Ex-ante institutional compatibility assessment of policy options. Methodological insights from a case study on the Nitrate Directive in Auvergne

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Ex-ante institutional compatibility assessment of policy options - Methodological insights from a case study on the Nitrate Directive in Auvergne, France

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Abstract

The Procedure for Institutional Compatibility Assessment (PICA) has been developed as a formalised methodology to predict the compatibility between a policy option and the institutional context of its implementation. As a first empirical test of the tool, PICA was applied to the implementation of the EU Nitrate Directive in Auvergne, France. Valuable insights were acquired on the combination of experts and stakeholders' perspectives and the choice of qualitative methods for the collection of the information needed at each step of the assessment. Further, this procedure proved to be a valuable tool for the ex-ante identification of institutional factors affecting the implementation of policies.

Keywords: ex-ante policy assessment, institutional compatibility, EU Nitrate Directive, integrative methodology

1. Introduction

Ex-ante impact assessments have become an integral part of the political decision making process at EU- and often national level (Bäcklund, 2009). Hence it is recommended that the analysis of the likely social, ecological and economic impacts of a policy should be complemented by an institutional assessment to provide detailed information about potential problems **(**European Commission, 2009). Until now, policy assessment tools have not provided any formalised method for ex-ante evaluation of policies from an institutional perspective. Instead, the focus has mainly been on the ex-post institutional analysis of past policy performance (Theesfeld et al., 2010). While there are numerous institutional case studies and indicators of the latter kind in existence (e.g. Briassoulis, 2004; Hagedorn, 2002; Knack et al., 2003; Spangenberg et al., 2002; Smits et al., 2008), standardised procedures to use this information to *predict* the institutional feasibility of policies are not available. To fill this gap, the "Procedure for Institutional Compatibility Assessment" (PICA) has been developed in the framework of the EU- project "SEAMLESS", whose aim is to develop an impact assessment tool for agri-environmental policies (Theesfeld et al., 2010). PICA constitutes a first formalized methodology to analyse the compatibility between policy options and various institutional contexts to assess the effectiveness and efficiency of policy making.

PICA draws mainly on the field of institutional economics (Hagedorn, 2008; North, 1990; Ostrom, 1990; Williamson, 2004). In this framework, institutions are defined as "the humanly devised constraints that shape human interaction" (North, 1990, p.3). They include formal rules (e.g. laws, property rights, etc.), informal rules (e.g. norms, codes of behaviour, conventions, etc.) as well as the enforcement characteristics of these

rules. Institutional economics build on the assumption of bounded rationality. Actors take decisions without a complete knowledge of all the available alternatives and their consequences, because of their limited computational power and uncertainty in the external world (Simon, 1979).

Institutions are understood as the structures human beings construct for coping with the limits of man's ability to compute in the face of complexity and uncertainty in their interactions. As North (1995, p.18) puts it, "Institutions are formed to reduce uncertainty in human exchange" but "There is no implication that the consequent institutions are efficient".

This being so, the effectiveness and cost-effectiveness of a policy will depend very much on the institutions in the context of implementation. Appropriate institutions will increase the likelihood of achieving the policy objectives, i.e. they increase the degree of actors' compliance and (intended) change of behaviour. They will also ensure that these policy objectives are achieved at reasonable cost (Bickers and Williams, 2001; Rutherford, 2001).

The "Procedure for Institutional Compatibility Assessment" (PICA) follows the concept of institutional compatibility between policy instruments and the institutional environments in which they are to be implemented (Bickers and Williams, 2001). The objective of the tool is then to apply institutional analysis to reveal the extent to which a policy being implemented may effectively achieve its objectives by identifying fostering and hindering factors for the implementation process.

PICA consists of four working steps (Theesfeld et al., 2010). The first is the classification of the policy option studied into a policy type (Table 1). The policy types are defined by two main dimensions: (i) the "Type of intervention", that is, the type of

policy instrument used (regulatory, economic or advisory) and (ii) the "Area of intervention" or "Governance structure", upon which the policy is intended to have an impact. The "Governance structure" follows the distinction between hierarchies, markets and hybrid forms (here, self-organized networks) developed by Williamson (2004). For example, agri-environmental schemes can be classified into an "economic type of policy having effects on market" while the reorganisation of a new administrative structure corresponds to a "regulatory type of policy having effects on hierarchy".

(Table 1)

The assumption behind this typology is that the institutional factors potentially fostering/hindering the implementation of a policy option depend on the *policy type* defined by the two dimensions described above (Theesfeld et al., 2010). Therefore this classification makes it possible to identify the institutional aspects relevant for the implementation of the policy option studied.

In **a second step**, the policy option under scrutiny is characterized by a set of Crucial Institutional Aspects (CIA) identified as potentially having a fostering or hindering effect on the implementation of the corresponding policy type. This initial set of CIAs associated with the corresponding policy type is further adapted to the specific features of the policy option and the context of implementation.

In **the third step**, indicators to empirically assess the extent of the CIAs previously identified in the context of implementation are defined. The information provided by these institutional indicators is aggregated to assess qualitatively the extent of each CIA in the context of implementation. The evaluated CIAs are then grouped and ranked in order to formulate qualitative statements regarding the institutional compatibility

between the studied policy and the context of implementation (**Step 4**). These statements are the final outputs of the application of PICA.

The objective of this paper is to present and to discuss the results of an application of PICA to the implementation of the EU Nitrate Directive in Auvergne, France. This first empirical assessment provides methodological insights with regard to the tool itself and the methods used for empirical applications.

The paper is structured in three main sections. Section 2 outlines the application of PICA in terms of methodology and generated results. In Section 3, the procedure and methodology of application are critically discussed. Section 4 draws conclusions and discusses the role PICA can play within the policy-making process.

2. A first empirical application of PICA: methodology and results

For the first empirical test of the procedure, PICA was applied ex-ante to the implementation of the policy option "EU Nitrate Directive" in the "département"[1] of Puy-de-Dôme in Auvergne, France (Amblard et al., 2008; Schleyer et al., 2008). For testing the capability of the procedure to a) disclose regional distinctions between implementation contexts and b) to correctly predict fostering and hindering factors to policy implementation, two additional analyses were carried out in the neighbouring "département" of Allier, where the Nitrate Directive has been implemented since 1994. The objective of this section is to present the methodology used for the three applications as well as the main results of the application in Puy-de-Dôme.

2.1. The test case: the implementation of the EU Nitrate Directive in Auvergne, France

The EU Nitrate Directive was adopted by the European Communities Council in 1991. This Directive aims at limiting the pollution induced by nitrates from agricultural sources in surface and ground waters. The application of this policy includes the designation of vulnerable zones, where nitrate concentrations in surface and ground waters are above 50 mg/l, or above 40 mg/l with an upward trend. The delimitation of these zones is revised every four years. Every farmer in a vulnerable zone has to comply with the measures included in specific action programmes. Additionally, a national code of good agricultural practices is to be voluntarily applied outside the vulnerable zones (European Commission, 2002).

The application of PICA focused more particularly on the mandatory rules included in action programmes which farmers have to follow in vulnerable zones (e.g. the limitation on organic fertilization to 170 kg N/ha or the periods when the application of organic fertilisers is prohibited or restricted).

Two study areas were chosen to apply PICA: the "départements" of Allier and Puy-de-Dôme in the Auvergne region in France (Figure 1). The two "départements" are located in the north and central part of Auvergne. The Allier River is prominent in both "départements", flowing from south to north, first through Puy-de-Dôme and then through Allier. Agriculture in Allier is characterized mainly by livestock farms: 75% of the agricultural area is occupied by grassland. Some crop farming activities are located in the Val d'Allier plain (next to the Allier River). In the Limagne plain area in Puy-de-Dôme, agricultural production is dominated by arable farms (cereals, seed corn, and

sugar beet) due to the rich soils. In the rest of the "département", cattle breeding (milk and cow production) is dominant.

While the Nitrate Directive has been implemented since 1994 in Allier, it was only recently decided to define a vulnerable zone in Puy-de-Dôme. In Allier, the vulnerable zone (22% of the total land area of the "département") is made up of 144 municipalities. The vulnerable zone in Puy-de-Dôme, defined at the time of the study in 2007, includes 41 municipalities along the Allier River.

(Figure 1)

2.2. Methodology

In the following, the methodology for the application of PICA to the implementation of the Nitrate Directive in Allier and Puy-de-Dôme is described in detail. First, the three analyses conducted in 2007 in the two implementation contexts and their objectives are presented. In a second sub-section, the different empirical methods used are described.

2.2.1. Three distinct analyses

Three different empirical analyses were made to test PICA. The procedure was first applied to the future implementation of the EU Nitrate Directive in Puy-de-Dôme, that is, the PICA tool was used in "real"[2] ex-ante conditions (Figure 2). In Allier, a "simulation" of running PICA before the actual implementation of the EU Nitrate Directive that started in 1994 was carried out as well as an ex-post evaluation of the implementation process and its results and effects. The comparison between the results of the ex-ante "simulation" and the ex-post evaluation in this "département" was used to assess the ability of PICA to "predict" or correctly identify those Crucial Institutional Aspects (CIA) that are relevant for both the policy option and the institutional context under scrutiny (Step 2). The CIAs identified during the ex-post evaluation in Allier

were also compared to the initial list of CIAs linked to the policy type associated with the EU Nitrate Directive, for evaluating the initial selection of CIAs made on the basis of the typology of policy options. Finally, the comparison of the results of the two ex-ante assessments in Allier and Puy-de-Dôme also shed light on the ability of the procedure to account for potential (crucial) similarities and differences in the institutional contexts of both study areas.

(Figure 2)

2.2.2. Empirical methods for the application of PICA

The various empirical methods that have been used for testing PICA include literature reviews, analysis of statistical data as well as qualitative interviews and focus groups with scientists and stakeholders from the environmental, agricultural and water administration and from interest groups involved in the implementation of the EU Nitrate Directive in Allier and Puy-de-Dôme (Table 2).

For **PICA Step 1**, policy documents of the EU Nitrate Directive were reviewed and analysed to identify the generic structure of the policy according to the matrix of policy types combining the "Type of intervention" and the "Area of intervention" (Figure 1). The mandatory rules farmers have to follow without any compensation may affect their production function (e.g., through a decrease in yield or an increase in production costs[3]) and thus their position in the market. The Nitrate Directive was therefore categorised as a "regulatory type of policy having effects on markets".

The objective of **PICA Step 2** was to identify the Crucial Institutional Aspects (CIAs) potentially affecting the implementation of the Nitrate Directive in both study areas. An initial list of CIAs linked to the various policy types, previously developed, served as a basis to pre-select the relevant aspects. The list was drawn up on the basis of a literature

review dealing with ex-post analysis of agricultural, environmental and rural policy implementation (Brouwer et al., 2003; Hodge and McNally, 2000; Lichtenberg, 2002; Lynggaard, 2001; McCann and Colby, 2005; Michaelowa and Jotzo, 2005; Wilson et al., 1999, Zélie, 2002).

As a starting point, the list covers eleven CIAs linked to the policy type "regulatory on markets", referring to the policy structures, power relations of involved actors, costs, monitoring and information aspects (Table 4). In step 2, this set of CIAs was then revised and adjusted to the Nitrate Directive and the study context through 1) focused literature studies and preliminary interviews with scientists and 2) semi-structured interviews with the stakeholders identified as being relevant through the literature review and the interviews.

The literature review covered scientific documents as well as reports, protocols, and position papers from private and public regional farmers' and environmental organisations. Additionally, two scientists familiar with the Nitrate Directive implementation, with a background in agronomy and environmental economics respectively, were interviewed in order to gain a deeper insight into the subject matter.

Then, 15 semi-structured interviews with stakeholders were carried out to further define the lists of CIAs. The selection of interview partners followed the rule of a maximal structural variation of perspectives (Kleining, 1982). This means that for this study, a variety of involved stakeholder groups from different public and private organisations dealing with the Nitrate Directive was included. Representatives of the agricultural, environmental and water administration, local councils, farmer organisations and environmental associations were asked about their individual perception of the institutional factors likely to affect the implementation of the Nitrate Directive in Allier

and Puy-de-Dôme. Taking the pre-selected CIA as a starting point, the interview partners were asked to evaluate their relevance for the implementation of the Nitrate Directive in the study context and to think of additional and/or alternative ones. Their answers were recorded and documented in fact sheets. The variety of interview partners served to provide as broad a view as possible on the real and hypothetical implementation process and the actual or assumed constraints.

(Table 2**)**

In a third step, institutional indicators were defined to assess the actual extent of the identified CIAs in Allier and Puy-de-Dôme[4] (**PICA Step 3**). For this, an initial library of institutional indicators**,** previously generated by a literature review (e.g. Bovaird and Löffler, 2003; Knack et al., 2003; Spangenberg, 2002; Woolcock and Narayan, 2000), was used as a starting point (Schleyer et al., 2007). The library contains about 100 indicators as variables and proxies characterizing each CIA from the initial list and includes data sources for their calculation as well as the assumptions made on the links between the CIAs and the corresponding indicators (Schleyer et al., 2007).

If no appropriate indicators were available for a particular CIA, new ones were developed for the assessment of the extent of the corresponding CIAs in the studied contexts. The selection of institutional indicators was further revised and validated by three scientists[5] through a group discussion. Two types of data source were used for the assessment of institutional indicators: i) existing international databases (e.g. World Bank, OECD, and EUROSTAT) as well as national and regional databases (e.g. INSEE[6], Agreste[7], and IFEN[8]); ii) new data generated by problem-centred interviews with regional experts and stakeholders. Three face-to-face interviews and six telephone interviews were carried out.

Indicator values were assessed at different geographical levels wherever it was necessary and/or possible: the national level (France), the regional level (Auvergne), the departmental level (Allier; Puy-de-Dôme) as well as the vulnerable zone level[9] as the smallest assessment unit. Indicators characterising CIAs for the ex-ante assessment in Allier based on data from 1988-1992 while for indicators characterising CIAs for the ex-ante assessment in Puy-de-Dôme, data from 2000-2007 was used.

The information provided by the institutional indicators was then compiled in order to assess the extent of every single CIA in each "département". Indicator values at the study area level were individually classified as "high", "medium" or "low" through a comparison with the values at higher or similar geographical levels[10]. The extent of each CIA was then assessed as "high", "medium" or "low" on the basis of the classified indicator values. The indicators considered as relevant for characterizing a CIA were assigned the same weight for the evaluation of CIA extent.[11].

In the final **Step 4 of PICA**, a qualitative assessment of the institutional compatibility between the EU Nitrate Directive and the institutional contexts of Allier and Puy-de-Dôme was carried out. For each "département", the respective CIAs were grouped into thematic categories in order to structure the information collected with regard to institutional compatibility (Figure 3). The definition of the categories was based on the distinction between institutions and organisations in the field of institutional economics (North, 1990). Like institutions, organisations provide a structure to human interaction. But they differ from institutions in the sense that institutions are the "rules of the game" while organisations are the "players". They "are groups of individuals bound by some common purpose to achieve objectives." (North, 1990, p.5). Organisations are influenced by institutions and, in turn, they influence the institutional framework.

(Figure 3**)**

Consequently, the formal and informal institutions present in the study contexts were distinguished from the organisations involved in the implementation process. These organisations are : i) the organisations representing the interests of the concerned stakeholders, ii) the public administrative bodies responsible for implementing the policy, and iii) the farms whose practices are targeted by the policy. Five thematic categories of institutional compatibility were therefore defined, into which the CIAs identified in Allier and Puy-de-Dôme were grouped: "*Informal institutions*", "*Formal institutions*", "*Public administration*", "*Interest groups*" and "*Farms*". The relative importance of each CIA within a thematic category, its form of influence (fostering/hindering), and the relative importance of each category with regard to the implementation of the EU Nitrate Directive in Allier and Puy-de-Dôme were assessed through a focus group with six stakeholders[12] who had already been interviewed in Step 2. A balanced stakeholder group between the type of organisation (public administrative versus private interest groups), their issue or policy area (agriculture-oriented versus environment-oriented) and the study regions was achieved. The outcomes of the focus group were used as a basis for the formulation of qualitative statements about the institutional compatibility of the EU Nitrate Directive with the contexts of Allier and Puy-de-Dôme.

In summary, a combination of qualitative approaches was used in order to take advantage of all the information available for the empirical application of PICA. Stakeholders were included in the assessment for their practical knowledge on the process of implementation of the policy and the contexts studied. Scientific expertise in the fields of agronomy and environmental economics was additionally included to bring

in a theoretical perspective on the interrelations between the social, economic and ecological aspects of farm management. Different qualitative interview techniques (face-to-face or focus groups) were chosen according to the specific objective of the data collection in each step. The methodological choices and their implications are discussed in the fourth section.

2.3. Results

In this section, the final results of the ex-ante assessment in Puy-de-Dôme (Table 3) are presented in order to illustrate the output of the application of the PICA procedure. The results of the ex-ante and ex-post evaluations of the implementation of the Nitrate Directive in Allier will be discussed in the fourth part, with regard to the methodological insights they provide on the ex-ante "predictive" capacity of PICA and on its ability to detect the institutional characteristics of two distinct contexts.

For the assessment in Puy-de-Dôme, the policy option "EU Nitrate Directive" was classified in Step 1 as a "regulatory type of policy having effects on markets". Step 2 led to the identification of eleven CIAs which are likely to influence the implementation of the policy in Puy-de-Dôme. These CIAs were subsequently evaluated by experts using indicators and ranked in order of importance for the implementation process in Puy-de-Dôme by stakeholders during a focus group (Table 3).

(Table 3)

It turned out that for the participating stakeholders the most important factors potentially affecting the implementation of the EU Nitrate Directive in Puy-de-Dôme are related to the influence of interest groups. More particularly, the high bargaining power[13] of agro-industries in the "département" was ranked as the major constraint to the process of implementation of the policy. Two large agro-industrial cooperatives,

"Limagrain" and "Domagri", hold a dominant position in the area. Their strong influence is based on their high economic weight in the "département" in terms of contribution to the economy and employment. Most farmers in the Limagne area are under contract with "Limagrain" (for the production of seed corn) or "Domagri" (for the production of high quality wheat). The restrictions on fertilisation which could be imposed by the Directive in the vulnerable zone are likely to affect the capacity of farmers to fulfil the conditions of the contracts in terms of product quality. As a result, these two cooperatives may seek to use their high bargaining power to influence the choice of the measures in the action program to be implemented in the vulnerable zone. The bargaining power of farmers' organisations was also considered as an important factor potentially affecting the implementation of the Nitrate Directive. Traditionally, in France, farmers' organisations are involved in the design and management of agricultural policies. In the case of the Nitrate Directive, Agricultural Chambers[14] have negotiated the right to co-manage the implementation of this environmental policy (Brives, 1998). Thus, they are locally involved in the choice of measures included in the action programmes that are to be applied in the vulnerable zone. However, the stakeholders participating in the focus group disagreed about the nature of the impact of this aspect, half of them considering it was likely to constrain the process of implementation while the other half stating it would be a positive factor.

In general, the bargaining power of environmental associations is weak in France. Regarding the issue of water quality, environmental associations are active mainly in Brittany, where the nitrate problem is most acute. In Auvergne, environmental groups are not greatly concerned by the question of nitrate pollution from agricultural sources; not least because nitrate pollution is not perceived as the main agriculture-related

environmental problem in this region. Yet, environmental associations are part of the official commissions in charge of the definition of the action programmes at the "département" level and, despite their little bargaining power, their participation to the formal process of implementation of the Nitrate Directive was seen by the participants of the focus group as having potentially a positive influence.

The two thematic categories "*Public administration*" and *"Farms"* follow, and were assigned equal importance by the stakeholders. The opportunity costs borne by farmers are likely to constrain the implementation of the EU Nitrate Directive. This CIA reflects the issue of farmers' compliance with the restrictions on fertilizer use when there is no financial compensation for the change in their practices (Shortle and Horan, 2001; Von Blottnitz *et al.*, 2006; Fezzi *et al.*, 2008). Indeed, the farmers under contract with the cooperatives will lose income if they have to change their fertilisation practices, so that they cannot fulfil the requirements of these contracts (e.g. the yearly provision of a definite quantity of produce, the high protein content of the produce, etc.). Hence one can expect poor compliance with the mandatory rules if they prevent farmers from fulfilling the terms of the contracts on which they depend economically.

With regard to the public administration responsible for implementing the policy, the level of information asymmetries between the administration and farms is an important issue in monitoring diffuse nitrate pollution (Shortle and Horan, 2001). It was assessed as comparatively low in Puy-de-Dôme, given the dominance of crop farms in the vulnerable zone. Crop farms are considered as less costly to monitor than livestock farms with regard to the application of mandatory rules by farmers. From the results of the focus group, these comparatively lower difficulties in monitoring farmers' practices could affect the process of implementation positively or negatively. Because the Nitrate

Directive is an environmental policy targeting farmers' practices, this policy is co-managed in France by the Ministry of Ecology, Sustainable Development and Territory Planning (MEDDAT) and the Ministry of Agriculture and Fishery (MAP). The existence of an official common structure linking the environmental and agricultural administrations at the departmental level (the Interdepartmental Water service (MISE)) is clearly considered to be a factor likely to foster the implementation of the policy.

Another constraint to the implementation of the Nitrate Directive could be a shortage of resources for environmental administration. The DIREN[15] is responsible for the revision of vulnerable zones on the basis of a one-year evaluation of water pollution by nitrates. The realisation of this evaluation, however, is hampered by a lack of financial resources. Because of this constraint, the DIREN has to use data already available, i.e. data collected from drinking water catchments. The use of these data, however, leads to a bias in the analysis as nitrate concentrations in drinking water catchments have to be kept below the limit of 50 mg/l.

The Crucial Institutional Aspects related to formal and informal institutions were considered as being less important with regard to the implementation of the EU Nitrate Directive in Puy-de-Dôme. However, at the level of formal institutions, the existence of policies and regulations whose implementation turns out to interfere with the implementation of the EU Nitrate Directive could be another constraint to the compliance of farmers with the mandatory rules. For example, the CAP subsidies which still benefit irrigated maize farming, which is known to cause substantial releases of nitrates in waters - may interfere with the implementation of the policy.

As for the CIAs related to informal institutions, they were ranked as having quite similar importance for the implementation of the EU Nitrate Directive in Puy-de-Dôme.

The perception of farmers of their role in relation to environmental management may influence the effective impact of environmental policies (Ward and Munton, 1992; Davies and Hodge, 2007). In Puy-de-Dôme, farmers are hardly concerned by the issue of diffuse water pollution from agricultural sources, whereas in Allier, the farmers' organisations have implemented the "Ferti-mieux" programme, based on the provision of advice services to farmers. No such voluntary operations have been organised in Puy-de-Dôme. This could be one reason why farmers in this "département" have not been made aware of the impact of their fertilization practices on water pollution. The low sensitivity of farmers towards ecological considerations is thus likely to be a constraint for the implementation process. Further, public concern about water pollution from agriculture is very slight in Auvergne due to a lack of knowledge and information on these issues. Moreover, tap water is generally cheap in Auvergne because it comes directly from the mountains and from large ground water reserves hardly affected by diffuse nitrate pollution. As a result, people do not care much about nitrate pollution caused by agriculture. The mixed results of the focus group do not allow clear conclusions to be drawn about the nature of the potential impact of this institutional aspect on the process of implementation.

Finally, the level of opportunism of farmers, i.e. their propensity for not complying with regulations, was identified as a crucial institutional aspect for the implementation of the Nitrate Directive in Puy-de-Dôme. Some interviewed stakeholders stated that the level of opportunism of farmers, evaluated as low in the area, could be a factor favouring their compliance with the action programmes. Others claimed that, without any effective monitoring and penalty system, farmers in Puy-de-Dôme would not comply with the mandatory rules. Indeed, there had been no procedures for monitoring farmers'

compliance with the action programmes in place in France until 2005, when the payment of EU CAP subsidies has become subject to the farmers' compliance with environmental regulations, including the EU Nitrate Directive. However, doubts were expressed about the effectiveness of this new control and sanction mechanism, given the economic dependency of farmers on the agro-industrial cooperatives in the "département".

3. Discussion

The application of the Procedure for Institutional Compatibility Assessment to the EU Nitrate Directive in the Auvergne allows us to reflect on a) the procedure itself, and b) the methods applied at each step regarding the type and quality of results. Both aspects are discussed in this section.

3.1. Reflections on the PICA procedure

With regard to the performance of PICA, the testing provides insights about the tool's ability to assess the compatibility of a policy option with the institutional context of implementation. In this connection, three key features of PICA are discussed: 1) the filter function of the policy matrix to predetermine likely CIAs, 2) the predictive power of PICA as an ex-ante assessment tool, and 3) the sensitivity of the tool to institutional differences of varying implementation contexts.

3.1.1. Evaluating the filter function of the policy matrix to predetermine CIAs

The first critical issue is the question whether the typology to classify policy options is a suitable filter to narrow down the range of potential crucial institutional aspects linked to specific policy options. The evaluation of this filter function was done by comparing the initial selection of CIAs associated with the policy option "regulatory on markets"

with the CIAs identified ex-post in Allier as having actually affected the implementation of the Nitrate Directive in this "département" (Table 4).

While five CIAs initially linked to the policy type proved to be relevant for the implementation of the Nitrate Directive in Allier, ten CIAs identified during the assessment had not been suggested by the initial selection of CIAs. When six CIAs were not included at all in the initial list, four CIAs were linked with other policy types in the matrix. Yet, the ex-post evaluation of the implementation of the Nitrate Directive in Allier provides new empirical insights suggesting that these CIAs are also relevant for the policy type "regulatory on market". They were thus added to the list linked to this policy type, together with the CIAs not listed beforehand.

(Table 4)

Also, many CIAs suggested by the initial selection proved not to be relevant for the effective implementation of the Nitrate Directive in Allier. However, this does not necessarily mean that they are not crucial for other policies of this type and/or in another institutional context. Consequently, they are not to be dropped at once from the list of CIAs linked to the policy type "regulatory on market".

In general, the filter function of the typology can be regarded as satisfactory, as the large majority of the initially selected 42 CIAs were correctly excluded from the assessment, as verified by the empirical findings of the testing. The results suggest that neither the initial library of CIAs nor the lists of CIAs linked to a particular policy type can be seen as static, but need to be revised and enlarged continually to improve the accuracy of the predictions. Yet, over time and with more applications of PICA assessing a particular policy type, some CIAs will turn out to be relevant more often than others. This will lead to a sort of "ranking" or "hierarchy" of CIAs with respect to a

particular policy type, and may even result in abandoning some less relevant CIAs from the initial selection.

3.1.2. Evaluating the "predictive" power of PICA

The ability of PICA to predict the most important crucial aspects (Step 2) was evaluated by comparing the CIAs identified during the "simulation" of the ex-ante assessment of the implementation of the Nitrate Directive in Allier and the CIA identified ex-post as having affected the effective implementation of the policy in this "département" (Table 5).

The four crucial institutional aspects identified ex-ante were also found ex-post to be factors that played an important role in the implementation of the Nitrate Directive in Allier. However, several additional CIAs were identified through the ex-post assessment as also being relevant for the implementation process. This lack of identification of crucial aspects is likely to be caused by the methodological limits of the "simulated" ex-ante assessment. First, the literature considered for this evaluation, that is, the documents published until 1993, was not extensive on the topic of the Nitrate Directive which was a new policy at this time, only recently adopted by the European Communities Council (1991). Second, it was difficult to identify stakeholders who were in charge of the implementation of the policy in Allier 14 years ago (many are retired and/or have left the region). As a result, only three interviews could have been carried out. Additionally, these interviews were hampered by the difficulty, for interviewees, to distinguish between the information and opinion they had at the time when the implementation started (ex-ante) and the experience and information gained during the subsequent implementation process (ex-post). Despite these methodological limitations, the ex-ante identification of crucial institutional aspects which proved to play a major

role in the implementation process of the Nitrate Directive can be regarded as satisfactory. Further validation of the "predictive power" of the procedure is nevertheless needed, which could take the form of ex-post assessments of the implementation of policies previously evaluated with PICA in real ex-ante conditions.

(Table 5)

3.1.3. Evaluating the ability of PICA to account for institutional differences

The comparison between the ex-ante assessments in Allier and Puy-de-Dôme served as a basis to provide insights about the ability of PICA to detect the similarities or differences between distinct institutional contexts (Table 6). This comparison shows that the main similar and distinct features of the "départements" were reflected in the identification of the crucial institutional aspects likely to hamper/foster the implementation of the Nitrate Directive. In particular, the identification of the similarly high relevance of the CIA "Bargaining power of farmers' organisations" in both departments, as well as of the high relevance of the CIA "Importance of the agro-industrial lobby" only in Puy-de-Dôme reflects real important differences between the two institutional contexts.

(Table 6)

However, some differences in the identified CIA can rather be explained by the evolution of the process of implementation in time than by some different features of the two departments. This is illustrated by the CIA "Level of information on policy" that matters in the Allier context but not in Puy-de-Dôme, mainly because of the better diffusion of information on the Nitrate Directive along with the effective implementation of the policy. Some other detected differences do not reflect real differences in the institutional contexts. For example, the CIA "Attitude of farmers

towards ecological considerations", "Level of opportunism" or "Bargaining power of environmental groups", which were identified in Puy-de-Dôme only, turned out to be crucial for the effective implementation of the Nitrate Directive in Allier too, as shown by the ex-post evaluation. This lack of identification of some similarities between the two contexts may be explained by the methodological limitations of the "simulation" of the ex-ante assessment in Allier, as described above.

Overall, though more applications are needed to assess to what extent the procedure is able to account for institutional specificities, this testing constituted a first validation of the tool's ability to distinguish between institutional contexts, as a necessary precondition to carry out different ex-ante compatibility assessments for policies.

3.2. Reflections on the methodology for application

No methodological framework was defined prior to the application of PICA to the implementation of the Nitrate Directive in the "départements" Allier and Puy-de-Dôme. Only the sequence of steps was fixed and organised in such a way as to locate, narrow down and extract the information necessary for the assessment. Hence, for this first empirical application, qualitative methods were chosen according to their ability to generate qualitative and/or statistical data, depending on the information needs at each step of the process.

Stakeholders were considered as a valuable source of information for the institutional compatibility assessment, being closely involved in the implementation of the Nitrate Directive in the studied context. Their point of view was particularly taken into account for the identification of institutional aspects potentially affecting the policy implementation (Step 2) and for the classification of these aspects in order of importance for the implementation process (Step 4).

In Step 2, the choice was made to conduct individual problem-centred interviews with stakeholders as this technique allows for a greater depth for the revision of the initial list of crucial institutional aspects, organised as a deductive-inductive interplay. A first narrative part (Schütze, 1977) encouraged the interviewees to think hypothetically about, or remember, the implementation of the Nitrate Directive and the related crucial institutional aspects. Additionally, semi-structured questions about possible crucial institutional aspects were included for validation, rejection and/or completion by the interviewees (Scheibelhofer, 2005).

In Step 4, a focus group (Krueger, 1994; Morgan, 1997) was favoured for the collection of stakeholders' opinions, the main objective being to achieve an importance ranking for the already defined institutional aspects and compatibility categories. The group interaction could also be used to elicit new information from the group members (Krueger, 1994). In such a setting, participants were encouraged to express their own views on the importance of CIAs, in the light of other peoples' views. This provided valuable insights into the attitudes, opinions, and perceptions of participants for the formulation of the final compatibility statements in the two "départements" (Seipel and Rieker, 2003).

The integration of stakeholders' points of view into the institutional compatibility assessment proved to bring an added value to the analysis. However, it also raises the issue of the potential strategic behaviour of interviewees who are involved in the policy implementation process.

The openness of statements made by stakeholders has to be questioned, especially as the PICA ex-ante assessment is conducted on a (new) policy that – if implemented – is expected to change the current situation of affected stakeholders. Indeed, the interviews

in both "départements" revealed that the Nitrate Directive is (still) a "hot topic" and under discussion. For example, some potential interview partners from the state agricultural administration (DDAF) in Puy-de-Dôme refused to be interviewed because of the ongoing political processes and/or because there was no clear official position of their organisation towards the Nitrate Directive. For future PICA applications, it is very likely that the issues addressed by the policy option under scrutiny are on the political agenda already. Thus, it is important that the potential strategic positions of stakeholders are identified and taken into account for the further processing of the information.

This issue was addressed first by the selection of a balanced group of interview partners and focus group participants in terms of represented organisations (administration versus interest groups; agriculture-oriented versus environment-oriented organisations) in order to include in the assessment the diversity of viewpoints on the implementation of the Nitrate Directive in the study contexts. Furthermore, in Step 2, the results of the interviews were triangulated with the outcomes of a literature review, bringing an additional perspective. However, in Step 4, the final statements about the institutional compatibility between the EU Nitrate Directive and the contexts of Allier and Puy-de-Dôme were mainly based on the results of the stakeholder focus group meeting. One alternative to consider for the future applications of PICA would be to organise additionally an expert review of the focus group results as a basis for the formulation of the final statements. This may help to put in perspective the stakeholders' potential strategic approach to the ranking of CIAs and categories of institutional compatibility and to interpret the sometimes contradictory assessments concerning the impact of CIAs on the policy implementation process.

In contrast, the definition of institutional indicators for the evaluation of the extent of Crucial Institutional Aspects (Step 3) was mainly done on the basis of experts' opinions (the PICA researchers with an external validation by a group of scientists). Only when facing limitations in terms of suitable and available statistical data, interviews were carried out with stakeholders for the qualitative valuation of institutional indicators.

For the evaluation of the extent of Crucial Institutional Aspects, taking into account the broader national, regional and/or departmental contexts by a relative ranking of indicator values limits the potential over- or under-estimation of these values at the vulnerable zone level. Another advantage of the comparative assessment of indicator values is to make transparent the choice of reference points; reference points which would have remained implicit if the assessment of single indicator values was based, for example, on expert knowledge.

Sometimes during the subsequent focus group in step 4, some participants did not agree with the pre-determined level of a CIA. However, to systematically incorporate stakeholders' opinions and expertise in the evaluation of indicator values was considered as a potentially time-consuming task. Besides, evaluating the CIA extents and giving them to the participants before the ranking in Step 4 also ensures that this ranking is done on a common basis. One option to consider in future PICA assessments to integrate the stakeholders' perspective in step 3 could be to allow for their participation to the selection of the indicators to be assessed on the basis of statistical data.

Finally, the feasibility of the procedure was addressed by the assessment of time and resources needed to run PICA. All PICA Steps have to be carried out in order to derive final statements of institutional compatibility but the choice and the extent of empirical methods to gather the information needed to complete all the steps depend on the

resources available. As we found, testing the procedure was time-consuming. For the ex-ante assessment in Puy-de-Dome, two full-time employed researchers spent about 16 weeks to carry out the application for an estimated total cost of 24000 € (including researchers' salaries (22 500 €) and direct costs (1500 €)). In particular, identifying and assessing the indicators in Step 3 was arduous. Here, the organisation of an expert-stakeholders workshop seems to be a good solution to compile the necessary information in a comparatively short time.

More generally, it remains a methodological challenge for the improvement of PICA to modify and/or to develop empirical methods to reduce the time and resources needed for this kind of assessment.

4. Conclusions and policy implications

So far, no standardised method has been devised to carry out an ex-ante policy assessment from an institutional perspective. PICA, as a formalised methodology, offers for the first time a sequence of steps to do so.

The empirical application of the procedure to the implementation of the Nitrate Directive in the "départements" Allier and Puy-de-Dôme helped to evaluate the tool from a methodological perspective. With regard to the procedure itself, the testing results provided a first validation of the filter function of the initial typology of policy options, the ability of the tool to predict ex-ante the institutional factors potentially affecting the implementation of a policy option and its capacity to account for differences between distinct institutional contexts. Regarding the methodology of application, valuable insights were acquired on the combination of experts and stakeholders' perspectives and the choice of qualitative methods for the collection of the information needed at each step of the assessment.

The application of PICA to the implementation of the EU Nitrate Directive also provided useful results with regard to the potential institutional constraints to this process, illustrating the interest of the tool for policy making.

Identifying ex-ante the institutional factors that might act against policy implementation may serve as an early warning system, helping policy makers to adapt the design and fit of new policies and/or to introduce some complementary policy instruments in order to mitigate the forecasted constraints and thus to avoid irreversible investments for policy design and implementation. This can take the form of e.g. providing better information, guidance and training for affected actors, fostering their participation in decision making and implementation processes to solve conflicts and/or create cooperation possibilities, or undertaking structural adjustments of administrative procedures and capacities.

The PICA tool may also be used to complement the agricultural and economic models used for the ex-ante assessment of social, economic and environmental impacts of a new policy. When the model results often depend on strong assumptions with regard to the institutional context (e.g. that the targeted actors will comply at no cost with the modelled policy), the PICA statements can contribute to the interpretation and validation of the predicted outcomes.

While policy makers may be aware, by their experience, of the likely institutional constraints to the implementation of a new policy, the procedure offers a structured frame for a systematic identification and classification of the relevant institutional aspects, building on theoretical and empirical insights from institutional analysis and allowing for the integration of a diversity of experts and stakeholders points of view.

In addressing the issues raised by such an institutional assessment, policy makers may face resource constraints as well as political resistances. More generally, the literature dealing with the impact of ex-ante policy assessments on policy making shows that the influence of such evaluations is still limited despite their growing integration in the formal policy process. Beyond constraints on the resources and capacities needed to integrate the knowledge produced in a short time frame, the latitude of policy makers is limited by the embeddedness of a given policy within a broader policy framework (Turnpenny *et al.*, 2008). More particularly, policy definition is often bounded by the parameters set at higher (national, EU) levels and at the EU level, by international policy commitments. Finally, policy assessments may be subject to a political use, e.g. serving to support rather than to inform a policy choice (Bäcklund, 2009; Hertin *et al.*, 2009).

More empirical applications of PICA are needed for further validation of the tool. A deeper analysis of the policy-making context at different levels would also allow for establishing the conditions under which PICA as an ex-ante evaluation tool may be integrated in policy definition in practice. However, this first test case shows it has the potential to serve as a valuable ex-ante policy institutional assessment procedure which can be used to add an institutional perspective to the social, economic and environmental dimensions of impact assessments.

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Notes

[1] The "départements" are administrative divisions of the French territory, run by elected local councils.

[2] Insofar as the Nitrate Directive was already implemented in Allier and elsewhere in France, the *ex-ante* assessment in Puy-de-Dôme covers an institutional context that has already been influenced by the evolution of the organisation of the implementation process of the policy and the accompanying learning processes in the neighbouring "département". The conditions of the evaluation are therefore not strictly speaking "ex-ante" conditions.

[3] In some cases, (e.g. intensive livestock farmers who have limited access to land to spread manure on), the overall viability of farms can be affected.

[4] Institutional indicators are not used to assess the impact of the respective CIAs on the policy implementation. The evaluation of the incidence of CIAs on the implementation process is realised after the importance of each CIA in the implementation context has been characterized (see Step 4).

[5] This group included the two scientists interviewed before as well as a farm management researcher.

[6] Institut National de la Statistique et des Etudes Economiques (Institute in charge of statistics and economic studies), French Ministry of Economy.

[7] Web-information of the Service Central des Etudes Economique et Statistique (Central service for economic and statistic studies), French Ministry of Agriculture.

[8] Institut Français de l'Environnement (French Institute of Environment), French Ministry of Environment

[9] The vulnerable zone level is not a recognized spatial unit for statistics in France. Data available at the municipality level was thus aggregated to assess indicator values at this level.

[10] For example, the CIA "Attitude of farmers toward ecological considerations" was characterized by three indicators: "Environmental program" (the share of farmers involved in a voluntary program for limiting fertiliser use); "Catch crop area" (the share of catch crop area in the agricultural area); "Organic farms" (the share of organic farms). The indicator "Organic farms" value at the national level (2.08%) was taken as main reference point and classified as "medium". The indicator values at the region and Puy-de-Dôme levels (2.04 % and 2.07 %, respectively), close to the national reference value, were equally classified as "medium". The lower share of organic farms in the vulnerable zone (0.18 %) was then comparatively evaluated as "low". Following the same comparative procedure, the indicators "Environmental program" and "Catch crop area" were assessed as "low" in the vulnerable zone in Puy-de-Dôme.

[11] Using the example of the "Attitude of farmers toward ecological considerations", the three indicators being evaluated as "low", the extent of the CIA was classified as "low" in Puy-de-Dôme vulnerable zone.

[12] The participants were asked to rank individually the importance of each CIA within one category and the importance of each category with regard to the implementation of the policy. They also had to indicate the nature of the impact of the CIAs on the implementation process as being fostering or hindering. Individual rankings and indications were then aggregated. The lists of CIA and categories of institutional compatibility were explained to the participants before they prioritised them with help of a ranking sheet. Aggregated results were then displayed as a basis for further discussions which were recorded and analysed later.

[13] By "bargaining power", we mean the capacity of interest groups to influence the political decision-making process.

[14] Agricultural Chambers in France are regional and departmental public organisations led by representatives of agricultural and other rural stakeholders. These representatives are elected every six years by farmers, landowners, farm workers, agricultural organisations employees, and farmers' unions.

[15] The DIREN (Direction Régionale de l'Environnement) corresponds to the administrative services of the national Ministry of Ecology, Sustainable Development and Territory Planning at the regional level.

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Tables

Table 1: The typology of policy options (adapted from Theesfeld et al., 2010)

		Area of Intervention (Governance Structures)		
		Hierarchy/ Bureaucracy	Market	Self-organised network
Type of intervention	Regulatory	Policies that intervene at hierarchies/ bureaucracies using regulatory (command-and-control) instruments Example: *Reorganisation/creation of a new administrative structure*	Policies that intervene at markets using regulatory (command-and-control) instruments Example: *Certification rules for food products*	Policies that intervene at self-organised networks using regulatory (command-and-control) instruments Example: *Modification in status for cooperatives*
	Economic	Policies that intervene at hierarchies/ bureaucracies using economic instruments Example: *Decentralisation*	Policies that intervene at markets using economic instruments Example: *Agri-environmental schemes*	Policies that intervene at self-organised networks using economic instruments Example: *Regional policies*
	Advisory/ voluntary	Policies that intervene at hierarchies/ bureaucracies using advisory/voluntary instruments Example: *Training operations*	Policies that intervene at markets using advisory/voluntary instruments Example: *Communication to consumers*	Policies that intervene at self-organised networks using advisory/voluntary instruments Example: *Information transfer*

Table 2: Empirical methods used for testing the four PICA steps

	Methods	**"Simulated" ex-ante assessment Allier**	**Ex-post evaluation Allier**	**"Real" ex-ante assessment Puy-de-Dôme**
Step 1: Classification of the policy option	Review of policy documents PICA experts team meeting	Definition of the policy type on the basis of original policy documents of the EU Nitrate Directive		
Step 2: Identification of Crucial Institutional Aspects	Literature review	Documents from the time of the implementation (1992/1993): scientific literature, regional, and local documents	Evaluation reports, scientific literature, etc. (1992-2007)	Literature review-Allier (1990-2007)
	Interviews	Preliminary interviews with scientists		
		Face-to-face interviews with stakeholders involved		Face-to-face interviews with stakeholders likely to be involved
Step 3: Definition of Institutional Indicators	Statistical data analysis	Data from 1988-1992		Data from 2000-2007
	Interviews	Group discussion with scientists		Group discussion with scientists
		Face-to-face interviews with external experts and stakeholders involved		Face-to-face interviews with external experts and stakeholders likely to be involved
Step 4: Assessment of the Institutional Compatibility	Focus group	Structured focus group with external experts and stakeholders involved		Structured focus group with external experts and stakeholders likely to be involved

Table 3: The results of the ex-ante institutional assessment of the implementation of the Nitrate Directive in Puy-de-Dôme.

Thematic category	Rank of categories	Crucial Institutional Aspect	Rank of CIA	Negative influence	Positive influence
Interest groups	**1**	*High* bargaining power of agro-industries	1	X	
		Medium bargaining power of farmers' organisations	2	X	X
		Low bargaining power of environmental groups	3		X
Farms	**2**	*Medium* opportunity costs for farmers	4	X	
Public administration	**2**	*Low* information asymmetry state versus farms	4	X	X
		High interplay between agricultural and environmental administration	5		X
		Low resources for environmental administration	6	X	
Formal institutions	**3**	*High* contradictory policy instruments and rules	7	X	
Informal institutions	**4**	*Low* sensitivity of farmers towards ecological considerations	8	X	
		Low public concern about water pollution from agriculture	9	X	X
		Low level of opportunism	10	X	X

Table 4: Comparison of the initial list of CIAs for the policy type "regulatory on market" and the final list of CIAs for the ex-post evaluation in Allier.

Initial list of CIAs for the policy type "*regulatory on market*"	**CIAs for the ex-post evaluation in Allier**
1. Ambiguous property rights **2. Information asymmetry state vs. farms** **3. Contradictory policy instruments and rules** **4. Redundant policy instruments and rules** **5. Level of opportunism** 6. Monopoly power 7. Lack of trust between economic actors 8. Administrative public and/or **private transaction costs** 9. Weak consumer preferences 10. Strong consumer preferences together with high level of social capital 11. Level of corruption	1. Bargaining power of farmers' organisations 2. Attitude of farmers toward ecological considerations 3. Bargaining power of environmental groups 4. **Information asymmetry state vs. farms** 5. Level of information on policy 6. Interplay between agricultural and environmental administrations 7. **Level of opportunism** 8. Public concern about water pollution from agriculture 9. Importance of the Agro-industrial lobby 10. Opportunity costs for farmers 11. Relevance of measures 12. Resources of administrations for the implementation of the policy 13. **Redundant policy instruments and rules** 14. **Contradictory policy instruments and rules** 15. **Private transaction costs**

Note: CIAs that are covered by both lists are in bold.

Table 5: Comparison of the final lists of CIAs for the "simulated" ex-ante assessment and the ex-post evaluation in Allier.

CIAs for the "simulated" ex-ante assessment in Allier	CIAs for the ex-post evaluation in Allier
1.**Bargaining power of farmers' organisations** 2.**Opportunity costs for farmers** 3.**Information asymmetry state vs. farms** 4.**Level of information on policy**	1.**Bargaining power of farmers' organisations** 2.Attitude of farmers towards ecological considerations 3.Bargaining power of environmental groups 4.**Information asymmetry state vs. farms** 5.**Level of information on policy** 6. Interplay between agricultural and environmental administrations 7.Level of opportunism 8.Public concern about water pollution from agriculture 9. Importance of the Agro-industrial lobby 10. **Opportunity costs for farmers** 11. Relevance of measures 12. Resources of administrations for the implementation of the policy 13. Redundant policy instruments and rules 14. Contradictory policy instruments and rules 15. Private transaction costs

Note: CIAs that have been identified in both cases are in bold.

Table 6: Comparison of the lists of CIA for the "simulated" ex-ante assessment in Allier and the "real" ex-ante assessment in Puy-de-Dôme.

CIAs for the "simulated" ex-ante assessment in Allier	CIAs for the "real" ex-ante assessment in Puy-de-Dôme
1. **Bargaining power of farmers' organisations** **2. Opportunity costs for farmers** 3. **Information asymmetry state vs. farms** 4. Level of information on policy	1. Importance of the Agro-industrial lobby 2. **Bargaining power of farmers' organisations** 3. Attitude of farmers towards ecological considerations 4. Level of opportunism 5. **Information asymmetry state vs. farms** 6. Bargaining power of environmental groups 7. Public concern about water pollution from agriculture **8. Opportunity costs for farmers** 9. Interplay between agricultural and environmental administrations 10. Resources for environmental administration 11. Contradictory policy instruments and rules

Note: CIAs that have been identified in both "départements" are in bold.

Figures

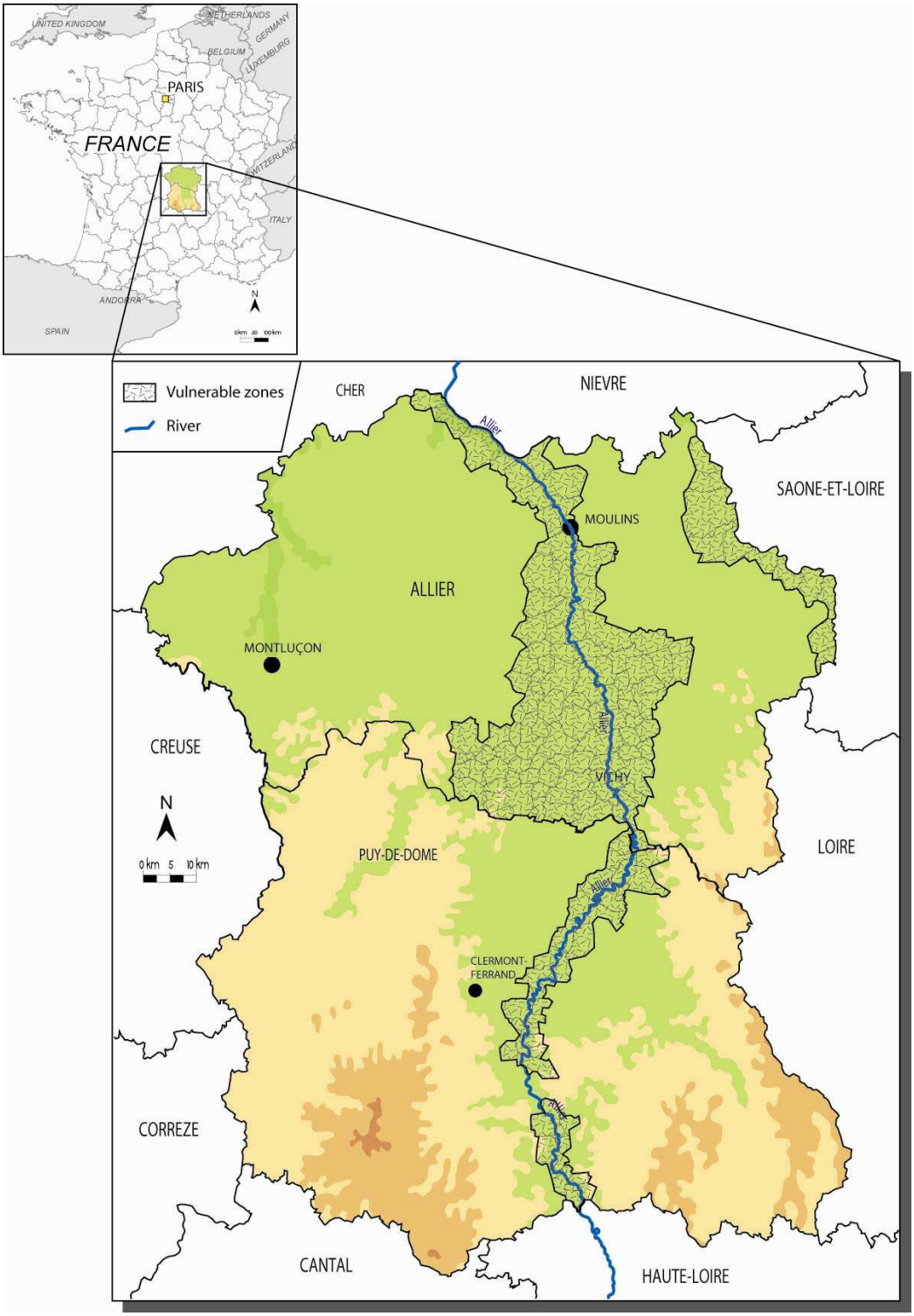

Figure 1: The "départements" of Allier and Puy-de-Dôme in Auvergne (including the vulnerable zones)
Note: Source: Cemagref: S. Herviou

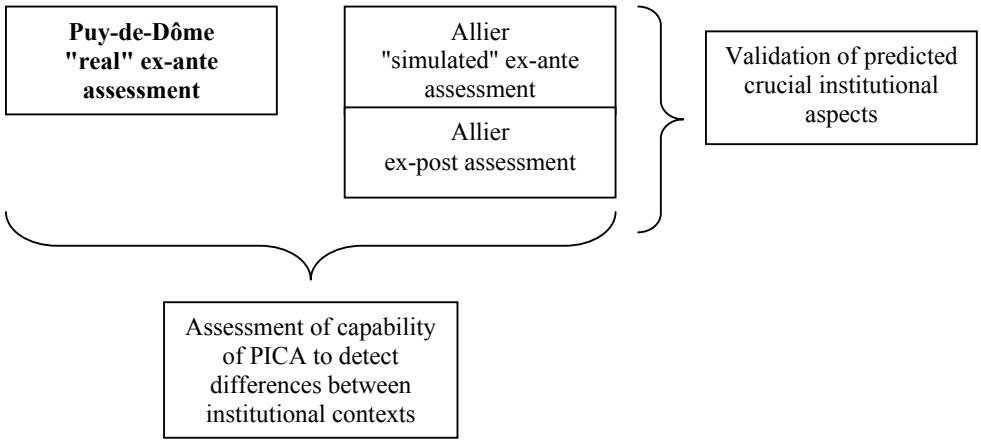

Figure 2: The analyses conducted for testing PICA

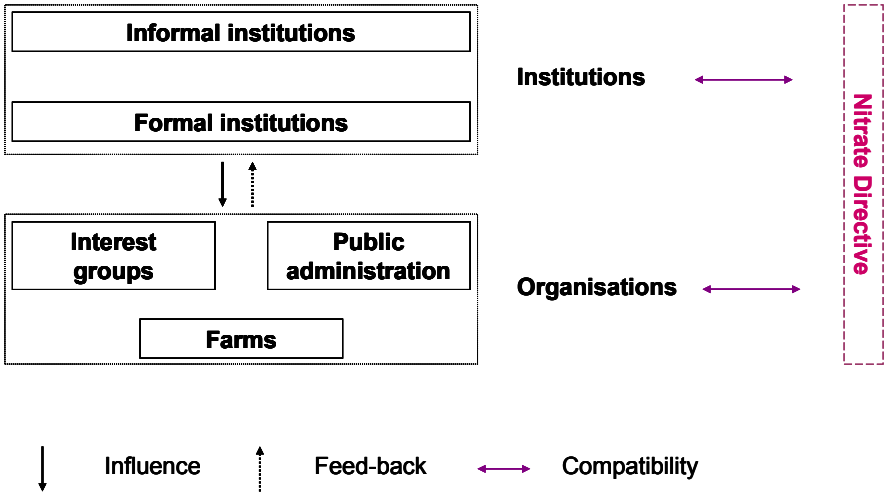

Figure 3: Defining the thematic categories of institutional compatibility: institutions and organisations