Encouraging farming practices which prevent land degradation due to erosion, salinity, continuous cropping or deforestation is then a key issue to achieve a sustainable agriculture. Conservation programmes have been designed and implemented in a number of countries such as Australia, Argentina, Canada and the US, where a large share of cropland is impaired by erosion. These voluntary programmes combine persuasion with financial compensations to farmers applying approved soil conservation practices. Those programme menus vary with society's willingness-to-pay for the conservation of environmental resources. It is limited to extension effort and modest compensations in Argentina, while more ambitious initiatives exist in the US. Australia favours training and extension through local committees thanks to the *landcare program*.

Water quality protection has been a major component of environmental policies since the nineteen sixties. Most of the focus of clean water legislation has been on point sources, primarily the discharge from factories and municipal waste treatment plants. Attention has turned quite recently to non-point sources, primarily nitrogen and phosphorus runoff from agricultural operations. This is an issue, at least locally, in all countries which have been reviewed. It is more serious in areas with a high population density where the ratio of land to other inputs is low. There is a correlation between the most serious water problems and large-scale livestock enterprises. Indeed harmful effects resulting from manure spreading add to those due to an overuse of mineral fertilisers and chemicals. This is illustrated by many highly polluted spots in the EU but also in some places in Canada and the US. Intensive cropping on irrigated land also leads to nitrate and pesticides problems as shown by cotton production in Australia. The recent growth of irrigated corn in the Argentinean Pampas will likely lead to water quality degradation.

Policy responses to environmental damage resulting from intensive livestock farming mainly rely on command-and-control. Land-use controls including zoning, public purchase of land and easements targeted at critical areas for protecting water resources are widely implemented. In addition, permits for the large installations and standards related to manure storage on the site and disposal of manure are commonly used. In a number of cases operators are committed to produce a farm level nutrient management plan that demonstrates that waste is being safely collected and disposed of. Economic incentives primarily take the form of cost-sharing with grants and low-rate loans for complying with regulations related to housing and manure storage installations. The Netherlands has experienced a more ambitious scheme with a tax on nitrogen and phosphorus surpluses. The use of environmental taxes as an agri-environmental mechanism remains very limited, though a few tax programmes do exist. For instance, a number of States in the US have input taxes, mainly on fertilisers. These are a negative incentive, but there they are designed for revenue generation rather than environmental protection.

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. They are usually 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 from presumptive property rights that have distorting effects (Bromley, 1997).

Distorting effects are also generated by water-pricing policies. They do not provide adequate incentives for farmers to use water resources efficiently and therefore do not ensure a balance between abstraction and recharge of groundwater. This market failure results in a decrease in the true agricultural production costs and contributes to exhaustion of the resource. Several examples illustrate this case in Argentina, Australia and the USA. In the long run the implementation of the water framework Directive of 23 October 2000, is likely to result into more efficient water programmes which should be consistent with the polluter-pays principle in the EU. Indeed, according to the principle of recovery of the costs of water services, including environmental and resource costs, farming should be charged for both water consumption and negative externalities. A similar decision has been made in Australia but its application should be effective in the long-run only.

Europeans, as well as Japanese, view the countryside and to some extent the natural environment as man-made while a number of people, including Americans and Australians, see nature as being undisturbed by any human activity (Hodge, 2000). These contrasted sensibilities lead to very different preferences related to the balance between commodity and non-commodity outputs. In the former case, farmers are subsidised to pursue traditional practices and maintain pastures on lands that would otherwise be abandoned, while in the latter case farmers are paid to return farmland to wilderness. In addition there is a greater European and Japanese emphasis on socio-economic goals such as rural development and maintaining farm incomes and employment in less-favoured areas.

A number of European and Japanese initiatives promote the production of positive externalities in the design and implementation of agri-environment schemes. They assume that either separate provision of commodity and non-commodity outputs is not physically possible or economies of scope exist. Since prices do not exist for non-commodity outputs, there is no market mechanism that ensures social optimum is achieved. Farmers do not have incentives to internalise the environmental benefits into their activities when decisions are made. If commodity and non commodity outputs are substitutable then the agri-environmental performance is likely to be sub-optimal (Bonnieux and Weaver, 1996). If there is no adequate scheme or regulatory framework, there is an under-supply of positive environmental externalities and an oversupply of negative environmental externalities relative to the levels that society desires. Up until the 2002 Farm Bill, the creation of positive externalities was seldom the objective of US agri-environment policy but was instead left to other Federal or State programmes.

4.3 Case study research: defining, contracting and enforcing of AES

Case study areas were chosen at the regional level at which AESs are planned, provided with a budget, organised and controlled, leading to the selection of the whole country for the Czech Republic, Finland and Ireland, and of regions who are empowered to scheme design in

Belgium (Flanders), Germany (Brandenburg) and Italy (Emilia Romagna and Veneto). In the other countries, the policy framework for the elaboration and the administration of AESs is strongly controlled by the national level, therefore the selected regions, North East England in the UK, Basse Normandie in France and Friesland in the Netherlands, benefit a limited legal power. Additional reasons were also considered in the case study selection. They include the variety of landscapes, the richness of wildlife, the existence of specific habitats, and last but not least existing connections between partners and local stakeholders.

Table 4.1: Case Studies list, Total area and population in 2002

	Area (km ²)	Population (1000)
Flanders	13 512	5984
Czech Republic	78 866	10 203
Brandenburg	29 477	2586
Basse Normandie	17 589	1434
Ireland	70 273	3917
Veneto	18 391	4554
Emilia Romagna	22 123	4007
Friesland	3358	638
Finland	304 529	5201
North East England	8612	2538

Source: Eurostat.

Across the 10 case studies, the resulting data of farm holdings characterisation underlines the discrepancy between the very intensive farming systems located in sub-urban areas (e.g. Flanders), and on the opposite, the very large size cropping systems of Brandenburg. Most regions are characterised by little/medium size farming systems, dairy or meat oriented.

The main environmental pressures of agriculture in these case studies, due to an increase of negative externalities, were in rank of importance : 1.water pollution, 2.loss of biodiversity, 3.erosion. The decrease of positive externalities, for example, land abandonment was mentioned as being an explicative factor of pressure in only two cases (Czech Republic and Finland). Furthermore wetlands, hedgerow landscape, forested areas and wildlife reserves are seen as being the main assets among case-studies.

Process characteristics of AESs s contracts

Environmental protection is challenged by the need to define the demand side. Its public good characteristics makes it difficult to define a level and a type of environmental protection that all actors would agree upon. The involvement of all parties in the process of AES implementation would then guarantee that at least all parties reach a compromise. The levels and the types of environmental output to be provided would be mutually beneficial to all parties. Obviously, agricultural actors are supposed to be involved in the implementation of AESs, but for example do non-agricultural interests express their preferences all along the process of AES implementation ? We divide this process upon the following stages:

- Definition level (design/diagnostic of measures to be offered).
As expected, in regionalised and federal countries like Italy (Veneto, Emilia Romagna), Belgium and Germany, design is decided at the regional level, whereas in

other countries decisions are taken by a governmental national representative (this can occur at a regional nuts level like in France). Farmers and environmental representatives are all the time involved in the designing process. In half cases, they have mainly a consultative role, whereas for Veneto, Basse Normandie, Finland and Friesland farmers representatives also have a decisional prerogative. But surprisingly decentralisation intensity does not seem to matter on involvement of farmers and environmental representatives. Code of good farming practices (GFP), which is the baseline situation that farmers have to go further in order to be remunerated, was generally settled at a local level in the majority of case-studies (only Friesland and the Czech Republic have to comply with a national GFP).

- **Contracting level**
The contracting phase is mainly dealt at smaller Nuts levels than nuts chosen as case-study. So, accountabilities for that phase are delegated to regional/local authorities. But that is not true for decentralised and federal states, where regional government is still responsible. Moreover, paying agencies are often involved, as being the final decisional authority. And finally, farmers' representatives are involved for providing technical support and following promotion of schemes in almost all cases.
- **Enforcement level (control monitoring and evaluation).**
In only cases (Friesland and Emilia Romagna) the institutions in charge of the enforcement phase were not the same as in the design and implementation phases, but they were also part of the Minister of Agriculture. There is a huge differences between compliance rates, from low rate of control associated with a very high rate of non-compliance (e.g. Basse Normandie to high rate of control associated to low non-compliance rate (e.g. Friesland). But, very often non compliance can be linked to the complexity of the single measures and to a lack of technical support.

In the majority of cases (8 of 10) external evaluators were called to achieve the evaluation. In only three cases (Friesland, Flanders and Basse Normandie), AESs priorities were contested by experts or environmental representatives. In most cases there is a lack of information on the exact degree of changes in farming practices resulting from AES adoption. Especially there is no clear discrimination between schemes resulting into the adoption of new farming practices and schemes involving the continuation of already applied practices. Regarding environmental impact, threshold and scale effects, as well as delayed environmental responses have not been taken into account in the design and implementation of most AESs. These points were only considered in Veneto and in the Czech Republic.

4.4 Methods for assessing the environmental performance

Our original aim was to assess the environmental performance of AESs in the ITAES case study areas from information in the Mid-Term Evaluation (MTE) relevant to each case study area. Due to a lack of appropriate environmental information in the MTEs, our main aim was to devise a methodology to estimate the environmental performance of AES in each case study area. More specifically, we aimed to ask:

- What is the environmental performance of specific measures toward specific environmental objectives?
- What is the aggregate environmental performance of a specific measure (across several environmental objectives)?

- What is the aggregate environmental delivery of a specific environmental objective (across several measures)?

An environmental assessment of multiple EU states with different environmental conditions and priorities requires a common and extensive set of descriptors of environmental objectives. To this end, we used the hierarchical set of environmental objectives as described in the EU Common Evaluation Questionnaire. Based on this hierarchy, we defined environmental objectives that were not excessively specific and detailed, nor excessively generic (see Table 1). Broadly, the major environmental issues address soil (Objective 1), water (Objectives 2 and 3), biodiversity (Objectives 4-6) and landscape (Objective 7), with a number of sub-objectives for each of these main objectives.

Table 4.2: Summary description of environmental categories and environmental objectives, as modified from evaluation criteria in the Common Evaluation Questionnaire.

Environmental objectives and sub-objectives
Objective 1: Soil quality
Objective 2: Water quality
Objective 3: Water quantity
Objective 4: Species diversity
Objective 5: Habitat quality
Objective 6: Genetic diversity
Objective 7: Landscape

There is rarely a one-to-one relationship between farm-level management prescriptions (measures) and environmental objectives of schemes. In practice, measures may contribute to more than one environmental objective, and an environmental objective may be achieved by more than one measure. In each case study area, we identified measures, and the various environmental objectives to which they contributed.

We also defined a set of criteria which assessed the link between environmental measures (farm-level prescriptions) and the environmental objectives, and used these to estimate environmental performance of a specified measure toward a specified environmental objective:

- priority level
- strength of cause-and-effect relationship
- quality of implementation (by institutions and farmers)
- extent of participation, and
- degree of targeting.

In each case-study region, 5-8 local agri-environmental experts assessed the above criteria for a variety of measures and the environmental objectives that the measures contribute to. The experts' assessment was first conducted individually, and a subsequent group meeting allowed sharing of knowledge among experts that helped achieve consensus, as well as elaborating on the justification for their decisions.

The environmental performance of a specific measure toward a specific environmental objective (which we term a measure-objective pair) was estimated using the product of expert's scores for each of the criteria. Such scores could be aggregated per objective to estimate the environmental supply toward the objectives in Table 1. Alternatively, scores

could be aggregated per measure to assess the contribution of a measure toward several environmental objectives.

The number of relevant measure-objective pairs differed across case study areas. Overall, there were differences across case studies and across criteria in experts' assessment scores. Across all of the case study areas, for example, analysis of the cause-and-effect criteria showed a number of measures that were well-designed, but a considerable number of measures were badly designed and would always be expected to achieve little or no environmental benefit (Figure 4.1). Poor performance of measure-objective pairs was attributable to various combinations of the five assessment criteria. Examination of scores for individual specific measure-objective pairs could quickly identify one or more criteria where performance was either extremely good, or extremely deficient.

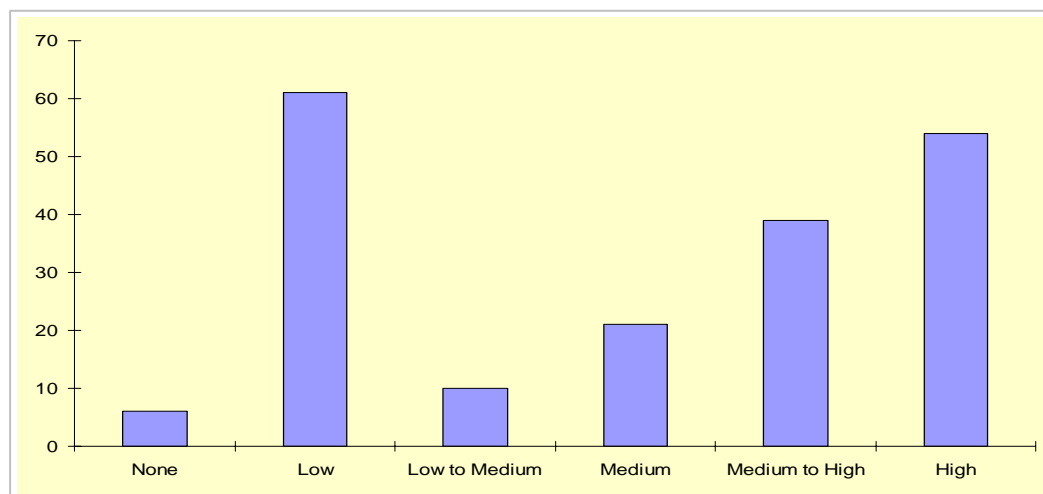


Figure 4.1: Distribution of experts' scores for criteria assessing 'strength of cause-and-effect relationship', across measure-objective pairs in nine of the case study areas. 'None' means that there was no expected cause-and-effect relationship between a measure and an environmental objective; 'High' represents a very high cause-and-effect relationship.

The AES design differed greatly across all case study areas. The design, implementation and evaluation of AESs could benefit from improved methodology for ex ante, mid-term and ex post evaluation. Linkages between measure and objectives were rarely explicit in scheme documents.

The data on poor cause-and-effect relationships point to an inadequate incorporation of knowledge from environmental scientists and ecologists in the design of a large number of measures.

This methodology successfully used experts to identify specific features of scheme design and implementation (the criteria, above) that would be expected to contribute to the success or failure to deliver environmental effectiveness. Although environmental data are crucially important for identifying where a scheme is ineffective, an understanding of *why* a scheme is ineffective will not be revealed from environmental data alone. An explicit aim of policy evaluation is not just to identify whether expected environmental effects are achieved but, where they are not, to identify the reasons why, and to suggest modifications and improvements. An evaluation of environmental effectiveness of AESs is therefore only

successfully achieved through an evaluation of the various factors required to achieve effectiveness. Where a scheme is ineffective, it requires identification of which factor (or combination of factors) is the cause of failure, and needs modification to improve scheme effectiveness.

4.5 Institutional aspects, public and private transaction costs

Institutional aspects and public transaction costs

The ITAES Work Package 4 (WP4) “Analysis of Institutional Arrangements of AEMs” focussed on institutional aspects and defined four main analytical research questions. First, it was asked whether differences in the decision-making and implementation procedures significantly affect the design of agri-environmental measures and their effectiveness. The second research question was which changes in the decision-making procedures could improve the effectiveness, efficiency and acceptance of AEMs. In this context, an analysis was made of the potential of the two innovations within the new Regulation (EC) No. 1698/2005¹⁵: Local actions groups and call for tenders (auctions). Third, the role of the EU was investigated against the background of the diverse political and administrative structures as well as various agricultural and environmental situations in the Member States. Policy recommendations are given how the EU could improve the effectiveness, efficiency and acceptance of AEMs. Finally it was asked which factors influence public transaction costs as an important indicator of institutional efficiency. The research questions are derived from the main framework of analysis, based on Herrera’s four step methodology of institutional analysis which is presented in 4.2.

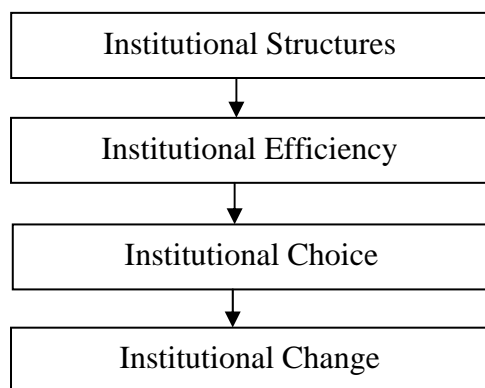


Figure 4.2: Analytical steps for analysing institutional arrangements for AESs (based on Herrera, Van Huylbroeck and Espinel 2005)

Methodology

To answer the research questions, 276 face-to-face interviews were conducted within ten case studies in nine countries. Quantitative and qualitative data have been collected mainly relying on standardized questions using five-point Likert scale variables to measure actors perceptions and preferences. The questionnaire consists of five parts:

- Part A: relevant information on the interview partner, his organisation and its involvement in the AES design and implementation process

¹⁵ Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD).

- Part B: assessment of the natural environment
- Part C: assessment of the Agro Environmental Measures (AEM)
- Part D: assessment of participation, organisation/administration structure and exchange of information
- Part E: assessment of institutional alternatives.

Results

1. The results show that decision-making and implementation procedures do affect the objectives of AEMs. In the case that agricultural administrations and farmers associations exert a strong influence the income objectives of AEMs come to the fore.

Decision-making and implementation procedures have an impact on the environmental effectiveness of AEMs as well. A stronger influence of lower administrative levels and of environmental associations is perceived to be connected with higher environmental effectiveness. However, it is assumed that the higher the influence of environmental associations is the greater are the transaction costs of decision making.

2. Several changes in the decision-making procedures are proposed which could improve the effectiveness, efficiency and acceptance of AEMs.

First, actors believe that more decentralisation¹⁶ could improve the effectiveness, efficiency and acceptance of AEMs. All actors postulate more influence for NUTS3¹⁷ and LAU¹⁸ levels, a demand which is especially raised by local actors. In this context, two perceptions are of significant influence: 1) the perception of the heterogeneity of the natural environment and 2) the perception of transaction costs. Actors perceiving the natural environment as heterogeneous have an increased demand for decentralisation. Actors considering transaction costs of decentralisation express a reduced demand for decentralisation.

Second, there is a demand of increased participation of other actor groups in the design process of agri-environmental measures. In all case study areas, the agricultural administration currently dominates decision-making and is less likely to allow for an increased influence of other actors. Likewise, the farmer associations exert a strong influence and do strongly oppose an increased influence of other actors.

Third, local action groups (LAGs) could improve the acceptance, effectiveness and, to a certain extent, also the efficiency¹⁹ of AEMs. Actors assume that measures designed in local action groups are not necessarily more efficient than current measures. However, they acknowledge the potential of a higher ecological effectiveness and higher acceptance of measures, which are designed in an LAG approach. Contrary to LAGs the opinion on auctions is comparatively critical.

¹⁶ The degree of centralisation or decentralisation is determined by the NUTS level at which design and implementation takes place. Design and implementation at NUTS 0 or 1 is regarded as centralised, design and implementation at NUTS 3 or beyond is regarded as decentralised.

¹⁷ Nomenclature of Territorial Units for Statistics

¹⁸ Local Area Unit

¹⁹ The new Regulation (EC) No. 1698/2005 contains two important innovations: First, it allows Member States to design a part of the AEM in local action groups (LAGs) defined in Article 61 of the regulation. Second, in particular for AEMs, the new regulation introduces auctions as an additional option for contracting farmers. In an ex-ante assessment actors were asked about the potential of LAGs.

Generally, the assessment of LAGs and auctions varies significantly among the actor groups. Actors from environmental administrations and associations as well as researchers and others attribute a high potential to LAGs and are indifferent to criticism concerning the implementation of auctions. Conversely, actors from the agricultural administrations and farmer associations tend to neglect or disagree with the fact that LAGs increase economic efficiency, environmental effectiveness and acceptance and attach little or no potential to auctions.

LAGs and auctions are evaluated more positively by the lower administrative levels and by regions of Flanders (BE), Fryslân (NL) and Basse-Normandie (F). Lower administrative levels may expect a growing influence due to the institutional innovations inherent in LAGs. The positive attitude towards LAGs of Basse-Normandie and especially Fryslân can be explained by the fact that they already have more experience with bottom-up approaches. The more seriously actors perceive environmental problems and the less satisfied they are with current AEMs, the more positive they assess auctions and LAGs as institutional alternatives.

Nevertheless, for such bottom-up approaches the budget, in particular, is regarded as an obstacle. Problems also arise from the risk-averse behaviour of civil servants in charge and from the general unfitness of administrative structures. For most countries it can be concluded that as long as agricultural administrations and farmers associations are by far the most influential groups on the design process of AEMs, bottom up approaches, which are considered in the new regulation, will remain an exception. Furthermore, actors fear the effort which might be connected with the control of the work of LAGs.

3. With the view to the diversity of political and administrative structures as well as agricultural and environmental conditions in the Member States, we have to be cautious when giving policy recommendations to the European Union. On the one hand, there is the principle of subsidiarity. Relating to this, the EU provides a frame and the Member States define actual measures according to their demands. On the other hand, the EU is obliged to respond if its objectives expressed in the regulations are not fulfilled. Since the effectiveness, efficiency and acceptance of the AEMs are unsatisfying, there is a need to act.

On the basis of the results of the ITAES research work, for the EU this would mean to significantly encourage environmental administrations, associations and local actors to increase their participation in the design and implementation process of AEMs. Strengthening the formal influence of these groups could yield promising results. This, in turn, could be achieved by implementing a kind of veto right for the environmental administration for the design and implementation process. The result should be that funds for agri-environmental measures could not be spent without getting the agreement of environmental administrations.

A further step, which could avoid a logjam, would be to shift the responsibility for the design process of AEMs to the environmental administrations. Both options could reduce the risk that AEMs focus too much on income objectives of farmers and less on environmental objectives. The authors underline that farms need a sound economic basis to fulfil environmental requirements of AEMs. Therefore, AEMs should also contain an economic incentive. However, the major income objectives should remain part of the first pillar of the CAP.

Following the results of the 276 interviews, a great potential to improve effectiveness, efficiency and acceptance of AEMs is assigned to the participation of other actor groups, in

general, and of local people in local action groups, in particular. However, without the proposed shift of competencies, participation will not be likely to improve. Thus, further research is urgently needed to analyse in detail the effects of a “shift of competencies” from the agricultural administrations to the environmental administrations in the different Member States.

4. Public transaction costs: The interviews don't aim to provide an exact measurement of the public transaction costs related to AESs, but rather assess the perception about the subject of the different people involved. A first important conclusion is that, in general, the knowledge of the Agricultural Administration about public transaction costs is assessed to be rather low, although the knowledge on utility losses is even lower. Judging from the high number of no opinion-answers, the knowledge of the interviewees on the subject or their insight into its problems was also limited.

The mean percentage of the personal working time of the interviewees spent on AESs is about 25%, with the Agricultural and Environmental Administration being the most important players. Research organisations and environmental associations are least involved in the matter. Factors influencing this time spent on AESs are of course the type of organisation, but also the NUTS level with most time spent on AESs at the NUTS 1 level and least time spent at the LAU level which indicates a generally more centralized administrative structure for AESs in the EU. When comparing the administrative effort spent on specific measures to their perceived ecological efficiency, making use of data obtained from the questionnaire and from the WP 5 expert workshops, there are indications of a positive relationship: ecologically more efficient measures require a higher administrative effort. A comparison with the data on private transaction costs, obtained in WP 6, reveals a trade-off between both cost types: a higher administrative effort by the Administration can cause private transaction costs to diminish, possibly increasing the uptake of AESs.

In the perception of the people involved in AESs, the most important factors influencing the design costs of the schemes are factors related to the nature of the measure, like the complexity, the number and precision of AESs. The institutional aspect seems to have a lower impact.

Private transaction costs

From a Transaction Cost Economics point of view an agri-environmental contract can be regarded as a transaction between the farmers and the government whereby the farmers are sellers and the government buyers of the agri-environmental goods and services (Figure 4.4). According to Williamson (Williamson 1996), a transaction results in high costs in time and resources for searching for information and contracting because of the risk of opportunistic behaviour of the trading partner and bounded rationality. These costs are called private transaction costs when they are incurred by the farmers. In the New Institutional Economics farmers can still be assumed to maximize their utility, so the benefits of participating in AESs should outweigh the costs if the farmer should have an incentive to contract.

The importance of transaction costs in the farmers' assessment of AESs is also acknowledged by the European Commission who in the new Council Regulation No. 1698/2005 introduces a revised calculation of the payment. This payment will now be based on the income foregone and the additional costs including transaction costs, dropping the incentive that used to represent maximum 20% of the total amount. Calculating transaction costs is however

difficult and there are only a few studies that made an attempt to measure them for agri-environmental contracts (Falconer and Whitby 1999; Falconer 2000; Falconer and Saunders 2002; Vatn 2002).

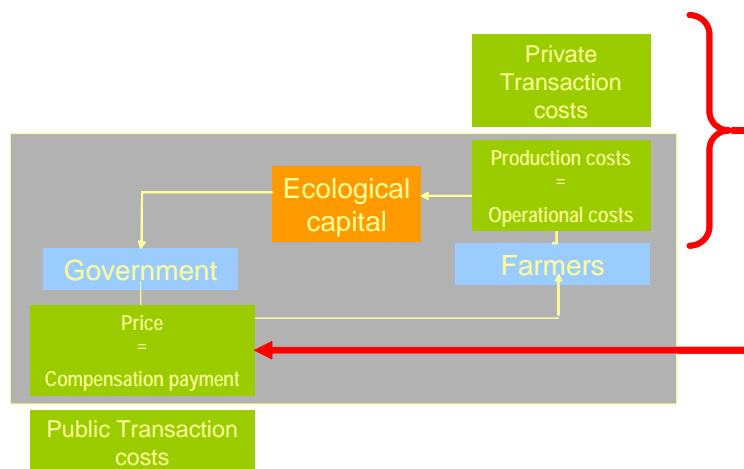


Figure 4.4: The AES transaction and costs involved

Therefore in Work Package 6 of the ITAES project an attempt has been made to create a methodology for analysing private transaction costs. On the basis of this methodology it should be possible to answer the following research questions:

1. What is the importance of transaction costs relative to the operational costs incurred by AESs, and the premium received?
2. Which factors influence private transaction costs, and more specifically, what is the influence of:
 - a. The institutional arrangements and the institutional environment;
 - b. The specificity of the investment – this includes the investment in people, infrastructure, knowledge specific to the implementation of the agri-environmental scheme;
 - c. The frequency of the contracts – it is argued that the transaction costs for a new contract will be lower compared to the initial contract because the less specific investments are needed;
 - d. Uncertainty and the level of trust in the government.
3. Is there a link between private and public transaction costs? (link with WP 4)

The methodology used consists of two parts:

1. A survey was done with approximately 300 farmers in every case study region in which several questions assess: (a) the ex ante costs for gathering information, (b) negotiation costs, (c) monitoring and control costs, (d) specific investments made (own time, family, volunteers, personnel, knowledge, physical assets), (e) yield and income foregone, (f) frequency of contract (new, renewed), (g) trust in the trading partner and (h) waiting time for approval.
2. A follow up of a small group of farmers was organised. A group of about twenty to thirty farmers in each case-study region engaged in agri-environmental contracts are asked to keep regularly (weekly) records of time and costs invested in all activities related to the implementation of the agri-environmental contracts for a whole year. More specifically, they are asked to compare labour hours, costs and revenues on a field with AESs to those on a comparable field without AESs. This allows a more accurate quantification of the transaction costs involved.

The questionnaire proved to be a good method to obtain a first idea of the amount of private transaction costs and the factors influencing this. Since the questionnaire was done in the form of a face-to-face interview, administered by people familiar with agriculture, the chance of misinterpretation is small and the results are quite reliable, although the recall procedure causes a small decrease in the quality of the answers. The method is also relatively cheap, e.g. in Belgium the total cost per farmer came down to €27.7.

More detailed information was obtained by the follow-up system, where 15 to 30 farmers were followed more closely for a total period of one year. Because the farmers had to note down labour hours spent, costs and revenues every week, and they were controlled on a regular basis, the quality of the data is high. However, this labour intensive method causes the costs to raise to a great height, with a mean cost per farmer of €343 for Belgium.

Quantifying private TC

First of all it is important to note that the private transaction costs and operational costs are highly variable over the different measures in the case study areas. Comparability between the measures is weak and therefore, drawing general conclusions is not advisable. A second observation is that the variability over the year is also considerable, with various peak moments in the administrative and operational work. Knowledge on these peak moments can be useful for policymakers and Administrations when setting dates for registration or control forms.

When comparing the premium farmers receive to the total amount of costs, consisting of transaction costs, other additional costs and income foregone, it's clear that, except for the French and German cases, the premium is not high enough to cover the extra costs (Figure 4.5). Both the follow up as the survey gave the same results. Comparing the different cost categories shows that the income foregone is often the highest cost component, followed by the additional costs. Private transaction costs are rather low in comparison with the other costs, although they can mount up to 35% of the premium.

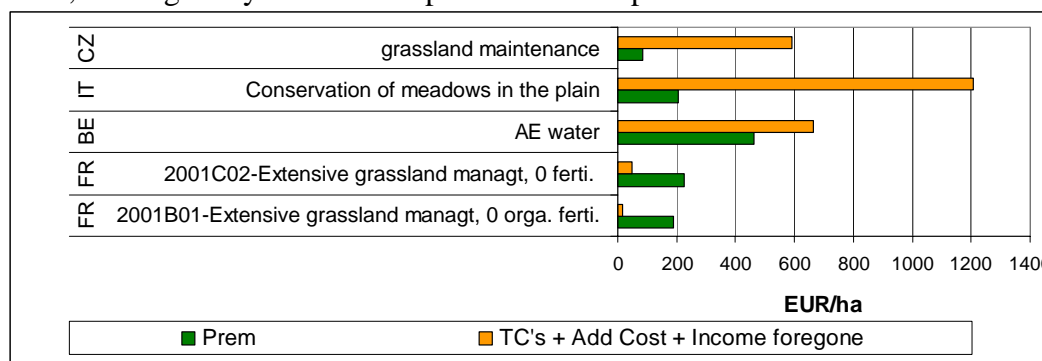


Figure 4.5: Premium and costs (€/ha) for different AESs

Factors influencing private transaction costs

To stay in the Williamson tradition, in this study private transaction costs are classified in three main categories: information costs, negotiation costs and monitoring and control costs. The extensive survey allowed assessing the influence of several variables on these different cost categories and confirmed the hypothesis that private transaction costs are influenced by

socio-demographic factors, farm related factors and the institutional environment. The factors Williamson identified as having an influence on transaction costs, namely the frequency and specificity of contracts, and uncertainty also seem to have an influence in this research in the form of the number of AESs, the type of AESs (Figure) and the level of trust in the government (Table 4.1).

Table 4.1: Factors influencing search, negotiation and monitoring/enforcement costs (0= no influence, + = positive influence, - = negative influence)

Variables	Cost type		
	search	negotiation	monitoring/enforcement
age farmhead	0	+	-
other professional training	-	-	-
agricultural education	0	-	-
reading farming reviews	-	0	0
# FTE	+	+	0
size farm	+	+	0
technical advice	-	-	+
no trust local government	+	+	0
no trust Agr & Env Adm	0	0	+
total payment	+	+	+
number AESs	0	0	+
countries above average	CZ, IE, IT, DE		
countries below average	UK, FR, FI, BE, NL		
centralized administrative structure			+
decentralized administrative structure			-

Link between private and public transaction costs

Within each country a comparison can be made of the private and public transaction costs related to some selected measures, since for most countries in the analysis the AESs chosen for WP 6 were the same as those chosen in WP 4 where the administrative effort for the Administration was assessed. The comparison was done for every country and the results give an indication of a possible trade-off between both cost types: the lower the public transaction costs, the higher the private ones. A higher administrative effort of the Administration could possibly lead to less paperwork for the farmers and in that way increase the uptake of AESs.

The results of the study show that private transaction costs are existent and that they can't be underestimated, since they can mount up to 35% of the premium. They are however quite variable over the different AESs in the different case study areas, and show a considerable variability throughout the year. When other costs related to AESs are also taken into account, for the majority of the case study areas the premium doesn't weigh up to the total cost. Factors influencing private transaction costs are socio-demographic factors like the education of the farmhead, farm related factors like the number of full-time equivalents, the number and type of AESs, the trust the farmer has in the government and the institutional environment and arrangements in a country.

In countries with a decentralized administrative structure, the monitoring and enforcement costs seem to be lower for the farmer than in countries with a centralized administrative structure. Together with the results from the comparison with WP 4 this is a clear indication of a possible trade-off between private and public transaction costs: a decentralized structure means more administrative work for the government, and apparently less private transaction costs for the farmer.

4.6 Design of AES: contract attributes and the level of payment

A part of the ITEAS- research aimed to design an approach that would be able to investigate farmers' preferences for key aspects of the design of AESs. This approach would be able to explore how farmers would trade-off key AES design attributes against each other and against associated per hectare payments. Such an approach would permit us to determine the relative preferences of farmers in the various partner countries for generic scheme design elements such as contract length, level of paperwork, and flexibility over area under agreement or over adherence to scheme prescriptions. It would also permit us to place a monetary value on farmers' willingness to pay for desired changes in these generic attributes such as a reduction in minimum contract length.

Similarly, the approach would also reveal the increases in per hectare payments that farmers would demand in return for accepting less desirable contractual conditions such as higher levels of paperwork. The outputs of such an approach would help us to understand how different scheme designs could either improve or reduce the probability of a farmer participating. While increased payment levels will always increase this probability it should be interesting for policy-makers to understand how farmers are willing to trade-off payments in order to gain schemes that have a more attractive combination of characteristics.

The methodology used to provide the framework for this approach was based on stated preference choice experiments. Within the choice experiment approach, the value of any good is assumed to depend on the goods' attributes and the levels these take. Choice experiments can be implemented using a variety of survey-based methodologies used for modelling preferences for goods, where such goods are described in terms of their attributes and of the levels of these attributes. Respondents are presented with a set of alternative scenarios (choice profiles) that differ in terms of a series of attributes (which generally include a price or cost element) and asked to choose their most preferred.

For example, farmers might be asked to choose their most preferred alternative from a set of different designs of proposed AES that vary according to the length of agreement (e.g. 5 years, 10 years, etc), the level of paperwork (e.g. low, medium, high) and the associated per hectare payment. By including payments as one of the attributes of the good, monetary estimates of the utility associated with the attribute levels can be indirectly recovered from the choice data. A baseline alternative, often corresponding to the status quo or 'choose neither' option is usually included in the choice set. Including this option avoids a 'forced choice' by allowing respondents to select another alternative if they do not prefer any of the alternatives in the choice set and serves to make the results obtained welfare-theoretic.

In this study the AES design attributes included in the choice profiles are shown in the Table below. These were chosen following a process of detailed literature review and focus group investigation of farmers' attitudes towards AES design elements. Respondents were asked to choose between a pair of choice profiles, with the option of choosing neither. These choices were repeated four times for each respondent yielding a data set of between 400 and 1300 choices across the partner countries. The choices offered to respondents were based on an orthogonal main-effects design which combines desirable statistical properties with a manageable set of choice profiles (see ITAES WP7 D6 P4-1 for more details).

Table 4.4: Attributes and attribute levels in choice experiments

Scheme attribute	Attribute levels
Minimum length of agreement (years)	5, 10, 20*
Flexibility over what areas of the farm are entered into the scheme?	No, Yes
Flexibility over undertaking some of the measures required under the scheme?	No, Yes
Average time spent on paperwork/administration	Low, Medium, High
Additional payment per ha	5%, 10%, 20%*

* Attribute values varied across partner countries

The results of the analysis of the choice experiment data suggested that in the majority of countries farmers had significant positive preferences for greater flexibility both in terms of the area of land entered into the agreement and the measures which they had to undertake. The former result was found both for farmers who were participants in AESs and for non-participants; while the latter was not so significant for non-participants (significant preferences in only 4 out of 8 countries).

Farmers were also found to, on the whole, prefer shorter rather than longer minimum contract lengths. Preferences for shorter minimum contracts were generally higher in older farmers, while farmers who revealed higher levels of trust in the agricultural administration were found to have a higher preference for longer contracts.

Analysis of the choice data revealed that farmers in different countries made different trade-offs between scheme income and per hectare payments. Trade-offs for different scheme attributes varied widely between and within countries from between a few per cent and up to 55 per cent of current payments. The highest levels of compensation required by farmers for accepting an undesirable change in AES conditions were observed for the change from a 10 year to a 20 year minimum contract length.

Our findings suggest that farmers are most likely to participate in schemes that either offer greater levels of flexibility or higher per hectare payments. More generally, an important finding is that farmers are usually willing to trade off less-desirable scheme attributes against those that are more desirable. This has potentially important implications for scheme design as does the observation that preferences for some attributes, particularly minimum length of contract, can be improved when respondents gain a greater level of trust in the institutions that administer AESs.

Our conclusions are that choice experiments are well-suited to investigating farmers' preferences for AES design attributes. Such experiments are relatively straightforward to design and implement and the high response rates in the farmer surveys across Europe suggest that they are easy to understand and to answer.

It would be possible to design choice experiments to investigate preferences for more detailed scheme attributes but this would have to be done carefully to ensure that appropriate sets of attributes were selected. In general, attributes should be well-defined, relevant to farmers (i.e.

their presence or absence should have an impact on farmers' utility for scheme membership) and independent of all other attributes (to facilitate interpretation of the choice models).

4.7 Design principles for AESs- contracts

A first step in the analysis process was classifying the case-studies with respect to the specificities of their AES (including 2078/92 and 1257/99 regulation) according to their focus (wide/specific) and their horizontality/verticality (geographical targeting). We distinguish 4 groups of cases. The first group consists of North East England and Friesland. In this group the schemes are mainly vertical. The second group consisting of Ireland and Finland has hierarchical schemes (compulsory measures + additional ones). The third group consisting of Brandenburg and Basse Normandie has wide and horizontal schemes, associated with several vertical schemes. Finally, the fourth group consisting of Emilia Romagna, Veneto, Flanders and Czech Republic has mainly horizontal but specific focused measures, associated with vertical schemes, leading to a more complex menu proposed to farmers.

AESs are usually five-year contracts without re-negotiation of the contract. All contracts in the survey sample are individual. However, France, Friesland and Ireland show examples of collective contracting phase, where group of farmers participate to the design of a contractual framework on behalf its members.

Main measures and uptakes

Measures of the AESs as contracts proposed to farmers can be classified, according to their prescriptions and the local reference level as: reducing negative externalities measures, supporting public good provision measures and maintenance of nature and landscape measures. From a first analysis of contract menus, it appears that most measures target the reduction of negative externalities. However, and being more precisely, the mandatory measures of hierarchical schemes are limited to the reduction of negative externalities in Finland while they simultaneously concern negative externalities reduction and maintenance in Ireland. Furthermore, in Ireland, Finland, Brandenburg, North East England and Veneto the most uptaken measure of the scheme is a maintenance one. These maintenance measures are mainly dedicated to maintenance of grassland management practices. Most of enrolled farms are located in LFA.

The ratio of contracted area is generally under 20 % of the total eligible area, except for the hierarchical schemes (Finland and Ireland, with 93 and 31 % respectively) and for the very targeted ones (North East England with 61 % of the restricted eligible area).

The structure of AESs has drastically changed since the first environmental schemes of the 70's both concerning areas and limited objectives. The current AESs consist of large number of programmes based on a collection of measures with high complexity, detailed description, and no clear strategy (see Section 3.2.3 also). In addition, programmes are implemented by different organisations across the EU following large institutional diversity.

The challenge is to balance between improving or maintaining environmental characteristics and limiting the costs of the schemes. One way could be to clarify the contracts by splitting the type of provision they intend to obtain (maintenance nature and landscape, reduction of

negative effects, supporting the public good provision). From the organisational point of view the possibility of implementing the bottom up approach and the handshake as coordination mechanism (see Section 3.2.3) should be stimulated.

Most previous studies do not take into account institution design, extension services, and social capital. Farmers consider the selection of a single contract among a set of contracts which are offered to eligible farmers. However, first of all several variables significantly affect the uptake decision for specific contract types whereas they do not influence other contract types. Secondly, the participation decisions among different contract types are not taken independently.

The results of the analysis are important in terms of policy design. A first important indication is that differences exist in participation characteristics among several contract types/measure types. This confirms that contracted transactions for farms are different, because of the characteristics of the farm, farmer and the requirements of the contract, or in other words the services to be delivered by the farmer. This means, implementing less intensive practices means something different on specialized dairy farms compared to extensive farms. This suggests that AESs-contracts which clearly targets specific transactions and take into account **characteristics of the farm and farmer** can increase the effectiveness and efficiency of the policy.

Another important issue is the importance of institutional design. A negative perception of farmers about institutional design can prevent them from contracting. However, it must be point out that results suggest that public extension services can increase uptake of farmers. Extension services could focus on the way AES are perceived in order to increase uptake. In addition trust in the government also increases uptake. The fact that farmers conclude a contract with the government shows a certain level of trust of farmers in the government. In this way, trust is a necessary condition of contracting. Well designed contracts cannot completely replace a lack of trust of farmers in the government. Uptake can be increased by better adjusting the institutional design of contract types and to maintain and develop trustworthiness. In addition public extension services will contribute to uptake.

Finally, our study shows the importance of social capital for the uptake of AES. If farmers perceive that family and neighbors judge AES positively farmers are more likely to enroll. This implies that not only financial concerns are important for the uptake of agri-environmental schemes. In addition the farmers who frequently are engaged in non-agricultural networks are more likely to be involved in AES. Farmers are influenced by their social networks. On the other hand the farmers who participate in general farming networks are less likely to be involved in AES. Both show the importance of non-monetary benefits of being involved in AES.

The analysis is subject to some qualifications. First, we only model a limited number of different contracts. In addition the contracts are groups of similar contracts which have different characteristics. This could lead to aggregation errors. However, the message of the study will not change. Second, other factors, e.g. preferences about contract terms like contract duration and payment levels, not included in the model, might play a role in contract choice.

In summary, based on the preceding we can conclude that the contractual approach of AES is very useful. The properties of AES as contracts, the design principles and the criteria for

policy analysis for AES in practice (see Figure 3.4) together form a comprehensive framework for analysing AES as contracts. Important parts of the properties of AES as contracts are coordination and motivation. The coordination mechanism of AES is mainly based on the handbook. This leads to detailed contracts. However, on the one hand detailed contracts can be destructive for developing trust between farmers and the government, and detailed contracts involves high transaction costs. On the other hand, low levels of trust of government officials in farmers leads to detailed contracts.

Contracts are a two-side mechanism. Both parties have to build up reputation and trust. A low level of trust of farmers in the government or a low reputation of the government has important consequences for the uptake of contracts. Time-inconsistency of the government has a negative influence on the trust of farmers in the government. It affects commitment and creates a negative influence on the uptake of long term contracts especially. Building up credible commitment, trust and good reputation are important rules of thumbs for contracting. However, it also means making use of the handshake and not only the handbook as coordination mechanism.

4.8 *Ex-ant and ex- post analysis of AES*

This part of the ITEAS-research has been carried out through the lens of Multi Criteria Analysis (MCA). MCA is a technique designed to compare alternatives (actions) on the basis of multiple indicators (effects). Multi Criteria Analysis (MCA) is a **tool** usable by Decision Makers (DMs) to **improve design and evaluations** of agri-environmental schemes (AESs). Within MCA DMs can achieve **efficiency and effectiveness design** of schemes through better choice of implementations strategies based on accurate choice of policy options (e.g. level of policy dosage, enforcement and choice of regulatory area). With MCA DMs can reach **robustness evaluations** phase of the past program/schemes/measures based on analysis of **cost-effectiveness** of implementations strategies.

Two MCA were built dealing with different policy stages of agri-environmental schemes and DM needs:

- **Ex ante** (policy design)
- **Ex post** (policy evaluation).

The design phase of AESs was approached by **comparing impact of several policies options at measure level**. The evaluation phase was approached by **comparing AESs implementations in different case studies** in terms of environmental effectiveness. Hierarchical structure of indicators was adapted following Common Evaluations Questions of the EU. Data used were mainly drawn by Mid Term Evaluations (MTE). For both analysis, **weights** were used. Weights are a measure of the relative importance of each criteria in an overall assessment. The text below gives the key insights from the MCA of the analysis.

Ex post:

- different case studies show relevantly **different priorities** and effectiveness;
- however main focus is on **soil, water quality and landscape**;
- rather widespread lack of **consistency** between **priorities** and most successful **achievements**;
- each measure usually addresses several **environmental objectives**;
- different measures show very **different cost/effectiveness**;

Ex ante:

- difficulties in identifying expected **reactions of farmers** to different policy design options;
- difficulties in identifying the **effects** of different policy options;
- however relevant **opportunities to improve** policy design;
- difficulties in matching priorities and incentive mechanism;

Important main difficulties with the present evaluation framework were:

- lack of trustable information about **additionality** of effects
- **lack of quantitative targets** of physical realisations and economic spending by action and/or objective,
- lack of **sufficient and consistent monitoring data**,
- unclear connection between the **analysis of local needs and policy design**,
- difficulties in interpreting the **connection between different** indicators,
- difficulties in **connecting costs and effects** of single measures;

Ex ante evaluation is the most lacking part of present AES implementation. This is the core issue in improving AES effectiveness/efficiency. Ex-post evaluations depend on the quality of ex-ante evaluation and programming, therefore it is important to improve the ex-ante evaluation by setting quantitative targets and clear objectives in the first place. There is an even excessive amount of ex post information, though key issues are often not dealt with (e.g. additionality). Evaluation could benefit from a stronger comparative approach across regions (e.g. through benchmarking) and possibly be connected to premiality indicators on which budget. MCA can contribute in understanding trade offs and areas of improvements. (Often hidden) MCA-like mechanisms are already in place to select applications and could be made more effective if linked to an explicit use also in policy design and evaluation.

5. Outlook and recommendations

The problem of designing efficient agri-environmental policies has not been given the emphasis it deserves. It is easy to fall into the trap of thinking that any policies, programmes or measures that flow out of the political process is likely to be of some help, or that they certainly be better than nothing. Moreover, since there are distortions in the economy, the best way to correct inefficiencies such as pollution will not be to blindly use prescriptions from theory developed for efficiency.

Programmes and measures devoted to agri-environmental matters vary greatly in their efficiency and effectiveness. Some have been well designed and have beneficial impacts, others are not well designed, badly implemented and will end up costing lots of money with no environmental improvement. Thus one of the primary jobs for economists is to examine carefully all the impacts of the different approaches which have been applied. We need to know if they are effective in terms of achieving prescribed environmental goals, and whether they are efficient in terms of balancing the benefits and the costs of environmental improvement. Several contributions dealt with this ambitious agenda, but up to now there is no comprehensive evaluation of agri-environmental programmes.

Among the many explanatory factors involved in the decision to participate in AESs are a series of contributions highlighted by the characteristics of the farm and of the farmer's family (Bonnieux *et al.*, 1998, 2001; Dupraz *et al.*, 2000, 2002), farmers' preferences (Morris and Potter, 1995) and the role of private transaction costs (Drake *et al.*, 1999; Falconer, 2000). The financial burden of public administration in the implementation of agri-environmental policy has also been considered in some detail (Falconer and Whitby, 1999). Despite some other valuable contributions (Falconer *et al.*, 2001; Verhaegen and Huylenbroeck, 1999)²⁰ more empirical studies are needed. Nevertheless there is both theoretical and empirical evidence that issues such as institutional arrangements (Hagedorn, 2002; Williamson (2000) and farmers' involvement in programme designing and contracting are important (Polman, 2002). Thus from a review of the literature, three important issues have been identified:

- Transaction costs;
- Contractual analysis;
- Governance issues

Measurement and evaluation of AESs based directly on environmental indicators pose serious difficulties such as non-linearity, time lags and cost of measurement (Primdahl *et al.*, 2003). Evaluation of AESs is mandatory for Member States and a number of reports on environmental impacts have been published. A significant amount of data related to different indicators has been collected but the environmental efficiency and effectiveness of AESs remains an open question. This justifies more research effort to elaborate a comprehensive conceptual framework, and more empirical work to feed the models that should be derived from this framework.

Despite contrasted sensibilities with respect to the role of farming, most countries pursued a similar set of objectives for agriculture related to the environment. The general purpose includes reduced water pollution, soil erosion control, wildlife habitat protection and landscape preservation. They combine regulation, cross-compliance and voluntary-payment

²⁰ For a comprehensive list of references see Huylenbroeck *et al.*, 2004.

schemes to attain these objectives. 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 (Bonnieux and Rainelli, 1999). The extensive use of payments imply that farmers require compensation for any diminution of their rights to natural resource use. However payments may be justified on conventional economic grounds once the positive externalities generated by agriculture are considered (Bonnieux *et al.*, 2001; OECD 2003a). Compensation takes into account profit foregone and the need to provide an incentive to change farming practices. Whether or not they significantly impact commodity supply leading to trade distortions or not still remains an open question.

The general philosophy has drastically changed since the early environmentally sensitive area schemes which targeted well-defined and limited objectives. AESs are henceforth embedded within an ambitious rural development policy which has multiple objectives including social, environmental and territorial aspects. This shift has resulted in a large number of programmes based on a collection of measures and no clear strategy. In addition, programmes are implemented by different organisations across the EU and through several programming systems. Control systems have become intractable involving a considerable administrative burden for the Member States and the EU Commission. Environmental effectiveness, economic efficiency, coherence and transparency of the overall system are very questionable.

The need for a significant simplification and for a better targeting to local context is acknowledged by most stakeholders. At the regional level there is also a claim for an increased application of the subsidiarity principle. However, policy objectives remain multiple and complex as stated by the EU Commission, and since 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' (Commission of the European Communities, 2004). Following several conferences, the Commission spelled out three major objectives for rural development policy for the period 2007-2013:

- 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.

There was an implementation deficit which partly results from vague and contradictory objectives. This is in many respects inevitable given the need to reach consensus or at least to get an extended majority. Anyway, issues relevant to implementation are often disregarded during the process of negotiation, and this favours the adoption of policies that cannot be monitored, controlled and enforced at least at a reasonable cost. Is it possible to avoid this trap? The Commission's policy proposal for the coming period should take into account these drawbacks by leaving sufficient flexibility to Member States for elaborating rural development programmes within given agreed priorities and budget (Commission of the European Communities, 2004). It is suggested that the Leader model could be applied on a wider scale. It is probably the only possible way given that implementation and enforcement are not top-down procedures but are informal, involving bargaining and negotiation. Even if the Commission had access to all the information it needed, it cannot command national or regional actors, public or private. It can only proceed to Courts when it has exhausted every diplomatic avenue (Snyder, 1993).

Recommendations

Central to this report is a contractual approach for analysing AES. In Figure 5.1 all the attributes important for analysing AESs within a contractual approach are brought together. The AES as contracts in practice are at the centre of the figure. On the top level we have placed the properties of AES, at the right side the results of contracts in terms of uptake, environmental effectiveness, efficiency and income distribution effects, and at the bottom the design principles for reducing contract failures. All these attributes were discussed and explained in chapter 3.

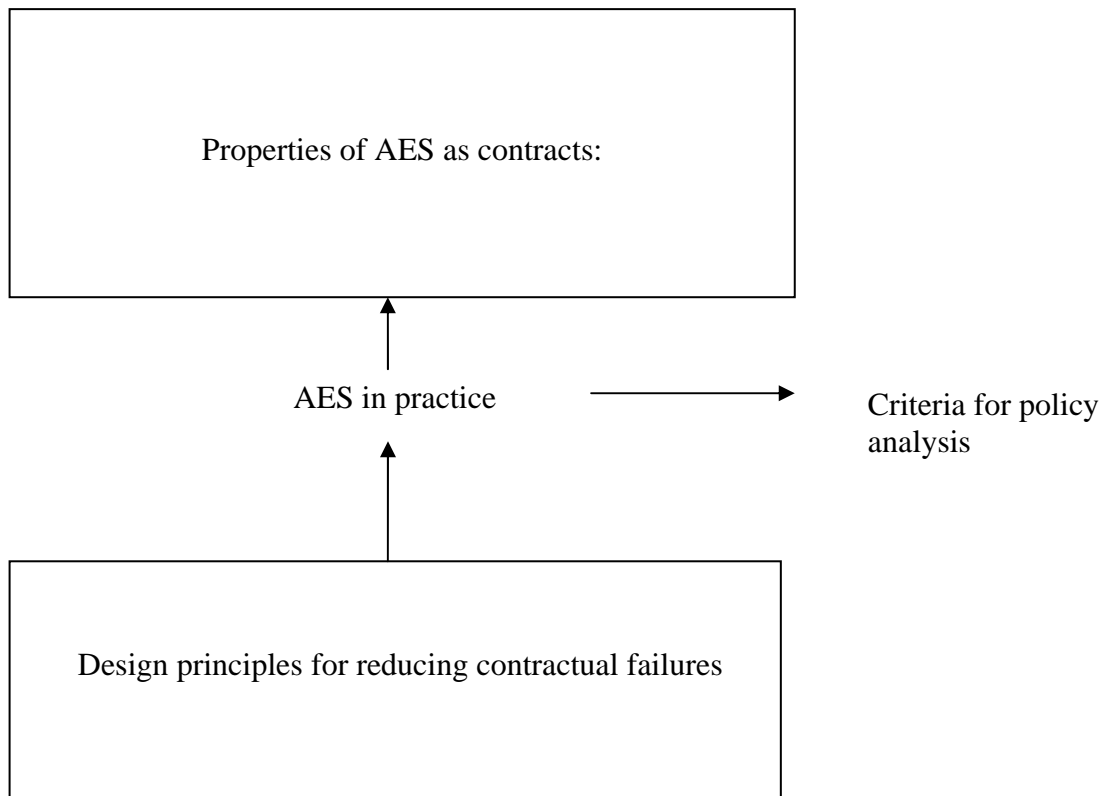


Figure 5.1: ITAES framework for analysing AES

Our recommendations fit within the attributes distinguished in chapter 3 and are based on the results of ITAES described in chapter 4. We can conclude that the contractual approach of AES is very useful. The properties of AES as contracts, the design principles for reducing contractual failures and the criteria for policy analysis for AES in practice together form a comprehensive framework for analysing AES as contracts. For policy analysis three levels for analysis can be distinguished: (1) definition level (design/diagnostic of measures to be offered); (2) contracting level; and (3) enforcement level (control monitoring and evaluation)). Important parts of the properties of AES as contracts are coordination and motivation. The coordination mechanism of AES is mainly based on the handbook. This leads to detailed contracts. However, on the one hand detailed contracts can be destructive for developing trust between farmers and the government, and detailed contracts involve high transaction costs. On the other hand, low levels of trust of government officials in farmers leads to detailed contracts.

Contracts are a two-side mechanism. Both parties have to build up reputation and trust. A low level of trust of farmers in the government or a low reputation of the government has important consequences for the uptake of contracts. Time-inconsistency of the government has a negative influence on the trust of farmers in the government. It affects commitment and creates a negative influence on the uptake of long term contracts especially. Building up credible commitment, trust and good reputation are important rules of thumbs for contracting. However, it also means making use of the handshake and not only the handbook as coordination mechanism.

Recommendations about properties of AES as contracts:

- better formalisation of the connection between type of the environmental problem and measures proposed;
- definition of physical and economic quantitative targets at all programming levels and identifications of thresholds;
- explicit consideration and definition of alternative measures or implementation strategies in the programming and decision-making process;
- consistent evaluation of trade offs among objectives and alternatives;
- support to participatory decision-making.
- support more the use of the 'hand shake' as coordination mechanism instead of the detailed handbook approach;

Recommendations for design principles for reducing contractual failures

- Design and evaluation would be greatly assisted by clear statements about
 - the relative priority of different environmental objectives;
 - the relative priority of different measures that are intended to achieve an environmental objective;
 - clear illustration of policymakers' intended cause-and-effect relationship between measures and objectives.
- Monitoring, graduated sanctions and a conflict-resolving mechanism will improve the commitment of AES;
- It would be better to make more use of the reputation building mechanism. A good reputation can overcome problems such shirking;
- The cost of monitoring can be reduced by making use of volunteers and NGOs
- Contract design requires an approach in which the attributes of transactions are taken into account
- Take into account the role social capital (trust and networks) when designing and applying agri-environmental contracts.

This study shows that the European Commission's decision to base the payment for AESs partly on the transaction costs borne by farmers was well-founded, since they are clearly not negligible and can represent a considerable part of the current payment. While compensating farmers for these costs could be a first step in increasing the uptake of AESs, trying to decrease them would increase their success even more. A possible way to do this would be for the Agricultural or Environmental Administration to take over part of the administration by the farmers, which could be possible by decentralizing the administrative structure.

Recommendations for criteria for policy evaluation:

- enlarging the existent evaluation of AES to indicators of the economic and social area (i.e. income, employment, gender, investments) and consequently revising the hierarchical structure;
- connecting more directly financial and environmental information in order to be able to perform cost/effectiveness analysis;
- considering and avoiding overlapping of impact indicators;
- devising indicators clearly addressing the additionality issue of the measures, and providing comparisons with the counterfactual.
- the methodology described here could contribute to improved design, implementation and evaluation of the environmental effectiveness of AESs. The methodology could especially contribute to scheme design and ex ante evaluation, whereby the use of expert knowledge can identify likely weaknesses in proposed AESs.

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