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## **Improving water quality with a “territorial” agri-environmental policy? Insights from the new generation AES in South-West France**

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### **Abstract**

This article deals with the Local Agri-Environmental Schemes (LAES), the French contractual policy instrument within the European Rural Development Regulation (2007-2013), designed to improve water quality within priority watersheds. The paper is structured in three parts. The first one focuses on the evolution of the program-theory which underlie the French agri-environmental policy, from a retrospective of the successive national schemes set up since 1985. The second part questions the role of territories and local actors in the program definition and implementation. We question the supposed “territorialization” of LAES, by leaning on a comparative study of the program in three regions of Southwest France. Our first results suggest that beyond the integration of spatial stakes in conformity with the Water Framework Directive, the LAES remains after all little territorialized and can be considered rather as a top-down site-specific pollution control policy. In the last part of the paper, we examine the adoption of LAES by French farmers, with a focus on the role of information, uncertainty and trust in the choice of contract commitment.

### **Key-Words**

Program-theory evaluation; territorialization; transaction costs; Agri-Environmental Scheme (AES); Water Framework Directive (WFD).

## Introduction

Improving or maintaining water quality has always been one of the key objectives of the European Community agri-environmental policy, established in 1985. In each member State, its regulation for implementation (Rural Development Regulation – RDR) comes in the form of national or regional programmes (in France, it is called as the *Plan de développement rural* – Rural Development Plan). During the current programming period 2007-2013, one of the priority objectives of EC agri-environmental policy is to back up the implementation of quality restoration programmes under the Water Framework Directive (WFD) (EC, 2000). Since 2007, France has had a twofold scheme for the implementation of this policy. The first is national, proposing support measures with national specifications for national issues (organic farming, endangered breeds, grassland payment). The second is local and comes in the form of contracts, called Local Agri-Environmental Schemes (LAES) which aim to back up compliance with the achievement of “Good Status” objectives under the WFD. A specific feature of these WFD LAES contracts is that they contain an obligation of “territorialization”, that is, the obligation to focus action on “territories previously qualified as requiring conservation of the water resource”.

This territorialization of agri-environmental policy is nothing new; it is part of a global move towards decentralization (of the public authorities) initiated in France since 1982. Although different, these two movements – territorialization and decentralization – are both markers of public action gaining local foothold via the implementation of different interventions according to the territories (Moquay, 2009; Frinault, 2008). After something of a lull, “territory” has returned over the last few years to the forefront of preoccupations in French public action, irrespective of the sector (social, health, education, agriculture...). The principle of territorialization has become a commonplace in public action, even though it is not clear whether this means devolution, decentralization or organizational management (Faure, 2004). The use of the term “territory” in local development policies and in agricultural policies is significant, as it assumes a certain unity and cohesion around a space. This need for cohesion may be demanded by the different decision-making levels (national, regional, departmental) and may involve the set-up of “zonation”. The regulator often confuses zonation of action, which is built from criteria (geographical, physical and socioeconomic), and territory, which is built from local actors (David, 2007). So this concept of territorialization is not always clear (Epstein, 2009).

When Douillet (2002) looks at local development policies (Leader, Country...), she reminds us that territory, which she prefers to call "development space", is merely a receptacle for programmes: 'It does not acquire any autonomy and in no way constitutes a territory of public action, since its emergence only owes itself to the set-up of programmes over which it does not always have control.'

Today this ambiguity surrounding the term "territory" is still present in French agri-environmental policy with the implementation of LAES. It raises a number of questions which we shall develop in this paper. Why do we speak of "territorialized" agri-environmental schemes? How has the concept of territorialization evolved over time? What is the regulator's interest in targeting WFD AES to "territories"? Does implementation of the LAES contribute to creating "territories" or merely the zonation of actions? Do the emerging LAES projects associated with "territories" mean anything to the local actors? Does the existence of "territories" encourage the contractualization of AES with farmers?

In an attempt to answer these questions, our paper deliberately adopts a top-down approach, drawing inspiration from the pattern in which agri-environmental policy is implemented (Europe, State, "Region", "territory"). The aim is to understand the process whereby a public action qualified as "territorialized" is set up. The first part of the article presents the way in which the territorial dimension fits into the implementation of French agri-environmental schemes, by (i) a look at the history of the AES designed to improve water quality and (ii) a program-theory evaluation of the LAES in progress. The second part addresses the question of the actual or supposed territorialization of the LAES. It presents the results of a statistical analysis of LAES projects and a qualitative survey carried out on institutional actors at regional and subregional level (Regional and District Agriculture Directorates, Chamber of Agriculture, Water Syndicate etc.) in three NUTS-2 regions of South West France: Aquitaine, Midi-Pyrénées and Poitou-Charentes. The third and final part examines the adoption of the schemes within a LAES project in Poitou-Charentes by analyzing a survey of farmers under contract and farmers not under contract. In this analysis we introduce various adoption determinants (structure of the contracts, confidence in institutions, risk-taking...), some of which are linked to the "territorial" dimension of the projects.

## **1. Agri-Environmental Schemes to conserve water quality**

Agri-Environmental Schemes (AES) are one of the economic instruments available to regulators confronted with the requirement of conserving water quality in the presence of nonpoint source pollution of agricultural origin (Salanié et al., 1997; Dupraz et al., 2007). They come in the form of a five-year contractual subsidy offered to farmers in order to encourage them to adopt environmentally friendly practices. This economic incentive scheme, which has been proposed to Member States since 1985, has undergone a great many changes in France in terms of its implementation.

### **The evolution of European and French AES: landmarks**

The French "water quality" AES has undergone changes due to the successive Common Agricultural Policy (CAP) reforms that have accompanied the escalating integration of environmental concerns into agricultural policy. Bonnieux (2009) highlights three main phases.

An experimental phase from 1985 to 1993 saw the emergence of the first "water quality" AES, further to Article 19 (EC regulation n° 797/85) which for the first time acknowledged the right of member States to award aid to farms that undertook to adopt practices that were compatible with the protection of natural milieus. At the time, this subsidy could only be awarded in "environmentally sensitive zones". In France, the scheme started in 1989 with the "environment" Land Improvement Operations (*Opérations Groupées d'Aménagement Foncier* – OGAF) incorporating the objective of "reducing water pollution by inputs".

The period 1993 to 1999 saw a rise in the number of environmental issues being integrated into the CAP. Starting in 1993, with the aim of attenuating the effects of the CAP reform, EC Regulation n°2078/92 brought with it with three schemes: early retirement, afforestation aid, and the AES. France proposed an agri-environmental policy composed of two schemes: (i) national and (ii) regional with the Local Agri-Environmental Operations (*Opérations Locales Agro-Environnementales* – OLAE) and six regionalized AES complying with the guidelines of national specifications. The "water quality" AES were mainly present in three types of regionalized schemes: diminution of crop inputs, conversion to organic farming, and reconversion of arable land into extensive grassland.

From 2000, although a certain continuity was building in terms of the nature of the schemes across the EC, wide-scale changes in strategy were occurring in France. From 2000 to 2006 with Agenda 2000, the AES were now an integral part of CAP rural development policy (EC, 1999). Over this period the French AES once again revolved around a twofold national and regional system: (1) the Land Management Contract (*Contrat Territorial d'Exploitation* – CTE), a special instrument of French agri-environmental policy which was replaced at the end of 2003 by the Sustainable Development Contract (*Contrat d'Agriculture Durable* – CAD), and (2) national measures such as the agri-environmental grassland payment and conversion to organic farming. The “water quality” AES were mainly to be found in the CTE /CAD and conversion to organic farming schemes. In the current period 2007-2013 of the Rural Development Regulation (EC, 2005), the French framework of AES is articulated around 9 schemes, of which the following contribute directly to restoring water quality: organic farming and new Local Agri-Environmental Schemes (LAES). These LAES, elaborated at local level, aim to back up the implementation of two environmental policies: the Water Framework Directive (WFD) and the Habitat Directive (Natura 2000 network).

### **What characteristics for water-quality LAES?**

In France, the WFD LAES are contracts offered to farmers to encourage them to change their farming practices in order to preserve or maintain the quality of water (WFD objectives). In exchange, they receive an annual subsidy (generally, a flat rate per hectare) to compensate for the extra costs, the lost income and the costs incurred when they implement these practices. From a governmental point of view, the WFD LAES are different from the previous AES in that they contain the requirement to “territorialize”. This territorialization involves:

- On the one hand, the presence of project leaders, private or semi-public operators responsible for running the LAES project and then submitting it to the regional authority for approval. This LAES project defines both the target area and the associated agri-environmental schemes eligible for funding.
- On the other hand, a contractualization for farmers whose farmland is located within the target area.

In practice, the project leader is responsible for building the LAES based on a combination of unit commitments which the leader proposes to farmers located within the target area. These LAES differ according to the types of crop (field cropping, grassland, vines, etc).

However, the technical content of the specifications and the amount of the subsidy for each unit commitment are set by an administrative rule of the Ministry of Agriculture (MAP, 2008). For example, regarding the reduction in the use of phytosanitary products, 9 unit commitments are available. They range from an annual account of crop-protection strategy through to stopping treatments altogether (weed-killer and synthetic phytosanitary products) via a progressive reduction in the number of phytosanitary treatments (calculated in approved doses) used on all crops and on field cropping operations. In Table 1 we give a summary of the way territorialization of the schemes has evolved. It has been analyzed according to the zonation rule of the policy and the local adaptation of the AES specifications.

Table 1. Evolution of the zonation criteria and regional adaptation of AES specifications

Period	EC Regulation N°	Type of Scheme	Mandatory zonation* (national instruction)	Non-mandatory zonation (initiative of regions and/or districts)	Type of specifications	
					National	Regional adaptation
1989 - 1992	N°797/85	Environment OGAF	x		x	
1993 - 1999	N°2078/92	OLAE	x			x
		Non OLAE		x	x	
2000 - 2006	N°1257/99	CTE		environmental diagnostic of territories for the stakes		x
		CAD	No zonation			x
2007 - 2013	N°1698/2005	MAET	x		x	x

\* Compulsory zonation: the regional or departmental authority must first delimit an environmental zone to allow the aid to be contractualized

This analysis shows that the "program-theory" evaluation of AES has changed over time as regards the territorialized nature of the scheme. Territorialization would make the actions more effective and would therefore have a bigger impact on the environment, in particular on the improvement of water quality. The public authorities take back principles that have long been established in the field of neoclassical economics (Baumol and Oates, 1988; Desaignes and Bonnieux, 1998; Bontems and Rotillon, 2007).

## **Program-theory evaluation applied to LAES**

Formalized by Chen (1990) and Rossi et al. (1999), "program-theory" evaluation is a set of assumptions made by financers and decision-makers to explain the way that public intervention produces impacts and achieves its global target. Program-theory evaluation thus consists in building *a causality schema* (Toulemonde, 1997) between the measures put forward and the expected effects.

Applied to LAES, the program-theory evaluation of the AES can be summarized as follows: the LAES is a volunteer-based contractual policy to act in order to change agricultural practice by farmers. Its contractualization dynamic is based on a financial incentive designed to compensate for the extra environmental costs that the market does not pay for. The environmental effectiveness of the "nonpoint source pollution" scheme relies on (i) the efficiency of the farming practice proposed in the specifications, (ii) the delimitation of the "territories" concerned and (iii) the collective nature of the project thanks to the presence of a project leader who ensures adhesion by means of coordination. The following specific effects are expected in terms of the territorialized nature of the scheme:

- better environmental effectiveness;
- appropriation by the local actors of the environmental stakes of the territory;
- greater collective dynamics thanks to the presence of a local operator involved in the implementation and monitoring of the measures (coordination, training, demonstration of equipment, pilot plots for the detection of pests...);
- quicker dissemination of the policy by means of collective learning linked to neighbourhood relations.

Table 2 gives a summary of program-theory evaluation and also distinguishes expected effects from non-expected effects. To sum up, the program-theory evaluation of the LAES places the emphasis on better environmental and economic efficiency thanks to the focus of public action on critical zones.

Table 2. Program-theory evaluation applied to water-quality LAES

<b>Program-theory evaluation</b>	<p style="text-align: center;"><b>Act to change practices in order to reduce nonpoint source pollution</b></p> <p style="text-align: center;">Contractual subsidy for change in farming practice</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Loss of income compensated by the subsidy</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Signature of a contract by the farmer to change his farming practices</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Implementation of new, more environmentally friendly farming practices</p>	
	<b>Expected effects</b>	<ul style="list-style-type: none"> <li>- Restoration of water quality or halt in its deterioration,</li> <li>- Drop in crop yields for certain practices,</li> <li>- Better perception of agriculture by Society,</li> <li>- Improved farmer awareness of environmental issues,</li> <li>- Lower aversion to change thanks to the farmer's individual learning and trust in the introduction of new practices in the management of his cropping procedures.</li> </ul>
	<b>Non-expected effects</b>	<p><b>Risks:</b></p> <ul style="list-style-type: none"> <li>- Change of regulations during the contract (termination of contract, drop in subsidy)              → loss of trust in the regulator,</li> <li>- Deadweight effect 1: the changes in practice would in any case have happened without the AES, under the influence of other regulations, the market which requires more environmentally friendly production, and the set-up of new, less polluting technologies.</li> <li>- Deadweight effect 2: the subsidy paid is higher than the cost borne by the farmer: overcompensation by the regulator.</li> </ul> <p><b>Uncertain effects:</b></p> <ul style="list-style-type: none"> <li>- Regulator's uncertainty about the practices of the farmer after the end of the contract,</li> <li>- The introduction of new farming practices may have favourable impacts on one compartment of the environment, but unfavourable impacts on others (mechanical weed removal and energy versus chemical weed removal).</li> </ul>

Source: authors, from the general framework proposed by Aubert *et al.*, 2005

## 2. Territorialization of LAES seen through an interregional comparison

The program-theory evaluation of LAES presented above imposes the delimitation of relevant "territories", the presence of a project leader, and the contractualization of the farmers. The concept of "one territory, one project, one contract" is used in our analysis. It emerged in the 1990s with the gathering of rural municipalities (Pasqua Law, 1995) and natural and rural spaces Law (Voynet Law, 1999). As explained by Debarbieux (2009) and Lajarge (2009), the concept of territorialization includes action, or a set of actions, which fashion the nature or meaning of a material environment in order to conform it to a territorial project. However, observers should question the "qualification of LAES areas as "territories".

At first glance, their construction is the result of socio-agro-economic criteria (crops, intensity of farming practices...) and biophysical criteria (pedology, water quality) and of a relative mobilization of the various actors concerned. But territory involves an appropriation – economic, ideological and political (and therefore social) – of space by people (Di Méo, 1996). It is thus the result of a construction of people's relationships with their space (Vanier, 2009). This construction implies the participation of various territorial actors in the elaboration of the project. By means of a statistical approach to LAES projects and a qualitative analysis via surveys on project leaders, we propose to understand what results from the program-theory evaluation of the WFD LAES in three administrative regions of South West France: Aquitaine, Midi-Pyrénées and Poitou-Charentes.

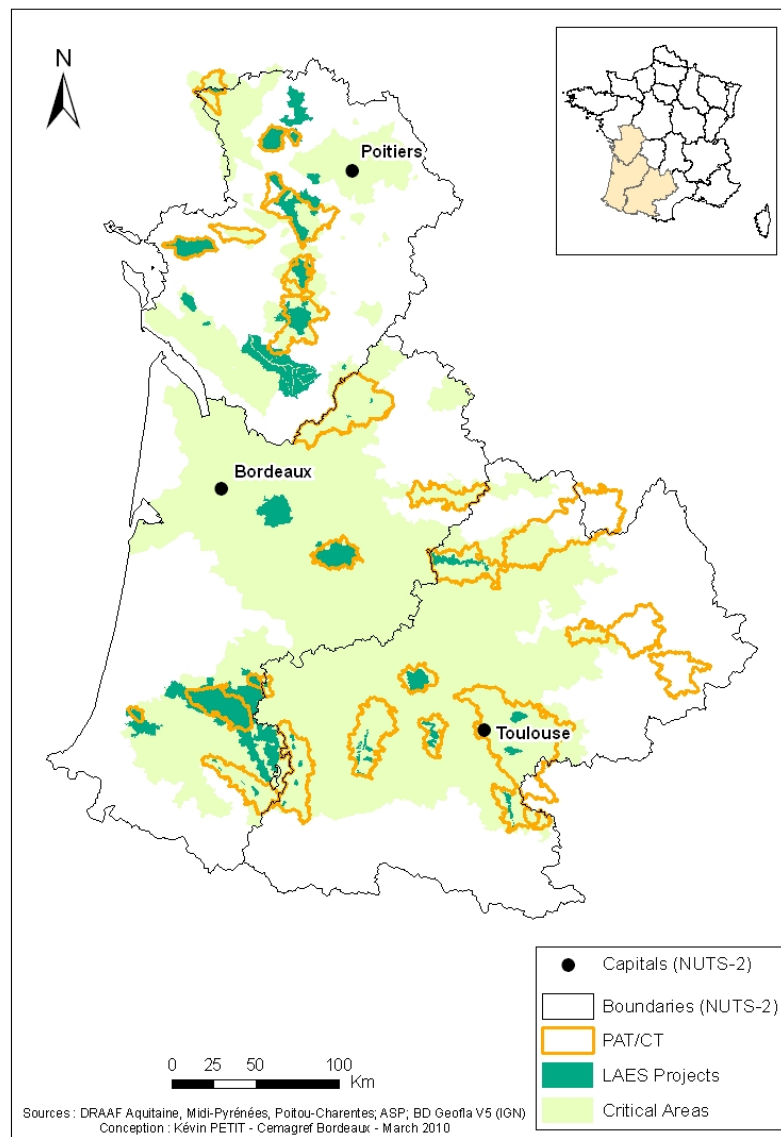
### **How the territorialization of WFD LAES translates: emergence of “territories” and project leaders**

LAES projects require “territories” with a double construction, halfway between an administrative approach (stemming from a list of measures and critical areas) and that of a project originating from local actors. In concrete terms, territorialization initially translates at regional level to the delimitation of several zones formed according to municipal borders or water catchment areas:

- Critical Areas (CA) officially defined by the Regional Food, Agriculture and Forestry Directorates (*Directions Régionales de l’Alimentation, de l’Agriculture et de la Forêt* – DRAAF),
- More restricted areas around drinking water abstraction points, defined by the DRAAF and by the Water Agencies: Local Action Plan (*plan d’action territorial* – PAT) or Local Contract (*contrat territorial* – CT) respectively for the Adour-Garonne and Loire-Bretagne Water Agencies.

Next, at local level this territorialization process leads to the emergence of project leaders (local operators), who in 2007/2008 put forward 30 LAES projects in the three regions with target areas chosen for their highly degraded water quality and possible changes to farming practices relating to pesticide-consuming crops (see map 1).

Map 1. Territorialization of LAES via 2 zonations and 30 projects



The results show that while the surface areas of the LAES projects are relatively small in relation to those of the critical areas proposed by the three regions (8% in Aquitaine, 3% in Midi-Pyrénées and 23% in Poitou-Charentes), the diversity of project leaders has, conversely, increased considerably. Although the District Chambers of Agriculture (*Chambres départementales d'Agriculture – CDA*) were strongly involved in the construction of previous schemes (Ollivier, 2001), their contribution to LAES appears to have been far smaller, with other, highly diverse bodies taking on a greater role (drinking water syndicates, local authorities, farm cooperatives, farmers' associations...). Only 10 projects out of 30 are led by CDAs in the three regions under study. These new operators nonetheless maintain a link with the historical operators, who are seen as technical partners.

Indeed, in order to ensure greater efficiency or to gain a firmer foothold in the “territory”, a large number of structures call upon technical partners. More than half of them form partnerships to set up and/or run LAES projects. Most partners are CDA, but also drinking water syndicates or local authorities. They play a central role in the success of the project, in particular the farmer coordination phase, which is generally acknowledged as being key to the success of the project (see below, Part 3).

The first results from the analysis of the 30 LAES projects also show that the target areas of projects have mainly been built from two quantitative criteria: risk of failing to achieve Good Status of water bodies (*Risque de Non Atteinte du Bon Etat* or RNABE in French) and agriculture dominated by crops using large quantities of phytosanitary products.<sup>1</sup> To achieve a real improvement in water quality, these LAES projects are particularly well targeted: 70% of their water bodies are at RNABE or “Doubt” level and 65% of their utilized agricultural area (UAA) is covered by the four crops that consume the most phytosanitary products. Last, a cross-analysis of the crops and the RNABE level shows that 15 of the 20 LAES projects that have water bodies with RNABE classification also have agriculture dominated by “crops that consume phytosanitary products”. From this point of view, the WFD LAES have indeed been implemented in critical areas.

### **Implementation of LAES – does it conform to the program-theory evaluation?**

The two main observed effects of the territorialization of LAES are the targeting of projects to areas and the appearance of new project leaders, both of which are in line with the initial program-theory evaluation (Table 2). As for the types of contractualized schemes, these change little in relation to the previous schemes.

The targeting of action to areas potentially sensitive to the deterioration of water quality by nitrogen and pesticides is an appropriate solution in environmental terms. Our empirical analysis of the WFD LAES (surveys of 18 project leaders out of 30 and 8 institutions) shows that most project leaders and institutions surveyed acknowledge that this “territorialisation” is justified (Harreau, 2009).

With regard to the surface areas of the eligible zones (Critical areas, PAT / CT) however, the low spatial coverage of the LAES projects is something of a surprise and raises questions about the effectiveness of such schemes at the watershed scale.

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<sup>1</sup> Four crops (straw cereals, maize, rapeseed, vines) account for 79% of consumption of phytosanitary products in France (Aubertot *et al.*, 2006).

Even though the "territory" is compulsory, the people we interviewed rarely presented it as an advantage. The fact that there are project leaders working in the field and carrying out genuine coordination work is the factor that farmers point to as being key. Additionally, the farmers have difficulty accepting this territorialization and the concept is hard to explain, according to project leaders. Farmers do not recognize themselves in these project territories and they do not produce a consensus. They have been created for a particular action without any thought necessarily having been given to whether they have a particular identity (Harreau, 2009).

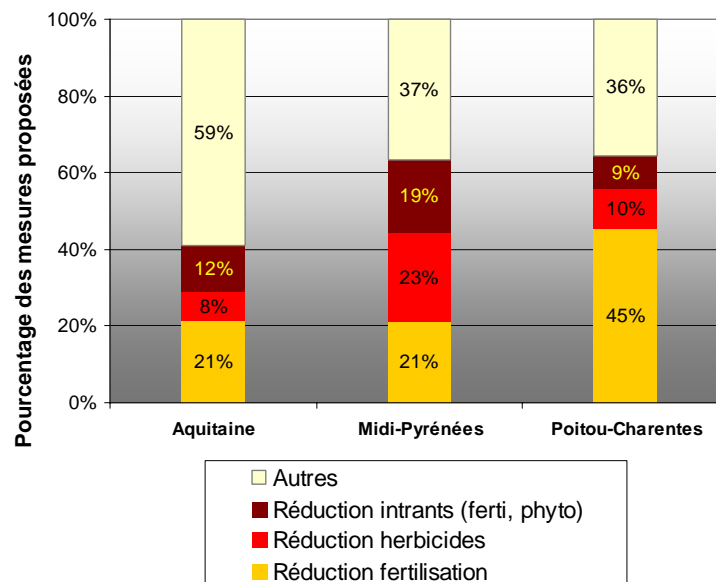
Added to the small surface areas of LAES projects is the fact that a number of farmers who were previously able to commit to a procedure to improve their practices are excluded from the current scheme. This exclusion is ill accepted, both by those who are in the territory and by those outside the territory. Jaillet (2009) rightly reminds us that "defining a territory involves the difficult exercise of inserting into a space a feature that discriminates between someone inside and someone outside". Although the principle of territorialization is theoretically relevant as it is borne by the desire for environmental effectiveness and efficiency of resources, when it is transposed locally it cannot help but create a feeling of inequality among farmers. In certain cases, this can be an obstacle to the appropriation of the environmental stakes and the collective dynamic.

The appearance of target areas and new project leaders cannot mask the difficulty of encouraging farmers to subscribe to ambitious schemes to reduce inputs. An assessment of previous French agri-environmental schemes has shown the measures focused on nonpoint source pollution to be somewhat ineffective. They involve little or no change of practice, but rather the farmer continuing what he used to do (Bonnieux, 2009). It is the project leaders who put forward the list of measures that are relevant to their "territory". In total, in the 30 projects, 233 schemes have been proposed and more than half of them (137) concern a reduction in inputs (fertilizers and phytosanitary products). The measures designed to reduce fertilizers are predominant (57%). 50% of the fertilization reduction schemes are proposed on territories with grassland while 75% of the schemes to reduce the use of weed-killers are on territories where field cropping dominates (cereals/maize/rapeseed).

Our interregional comparison shows marked differences in the implementation of these schemes. In Poitou-Charentes, only 10% of the schemes target a reduction in the use of weed-killer, whereas in the Midi-Pyrénées, where field cropping is dominant, a reduction in the use of weed-killer concerns 23% of the measures put forward, added to the 19% of schemes targeting the global reduction of inputs. While in Poitou-Charentes and Midi-Pyrénées the

schemes for the reduction of inputs account for more than 60% of the proposed schemes, in Aquitaine they only just reach 40% (Figure 1). The schemes chosen by farmers mainly cover a reduction in fertilizers (and almost exclusively on grassland) while those relating to pesticides are few and far between (for weed-killer only).

Figure 1. Types of schemes proposed by the projects, by region



The territorialization of LAES public action is perceived differently depending on the actors. Although it is pertinent within an environmental objective since it is focused on an *a priori* at-risk area in terms of water quality, different perceptions from the project leaders, institutions and farmers can be distinguished. One of the reasons behind this distortion is the return of “State centrality in the management of territories” (Epstein, 2009), where the project construction is highly constrained by national and regional regulations, but also the potential marginalization of institutions such as the CDA in the territories (Esposito-Fava, 2007). So compared with the program-theory evaluation, the results of our study highlight a certain ambivalence in the implementation of LAES, in particular with the targeting of schemes to “territories” leading to better environmental effectiveness but excluding farmers outside of the territories. Our results also show the ambiguity of the use of the word “territory” in agri-environmental policy, meaning target areas rather than territories since interacting local actors are not to be found in them. As presented in the next part, this territorialization process is not the only difficulty in implementing these LAES.

### **3. Adoption of WFD LAES by farmers: the importance of local coordination**

The environmental effectiveness of AES depends on the zonation and on the relevance of the proposed changes in practices, but also on the adoption rate of the contracts by farmers, particularly for schemes targeting a reduction in nonpoint source pollution in vulnerable catchment areas, measures which present threshold effects in terms of effectiveness (Dupraz et al., 2007). The LAES operators also specify the objectives to be reached in terms of surface area coverage in their projects (Harreau, 2009). On a voluntary basis, the adoption of protection and conservation practices nonetheless remains limited as shown by the feedback from the previous programme of AES (AND, 2008). Additionally, the available studies on the first RDR showed that farmers favoured the less restrictive schemes requiring the least modification of practices, with clear knock-on effects (Arnaud and Dupraz, 2006; Chabé-Ferret and Subervie, 2009). At the time of writing (spring 2010), that is, after two contractualization campaigns in Aquitaine and Midi-Pyrénées and three in Poitou-Charentes, the number of signed WFD LAES contracts remains low (Table 3).

Table 3. Number of WFD LAES contracts

Year	2007		2008		2009		Farmers present in the project areas*
	New	Total	New	Total	New	Total	
Aquitaine <sup>a</sup>	Contractualization		14	14	111	125	> 5000
Midi-Pyrénées	not opened		68	68	42	110	> 1300
Poitou-Charentes	35	35	90	125	150	275	> 3900

<sup>a</sup> Excluding specific schemes of the Aquitaine Regional Council

Sources: DRAAF; \* our estimation from the dossiers of WFD LAES projects

#### **Transaction costs as an obstacle to adoption of the LAES**

Among the factors identified by farmers as being an obstacle to contractualization, transaction costs are the subject of growing concern (Falconer and Saunders, 2002; McCann and Easter, 2000; Rorstad et al., 2007). In relation to the regulatory schemes and the taxing of inputs, contractual policies raise a specific problem since their implementation is on a voluntary basis

and there is a direct relationship between the beneficiary and the administration. Private transaction costs depend on the individual characteristics of the farm, the farmer and the organizational and/or institutional networks in which he is involved (Ducos et al., 2009; Kephaliacos and Ridier, 2007). Further to Williamson (1993) and Saussier (2000), Ducos and Dupraz (2006, 2007) showed that uncertainty and the perception of contractual risks explain both the choice of contractualizing and the level of investment in skills and other specific assets by the farmer. The uncertainty may be exogenous (price volatility on the agricultural markets) but also linked to the legal and relational characteristics of the contract (term, control and sanction system, etc.) which are imposed on farmers and are non-negotiable. More specifically, we have identified several sources of transaction costs which led us to formulate testable assumptions. These propositions are detailed in Louis and Rousset (2010). Our main proposition is that a high degree of uncertainty surrounding the transaction should lessen the probability of adoption of the LAES. Risk-averse farmers or those wanting greater flexibility in the contracts are also likely to commit less. Conversely, good information about the schemes proposed in the territory should encourage adoption of the contract, in the same way that the farmer's trust in the administration and institutions should bring down risk perception. Lastly, the contract should logically be accepted more readily if the payment compensates for the extra costs and loss of income according to the opinion of the farmer.

### **Results of a case study in the Poitou-Charentes region**

We tested these assumptions by means of a direct survey on 60 farmers in the *Moulin-Neuf* drinking water catchment area (project territory in Poitou-Charentes). From a comprehensive list of the 186 eligible farmers on the territory, the contracting and non-contracting farmers were separated into two populations. We randomly drew farmers from the contracting population (29 out of 38) and non contracting population (31 out of 148), with an intentionally unbalanced survey ratio as the aim was to obtain two samples of the same size. The survey was carried out in face to face interviews during the summer and autumn of 2009. We used psychometric measures, with scales ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Although strictly speaking Likert scales are ordinal measures, in practice it is customary to consider them as interval scales (Spector, 1992).

Here we will only present the main results of the statistical analyses (Louis and Rousset, 2010). Univariate tests (chi-squared and Student's t) show that the farmers who have contractualized a LAES are more often directly informed by the project coordinator, had more

frequently contractualized a CTE or another AES in the previous programming period, and are more willing to take on responsibilities in a professional network and less frequently state they are an individual operation. The results concerning information and experience with the schemes of the first RDR conform to the hypotheses. The proportion of field cropping farmers is identical in both populations, with two-thirds of cereal farmers. On average, the contracting farmers are younger and operate a larger UAA than the non-contracting farmers. Contracting farmers are less risk-averse and have a greater tendency to state that the amount of the LAES is sufficient, in line with the hypotheses. Non-contracting farmers are more likely to state that the contract commitment period is long and that the subsidy amount needs to be modulated, which suggests a preference for flexibility and "tailor-made" contracts. The rigidity of the AES therefore appears to be an obstacle to their adoption by certain farmers.

Contrary to our hypothesis, the perception of uncertainty surrounding production conditions and markets does not differ between the two groups. This result could be explained by fairly homogenous production orientations with a predominance of cereal crops, and hence the populations being exposed to the same uncertainties. As for the question of trust, opinions are not split with regard to the honesty of the inspectors and the acceptability of sanctions: we merely note – counter-intuitively – that the non-contracting farmers have a greater tendency to think that the inspectors "know their job well". According to Kephaliacos and Ridier (2007), although certain methods for implementing controls may be ill-perceived by farmers, they are aware that the controls are necessary. This element also came out in the interviews during the survey.

The variables identified in the tests above are candidates to be used in a multivariate analysis performed with a discrete choice model (1 = contract; 0 = no contract). Propensity to contractualize an AES is modelled with a logistic regression. The general form of the LOGIT is  $P(y_i = 1) = F(X_i, \theta)$ ,

where  $y_i$  is the dichotomous variable coding for the choice of operation  $i$ ;  $F$  is the distribution function of the likelihood retained, here the logistic law;  $X$  is the vector of the explanatory variables introduced;  $\theta$  is the vector of all the unknown parameters that we propose to estimate.

The model is estimated using the Maximum Likelihood method (SAS V8 LOGISTIC procedure). Here we will present only the most significant regressions (Table 4).

The outcome is that the likelihood of contractualizing a scheme is higher when the farmer:

- has received information about the agri-environmental schemes directly from the local coordinator (*INFO* dummy variable);
- already subscribed to an AES (CTE/CAD, PHAE...) during the 2000-2006 period (*EXP* dummy variable);
- considers that the amount proposed is satisfactory (*COST* variable);
- operates a large UAA (*SIZE*).

Conversely, the likelihood of contractualizing a scheme is lower when the farmer:

- finds the commitment period long (*FLEX1*);
- would like the AES subsidy to be tailored to the costs of each farm (*FLEX2*);
- is risk-averse (*RISK*).

### **Local coordination and effectiveness of a territorialized policy**

Despite a context in which market revenue is falling and which should therefore encourage French farmers to supplement their income, contractualization of the new WFD LAES has remained low in the three regions studied. This "restraint" shown by farmers towards agri-environmental contracts has been well documented: economic compensation deemed insufficient, low level of interest in environmental issues, excessive paperwork, doubts about the sustainability of the scheme. Conversely, the experience of the farmers (or their neighbours) with this type of programme is likely to facilitate dissemination of the schemes (See Allaire et al., 2009; Arnaud and Dupraz, 2006; Ducos et al., 2009; Dupraz et al., 2003; Gafsi et al., 2006, Vanslebrouck et al., 2002).

Our work confirms the role of private transaction costs. More specifically, the information provided by the local coordinator plays a decisive role. Explanatory variable *INFO* is significant (Table 4) and has an important marginal effect. The works conducted on the evaluation of AES over the previous period also show that farmers who are well informed about the AES are more likely to adopt a contract (Arnaud and Dupraz, 2006). WFD project coordinators have a threefold role: build the agri-environmental project with a territorial diagnostic as the starting point in conjunction with the other instruments available (local action plans by the water agency, regional programmes, etc), look for funding, and disseminate information to and advise and inform the eligible farmers.

Table 4. Determinants of LAES contracts adoption

LOGIT MODEL											
CONTRACT (1) versus NO CONTRACT (0)											
Explanatory variables		I		II		III		IV		V	
		Coeff.	Pr<=p	Coeff.	Pr<=p	Coeff.	Pr<=p	Coeff.	Pr<=p	Coeff.	Pr<=p
<i>INFO</i>	information provided by local operator (yes=1)	1.354	0.017 **	1.274	0.015 **	1.155	0.006 ***	1.488	0.002 ***	1.194	0.001 ***
<i>EXP</i>	prior experience with AES (yes=1)	0.275	0.579			0.563	0.173	0.553	0.177	0.769	0.039 **
<i>SIZE</i>	farm size in ha	0.009	0.143			0.014	0.017 **	0.010	0.039 **	0.012	0.012 **
<i>COST</i>	'AES money compensation is enough' <sup>a</sup>	1.212	0.112	1.712	0.015 **						
<i>FLEX1</i>	'AES contract is long' <sup>a</sup>	-0.915	0.064 *	-1.069	0.016 **	-0.763	0.076 *				
<i>FLEX2</i>	'Subsidy should be tailored to each farmer's costs' <sup>a</sup>	-0.915	0.060 *	-1.089	0.016 **			-0.668	0.051 *		
<i>RISK</i>	'In my life, I take less risks than others' <sup>a</sup>	0.349	0.594	0.264	0.674	1.005	0.060 *	0.633	0.255		
N		50		50		57		56		60	
- 2 Log L		33.1		38.3		46.4		44.4		54.6	
Concordants		92%		90%		89%		90%		86%	
McFadden R2		0.503		0.449		0.435		0.447		0.378	

\*\*\* significant at a threshold of 1% , \*\* significant at a threshold of 5% , \* significant at a threshold of 10%

<sup>a</sup> Continuous scale: 1 (strongly disagree) to 5 (strongly agree)

In the region under study, coordination was deployed in four stages, with brochures and posters sent to the town halls in the WCA at the start of February 2008, brochures and posters deposited at the Charente Chamber of Agriculture, 3 public meetings scheduled in late February, and individual meetings in March and April further to phone calls by the coordinator or the participation of the farmer in the meetings.

The information was also disseminated in the regional and trade press. The results show that a direct contact with the coordinator facilitated the contractualization of the schemes, with 77% of the contracting farmers having had prior contact with her, against 23% of the non-contracting farmers.

From this viewpoint, the results are consistent with the program-theory evaluation of LAES, based on local coordination of projects in the target areas in order to improve the effectiveness of the programme. Although in the project construction phase the "territorial" reality of the LAES seems debatable, in the later contractualization phase the proximity of the project leader plays a decisive role. However, although the organizations have specifically recruited in order to coordinate the LAES, in general this is less than one full-time equivalent. The low level of extra financial means for coordination is another problem. It does not seem adapted to ambitions, raising major questions from project leaders about the future of the scheme in the medium term (Harreau, 2009). The funding for coordination provided for in the new *Plan de développement rural* is low with a maximum of 2% of the State credits that the Regional Head of State Administration receives for the devolved AES budget. Moreover this method of financing must at all events remain subsidiary to the other existing possibilities, notably funding from the water agencies or the local authorities (MAP, 2008).

## Conclusion

Support for the objectives of restoring water quality under the Water Framework Directive (WFD) is one of the priority targets of the CAP agri-environmental policy. The French framework for the 2007-2013 period is mainly based on Local Agri-Environmental Schemes (LAES). What sets them apart from the other AES is the obligation to "territorialize". This territorialization combines the targeting of public spending to "territories" that have first been recognized as having water quality issues with the construction by local actors of projects that are appropriate to local agriculture.

This twofold nature of the territory (administrative recognition, local emergence of projects) led us to raise questions about the actual degree to which LAES have a territorial foothold, within the meaning that the social sciences give to the concept of "territory". Geographers define the word as the result of a construction of people's relationships with their space, and an economic, ideological and political appropriation of that space (Di Méo, 1996; Vanier, 2009). Our analysis of all thirty projects in the three regions of South West France shows that they were indeed implemented in pertinent areas with regard to the

environmental stake of water quality. Additionally, the bottom-up logic of the LAES, with local project leaders working on the construction of the schemes and coordination of the programme, seems to work in favour of a contractualization dynamic. Our surveys on farmers located in a drinking water catchment area in the Poitou-Charentes region show that farmers who are well informed about the LAES adhered to the new scheme more readily. However, the target areas have often initially been built without any real interaction between local actors, which explains the "defensive" attitude of certain farmers towards the territorial projects.

So the implementation of LAES does not escape the difficult task of articulating between local stakes and the coherence of national policies (CAP and WFD). Territorializing the AES to improve water quality is pertinent from an environmental point of view. But in the previous schemes (CTE/CAD) there was no zonation, with the effect of raising awareness among a larger number of farmers. A return to more restricted access to support could lead to a feeling of inequality and of mistrust towards the public authorities, and a drop in motivation among certain farmers who had already launched into an agri-environmental dynamic by starting to change their fertilization or plant protection practices. Bearing in mind the inertia involved in restoring milieus and the threshold effects, a sustainable improvement in water quality involves a long-term commitment from the actors in the relevant areas. Rieutort (2009) notes that "the territorialization of environmental action should be nuanced; it is about changing scale, i.e. moving from a set of plots up to a territory". The LAES are only in their infancy. It is therefore natural to wonder about the longer-term effects of this new AES: is it likely to create territories in which a constructed - rather than enforced - local environmental dynamic is a source of change that goes beyond a mere contractual modification of the agricultural practices of farmers?

Additionally, our first results raise the question of the contribution by LAES to a new form of governance or regulation of public action (increasingly procedural): central government delegates (or transfers) the local construction of its environmental policy to third parties, in order to encourage targeted local action with a bottom-up approach, as this is considered more effective and economical for the taxpayer. It may be premature to go further in our analysis, but the question remains: with the LAES, are we witnessing a transformation of public agri-environmental action into something increasingly co-constructed between actors from different spheres (public, farming profession, drinking water actors), or the desire of the State to "refocus its roles and missions" by delegating the territorial construction of agri-environmental action to professional or semi-public structures?

The coming years will give us a better understanding of how the professional structures have accompanied this new form of public action. But counting exclusively on the "spontaneous" emergence of third parties raises also the question of possible inequality of access for farmers to public support for the payment of environmental services in the event of failure by the local operator.

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